# PH690 Radio

# MAINTENANCE MANUAL

# (Level1) V1.0

# PH690 Radio Maintenance Manual (Level1) V1.0

| Version | Date | Author | Update | Remarks |
|---------|------|--------|--------|---------|
| V1.0 | 2020/4/3 | | | |
| | | | | |
| | | | | |

# CONTENTS

# 1  Overview

## 1.1 Appearance



*Note:*

*This picture is for reference only, please refer to the actual product.*

## 1.2 Standard Package

| SN | Item | Quantity (PCS) |
|----|------|----------------|
| 1 | PH690 Radio Unit | 1 |
| 2 | Battery | 1 |
| 3 | Power Adapter | 1 |
| 4 | Quick Start Guide | 1 |
| 5 | Antenna | 1 |
| 6 | Belt Clip | 1 |
| 7 | Charger | 1 |

## 1.3 Specification

| General | |
|---|---|
| Frequency | UHF1：400-470MHz VHF:136-174MHz |
| Channel Capacity | 1024 |
| Zone Capacity | 64 (maximum 32 channels per zone) |
| Channel Spacing | 12.5kHz/20KHz/25KHz |
| Frequency Stability | ±0.5ppm |
| Operating Voltage | 7.4V |
| Battery Capacity | 2000mAh (Standard) / 2600mAh (Optional) |
| Battery Life(5:5:90) | Analog: 14 hours<br>Digital: 18hours |
| Size (H x W x D) | 126*54.5*32mm (Without Antenna) |
| Weight | About 310g (With Antenna and Battery) |
| Screen | 2.0 inch LCD, 240×320, 6 Lines Text |
| Vocoder | AMBE++ |
| Bluetooth | Support BT2.1+EDR/4.0 (Optional) |
| Man down | Support |
| Real-time | Support |
| Location | GPS/BeiDou (Optional) |
| Encryption | Support SW and T-Flash card Encryption (Optional) |
| Vibration | Support |
| Geomagnetic | Support |
| Optional Board | Support |
| Receiver | |
| Sensitivity(Analog) | 0.22uV(12dB SINAD) |
| Sensitivity(Digital) | 0.22uV (5% BER) |
| Adjacent Channel Selectivity | 60 dB@12.5KHz/70 dB@20/25KHz (TIA603A) -1T |
| | 45dB@12.5KHz /70 dB@20/25KHz (TIA603D) -2T |
| | 60dB@12.5KHz /70 dB@20/25KHz ( ETSI ) |
| Intermodulation | 70 dB (TIA603D) |
| | 65 dB (ETSI) |
| Spurious Rejection | 70 dB (TIA603D) |
| | 70 dB (ETSI) |
| Blocking or Desensitization | 80dB(TIA603D) |
| | 84dB(ETSI) |
| Co-channel Rejection | -12~0 dB @12.5KHz/-8~0 dB @20/25KHz |
| Hum and Noise | -40 dB@12.5KHz /-43 dB@20KHz /-45 dB@25KHz |
| Rated Audio Power | 0.5W |

| Max Audio Power | 2.0W |
|---|---|
| Audio Distortion @ Rated Audio | ≤3% (Typical) |
| Audio Response | +1～-3dB (TIA603D) |
| Conducted Spurious Emission | -57 dBm (TIA603D) |
| **Transmitter** | |
| Low Power Output | 1W |
| High Power Output | 4W (UHF1)/5W(VHF) |
| FM Modulation | 12.5KHz: 11K0F3E / 20KHz: 14K0F3E / 25KHz: 16K0F3E |
| 4FSK Digital Modulation | 12.5KHz Data Only: 7K60F1D&7K60FXD |
| | 12.5KHz Voice Only: 7K60F1E&7K60FXE |
| | 12.5KHz Voice And Data: 7K60F1W |
| Conducted/Radiated Emission | -36dBm ≤1GHz ; -30dBm >1GHz |
| Modulation Limiting | ±2.5KHz @12.5KHz /±4KHz @20KHz /±5.0KHz @25KHz |
| FM Hum and Noise | -40 dB@12.5KHz /-43dB@20KHz /-45 dB@25KHz |
| Adjacent Channel Power | 60 dB@12.5KHz /70 dB @20/25KHz |
| Audio Distortion @ Rated Audio | ≤3% (Typical) |
| Audio Response | +1～-3dB(TIA603D) |
| **Environmental** | |
| Operating Temperature | -30℃ ～ +60℃ |
| Storage Temperature | -40℃ ～ +85℃ |
| ESD | IEC 61000-4-2 (level 4) ±8kV (Contact) ±15kV(Air) |
| Dust and Water Resistance | IP68 |
| Reliability | GJB 150A-2009 and MIL-STD-810 C/D/E/F/G |
| **BeiDou/GPS** | |
| Accuracy specs are for long-term tracking (95th percentile values>5satellites visible at nominal -130 dBm signal strength) | |
| TTFF (Time To First Fix) - Cold Start | <60s |
| TTFF (Time To First | <10s |

| Fix) - Hot Start | |
|---|---|
| Horizontal Accuracy | <10m |

# 2  Function Test

## 2.1 Basic Function Test

| Item | Test Method and Requirements | Component Involved |
|---|---|---|
| 1.Basic requirement | 1. Radio accessories complete.<br>2. No dismantle label complete.<br>3. Waterproof label no discoloration.<br>4. No physical damage.<br>5. Within the warranty period. | None |
| 2.Failure Re-present | 1. Radio with the battery can power on normally.<br>2. Detect the fault according to the customer description to confirm if it can be re-presented. | Radio Unit, Battery |
| 3.Function Test | 1. Test the PTT call to confirm the function is normal.<br>2. Connect the matching earpiece with the radio to confirm it can transmit and receive voice normally and the actual voice quality is good. | Earpiece, Battery |
| 4.Charging Test | Connect the matching charger to confirm it can charge. | Charger, Battery |

*Note：*

*For other items that cannot be detected in steps (1) to (4), please refer to the radio user manual. If a fault is found in one step, the subsequent detection steps are suspended as the radio is treated faulty.*

## 2.2 Check Firmware Version and Device Information

Check the firmware version and device information as below:

1) Go to the home screen;

2) Press OK button to enter the main menu and choose Device Info;

3) Check the firmware version, DSP version, RCDB version, frequency range and serial number, etc.

Or get the device information by reading through CPS. You can contact after sales to get version comparison table.

| Basic Information | |
|---|---|
| Model Name | PH690 |
| Serial Number | 1234567890 |
| Model Type | Portable |
| Model Number | PH690-GMBD00000000-U1-C |
| Frequency Band[MHz] | 400-470 |
| Firmware Version | V3.06.05.B1 |
| RCDB Version | D3.06.016 |
| DSP Version | V3.06.05.B2A |
| Bootloader Version | V3.06.002 |
| Bluetooth Version | V2.02 |
| Last Programming Date | 2020-03-13,14:02 |

# 3 Software Upgrade

## 3.1 Before Upgrade

1. Get the one-click upgrade software for the target version.

2. Prepare the radio to upgrade, take away the cover of accessory interface on the side.

3. Prepare the data cable (Type: AP340). Connect its USB port to your computer USB port, connect the other side to your radio accessory interface port and fasten it.

AP340 Data Cable:



## 3.2 Upgrade Procedure

1. Install the upgrade software package

1) Click to open the upgrade software, choose the language according to your requirement (Cn for Chines, En for English);



2) Double click setup.exe in the chosen language folder;
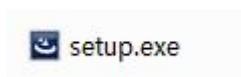


3) Click Next in the below interface;

6
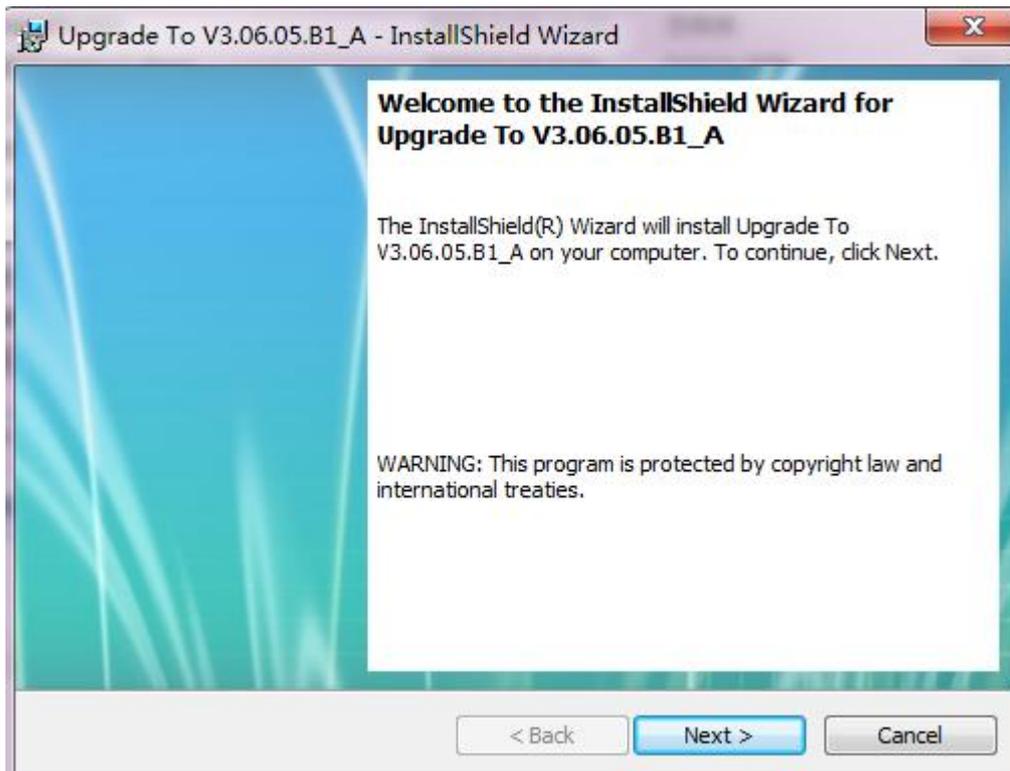
4) Select 'I accept' and click Next in the below interface;



     7

5) Select Complete and click Next if you use the default installation path;
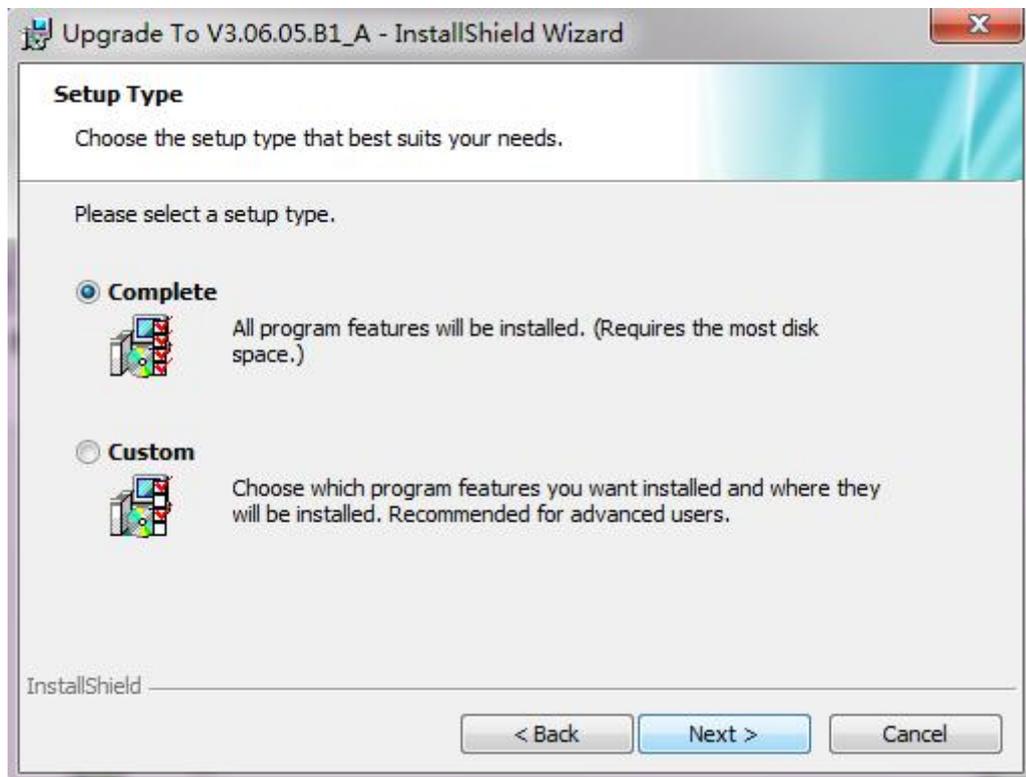


Select Custom and click Next if you choose your own installation path;
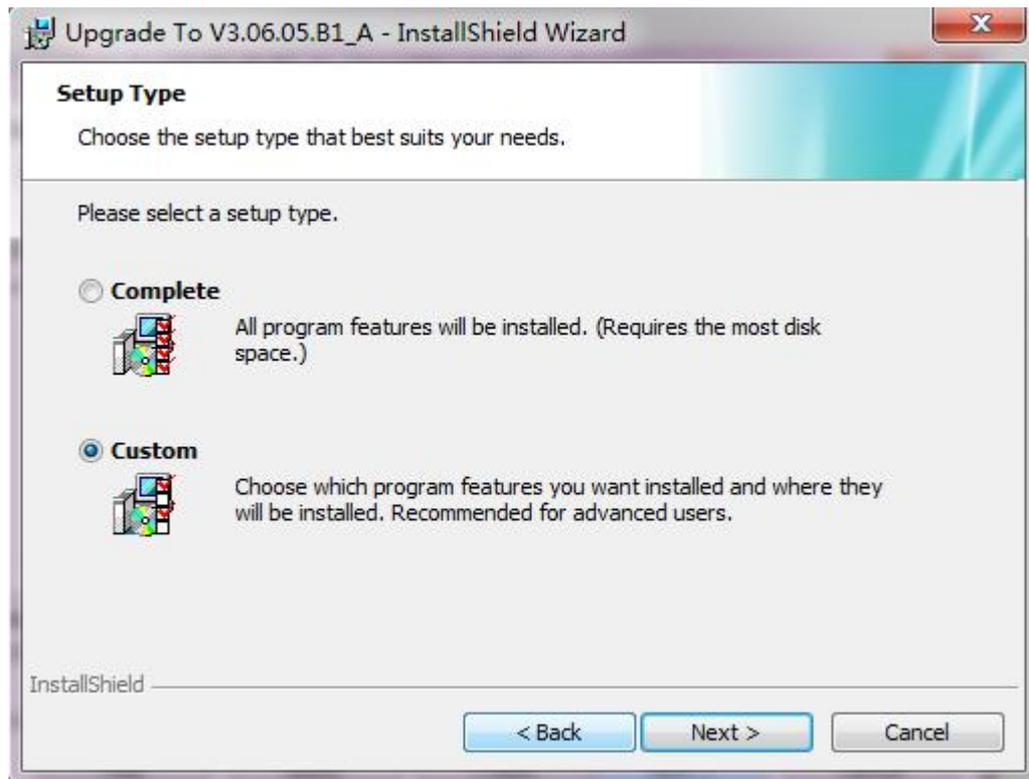
Click Change to modify the installation path, then click Next;
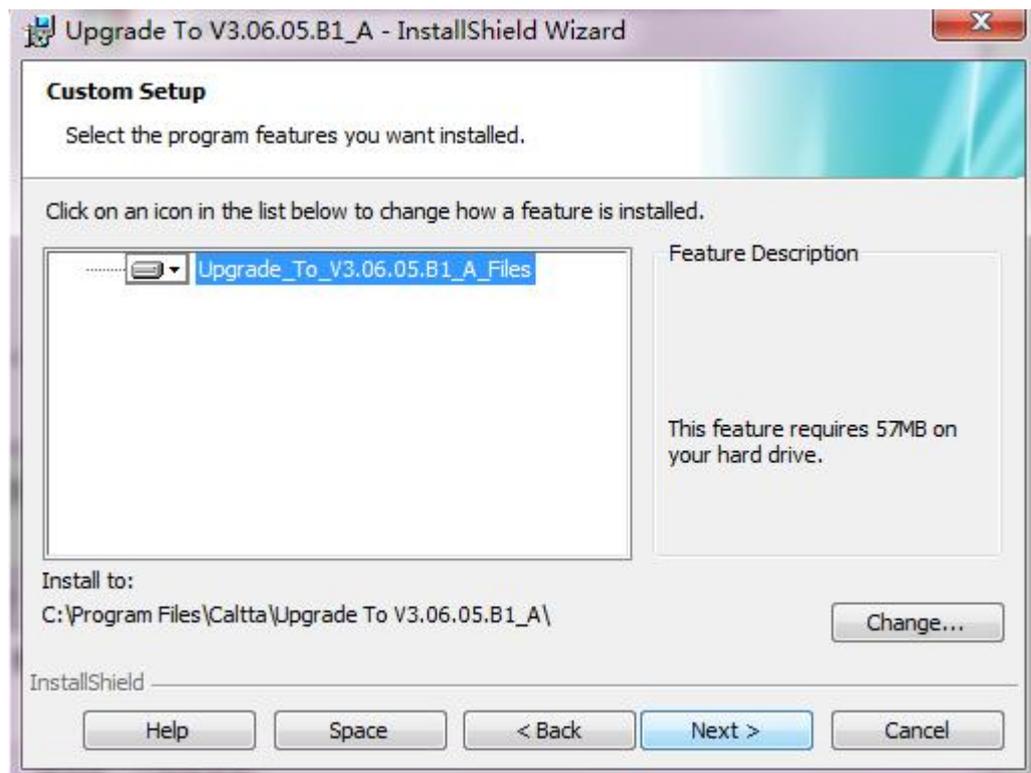
6) Click Install to confirm installation.
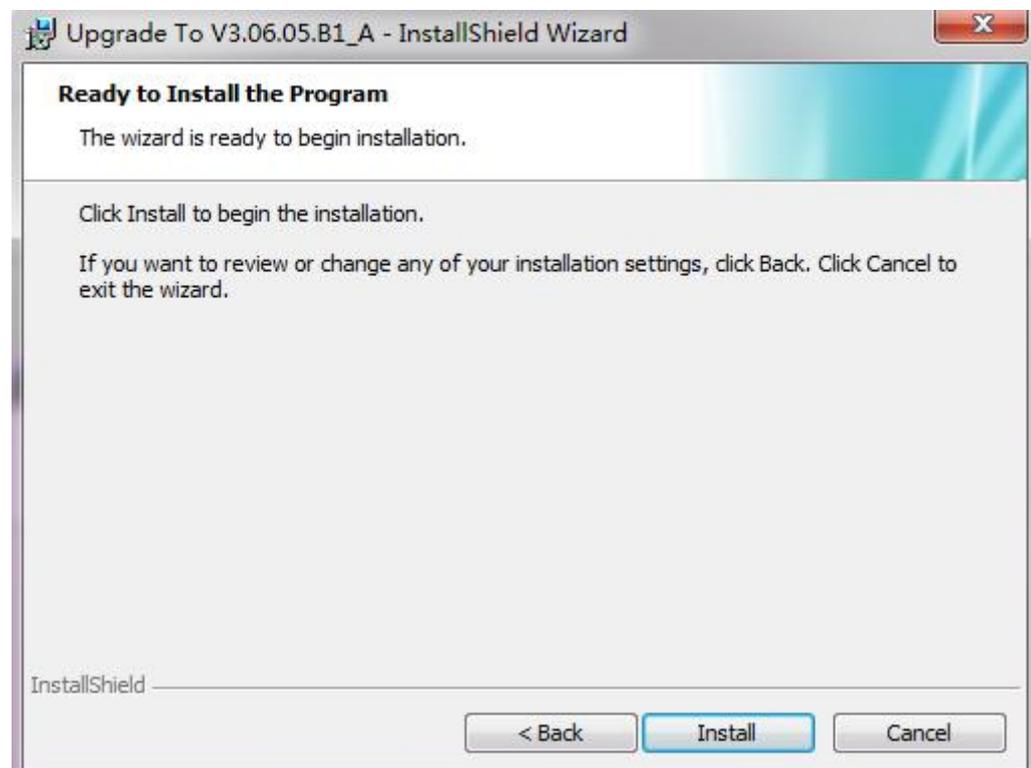
7) Wait the installation to complete. Click Finish to end one-click upgrade procedure.
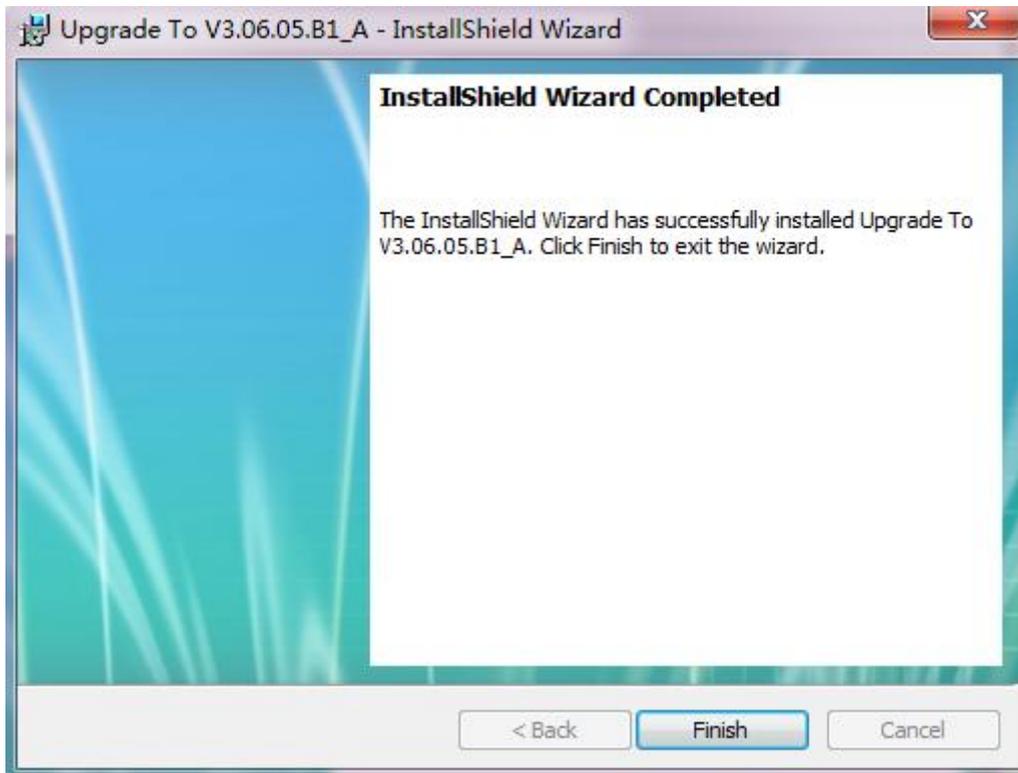


8) An icon will be on desktop after installation.



2. Radio Upgrade

1) Connect the radio to the PC through the data cable;

2) Double click the upgrade tools icon to run it;

3) The radio enters into the flash burn mode, press the PTT button and TK button (on the top) at the same time, and rotate the volume knob to power on the radio, the radio enters into the upgrade mode;

The LED indicator glows green:



4) After the upgrade software detects the USB port and displays it, you can select the corresponding USB port and click to upgrade.

5) You can choose Chinese or English language, and choose if preserve the current setting data when upgrade the radio.
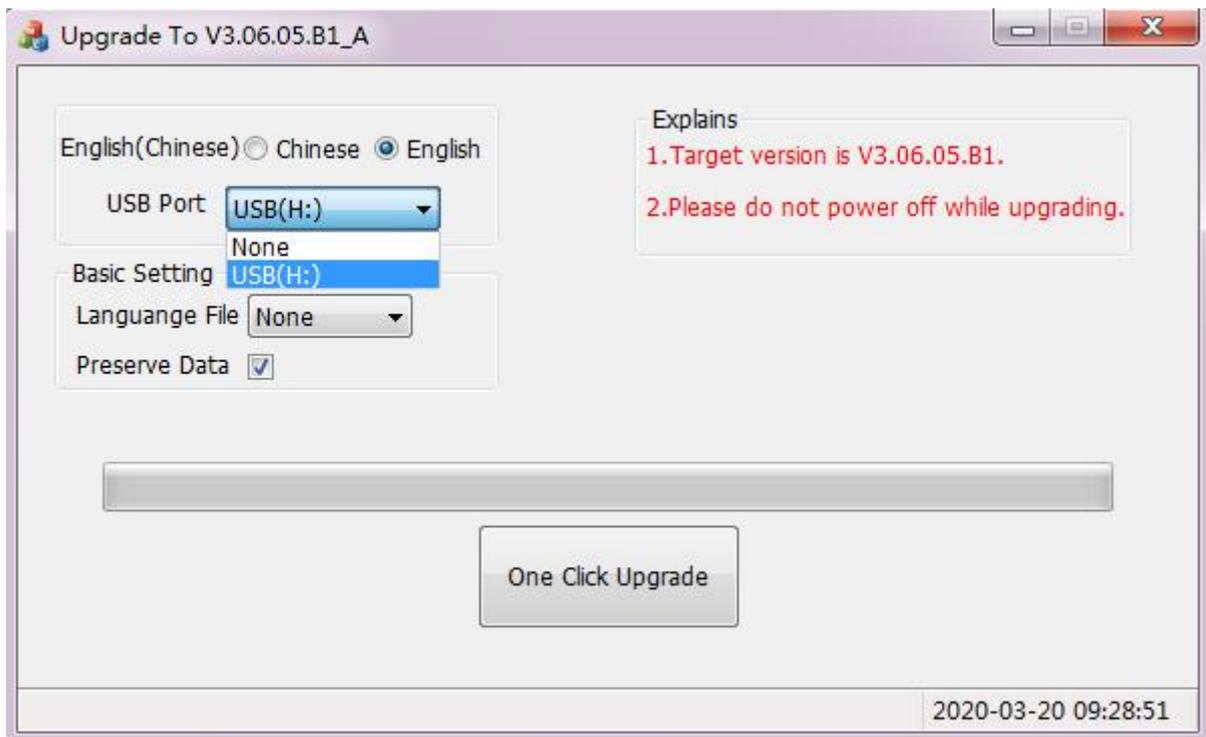
6) The LED indicator flashes green during the upgrade, the radio displays the following interface：



7) Upgrade complete prompt;

After upgrade completes, the software tools will display as below：

*Note:*

● *Don't power off the radio during the upgrade.*

● *If upgrade fails, please repeat the upgrade procedure.*

8) Reboot the radio after upgrade to check if the firmware is the target version.

## 3.3 CPS Software

1. CPS Software Installation Procedure

1) Start installation, double click   setup.exe   to install;

2) Click Next following the prompt.
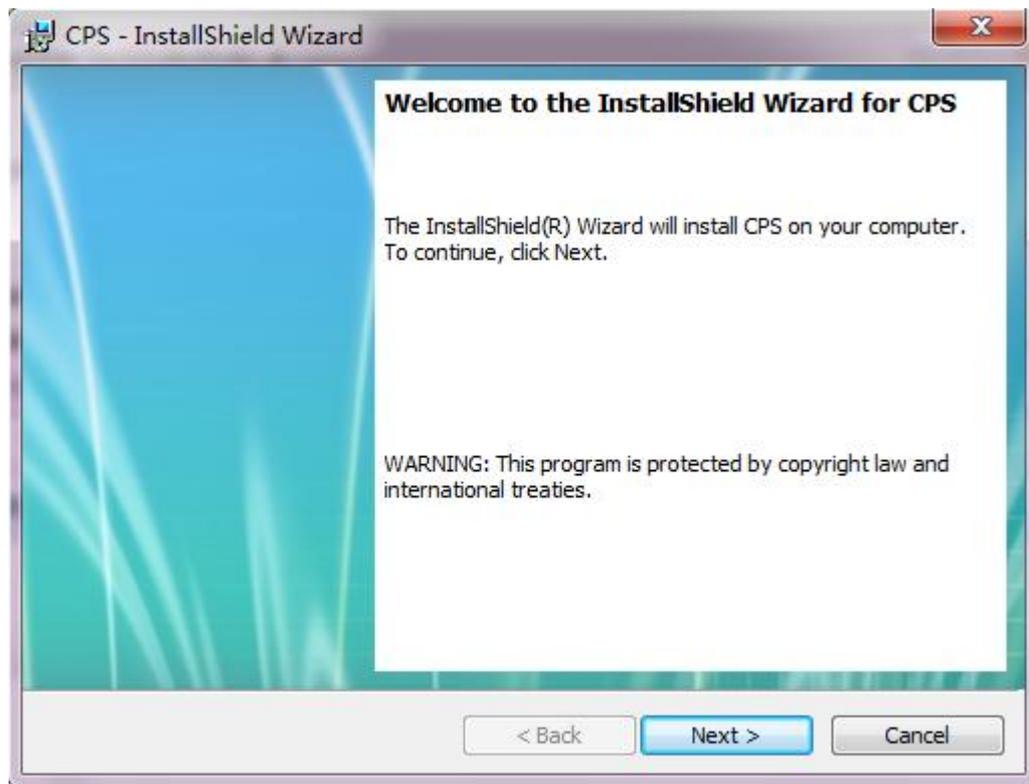
3) Select 'I Accept' and click Next.
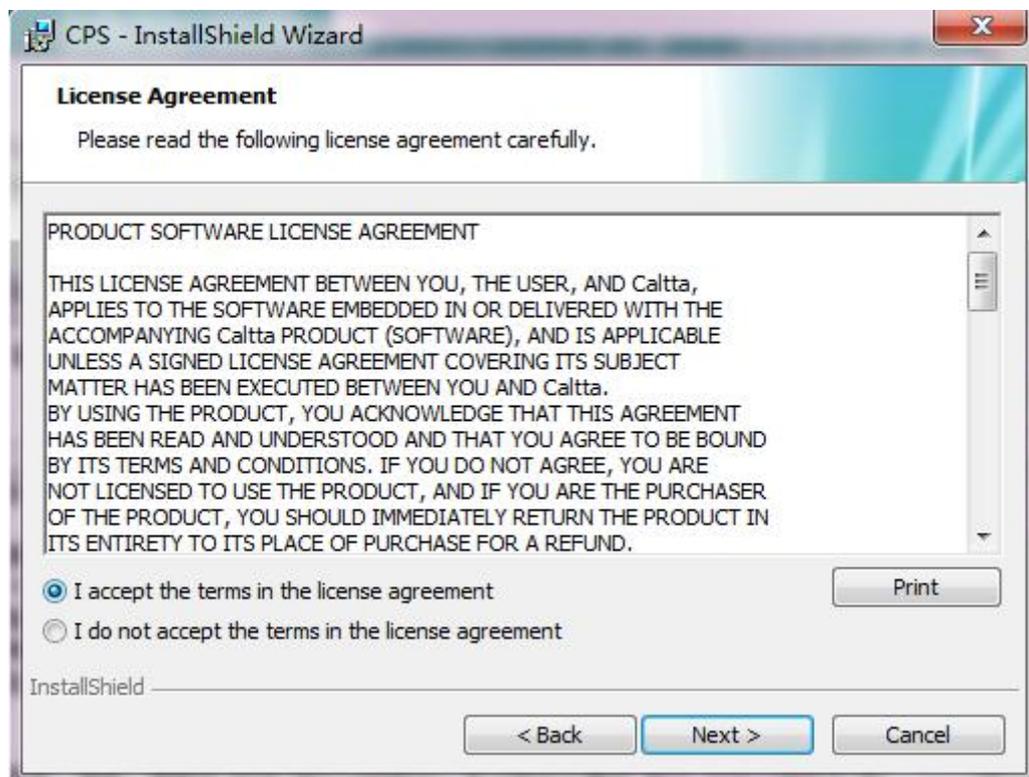
4) Select Complete and click Next if you use the default installation path.
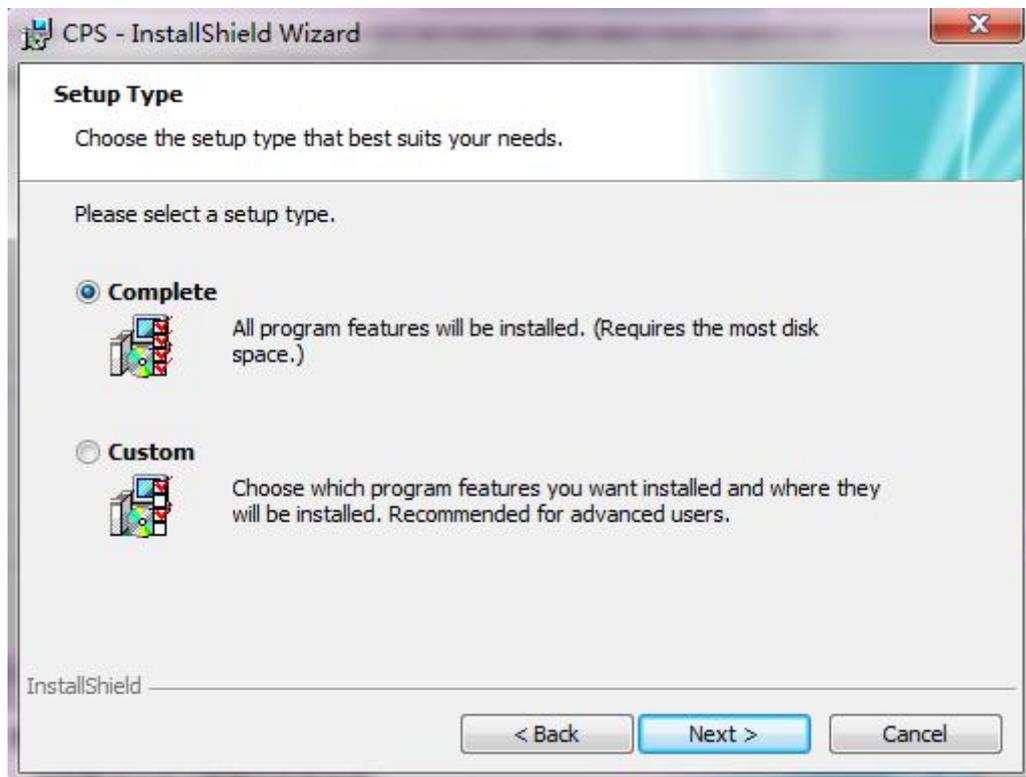


Select Custom and click Next if you choose your own installation path.
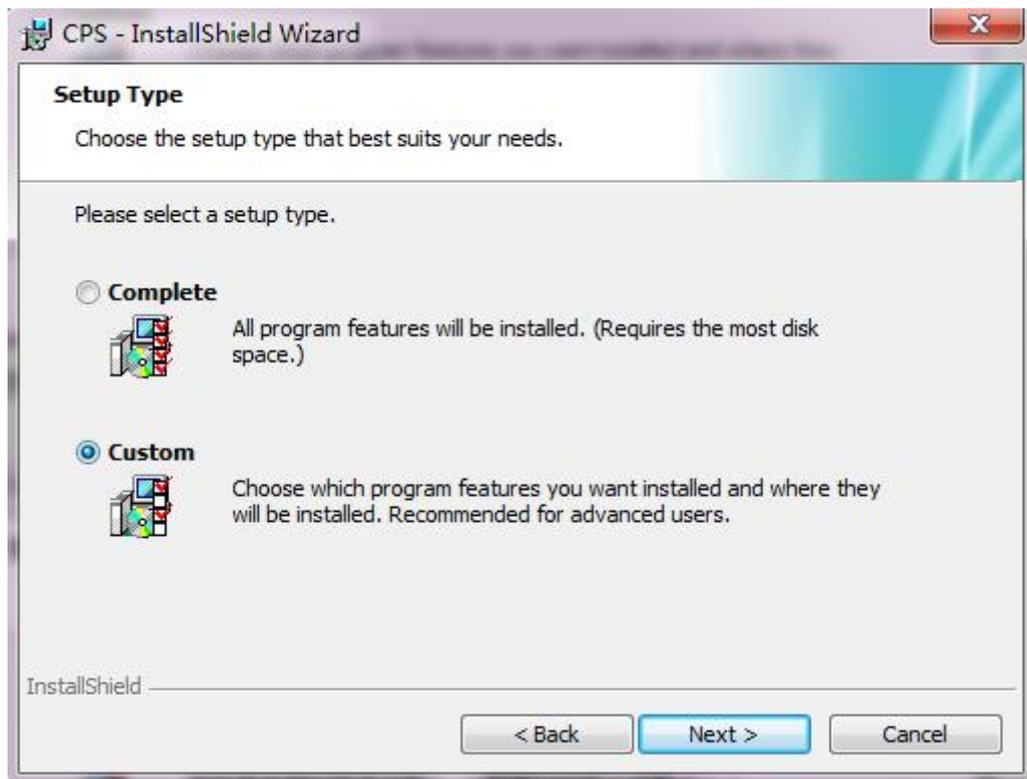
Click Change to modify the installation path, then click Next.
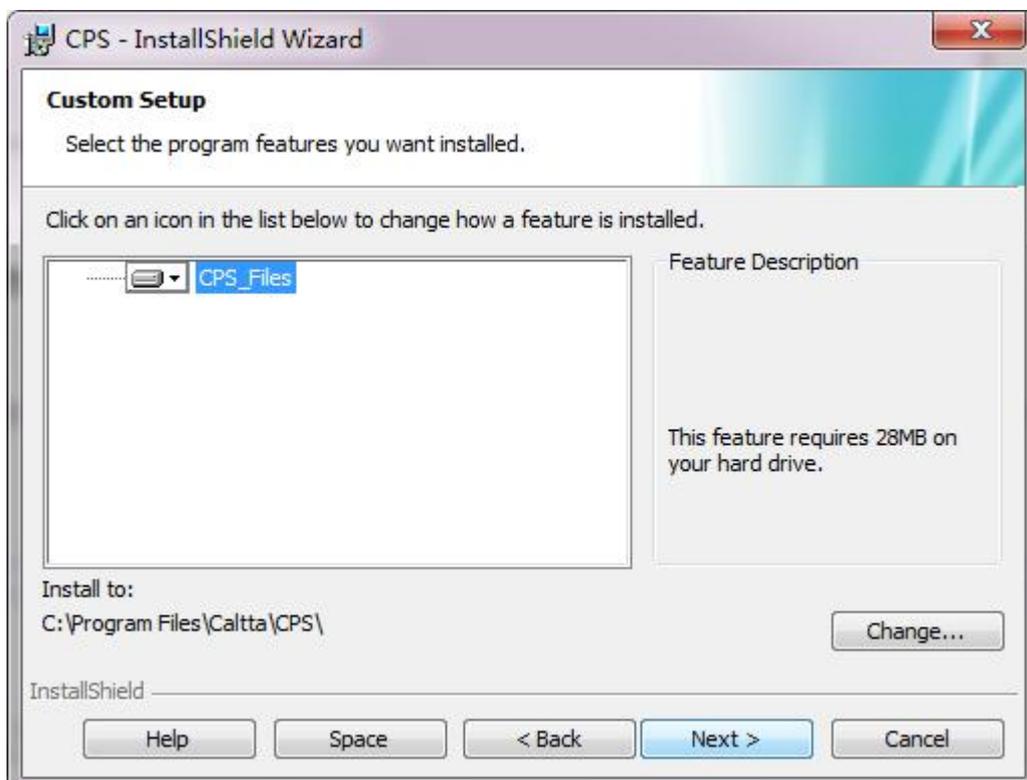
5) Click Install to confirm installation.
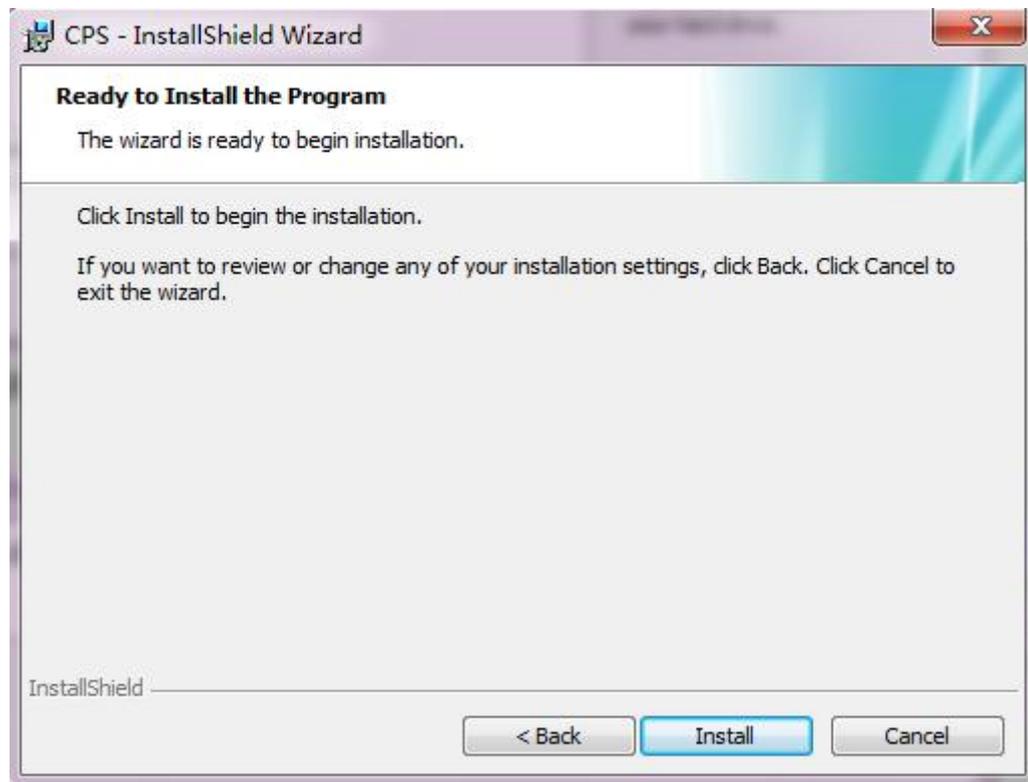


6) Wait the installation to complete. Click Finish to end CPS tools installation procedure.

18
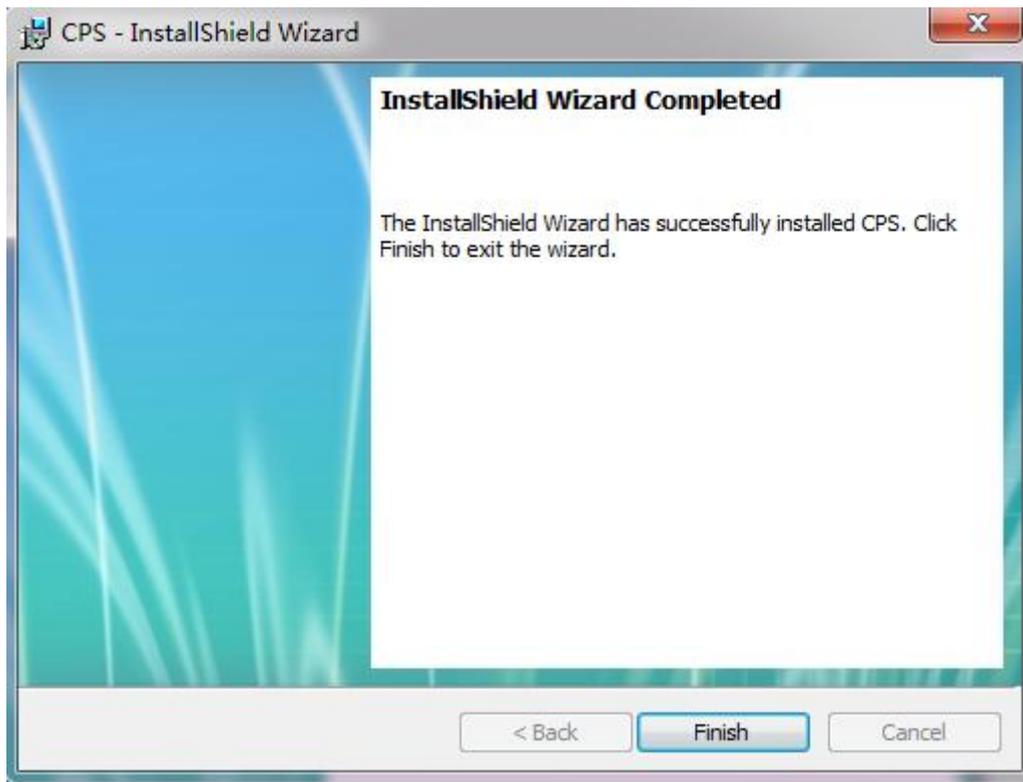
7) An icon will be on desktop after installation:



2. CPS Read

CPS read function can be started by shortcut key combination Ctrl + R or shortcut icon  to read data from the radio.

Precondition: The radio is power on in user mode.

1) Connect the radio with data cable, and connect data cable USB port to the computer, click CPS read to display the following interface;
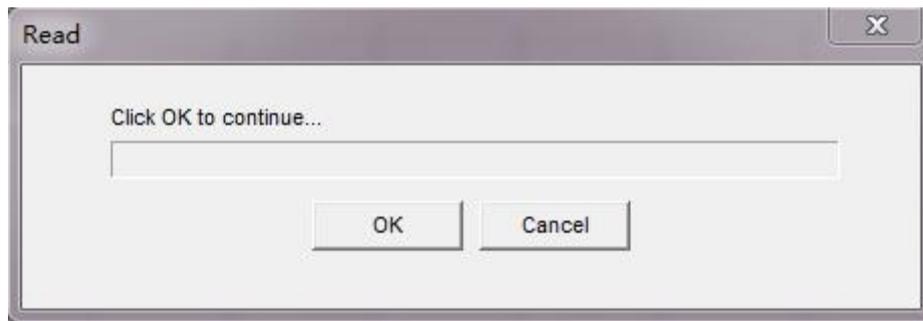
2) Click OK to continue, the radio displays reading and the CPS interface displays as below;
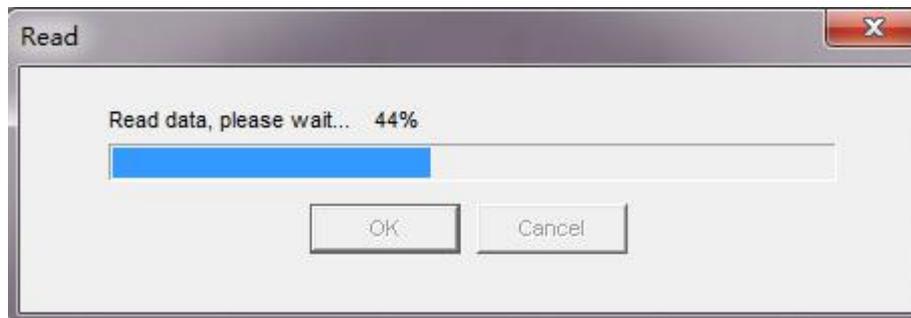


3) A pop-up message on the radio display will indicate read success after about 10 seconds, the radio goes back to home display. The CPS will indicate read success as below.



4) Click OK to complete CPS read.

3. CPS Write

CPS write function can be started by shortcut key combination Ctrl + W or shortcut icon  to write data into the radio.

Precondition: The radio database version and type code are consistent with the database version and type code of the data currently edited by the CPS software. The radio is power on in user

mode.

1) CPS software is used to configure data in template.

2) Connect the radio with data cable, and connect data cable USB port to the computer, click CPS write to display the following interface;



3) Click OK to continue, the radio displays writing and the CPS interface displays as below;

21
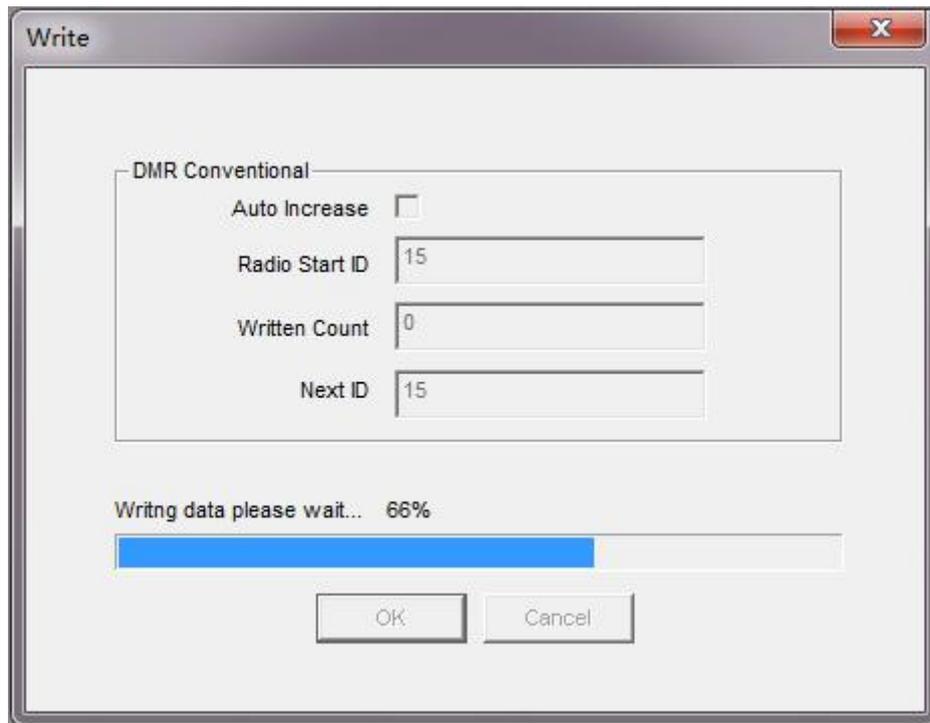
4) The radio automatically reboots after about 10 seconds. The CPS will indicate write success as below.



5) Click OK to complete CPS write.

    22

# 4 Radio Disassemble Demonstration

## 4.1 Tools
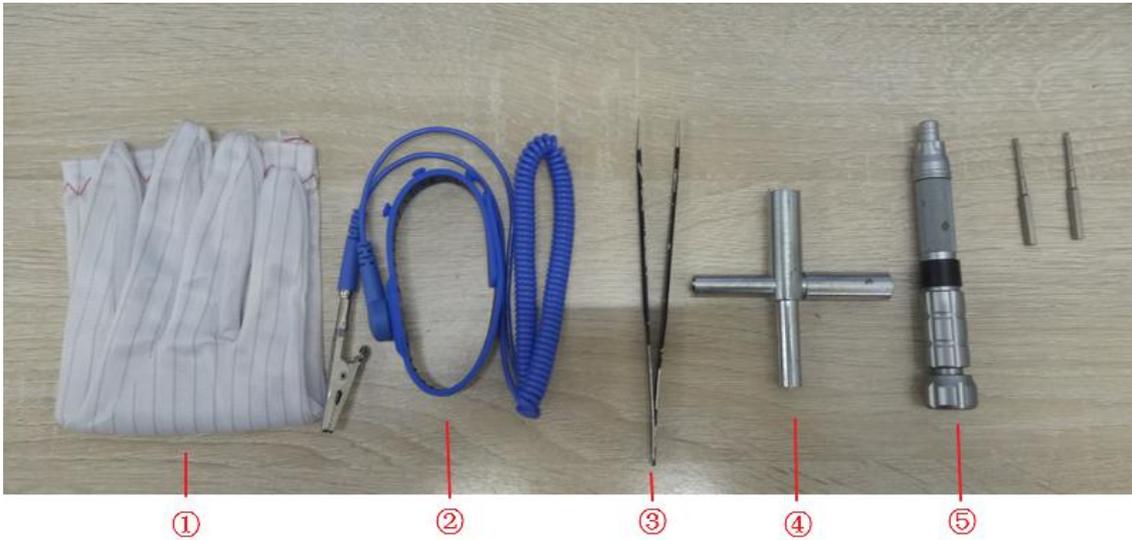




| SN | Item |
|----|------|
| 1 | Anti-static Glove |
| 2 | Anti-static Wrist Strap |
| 3 | Tweezers |
| 4 | Sockets |
| 5 | Screwdriver (Cross Screwdriver, Slotted Screwdriver, T6 Torx Screwdriver) |
| 6 | Soldering Iron |

## 4.2 Procedure

```
┌──────────────┐      ┌──────────────┐      ┌──────────────┐            ┌──────────────────────────┐
│ Dismantle    │  ⇒   │ Remove the   │  ⇒   │ Dismantle the│    ⇒       │ Dismantle the coding knob│
│ the clip     │      │ battery      │      │ aluminum cover│           │ and volume knob          │
└──────────────┘      └──────────────┘      └──────────────┘            └──────────────────────────┘
```

```
       ┌──────────────┐            ┌──────────────────────────┐            ┌──────────────────┐
  ⇒    │ Remove the   │     ⇒      │ Remove the switch nuts of│     ⇒      │ Remove the switch│
       │ antenna      │            │ coding knob and volume knob│          │ nut of antenna base│
       └──────────────┘            └──────────────────────────┘            └──────────────────┘
```

```
       ┌──────────────┐      ┌──────────────┐      ┌──────────────────┐      ┌──────────────────┐
  ⇒    │ Remove screws│  ⇒   │ Dismantle    │  ⇒   │ Remove screws of │  ⇒   │ Remove the P+R   │
       │ of main PCB  │      │ main PCB     │      │ P+R buttons      │      │ buttons          │
       └──────────────┘      └──────────────┘      └──────────────────┘      └──────────────────┘
```
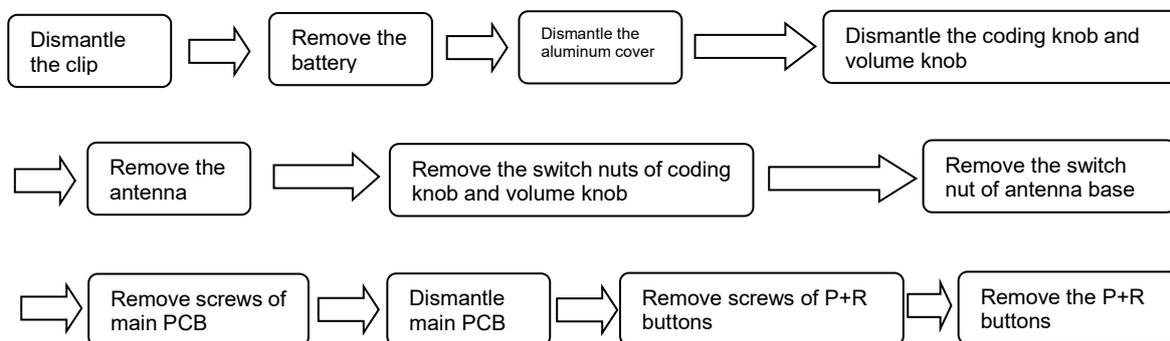
## 4.3  Disassemble Steps

*Note: The following steps apply to PH690/DH680 Radio.*

1. Remove the two back cover/clip screws with cross screwdriver to remove the clip.
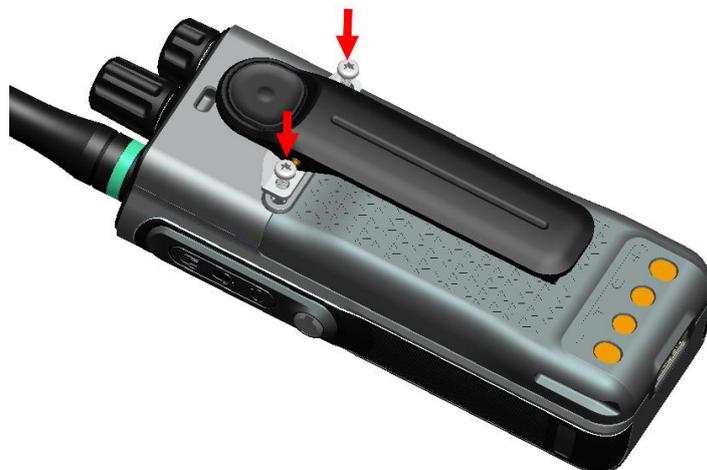


2. Push the battery lock of arrow A, and lift the battery at the direction of arrow B to remove the battery.

3. Use the T8 screwdriver to remove the two screws at the arrow to remove the aluminum cover component.
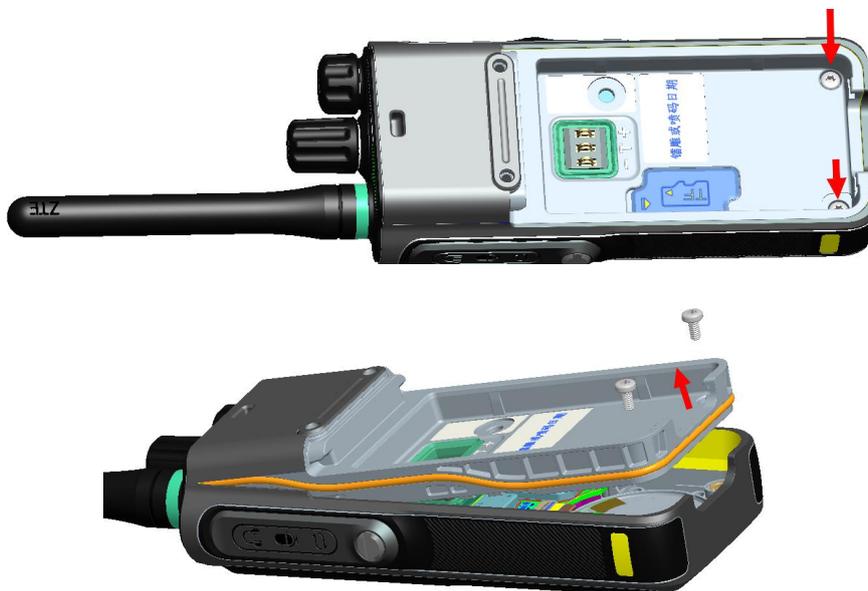
4. Remove A (waterproof ring of the radio), B (PTT FPC), C (waterproof ring of the battery) and D (back cover) of the aluminum cover component;
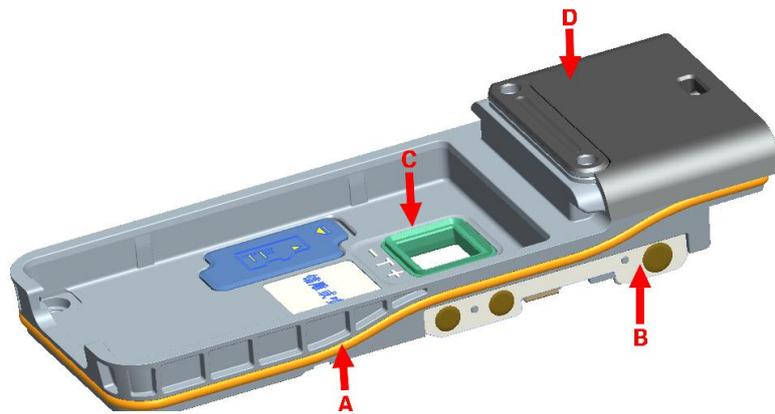
5. Pull out the volume knob and coding knob in the direction of the arrow, rotate the antenna counterclockwise to remove it, and finally remove the nuts with the sockets.



6. Open the A connector to separate FPC of accessory interface board, open the B connector to separate FPC of keypad, and disconnect speaker leads C with soldering iron;
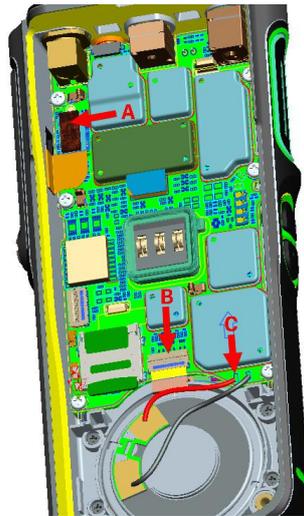
7. Remove the six screws of main PCB with the cross screwdriver to take out the main PCB obliquely, be careful that the accessory interface board FPC and connector can obstruct the main PCB, pay attention to pull it out slowly not to break the FPC with too much force.
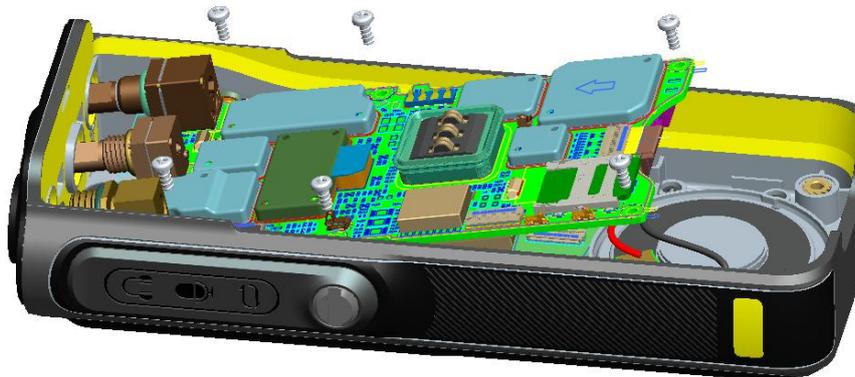


8. Separate the LCD connector at the arrow, press the buckle of the LCD holder at the arrow A with finger or tweezers to remove LCD components, then open the LCD holder in the direction of the arrow B to take out LCD module.
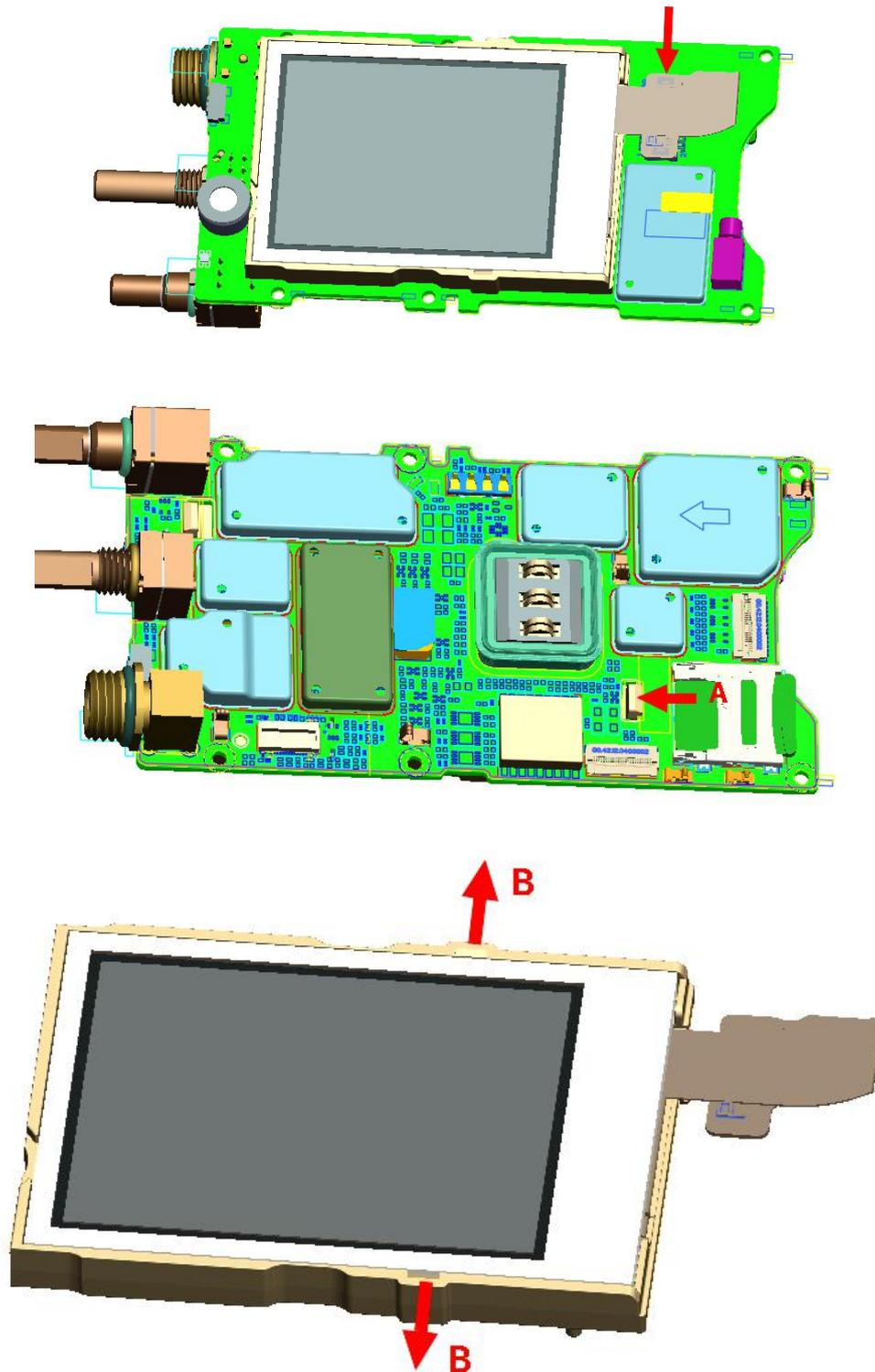
9. Remove the four screws at the arrows with the cross screwdriver to take out the P+R keypad.
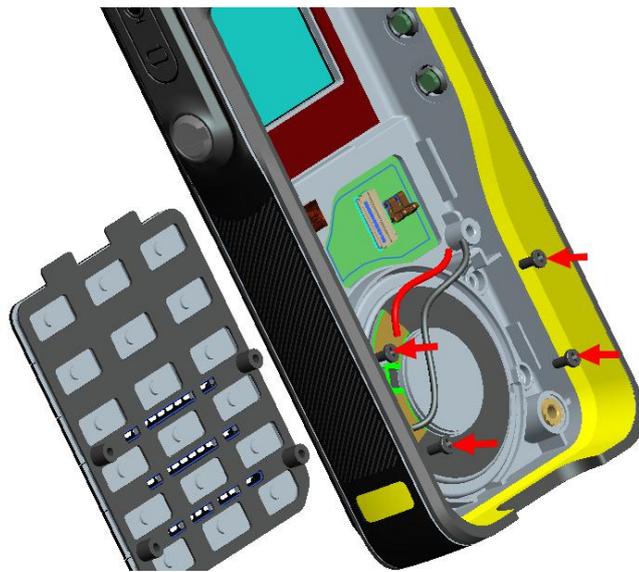
10. Remove the white sealing on the back of keypad at the arrow with the slotted screwdriver after taking out the P+R keypad, press the keypad from the back to remove it.
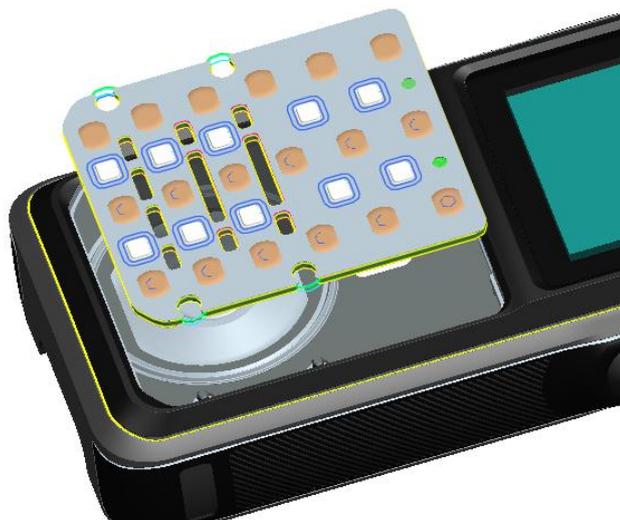
11. Use the slotted screwdriver to open the buckles at the arrows to push out the PTT button (A), rubber (D), holder (E), side key (F), holder (G). The holder (E) and the rubber (B/C) can be separated directly.





30
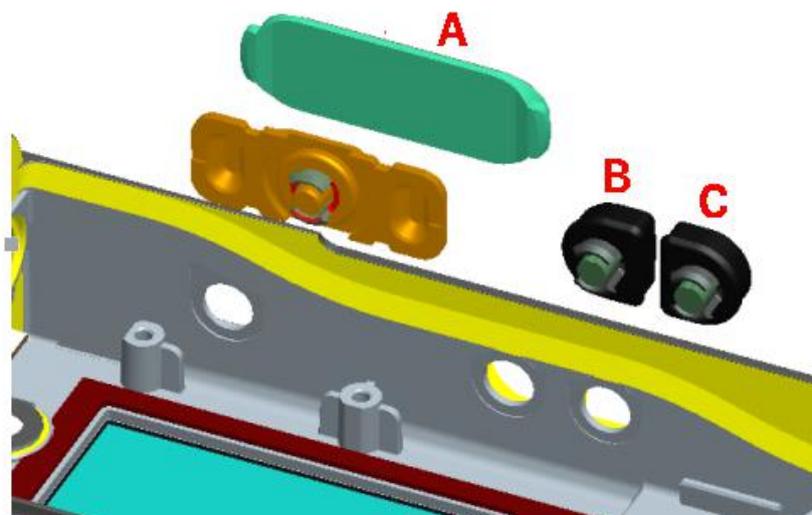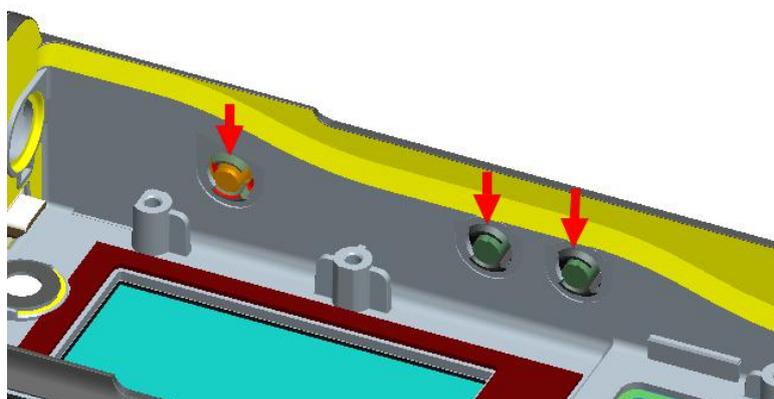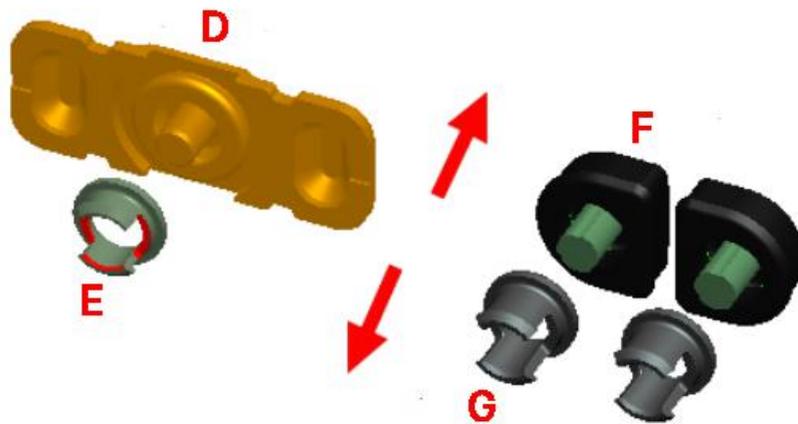
12. To dismantle the speaker, remove the white sealing around the speaker, and use slotted screwdriver to take out the speaker.
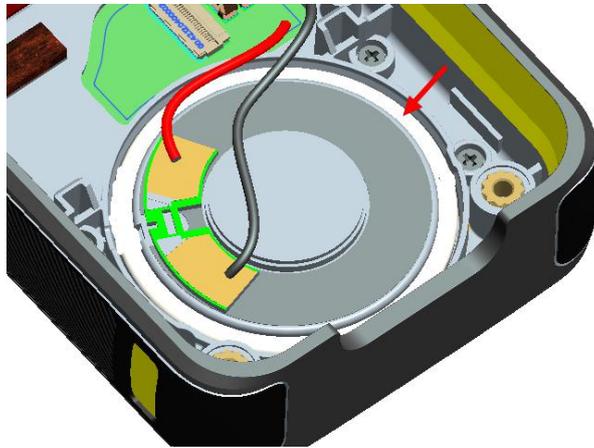


## 4.4  Assemble Steps

The assemble steps can refer to the disassemble steps and vice versa.

## 4.5 Components



| SN | Item | SN | Item |
|----|------|----|------|
| 1 | Front Cover | 12 | Antenna |
| 2 | Aluminum Cover | 13 | Coding Switch Nut |
| 3 | Main PCB | 14 | Antenna Base Nut |

| 4 | Accessory Interface Cover | 15 | T8 Screw |
|---|---|---|---|
| 5 | Coding Knob | 16 | Main PCB Screw |
| 6 | Volume Knob | 17 | Keypad Screw |
| 7 | PTT Button | 18 | P+R Keypad |
| 8 | PTT Rubber | 19 | Battery |
| 9 | PTT Holder | 20 | Keypad Board |
| 10 | Side Key Rubber | 21 | Speaker |
| 11 | Side Key Holder | | |

# 5  Hardware Pictures

## 5.1  Front of Main PCB

| SN | Item |
|----|------|
| 1 | MIC |
| 2 | Emergency Button |
| 3 | LCD FPC plug |
| 4 | Vibrator |
| 5 | Bluetooth IC (none for low configuration) |

## 5.2  Back of Main PCB
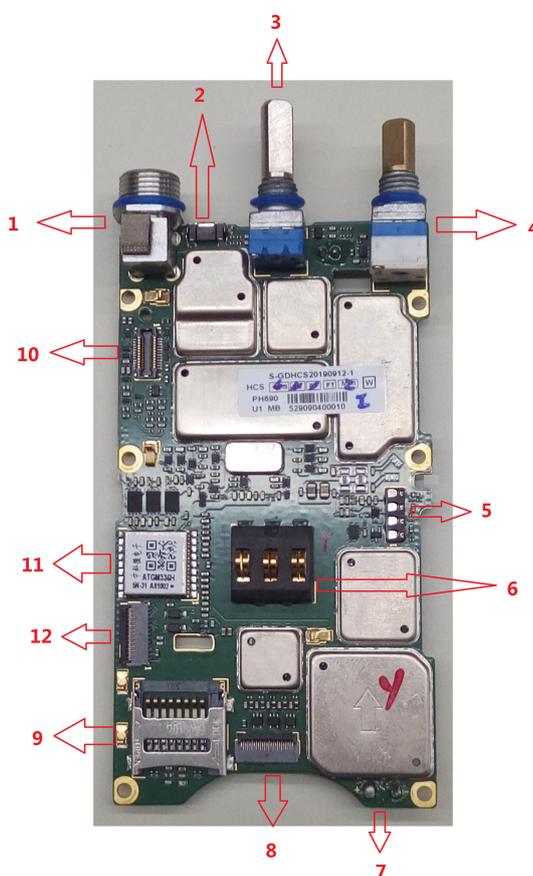


| SN | Item |
|----|------|
| 1 | Main Antenna Connector |
| 2 | Emergency Button |
| 3 | Channel Knob |
| 4 | Power&Volume Knob |
| 5 | Side Key Interface (Connected to FPC and including PTT, |

| | GND, Up and Down from top to bottom) |
|---|---|
| 6 | Battery Connector |
| 7 | Speaker Soldering Point |
| 8 | Keypad FPC Plug |
| 9 | TF Card Slot |
| 10 | Accessory FPC Plug |
| 11 | GPS Module (none for low configuration) |
| 12 | Option Board FPC Plug |

# 6  Troubleshooting Maintenance Flow

## 6.1  Structural Part Failure

For the failure of radio structural parts, please refer to 4.3 Disassemble Steps for replacement.

## 6.2 Battery Failure

```
          Start
            │
            ▼
      Battery Failure
            │
            ▼
   Can the battery    No
   be charged?   ─────────►  Replace
                              battery
        │ Yes                    ▲
        ▼                        │
  Charge the battery             │
  for one hour                   │
        │                        │
        ▼                        │
   Can the radio        No       │
   power on and work ─────────────┘
   normally with the
   battery?
        │ Yes
        ▼
          End
```

## 6.3  No Power On

```
┌──────────┐
│  Start   │
└──────────┘
     │
     ▼
┌──────────────┐
│ No Power On  │
└──────────────┘
     │
     ▼
  ◇ Is the battery          No    ┌──────────────┐
    normal? ─────────────────────▶│   Replace    │
                                   │   battery    │
     │ Yes                         └──────────────┘
     ▼
  ◇ Is the battery          No    ┌──────────────┐
    connector ───────────────────▶│ Repair the   │
    normal?                        │ battery      │
                                   │ connector    │
     │ Yes                         └──────────────┘
     ▼
  ◇ Are the power           No    ┌──────────────┐
    knob and main ─────────────────▶│  Replace    │
    PCB normal?                    │  the main    │
                                   │  PCB         │
     │ Yes                         └──────────────┘
     ▼
  ◇ Are the LCD             No    ┌──────────────┐
    FPC and LCD ───────────────────▶│ Replace LCD │
    normal?                        │ or repair LCD│
                                   │ FPC          │
     │ Yes                         └──────────────┘
     ▼
┌──────────┐
│   End    │
└──────────┘
```

## 6.4 Radio Freeze or Power Off Automatically

```
                    ┌─────────┐
                    │  Start  │
                    └─────────┘
                         │
                         ▼
          ┌──────────────────────────────┐
          │ Radio freeze after power on or │
          │   power off automatically      │
          └──────────────────────────────┘
                         │
                         ▼
                    ◇ Is the battery      No   ┌──────────┐
                      normal?        ────────▶ │ Replace  │
                    ◇                          │ battery  │
                         │                     └──────────┘
                       Yes
                         ▼
                  ┌──────────────┐
                  │ Replace the  │
                  │  main PCB    │
                  └──────────────┘
                         │
                         ▼
                    ┌─────────┐
                    │   End   │
                    └─────────┘
```

## 6.5 Charge Failure

```
          ┌──────────┐
          │  Start   │
          └──────────┘
               │
               ▼
       ┌────────────────┐
       │ Charge failure │
       └────────────────┘
               │
               ▼
        ◇ Are the charger      No   ┌────────────────────┐
          and power adaptor  ─────▶ │ Replace charger    │
          normal?                   │ or power adaptor   │
               │ Yes                └────────────────────┘
               ▼
        ◇ Is the battery       No   ┌──────────────┐
          charging pole      ─────▶ │ Replace      │
          corroded or dirty?        │ battery      │
               │ Yes                └──────────────┘
               ▼
       ┌────────────────────┐
       │ Replace the        │
       │ battery if corroded│
       │ or clean it if dirty│
       └────────────────────┘
               │
               ▼
          ┌──────────┐
          │   End    │
          └──────────┘
```

## 6.6  No Voice (MIC) Failure

```
                        ┌─────────────┐
                        │    Start    │
                        └─────────────┘
                               │
                               ▼
                        ┌─────────────┐
                        │ No voice (MIC)│
                        │   failure   │
                        └─────────────┘
                               │
                               ▼
                          ◇─────────◇
                         ╱  Is the MIC hole ╲    Yes    ┌──────────────┐
                        ◇  dirty and blocked? ◇────────▶│  Clean or    │
                         ╲               ╱              │ replace the  │
                          ◇─────────◇                   │ front cover  │
                               │                        └──────────────┘
                              No
                               ▼
                          ◇─────────◇
                         ╱  Is the MIC of main ╲   No    ┌──────────────┐
                        ◇   PCB normal?     ◇──────────▶│ Replace the  │
                         ╲                ╱             │  material    │
                          ◇─────────◇                   └──────────────┘
                               │
                              Yes
                               ▼
                        ┌─────────────┐
                        │ Replace the │
                        │  main PCB   │
                        └─────────────┘
                               │
                               ▼
                        ┌─────────────┐
                        │     End     │
                        └─────────────┘
```

## 6.7 No Sound (Speaker) Failure

```
                        ┌──────────┐
                        │  Start   │
                        └──────────┘
                              │
                              ▼
                     ┌──────────────────┐
                     │    No Sound       │
                     │ (Speaker) failure │
                     └──────────────────┘
                              │
                              ▼
                         ╱─────────╲
                        ╱  Is the    ╲        No      ┌──────────────┐
                       ╱   volume      ╲───────────▶  │  Reset the   │
                       ╲ setting normal?╱             │   volume     │
                        ╲             ╱               └──────────────┘
                         ╲───────────╱
                              │ Yes
                              ▼
                         ╱─────────╲
                        ╱ Are the     ╲       No       ┌──────────────┐
                       ╱  speaker       ╲───────────▶  │ Replace the  │
                       ╲ and soldering  ╱              │ material or  │
                        ╲   normal?    ╱               │  re-solder   │
                         ╲───────────╱                └──────────────┘
                              │ Yes
                              ▼
                      ┌──────────────┐
                      │ Replace the  │
                      │  main PCB    │
                      └──────────────┘
                              │
                              ▼
                        ┌──────────┐
                        │   End    │
                        └──────────┘
```

Alright

Let

Let

LOOP

## 6.8 Side Key Failure

Start

Side Key failure

Are the main PCB and back cover assembled correctly? Is the button touch feeling normal? — **No** → Reassemble correctly

**Yes**

Is the main PCB Side Key metal dome collapsed? — **Yes** → Repair the Side Key metal dome

**No**

Is the contact of Side Key FPC corroded or dirty? — **Yes** → Clean or replace the Side Key FPC

**No**

Replace the main PCB

End

## 6.9  Keypad Failure

```
        ┌──────────┐
        │  Start   │
        └────┬─────┘
             │
        ┌────▼─────┐
        │ Keypad   │
        │ failure  │
        └────┬─────┘
             │
    ┌────────▼────────┐        No   ┌──────────────────┐
    │ Are the front   │──────────▶ │ Replace the front│
    │ cover keypad and│            │ cover keypad or FPC│
    │ the FPC normal? │            └──────────────────┘
    └────────┬────────┘
           Yes
             │
    ┌────────▼────────┐        No   ┌──────────────────┐
    │ Is the keypad   │──────────▶ │ Repair the keypad│
    │ FPC plug normal?│            │ FPC plug         │
    └────────┬────────┘            └──────────────────┘
           Yes
             │
        ┌────▼─────┐
        │ Replace  │
        │ the main │
        │ PCB      │
        └────┬─────┘
             │
        ┌────▼─────┐
        │   End    │
        └──────────┘
```

　　43

## 6.10  Accessory Failure

```
                        ┌──────────┐
                        │  Start   │
                        └────┬─────┘
                             ↓
                   ┌───────────────────┐
                   │ Accessory failure │
                   └─────────┬─────────┘
                             ↓
          ◇ Is the contact of          Yes   ┌──────────────────────┐
            accessory interface    ──────────→│ Clean or replace the │
            corroded or dirty?                │ accessory interface  │
                   │ No                       │ FPC                  │
                   ↓                          └──────────────────────┘
          ◇ Is the signal pin of        Yes   ┌──────────────────────┐
            accessory interface    ──────────→│ Replace the          │
            connector broken?                 │ accessory            │
                   │ No                       └──────────────────────┘
                   ↓
          ◇ Is the accessory           Yes   ┌──────────────────────┐
            interface FPC          ──────────→│ Replace the accessory│
            broken?                           │ interface FPC        │
                   │ No                       └──────────────────────┘
                   ↓
          ◇ Is the accessory           No    ┌──────────────────────┐
            interface plug of the  ──────────→│ Repair the accessory │
            main PCB normal?                  │ interface plug       │
            Especially pay attention          └──────────────────────┘
            to the contacts of plug.
                   │ Yes
                   ↓
            ┌──────────────┐
            │ Replace the  │
            │ main PCB     │
            └──────┬───────┘
                   ↓
              ┌─────────┐
              │   End   │
              └─────────┘
```

## 6.11   TF Missing

```
                          ┌──────────────┐
                          │    Start      │
                          └──────────────┘
                                  │
                                  ▼
                          ┌──────────────┐
                          │  TF missing   │
                          └──────────────┘
                                  │
                                  ▼
                              ◇ Is the TF card
                               normal? Are the gold      Yes      ┌───────────────────┐
                               finger contacts     ─────────────▶ │  Clean TF card or   │
                               corroded or dirty? ◇              │    replace it       │
                                  │                               └───────────────────┘
                                 No
                                  ▼
                              ◇ Does the firmware
                                version support the      No       ┌───────────────────────┐
                                TF card? ◇         ─────────────▶ │ Re-upgrade radio firmware to │
                                  │                               │  support TF card        │
                                 Yes                              └───────────────────────┘
                                  ▼
                              ◇ Is the TF card slot
                                of main PCB              Yes      ┌───────────────────┐
                                broken? ◇          ─────────────▶ │   Repair the TF     │
                                  │                               │   card slot         │
                                 No                               └───────────────────┘
                                  ▼
                          ┌──────────────┐
                          │ Replace the   │
                          │  main PCB     │
                          └──────────────┘
                                  │
                                  ▼
                          ┌──────────────┐
                          │     End       │
                          └──────────────┘
```

45

# 7  Check After Maintenance

## 7.1  Check Latest Firmware Version and Device Information

Please refer to 2.2 Check Firmware Version and Device Information.

## 7.2  Function Check

After the radio maintenance, check if every function is available. Follow the steps:

1. After assemble the radio, check if all screws and components are installed, there should be no extra screws.

2. Check if the touch feeling of button is normal for PTT button, up button, down button and top button. Check if the volume knob and coding knob operate normally.

3. Install the battery and power on the radio to check that radio can power on normally and LED indicator is normal.

4. Check if the keypad is normal and the key can respond normally to touch.

5. Connect the data cable to check if the radio can CPS read and write normally.

6. Turn coding knob to adjust radio frequency and set work mode to the same as another normal radio, and make a voice call test to check if the call can be sent, received, and if the voice is normal.

7. Finish checking.