MOTOROLA SOLUTIONS

VHF Digital/Analog Transceiver

EVX-261

Service Manual

Motorola Solutions, Inc.

EC137N91A

Introduction

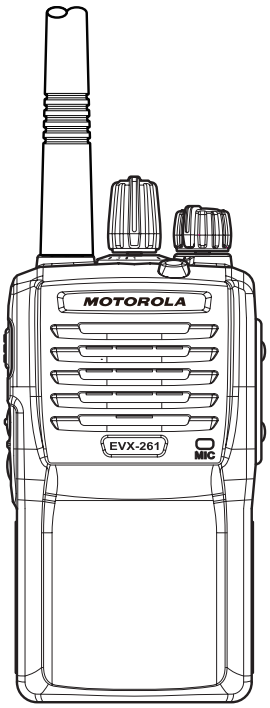
This manual provides the technical information necessary for servicing the **EVX-261** VHF Digital/Analog Transceiver.

Servicing this equipment requires expertise in handing surface-mount chip components. Attempts by non-qualified persons to service this equipment may result in permanent damage not covered by the warranty, and may be illegal in some countries.

Two PCB layout diagrams are provided for each double-sided board in this transceiver. Each side of the board is referred to by the type of the majority of components installed on that side ("Side A" or "Side B"). In most cases one side has only chip components (surface-mount devices), and the other has either a mixture of both chip and leaded components (trimmers, coils, electrolytic capacitors, ICs, etc.), or leaded components only.

As described in the pages to follow, the advanced microprocessor design of the **EVX-261** Transceiver allows a complete alignment of this transceiver to be performed without opening the case of the radio; all adjustments can be performed from the front panel, using the "Alignment Mode" menu.

While we believe the information in this manual to be correct, Motorola Solutions assumes no liability for damage that may occur as a result of typographical or other errors that may be present. Your cooperation in pointing out any inconsistencies in the technical information would be appreciated.



Important Note

This transceiver is assembled using Pb (lead) free solder, based on the RoHS specification.
Only lead-free solder (Alloy Composition: Sn-3.0Ag-0.5Cu) should be used for repairs performed on this apparatus.
The solder stated above utilizes the alloy composition required for compliance with the lead-free specification, and any solder with the above alloy composition may be used.

Contents

Specifications: USA (NA) & Except Europe (CE)

General

Frequency range:	136-174 MHz
Channel:	16 Channels
Emission Type:	16K0F3E / 11K0F3E (Analog)
	7K60F1E / 7K60FXE (Digital: 12.5 kHz Voice)
	7K60F1D / 7K60FXD (Digital: 12.5 kHz Data)
	7K60F1W (Digital: Combination of 12.5 kHz Voice & Data)
Power Supply Voltage:	7.4 V DC ± 10%
Current Consumption:	<1.8 A (5 W TX)
Channel Separation:	12.5 / 25 kHz (Analog)
	12.5 kHz (Digital)
IP Rating:	IP55
Operating Temperature Range:	–22 °F to +140 °F (–30 °C to +60 °C)
Charging Temperature Range:	+32 °F to +113 °F (0 °C to +45 °C)
Frequency Stability:	±1.5 ppm
Antanna Impedance:	50 Ohm (unbalanced)
Dimension (W x H x D):	2.3 x 4.3 x 1.3 inches (58.4 x 109 x 32.3 mm) (with FNB-V133LI-UNI)
	2.3 x 4.3 x 1.6 inches (58.4 x 109 x 40.6 mm) (with FNB-V134LI-UNI)
Weight (Approx.):	9.9 oz (281 g) (with FNB-V133LI-UNI, Antenna, Belt Clip)
	11.6 oz (330 g) (with FNB-V134LI-UNI, Antenna, Belt Clip)

Receiver (Measured by TIA/EIA-603)

Circuit Type:	Direct Conversion
Sensitivity:	0.25 µV (Analog, 12 dB SINAD)
	0.28 µV (Digital, 1 % BER)
Adjacent Channel Selectivity:	70 dB (25 kHz)
	60 dB (12.5 kHz)
Hum and Noise:	45 dB (25 kHz)
	40 dB (12.5 kHz)
Intermodulation:	70 dB
Spurious Image Rejection:	70 dB
Conducted Spurious:	–57 dBm
Audio output:	700 mW (internal @16 Ohm, 5% THD)
	500 mW (external @4 Ohm, 5% THD)

Transmitter (Measured by TIA/EIA-603)

Output Power:	5 / 1 W
Modulation:	Sigma Delta Modulation
Maximum Frequency Deviation:	±5.0 kHz (25 kHz Step, Analog)
	±2.5 kHz (12.5 kHz Step, Analog)
	1745 Hz - 2138 Hz (12.5 kHz Step, Symbol Deviation)
Conducted Spurious Emissions:	–36 dBm @≦ 1 GHz, –30 dBm @> 1 GHz
FM Hum & Noise:	45 dB (25 kHz)
	40 dB (12.5 kHz)
Audio Distortion:	<5% @1 kHz

Specifications subject to change without notice or obligation.

Specifications: Europe (CE)

General

Frequency range:	136-174 MHz
Channel:	16 Channels
Emission Type:	16K0F3E / 11K0F3E (Analog)
	7K60F1E / 7K60FXE (Digital: 12.5 kHz Voice)
	7K60F1D / 7K60FXD (Digital: 12.5 kHz Data)
	7K60F1W (Digital: Combination of 12.5 kHz Voice & Data)
Power Supply Voltage:	7.4 V DC ± 10%
Current Consumption:	<1.8 A (5 W TX)
Channel Separation:	12.5 / 25 kHz (Analog)
	12.5 kHz (Digital)
IP Rating:	IP55
Operating Temperature Range:	–30 °C to +60 °C
Charging Temperature Range:	0 °C to +45 °C
Frequency Stability:	±1.5 ppm
Antenna Impedance:	50 Ohm (unbalanced)
Dimension (W x H x D):	58.4 x 109 x 32.3 mm (with FNB-V133LI-UNI)
	58.4 x 109 x 40.6 mm (with FNB-V134LI-UNI)
Weight (Approx.):	281 g (with FNB-V133LI-UNI, Antenna, Belt Clip)
	330 g (with FNB-V134LI-UNI, Antenna, Belt Clip)

Receiver (Measured by EN 300 086)

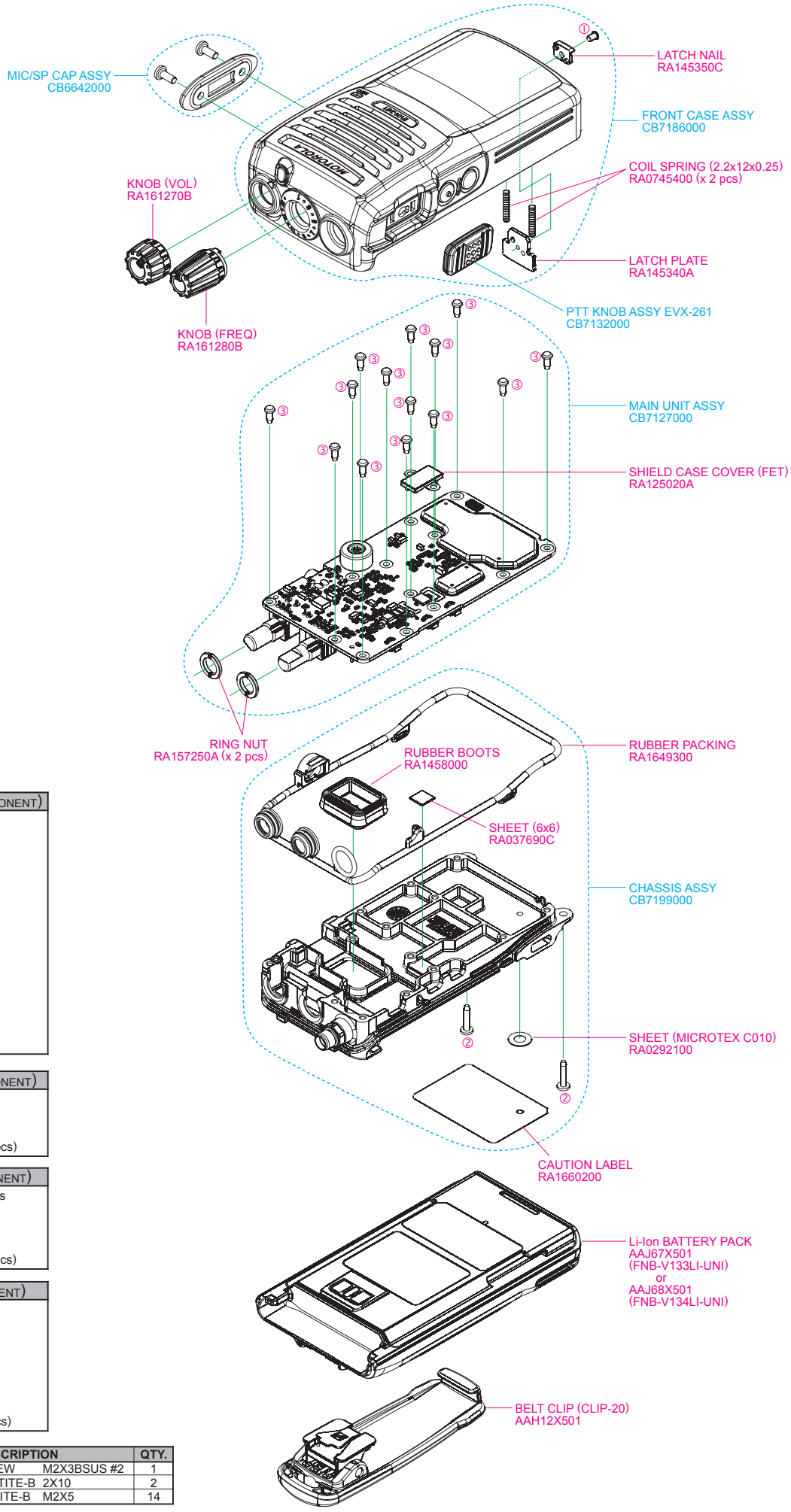
Circuit Type:	Direct Conversion
Sensitivity:	0.4 µV (Analog, 20 dB SINAD)
	0.28 µV (Digital, 1 % BER)
Adjacent Channel Selectivity:	70 dB (25 kHz)
	60 dB (12.5 kHz)
Hum and Noise:	45 dB (25 kHz)
	40 dB (12.5 kHz)
Intermodulation:	65 dB
Spurious Image Rejection:	70 dB
Conducted Spurious:	–57 dBm
Audio output:	700 mW (internal @16 Ohm, 5% THD)
	500 mW (external @4 Ohm, 5% THD)

Transmitter (Measured by EN 300 086)

Output Power:	5 / 1 W
Modulation:	Sigma Delta Modulation
Maximum Frequency Deviation:	±5.0 kHz (25 kHz Step, Analog)
	±2.5 kHz (12.5 kHz Step, Analog)
	1745 Hz - 2138 Hz (12.5 kHz Step, Symbol Deviation)
Conducted Spurious Emissions:	–36 dBm @≦ 1 GHz, –30 dBm @> 1 GHz
FM Hum & Noise:	45 dB (25 kHz)
	40 dB (12.5 kHz)
Audio Distortion:	<5% @1 kHz

Specifications subject to change without notice or obligation.

Exploded View & Miscellaneous Parts



FRONT CASE ASSY (COMPONENT)
FRONT CASE
NAME PLATE
MODEL LABEL (EVX-261)
PTT KNOB ASSY EVX-261
RUBBER (SIDE)
LATCH NAIL
LATCH PLATE
COIL SPRING (2.2x12x0.25) (x2 pcs)
INDICATOR
SPEAKER
SP NET
WIRE ASSY (BLK65)
WIRE ASSY (YEL65)
SHEET (MICROTEX 8x4)
PAN HEAD SCREW (M2x3BUS #2)

MIC/SP CAP ASSY (COMPONENT)
CAP (MIC/SP)
O RING (CAP)
O RING (0.8x2.2) (x2 pcs)
BIND HEAD SCREW (M2.6x6B) (x2 pcs)

MAIN UNIT ASSY (COMPONENT)
Printed Circuit Board with Components
HOLDER RUBBER (MIC)
SHIELD CASE COVER (FET)
RING NUT (x2 pcs)
PAN HEAD TAPTITE-B (M2x5) (x14 pcs)

CHASSIS ASSY (COMPONENT)
CHASSIS
CONNECTOR (5MAF11S-T02)
RUBBER PACKING
RUBBER BOOTS
SHEET (6x6)
SHEET (MICROTEX C010)
CAUTION LABEL
BIND HEAD TAPTITE-B (2x10) (x2 pcs)

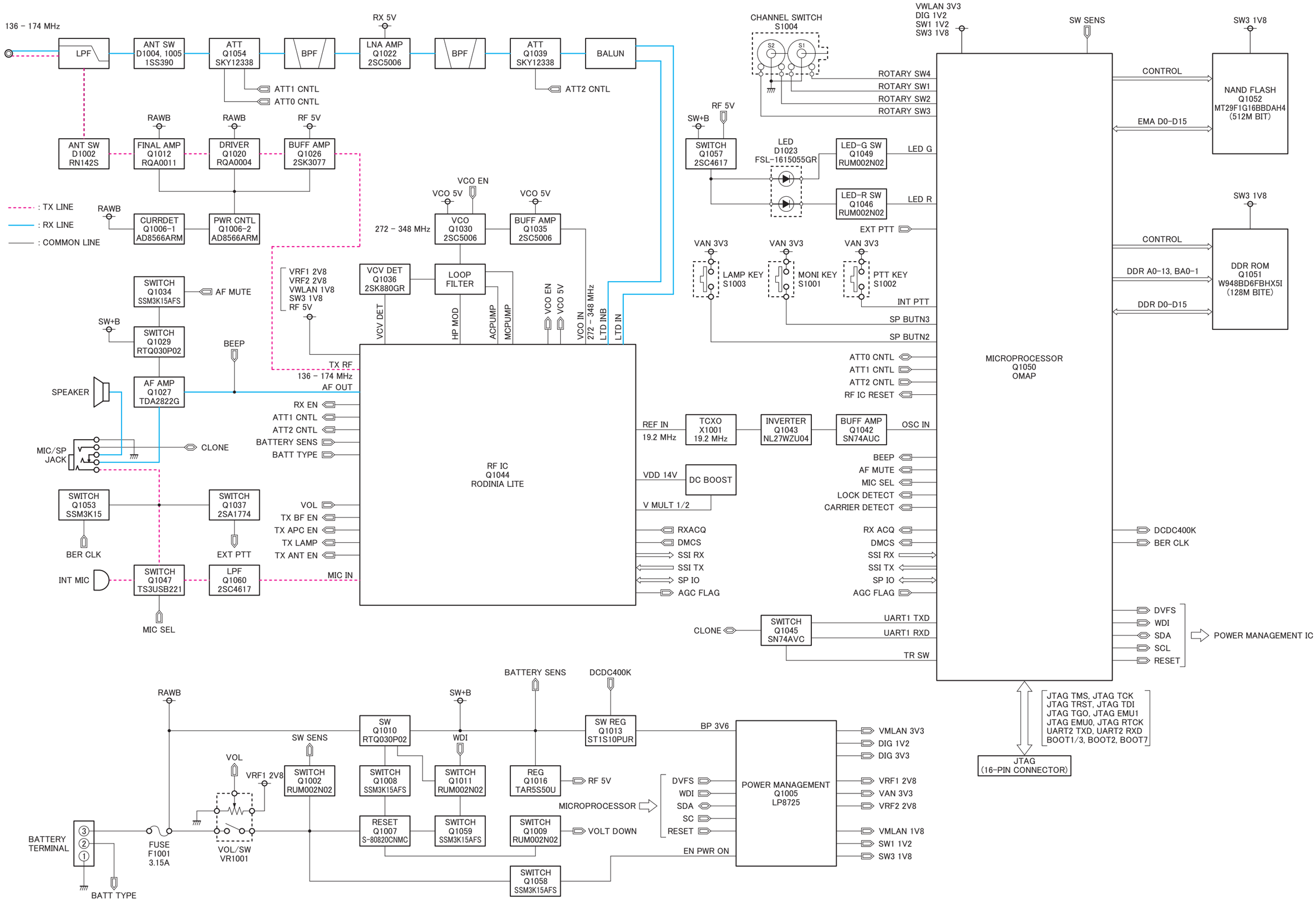
REF.	VXSTD P/N	DESCRIPTION	QTY.
①	U07230227	PAN HEAD SCREW M2X3BSUS #2	1
②	U24110001	BIND HEAD TAPTITE-B 2X10	2
③	U44105001	PAN HEAD TAPTITE-B M2X5	14

Non-designated parts are available only as part of a designated assembly.

REF.	DESCRIPTION	VALUE	MFR's DESIG	VXSTD P/N	SIDE	LAY ADR
	FRONT CASE ASSY			CB7186000		
	LATCH NAIL			RA145350C		
	LATCH PLATE			RA145340A		
	PTT KNOB ASSY EVX-261			CB7132000		
	COIL SPRING	(x2 pcs)	(2.2x12x0.25)	RA0745400		
	PAN HEAD SCREW		(M2X3BSUS #2)	U07230227		
	MIC/SP CAP ASSY			CB6642000		
	CHASSIS ASSY			CB7199000		
	RUBBER PACKING			RA1649300		
	RUBBER BOOTS			RA1458000		
	SHEET		(6X6)	RA037690C		
	SHEET		(MICROTEX C010)	RA0292100		
	CAUTION LABEL			RA1660200		
	BIND HEAD TAPTITE-B	(x2 psc)	2X10	U24110001		
	MECHANICAL PARTS					
	KNOB		(VOL)	RA161270B		
	KNOB		(FREQ)	RA161280B		
	MAIN UNIT ASSY			CB7127000		
F 1001	CHIP FUSE ⚠	3.15A, 36V	FHC16 322ADTP	Q0000118	A	B2
MC1001	MIC. ELEMENT		PF0-1055P	M3290045	A	C3
Q 1012	FET		RQA0011DNS#G0	G3070507	A	A3
S 1001	TACT SWITCH		EVQPUB02K	N5090167	B	d3
S 1002	TACT SWITCH		EVQPUB02K	N5090167	B	d2
S 1003	TACT SWITCH		EVQPUB02K	N5090167	B	d4
S 1004	ROTARY SWITCH		TP7LBJT16 RY-10487 Rev.1	N0190199A	B	b1
TH1001	THERMISTOR		TH05 4B473FR	G9090150	A	B5
VR1001	POT.		TP7LBRN1 B503 RY-10489	J60800323	B	a1
X 1001	TCXO	19.2MHz	NT2520SB 19.2MHZ	H9501523	B	b6
	SHIELD CASE COVER		(FET)	RA125020A		
	RING NUT	(x2 psc)		RA157250A		
	PAN HEAD TAPTITE-B	(x14 psc)	M2X5	U44105001		

⚠ When replace a chip fuse, use the part of the same type and value.

Block Diagram



1. Receiver System

1-1. Front-end RF Amplifier

Incoming RF signal from the antenna passes through the low-pass filter and the antenna switching diode **D1004/D1005** (both **1SS390**), then reduce the RF signal to the optimal level to the next stage by the digital attenuator **Q1054** (**SKY12338**).

The attenuated RF signal passes through the band-pass filter and amplifier **Q1022** (**2SC5006**), then remove the undesired frequencies by the another band-pass filter.

The filtered RF signal is applied to the custom IC **Q1044** (**RODINIA**) through the another digital attenuator **Q1039** (**SKY12338**).

1-2. Demodulator

The custom IC **Q1044** (**RODINIA**) converts a Base Band signal by mixing the RF signal with the local signal, and then the Base Band signal is demodulated by the another section of the custom IC **Q1044** (**RODINIA**).

The local signal is generated by the VCO which consists of **Q1030** (**2SC5006**) and varactor diodes **D1016/D1017** (both **BB173X**) and **D1018/D1019** (both **1SV279**).

1-3. Audio Amplifier

The demodulated signal is adjusted the audio volume level in the custom IC **Q1044** (**RODINIA**). The adjusted the audio signal is applied to the audio amplifier **Q1027** (**TDA2822G**). As a result, the audio signal provides up to 700 mW (@16-ohm BTL) for internal speaker or up to 500 mW (@4-ohm OTL) for external speaker.

2. Transmitter System

2-1. MIC Amplifier & Modulator

The speech signal from internal microphone **MC1001** or external microphone **J1003** is passed through the buffer amplifier **Q1060** (**2SC4617**), and then applied to the custom IC **Q1044** (**RODINIA**), which modulates the speech signal to the FM or digital signal.

2-2. Drive & Final Amplifier Stages

The modulated signal from the custom IC **Q1044** (**RODINIA**) is buffered by **Q1026** (**2SK3077**) and amplified by driver amplifier **Q1020** (**RQA0004PXDQS**). The low level transmit signal is then applied to **Q1012** (**RQA0011DNS**) for final amplification up to 5 watts output power.

The transmit signal then passes through the antenna switch **D1002** (**RN142S**) and is low-pass filtered to suppress away harmonic spurious radiation before delivery to the antenna.

2-3. Automatic Transmit Power Control

The current detector **Q1006-1** (**AD8566ARM**) detects the current of the final amplifier **Q1012** (**RQA0011DNS**) and the driver amplifier **Q1020** (**RQA0004PXDQS**), and converts the current difference to the voltage difference.

The output from the current detector **Q1006-1** (**AD8566ARM**) is compared with the reference voltage and amplified by the power control amplifier **Q1006-2** (**AD8566ARM**).

The output from the power control amplifier **Q1006-2** (**AD8566ARM**) controls the gate bias of the driver amplifier **Q1020** (**RQA0004PXDQS**) and the final amplifier **Q1012** (**RQA0011DNS**).

The reference voltage changes into two values (Transmit Power High and Low) controlled by custom IC **Q1044** (**RODINIA**).

3. PLL Frequency Synthesizer

The frequency synthesizer consists of VCO, TCXO **X1001**, and the custom IC **Q1044** (**RODINIA**).

The output frequency from TCXO **X1001** is 19.2 MHz and the tolerance is ±1.5 ppm in the temperature range –22 °F to +140 °F (–30 °C to +60 °C).

3-1. VCO (Voltage Controlled Oscillator)

The VCO **Q1030** (**2SC5006**) generates a between 272-348 MHz. The output from VCO (**Q1030**) is amplified by buffer amplifier **Q1035** (**2SC5006**) and then is supplied to the custom IC **Q1044** (**RODINIA**).

The VCO frequency is divided into two by the dividing section of the custom IC **Q1044** (**RODINIA**) in order to become a true receiving or transmitting frequency.

In the reception, the RF signal convert a Base Band signal by mixing with the divided VCO signal, and then supplied to the demodulator section of the custom IC **Q1044** (**RODINIA**), described previously.

In the transmission, the divide VCO frequency is modulated to the FM (or digital) in the custom IC **Q1044** (**RODINIA**), and then is supplied to the transmitter section described previously.

3-2. Varactor Control Voltage

The tuning voltage (VCV) of the VCO establishes the lock range of VCO by controlling the cathode of varactor diode **D1012**/**D1013** (both **BB173X**) and **D1014**/**D1015** (both **1SV279**).

3-3. PLL

The main constitution product of the PLL is equipped all with in the custom IC **Q1044** (**RODINIA**), so that all processing regarding the frequency control is performed in the custom IC **Q1044** (**RODINIA**).

Introduction

The **EVX-261** is carefully aligned at the factory for the specified performance across the frequency range specified for each version. Realignment should therefore not be necessary except in the event of a component failure, or altering version type. All component replacement and service should be performed only by an authorized Motorola Solutions representative, or the warranty policy may be void.

The following procedures cover the sometimes critical and tedious adjustments that are not normally required once the transceiver has left the factory. However, if damage occurs and some parts subsequently are replaced, realignment may be required. If a sudden problem occurs during normal operation, it is likely due to component failure; realignment should not be done until after the faulty component has been replaced.

We recommend that servicing be performed only by authorized Motorola Solutions service technicians who are experienced with the circuitry and fully equipped for repair and alignment. Therefore, if a fault is suspected, contact the dealer from whom the transceiver was purchased for instructions regarding repair. Authorized Motorola Solutions service technicians realign all circuits and make complete performance checks to ensure compliance with factory specifications after replacing any faulty components.

Those who do undertake any of the following alignments are cautioned to proceed at their own risk. Problems caused by unauthorized attempts at realignment are not covered by the warranty policy. Also, Motorola Solutions reserves the right to change circuits and alignment procedures in the interest of improved performance, without notifying owners.

Under no circumstances should any alignment be attempted unless the normal function and operation of the transceiver are clearly understood, the cause of the malfunction has been clearly pinpointed and any faulty components replaced, and realignment determined to be absolutely necessary.

The following test equipment (and thorough familiarity with its correct use) is necessary for complete realignment. Correction of problems caused by misalignment resulting from use of improper test equipment is not covered under the warranty policy. While most steps do not require all of the equipment listed, the interactions of some adjustments may require that more complex adjustments be performed afterwards. Do not attempt to perform only a single step unless it is clearly isolated electrically from all other steps. Have all test equipment ready before beginning, and follow all of the steps in a section in the order presented.

Required Test Equipment

- ❒ Frequency Counter with 0.2 ppm accuracy at 200 MHz
- ❒ Deviation Meter (linear detector)
- ❒ 50 Ohm RF Dummy Load with power rating 10 W at 200 MHz
- ❒ VHF Sampling Coupler
- ❒ In-line Wattmeter with 5 % accuracy at 200 MHz
- ❒ Regulated DC Power Supply (standard 7.5 V DC, 3 A)
- ❒ IBM® PC/compatible Computer with Microsoft® Windows® Vista, 7, 8, 8.1, or Windows 10
- ❒ Motorola Solutions CE156 PC Programming Software
- ❒ Motorola Solutions FIF-12 USB Programming Interface and CT-104A, CT-106, or CT-171 PC Programming Cable.
- ❒ Motorola Solutions FRB-6 Tuning Interface Box and CT-160 Connection Cable.
- ❒ Motorola Solutions CN-3 (P/N: A08760001) Antenna Connector

Alignment Preparation & Precautions

A 50-Ohm RF Dummy Load and in-line wattmeter must be connected to the main antenna jack in all procedures that call for transmission, except where specified otherwise. Correct alignment is not possible with an antenna.

Because of the BTL (Bridged Trans Less) Amplifier circuit used in the **EVX-261**, do not connect earth side of the speaker leads to chassis “ground”.

After completing one step, read the following step to determine whether the same test equipment will be required. If not, remove the test equipment (except dummy load and wattmeter, if connected) before proceeding.

Correct alignment requires that the ambient temperature be the same as that of the transceiver and test equipment, and that this temperature be held constant between 68 and 86 °F (20 ~ 30 °C). When the transceiver is brought into the shop from hot or cold air, it should be allowed time to come to room temperature before alignment.

Whenever possible, alignments should be made with oscillator shields and circuit boards firmly affixed in place. Also, the test equipment must be thoroughly warmed up before beginning.

Note: Signal levels in dB referred to in the alignment procedure are based on 0 dBµ EMF = 1 µV.

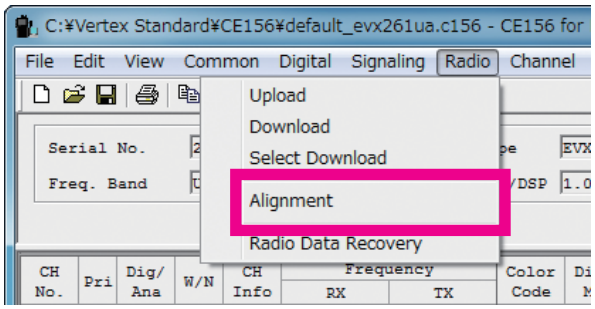
Test Setup

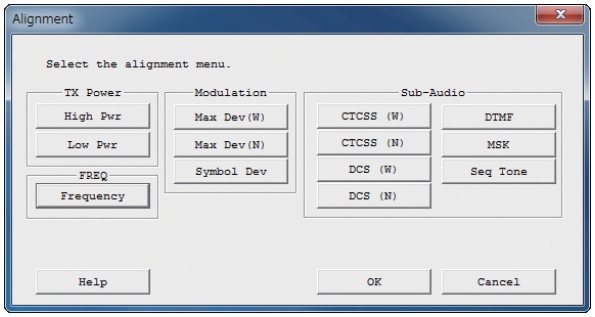
Setup the test equipment as shown below for transceiver alignment, then apply 7.5 V DC power to the transceiver.

The Alignment Tool Outline

Installation of the alignment tool

- ❒ Install the CE156 (PC Programming Software) to your PC and execute the CE156.
- ❒ Click the "Alignment" in the "Radio" menu tab of CE156 to open the "Alignment" window.





Action of the switches

When the transceiver is in the "Alignment mode," the action of the SIDE-1, SIDE-2, and PTT keys are ignored. All of the action is controlled by the PC.

Caution

Please never turn off the power supply during alignment. If the power supply is turned off during alignment, the alignment data will be corrupted.

Alignment Mode

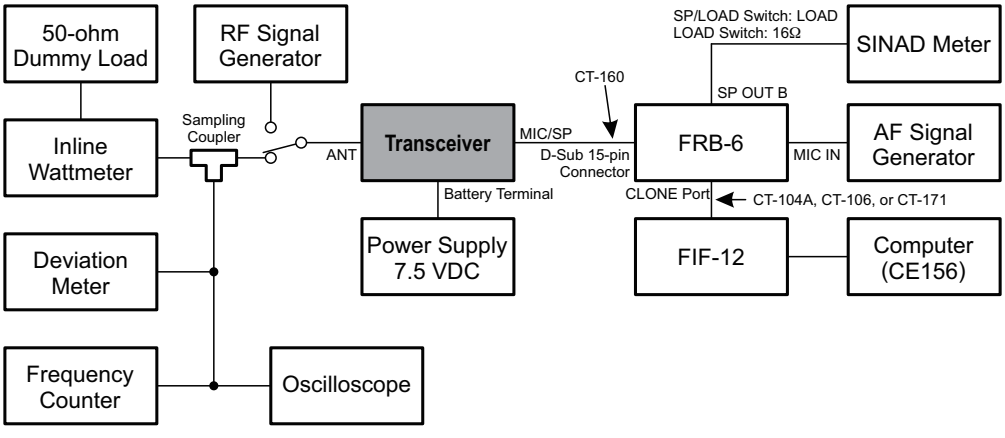
In the "Alignment Mode", the aligned data written in the radio will be able to re-align its alignment data. The value of each parameter can be changed to desired position by "←"/"→" arrow key for data up/down, "↑"/"↓" arrow key for channel up/down, direct number input, and drag the mouse.

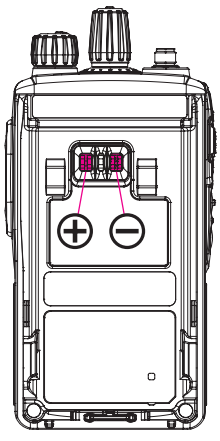
Note: when all items are aligned, it is strongly recommended to align according to following order. The detail information is written in the help document of CE156 PC Programming Software.

1. PLL Reference Frequency (Frequency)
2. TX Power <High/Low>
3. Maximum Deviation <Wide/Narrow>

Adjust the following items when needed.

- ❍ Symbol Deviation
- ❍ CTCSS Deviation <Wide/Narrow>
- ❍ DCS Deviation <Wide/Narrow>
- ❍ DTMF Deviation
- ❍ MSK Deviation
- ❍ Sequential Tone Deviation

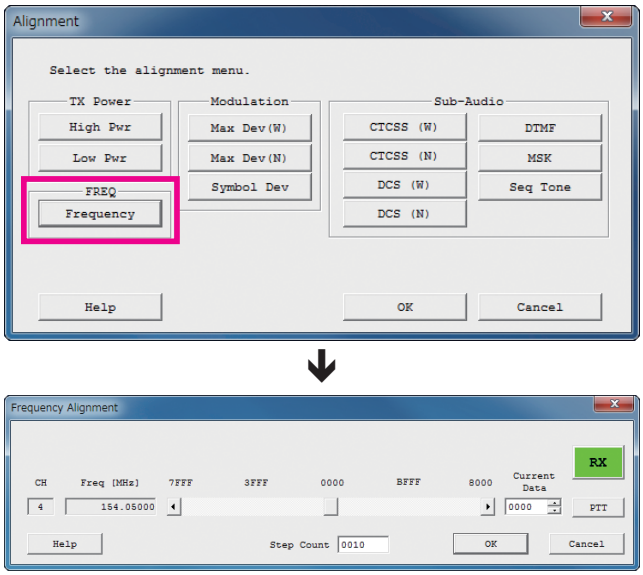




1. PLL Reference Frequency (Frequency)

This parameter is to align the reference frequency for PLL.

1. Click the "Frequency" button to open the "Frequency Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard, the radio will start to transmit on the center frequency channel.
3. Set the value to get the desired frequency according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("0000" - "FFFF") in the "Current Data" box from the computer's keyboard
4. After getting the desired frequency, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the frequency alignment and save the data.



2. TX Power

This parameter is to align the "High Power" and "Low1 Power" for the selected channel.

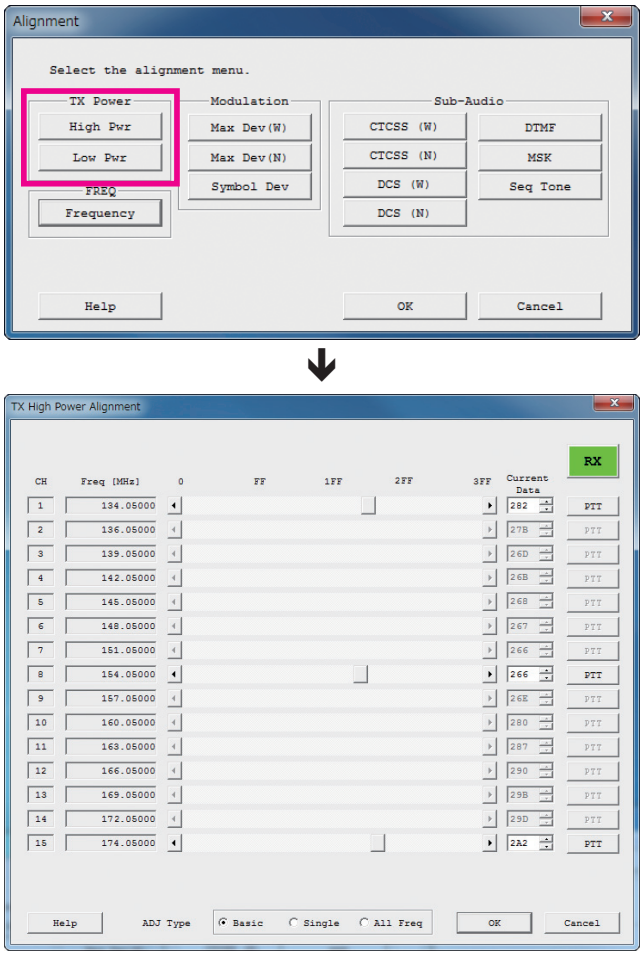
1. Click the "TX Power (High Pwr / Low Pwr)" button to open the "TX Power Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get desired output power (High: 5 W, Low: 1 W) on the Power Meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("000" - "3FF") in the "Current Data" box from the computer's keyboard
4. After getting the desired output power, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the TX Power alignment and save the data.

You may select the adjusting type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

Single: Alignment value changes only on the selected channel.

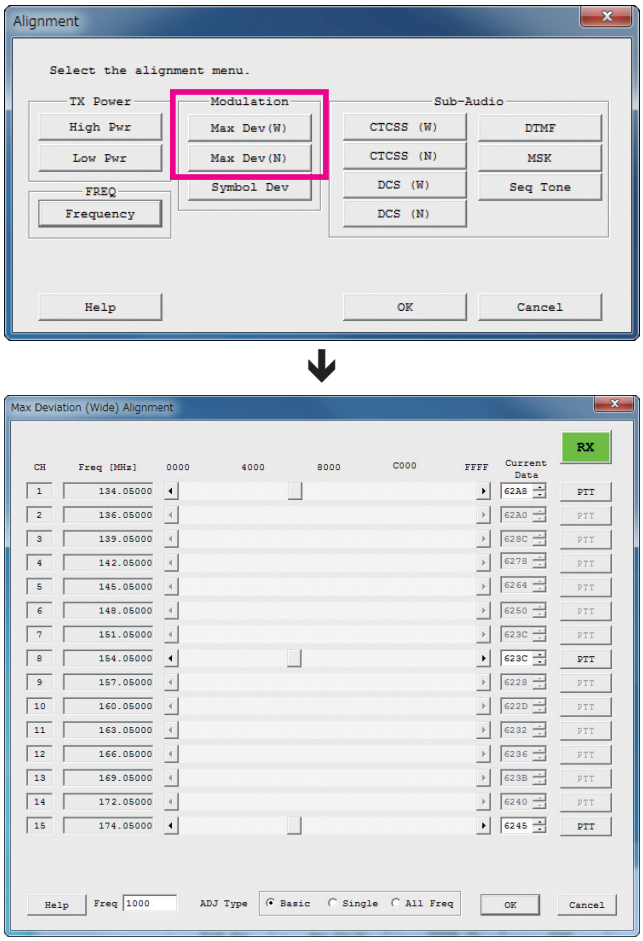
All Freq: Alignment value changes on all channels.



3. Maximum Deviation <Wide> / <Narrow>

This parameter is to align the "Maximum Deviation" (Wide/Narrow).

1. Press the "Max Dev (W/N)" button to open the "Max Deviation Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get desired deviation (Wide: 4.2 kHz, Narrow: 2.1 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the up-down key of the computer's keyboard
   - Entering the value ("0000" - "FFFF") in the entry box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the Max Deviation alignment and save the data.



1) You may align the deviation level by any modulation frequency (default: 1000 Hz) by changing the value of the "Freq" box located at the bottom left of the screen, if needed.
2) You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

   Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

   Single: Alignment value changes only on the selected channel.

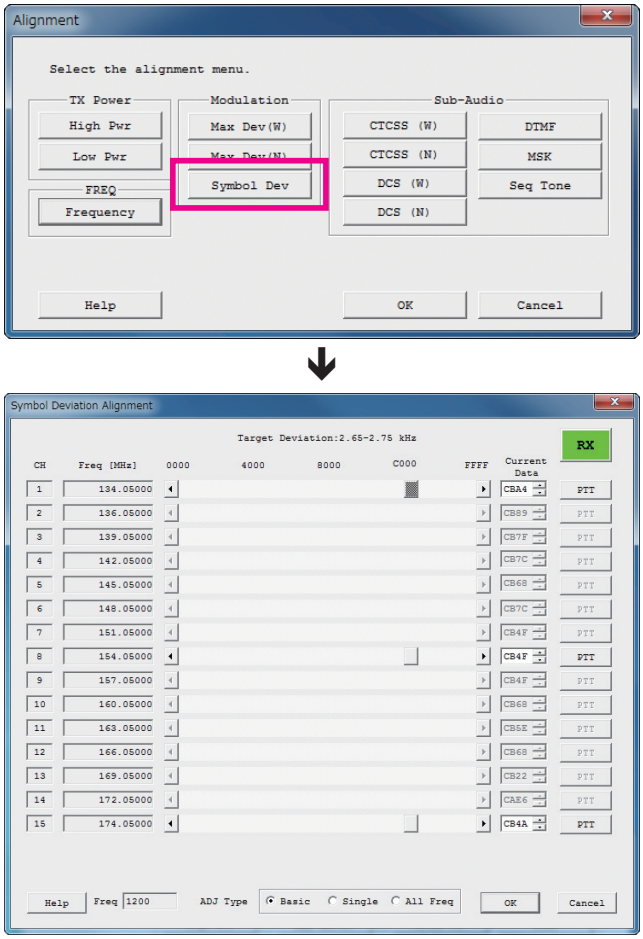
   All Freq: Alignment value changes on all channels.

Perform the following alignments as needed.

Symbol Deviation

This parameter is to align the deviation of the digital mode artificially.

1. Press the "Symbol Dev" button to open the "Symbol Deviation Alignment" window.
2. Click the "PTT" button on the desired channel. The radio starts to transmit on the selected channel.
3. Set the value to get Target Deviation (which is indicated on the screen) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the up-down key of the computer's keyboard
   - Entering the value ("0000" - "FFFF") in the entry box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the Symbol Deviation alignment and save the data.



You may select the alignment type from the "Radio" button (**ADJ Type**) located at the bottom of the screen, as needed.

Basic: "Low-edge / band center / high-edge" and select the channel for alignment (Default).

Single: Alignment value changes only on the selected channel.

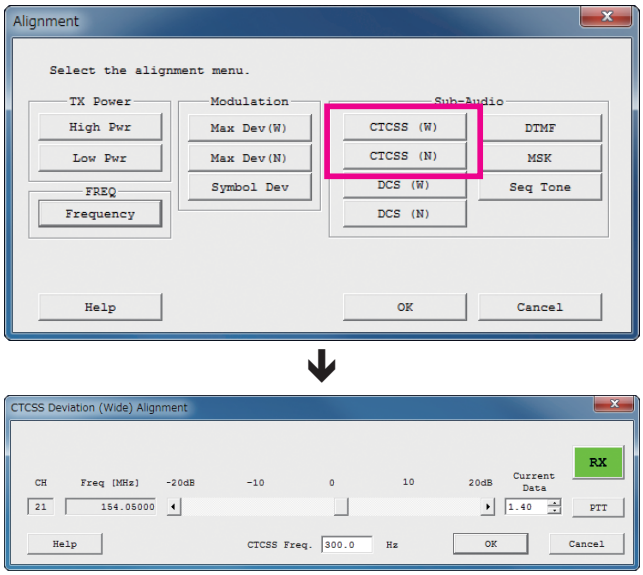
All Freq: Alignment value changes on all channels.

CTCSS Deviation <Wide> / <Narrow>

This parameter is to align CTCSS Deviation of the selected channel.

1. Press the "CTCSS (W/N)" button to open the "CTCSS Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: Wide: 0.55 kHz, Narrow: 0.35 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("–20.00" - "20.00") in the "Current Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the CTCSS Deviation alignment and save the data.

You may align the deviation level by any CTCSS tone frequency (default: 300.0 Hz) by changing the value of the "CTCSS Freq" box located at the bottom of the screen, if needed.

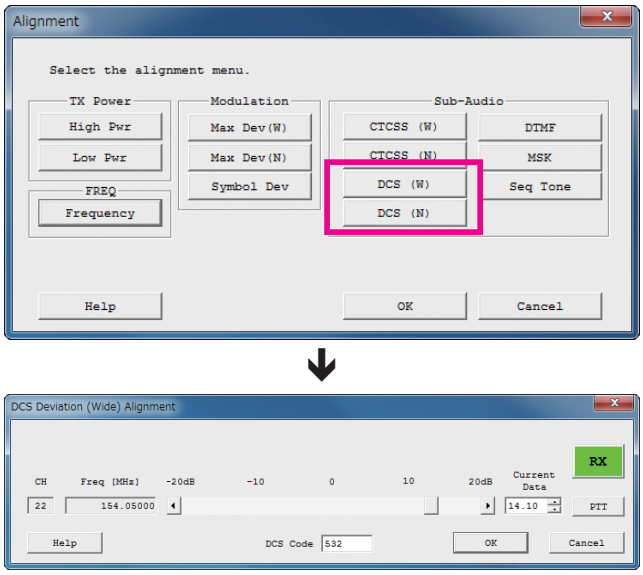


DCS Deviation <Wide> / <Narrow>

This parameter is to align "DCS Deviation" of the selected channel.

1. Press the "DCS (W/N)" button to open the "DCS Deviation Alignment" window.
2. Click the "PTT" button or press the "SPACE" bar of the computer's keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: Wide: 0.6 kHz, Narrow: 0.4 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer's keyboard
   - Entering the value ("–20.00" - "20.00") in the "Current Data" box from the computer's keyboard
4. After getting the desired deviation, click the "PTT" button or press the "SPACE" bar to stop transmitting.
5. Click the "OK" button to finish the DCS Deviation alignment and save the data.

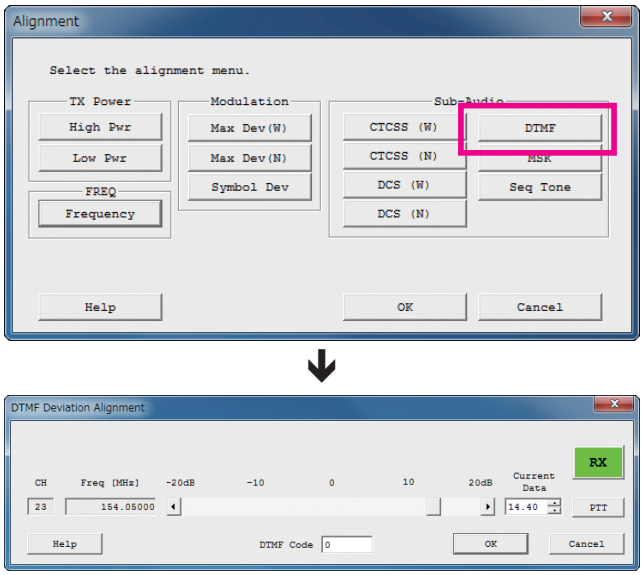
You may align the deviation level by any DCS code (default: 532) by changing the value of the "DCS Code" box located at the bottom of the screen, if needed.



DTMF Deviation

This parameter is to align “DTMF Deviation”.

1. Press the “DTMF” button to open the “DTMF Deviation Alignment” window.
2. Click the “PTT” button or press the “SPACE” bar of the computer’s keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: 3.0 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer’s keyboard
   - Entering the value (“–20.00” - “20.00”) in the “Current Data” box from the computer’s keyboard
4. After getting the desired deviation, click the “PTT” button or press the “SPACE” bar to stop transmitting.
5. Click the “OK” button to finish the DTMF Deviation alignment and save the data.

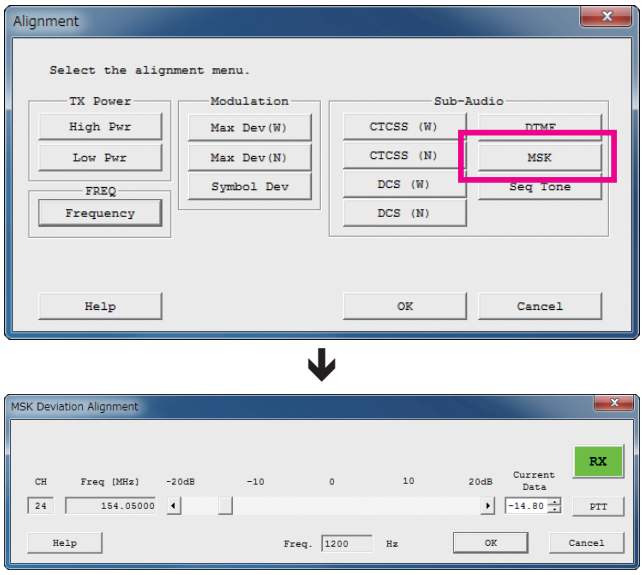


You may align the deviation level by any DTMF tone (default: “0”, available selection: “0” - “9”, “A” - “D”, “E(*)”, and “F(#)”) by changing the value of the “DTMF Code” box located at the bottom of the screen, if needed.

MSK Deviation

This parameter is to align “MSK Deviation” which use for the ANI operation of the MDC1200 System.

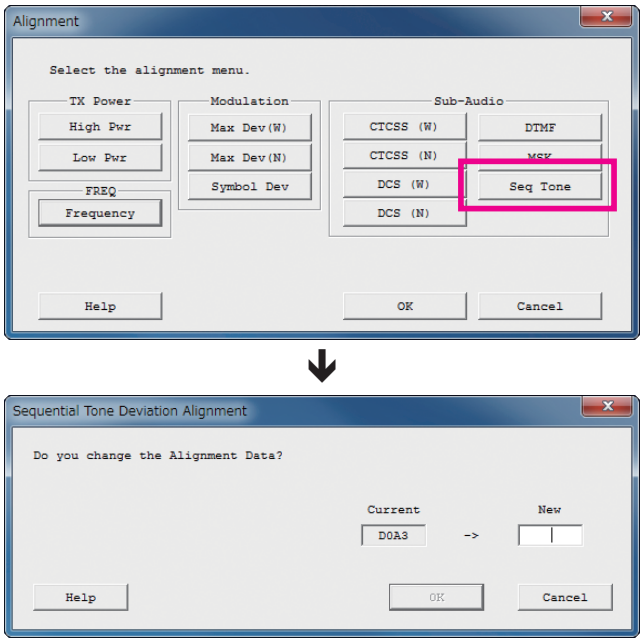
1. Press the “MSK” button to open the “MSK Deviation Alignment” window.
2. Click the “PTT” button or press the “SPACE” bar of the computer’s keyboard to transmit the radio.
3. Set the value to get desired deviation (Nominal: 3.0 kHz) on the deviation meter according to the following ways:
   - Dragging the slide bar
   - Clicking the arrow (◀/▶) buttons
   - Pressing the left/right arrow key of the computer’s keyboard
   - Entering the value (“–20.00” - “20.00”) in the “Current Data” box from the computer’s keyboard
4. After getting the desired deviation, click the “PTT” button or press the “SPACE” bar to stop transmitting.
5. Click the “OK” button to finish the MSK Deviation alignment and save the data.



Sequential Tone Deviation

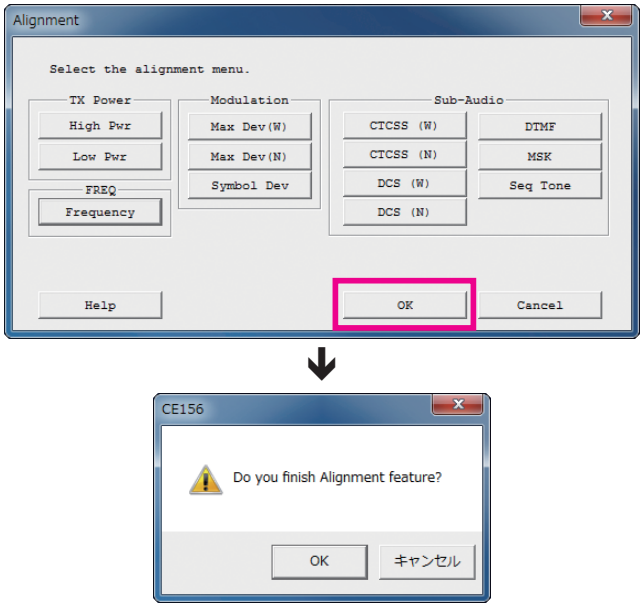
This parameter is to fine-tune of the "Sequential Tone Deviation" for the 2-Tone and 5-Tone Encoder.

1. Press the "Seq Tone" button to open the "Sequential Tone Deviation Alignment" window.
2. Entering the desired value in the "New" box from the computer's keyboard.
3. Click the "OK" button to finish the Sequential Tone Deviation alignment and save the data.



Download (Save) the Alignment Data and Exit from the Alignment Mode

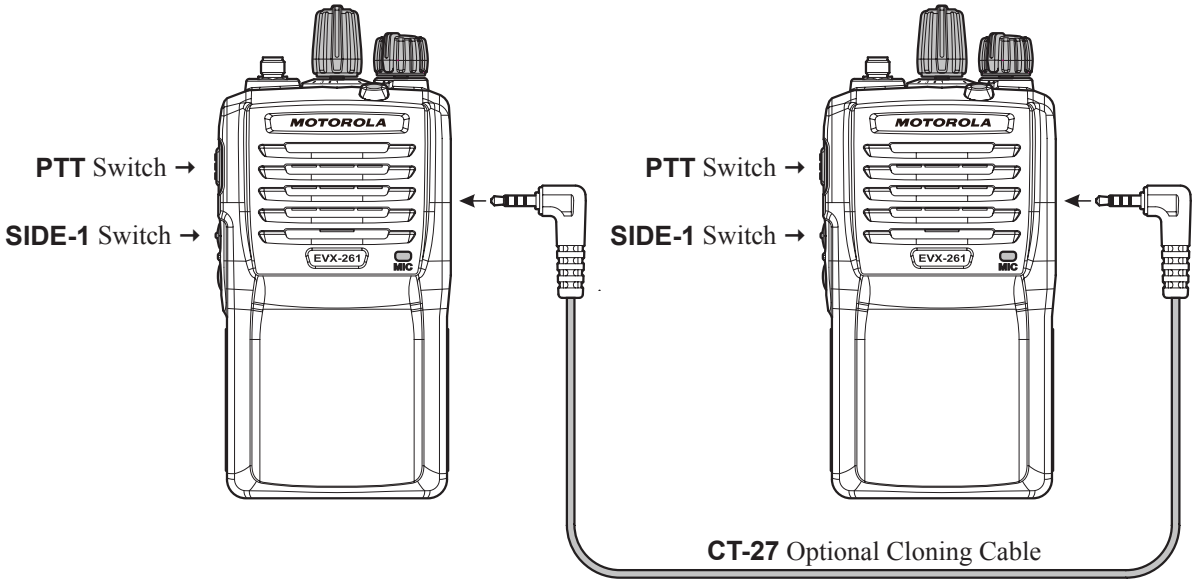
Press the "OK" button, then the Alignment Data will be downloaded (saved) to the transceiver and Exit from the Alignment Mode.



Cloning

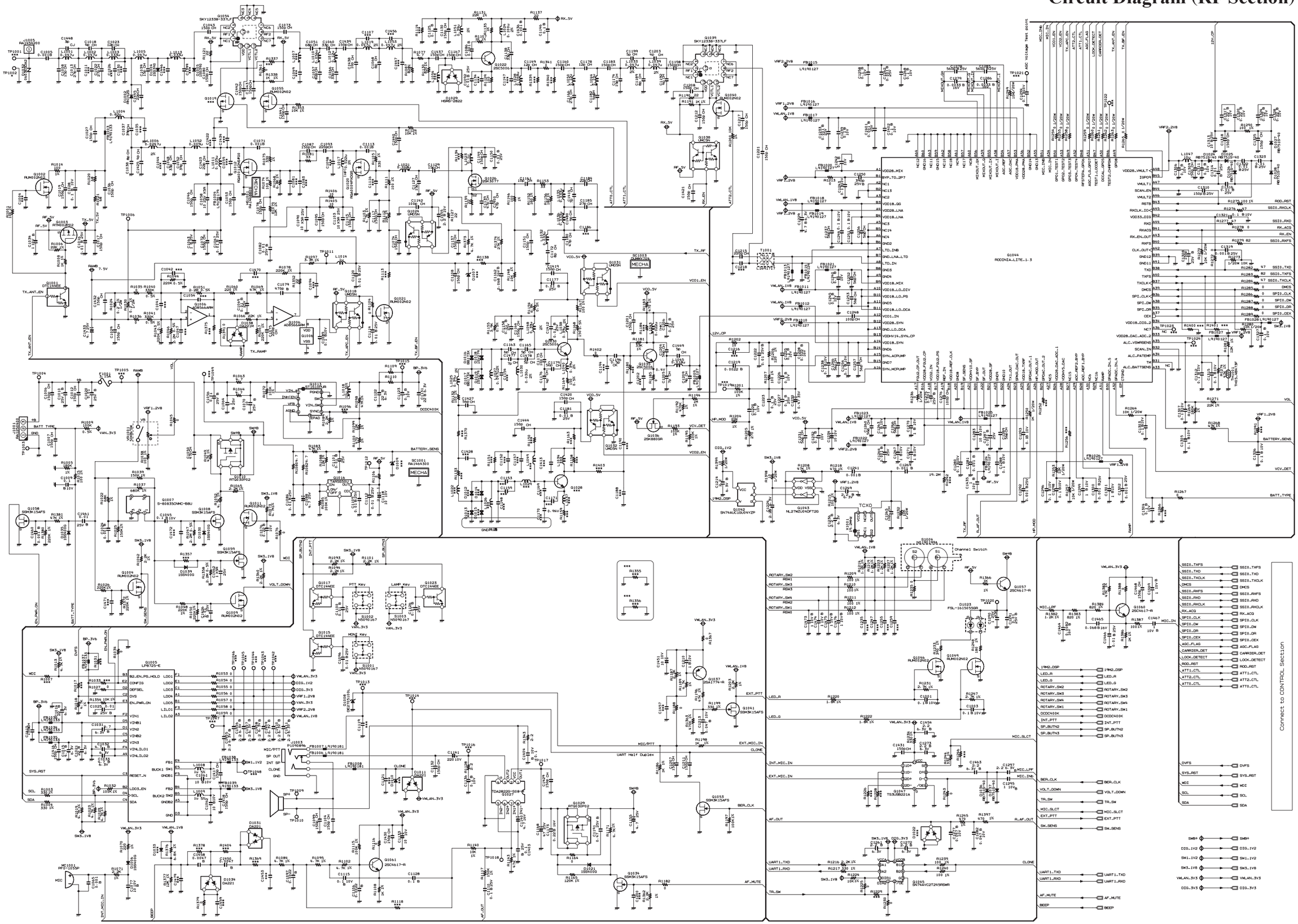
The **EVX-261** transceiver includes a convenient "Cloning" feature, which allows the programming data from one transceiver to be transferred to another **EVX-261**. Here is the procedure for Cloning one transceiver's data to another.

1. Turn both transceivers "off".
2. Remove the plastic cap and its two mounting screws from the **MIC/SP** jack on the right side of the transceiver. Do this for both transceivers.
3. Connect the optional **CT-27** cloning cable between the **MIC/SP** jacks of the two transceivers.
4. Press and hold in the **PTT** and **SIDE-1** switches (just below the **PTT** switch) while turning the transceiver "on" (the order of the switch-on operation does not matter). When Clone mode is successfully activated in this step.
5. On the **Destination** transceiver, press the **SIDE-1** switch. The LED indicator on the top of the transceiver will glow Green.
6. Press the **PTT** switch on the **Source** transceiver. The LED indicator on the top of the transceiver will glow Red, and the data will be transferred.
7. If there is a problem during the cloning process, the LED indicator on the top of the transceiver will blink Red; check your cable connections and battery voltage, and try again.
8. If the data transfer is successful, the LED indicator on the top of the transceiver will turn off. Turn both transceivers "off" and disconnect the **CT-27** cable. You can then turn the transceivers back on, and begin normal operation.
9. Replace the plastic cap and its two mounting screws.



Main Unit (FR028080C)

Circuit Diagram (RF Section)



Main Unit (FR028080C)

Circuit Diagram (CONTROL Section)