

**ALINCO**

2m FM HAND HELD TRANSCEIVER

**DJ-120T/E**

**INSTRUCTION MANUAL**



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# INTRODUCTION

The Alinco DJ-120T/E is a compact, hand-held 2 meter transceiver for the active VHFer. The transceiver comes standard with 10 memories/VFOs, DTMF pad (DJ-120T), subaudible tones (DJ-120T), and 2.5 watts of RF output power.

The DJ-120T/E has 10 dual function memories/VFOs. Each or the 10 can act as a full-function VFO, complete with + or - 600 kHz repeater shifts and programmable subaudible tone. The entire contents of the VFO is stored in memory when the radio is switched to another VFO. The memory contents can be locked to prevent accidental alteration of a memory channel.

A range of accessories is available to enhance the operation of your radio for your particular use. Accessory batteries are available to yield smaller overall size, increased battery capacity, and up to 6.5 Watts of output power. You can also add an external earphone and/or microphone, and cigarette lighter plugs for extended battery life while mobile. The standard battery pack has a built-in DC/DC converter.

## USING THIS MANUAL

If you are an experienced user of HT-type radios, the section on "Controls" provides a quick way to get the DJ-120T/E operational. For more information, especially if you don't have much experience with an HT, read the sections beginning with "Preparation for Operating" in conjunction with the "Controls" section.

# SPECIFICATIONS

## GENERAL

Frequency coverage:	144.0–147.995 MHz (DJ-120T)	
	144.0–145.995 MHz (DJ-120E)	
Frequency step:	5 kHz (800 channels) (DJ-120T)	
	12.5 kHz (160 channels) (DJ-120E)	
Emission type:	16F3 (FM)	
Antenna Impedance:	50 ohms, unbalanced	
Operating voltage:	5.5 to 12 vdc	
Operating Current:	Battery save	15 mA
(typical at 7.2 vdc)	Squelched	42 mA
	Max. audio out	98 mA
	Transmit HI	750 mA
	Transmit LO	350 mA
Battery charging time:	14–16 hours	
Dimensions:	6 <sup>1</sup> / <sub>2</sub> " (H) x 2 <sup>3</sup> / <sub>8</sub> " (W) x 1 <sup>3</sup> / <sub>16</sub> " (D)	
Weight:	0.82 lbs. (with EBP-7NAZ)	

## RECEIVER

Type:	Dual conversion;
	1st IF 21.6 MHz; 2nd IF 455 kHz
Sensitivity:	Less than .25 uV @ 12 dB SINAD
Spurious response	
Rejection ratio:	more than 60 dB
Selectivity:	More than ± 7.5 kHz at -6 dB
	Less than ± 15 kHz at -60 dB
Squelch sensitivity:	Less than -12 dB
Audio output:	more than 200 mW (10% THD), 8 ohms

## TRANSMITTER

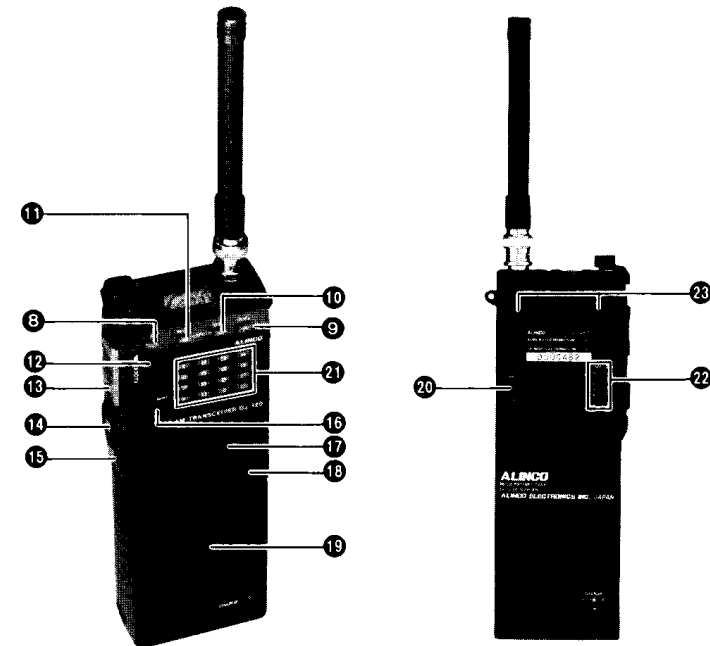
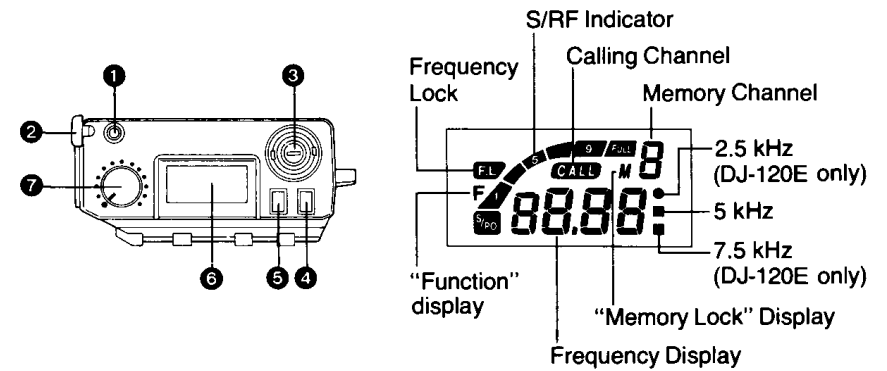
Output power:	See table
Modulation:	Variable reactance FM
Maximum deviation:	± 5 kHz
Harmonic suppression:	-60 dB
Microphone:	Built-in electret condenser
Operating modes:	Simplex
	Shifted + or - 600 kHz from receive frequency

RF POWER OUTPUT TABLE		
Battery	HI	LO
EBP-7NAZ	2.5 W	450 mW
EBP-8NAZ	7.0 W	850 mW

# ACCESSORIES AVAILABLE FOR THE DJ-120T/E

- |                                  |   |
|----------------------------------|---|
| A. EBP-7NAZ (Standard)           | 7.2 V, 700 mAH NiCd with DC/DC converter  |
| B. EBP-8NAZ                      | 12.0 V, 700 mAH NiCd with DC/DC converter |
| C. EDC-10 (120 V)/EDC-6 (220 V)  | Wall charger for 7.2 V NiCds              |
| D. EDC-11 (120 V)/EDC-12 (220 V) | Wall charger for 12.0 V NiCds             |
| E. EDC-2                         | Cigarette lighter plug                    |
| F. EDC-8Z                        | Cigarette lighter plug with noise filter  |
| G. EME-2                         | Earphone/microphone                       |
| H. EME-3Z                        | Earphone                                  |
| I. EMS-1Z                        | Speaker/microphone                        |
| J. ESC-12                        | Soft case                                 |

# CONTROLS



**1 SP/MIC**, 3-conductor miniature phone jack for speaker, earphone, and/or external microphone.

**3 ANTENNA CONNECTOR** provides a BNC jack for connecting a rubber ducky antenna, or an external antenna.

**2 SP/MIC COVER** provides a dust and moisture cover for the SP/MIC jack.

**4 SQL**, the squelch button; in the out position it provides squelch quieting; the in position opens the squelch.

**5 CALL** button toggles between the active memory/VFO and memory 0; also toggles memory lock with FUNCTION button depressed.

**6 LIQUID CRYSTAL DISPLAY** provides a multifunctional display:

**S/RF** indicates relative received signal strength and relative power output on a bargraph display.

**F.L** indicates that the frequency lock switch is engaged.

**F** indicates that the FUNCTION button is being held down.

**FREQUENCY DISPLAY** displays the 10 MHz, 1 MHz, 100 kHz, and 10 kHz digits; a black square indicates 2.5, 5, 7.5 kHz (absence of a black square indicates a 0 in the units kHz position).

**M** shows that the memory channel is locked; the frequency and shift for that memory cannot be altered while locked.

**MEMORY/VFO CHANNEL NUMBER** indicates which memory/VFO you are operating from.

**CALL** indicates that you are operating on the call channel (same as memory 0).

**7 POWER** and **VOLUME**, is a standard audio gain control, with built-in on/off switch.

**8 FUNCTION**, the blue button, enables the alternate functions of the other pushbuttons.

**9 UP**  $\wedge$  changes frequency upwards in steps of 5 kHz, (DJ-120E: 12.5 kHz), or steps 100 kHz with the FUNCTION button depressed.

**10 DOWN**  $\vee$  changes frequency downwards in steps of 5 kHz, (12.5 kHz), or steps of 100 kHz with the FUNCTION button depressed.

**11 MEMO.**, increments VFO/memory number; also increments frequency by 1 MHz with the FUNCTION button depressed. If held down, the VFO/memory channel (or MHz digit if the FUNCTION button is also depressed) will increment sequentially at about 3 channels per second until the button is released.

**12 F.LOCK** in the "up" position locks the frequency currently displayed and will not allow changes to operating frequency or shift.

**13 PTT**; depressing the push-to-talk button enables the transmitter and microphone; releasing the PTT returns the radio to receive.

**14 LIGHT** button turns on the lights behind the LCD for as long as this switch is depressed. (DJ-120T)

**14 TONE BURST** button enables the transmitter with 1750 Hz tone in the duplex mode. (DJ-120E)

**15 RELEASE**; the battery lock is released when the release button is held upward, and the battery pack may be slid off.

**16 SHIFT**, when held depressed, switches the receiver to the repeater input frequency; with the FUNCTION switch held, it toggles the transmit offset frequency from none (simplex), to -600 kHz, to +600 kHz shift.

**17 SPEAKER/MICROPHONE** is built into the radio behind the metal screen.

**18 RESET** button clears all memories, sets all VFOs to 145.000 MHz, and locks memory 0; use a sharp point, such as a pencil, to depress the reset button.

**19 BATTERY**; the standard battery, or optional batteries, slide onto the transceiver and lock; to remove the battery pack, hold the release button up and slide the pack off.

**20 HI/LO** switches the transmitter between high power and low power; see the RF Power Output Table to determine the output power for a specific battery pack.

**21 DTMF PAD (DJ-120T)**; with the PTT depressed, transmits a DTMF (dual tone, multi-frequency) tone corresponding to the digit depressed; A through D can be used for remote control applications.

**22 TONE (DJ-120T)** is used to enable the CTCSS tones and to set the tone frequency (see chart).

**23 BELT CLIP MOUNT**; the belt clip mounts here with the two phillips-head screws provided.

**CTCSS TONE CHART**

(1=ON, blank=OFF)

Freq (Hz)	P1	P2	P3	P4	P5	P6
67.0	1					
71.9		1				
74.4	1	1				
77.0			1			
79.7	1	1				
82.5		1	1			
85.4	1	1	1			
88.5				1		
91.5	1			1		
94.8		1		1		
97.4	1	1		1		
100.0			1	1		
103.5	1		1	1		
107.2		1	1	1		
110.9	1	1	1	1		
114.8					1	
118.8	1				1	
123.0		1			1	
127.3	1	1			1	
131.8			1		1	
136.5	1	1		1		
141.3		1	1	1		
146.2	1	1	1		1	
151.4				1	1	
156.7	1			1	1	
162.2		1		1	1	
167.9	1	1		1	1	
173.8			1	1	1	
179.9	1		1	1	1	
186.2		1	1	1	1	
192.8	1	1	1	1	1	
203.5						1
210.7	1					1
218.1		1				1
225.7	1	1				1
233.6			1			1
241.8	1		1			1
250.3		1	1			1

## PREPARING FOR OPERATION

### ■ BATTERY CHARGING

The battery pack must be fully charged before the radio can be operated for the first time, or when the batteries become discharged through use. Plug the transformer of the supplied EDC-10/EDC-6 charger into a wall outlet, and plug the charging plug into the jack marked "CHARGER" on the back of the battery pack. Charging takes approximately 14 to 16 hours. While the charger is plugged in, the red "CHARGE" LED on the front of the battery pack will illuminate.

### ■ BATTERY INSTALLATION/REMOVAL

The battery must be installed on the radio before it can be operated. To install the battery, align the rails of the battery with those on the transceiver and slide the battery onto the radio. Once slid fully onto the radio, the battery lock will engage. Remove the battery pack by holding the RELEASE button up and sliding the battery pack off.

### ■ ANTENNA INSTALLATION

You must attach a suitable antenna to your transceiver before operating. The included rubber ducky antenna provides a convenient and durable antenna for portable operation. When operating fixed or mobile, you can increase the performance of the DJ-120T/E by using an external antenna. Many antennas are available that provide gain of from 3 to 14 dB or more.

### ■ BELT CLIP INSTALLATION

The included belt clip is easily mounted to the back of the radio. Using the two screws provided, attach the belt clip to holes (23) on the back of the radio.

## OPERATION

### ■ POWER

After charging and installing the battery pack and installing an antenna, turn the DJ-120T/E on by rotating the POWER/VOLUME switch clockwise. You will not hear any audio when you do this. Depress the SQL button, and you will hear receiver noise; adjust the volume to a comfortable level and depress the squelch button again to quiet the receiver.

### ■ FREQUENCY SELECTION

When the radio is first turned on, or after being reset (see the section on RESET) all VFOs/memories will be set to 145.000 MHz, and the VFO/memory 0 will be in the memory lock mode. At all other times, the VFO/memories will contain the frequency that you last stored there, along with the settings for repeater shift.

Select the VFO/memory that you want to program by stepping through VFO/memory channels with the MEMO. button. Holding the MEMO. button down will cause the VFO/memory channels to step sequentially until the button is released. You can then set the frequency by using the UP  $\wedge$ , DOWN  $\vee$ , and FUNCTION+MEMO. buttons. First, set the correct MHz digit with the MEMO. button while holding the FUNCTION button down. This will step the MHz digit up 1 MHz each time you depress the MEMO. button. When you have set the correct MHz digit, move on to the 100 kHz digit. This is set by depressing either the UP  $\wedge$  or DOWN  $\vee$  button while holding down the blue FUNCTION button. When you've reached the correct digit, stop and go on to set the 10 kHz and kHz digits using the UP  $\wedge$  or DOWN  $\vee$  button without holding the FUNCTION button.

A black square indicates 2.5 kHz, 5 kHz, 7.5 kHz and absence of the square indicates 0 kHz.

Once you've finished setting the frequency that you want to operate on, you can set repeater shift and CTCSS tones (DJ-120T), if necessary. If you want to operate simplex, you are finished and can begin operating.

The display shows the receive frequency. To operate through a repeater, you must set the correct transmit frequency offset (shift). Set the repeater offset by depressing the SHIFT button while holding the FUNCTION button down. The first depression steps to -600 kHz offset, and the second depression steps to +600 kHz offset; the third depression repeats the cycle by stepping back to no offset (simplex). The CTCSS tone, if needed, can be set with the DIP switch on the back of the radio using the CTCSS Tone Table (DJ-120T).

Once you have programmed the frequency information, you can lock the memory so that you can't accidentally change it. Do this by pressing the CALL button while holding the blue FUNCTION button. A small "M" will appear in the LCD to remind you that the memory is locked. It's a good idea to lock the memories that you have programmed with often-used repeater or simplex frequencies. You can still step to other VFO/memories with the MEMO. button. To prevent accidental switching of VFO/memories, slide the F.LOCK switch up, which will be confirmed by a "F.L" on the LCD. This will prevent you from changing the frequency of the displayed VFO/memory, or from changing VFO/memory channels. You can activate the F.LOCK switch with or without the memory locked.

The BATTERY SAVE function turns off much of the radio's circuitry for 7 to 8 hundred milliseconds every second. If activity is heard on the channel when the radio turns on, it will lock on. If no activity is heard, the radio will go back to sleep for 7 to 8 hundred milliseconds. The BATTERY SAVE function will dramatically increase your battery life.

When using repeater shift, you can listen to the repeater's input frequency by holding the shift button down. This function works even with memory and frequency locks engaged. If you can receive the other station clearly, you can probably work simplex and free up the repeater for other stations.

#### ■ CALL CHANNEL

The call channel is handy when you have a frequency that you want to be able to access instantly, such as 144.50 MHz or a favorite repeater. Push the CALL button, and you will instantly go from the channel you were working to the CALL channel. Depressing the CALL button again will return you to the channel you were operating on prior to using the CALL feature. The CALL channel is actually VFO/memory 0, so whatever you program into that channel becomes the CALL channel frequency. It's a good idea to lock the memory of the CALL channel to prevent accidental alteration.

#### ■ SQUELCH

The squelch in the DJ-120T/E is set up so that you need not adjust it. It will quiet receiver noise, while letting copyable signals through. If you are trying to receive a very weak signal, you may wish to open the squelch to prevent the

circuit from quieting the other station. Do this by depressing the SQL button. Depressing it again releases the button and returns the squelch to normal operation.

#### ■ POWER SELECTION

You can operate the transceiver in either high (HI) or low (LO) power positions. With the standard battery pack, HI provides about 2.5 W of RF output, and LO provides about 450 mW. Using the low power position will extend your battery life significantly...up to 100% or more. The high power position will assure solid communications through a repeater or simplex when low power is not sufficient. Switch between high and low power with the slide switch on the back of the radio marked "HI" and "LO".

#### ■ CTCSS TONES (DJ-120T)

Subaudible CTCSS tones are built into the DJ-120T. The tones are programmed using the 7-position DIP switch on the back of the radio. The CTCSS Tone Table lists the programming information for the available frequencies. Once set, the tones are enabled by sliding "T" switch to "ON", and can be disabled by sliding the switch to "OFF".

#### ■ DTMF PAD (DJ-120T)

The built-in DTMF pad provides all 16 combinations of tones. The pad can be used with an autopatch for access to the telephone system, or can be used with another receiver for remote control applications. The PTT button must be held down while using the DTMF pad. Be careful what you say while using the pad...the microphone is still enabled between digits!

#### ■ LAMP (DJ-120T)

When it becomes too dark to read the LCD, you can use the backlighting feature to illuminate it. Holding the LAMP button down turns on the two lights behind the display. These lamps draw about 12 mA of current, and can shorten your battery life if used for a long period of time.

#### ■ RESET

If you should need or want to reset the transceiver, use a pointed object, such as a pencil tip. Insert the tip into the hole marked "RESET" far enough to activate the switch. The display will blink and return set to 145.00 MHz, and in VFO/memory 1. All other VFO/memories will also be set to 145.000 MHz, and VFO/memory 0 will be locked.