Introduction

The MFJ-422D *Electronic Keyer Paddle* is an iambic keyer and paddle combination. The MFJ-422DX keyer installs on your MFJ-564 or Bencher type paddle. Both are microprocessor controlled keyers that provide iambic key operation and dot-and-dash memory to make sending perfect code easier. It has tunable code speed, code weight, and sidetone frequency; it supports both direct and grid-block keying outputs. You also get to choose between Iambic Type "A" and Type "B" keying.

Note: *All references to the MFJ-422D apply to the MFJ-422DX, unless otherwise stated.*

Control Functions

1. The **Power** button turns the unit ON and OFF. The power is ON when the button is locked in the "in" position and the LED is lit and OFF in the "out" position.

2. The **Semi-Auto/Auto** button allows semi-automatic "bug" and manual operations. The keyer generates dots automatically when a squeeze or single lever key is used. Dashes are manually made. The keyer is completely manual when a straight key is used. Semi-Auto is active when the switch is in the "in" position and Auto when in the "out" position.

3. The **Speed** control, located on the left side of the unit, varies the code speed. The speed range is configured with an internal jumper (JMP9) for 5 to 65 WPM or 10 to 40 WPM. Turn the control clockwise to increase speed and counter-clockwise to decrease speed. The unit is factory set to 5 to 65 WPM. To make the speed adjustment less sensitive, change the speed range to the narrower range of 10 to 40 WPM. To change the speed range the power must be off, then remove the paddle to access the jumper inside the case. Locate jumper JMP9 next to the microprocessor and set it to the "H" position.

   Note: *Power must be off when changing the jumper settings.*

4. The **Volume** control, located on the left side of the unit, adjusts the sidetone level of the internal speaker. Turn the control clockwise to increase the volume and counter-clockwise to decrease the volume.

5. The **Weight** control varies the code weight from approximately 25% to 75%, with the standard dot defined as 50% weight. The standard dot-dash-

space ratio is 1:3:1 (trimpot at mid-range). This control is accessed through a small hole on the rear of the unit and may be adjusted using a small flat-headed screwdriver. This control is turned clockwise to increase dot and dash lengths and counter-clockwise to decrease dot and dash lengths.

6. The **Tone** control sets the desired sidetone pitch from approximately 300 to 1200 Hz. This control is also accessed through a small hole on the rear of the unit and may be adjusted using a small flat-headed screwdriver. This control is turned clockwise to raise the pitch and counter-clockwise to lower the pitch.

7. The **Key Output** circuit supports both positive and negative keyed radios. The MFJ-422D can only key one type of transmitter at a time. This is an internal jumper selected option. The unit is factory set to direct keying (most solid state radios). To change to grid-block keying (most radios with tube finals) the power must be off, then remove the paddle to access the jumpers inside the case. Locate jumpers JMP1 and JMP2. JMP2 is directly behind the RCA jack (J2). JMP1 is located behind the power jack (J1). Set ***both*** jumpers JMP1 and JMP2 to the "G" position. To key a solid state transmitter, set both jumpers to the "D" position.

   Note: *Power must be off when changing the jumper settings.*

8. The **Iambic Type A/B** mode is also set inside the unit with a jumper. The unit is factory set for Type "A" Iambic. If you prefer Type "B" Iambic, remove the paddle to access the jumper. Locate jumper JMP3 behind the power jack (J1), between JMP1 and JMP8; set it to the "B" position. For Type "A" Iambic, set the jumper to the "A" position.

   Note: *Power must be off when changing the jumper settings.*

   When a squeeze is released during an element (dot or dash), type "B" adds the opposite element. Type "A" just finishes the element in progress and does *not* produce a following alternate element. For example, in Type "A" Iambic, a squeeze release during the "dah" in the letter A will produce "dit dah" (A). In Type "B" Iambic, a squeeze release during the "dah" in the letter A will produce "dit dah dit" (R).

Paddle Installation for the MFJ-422DX

If you purchased the MFJ-422DX (keyer without paddle), you must install it onto your paddle. Follow these instructions for installing the MFJ-422DX onto a MFJ-564 or Bencher type paddle:

1. Remove any cables from the paddle. Do not apply power to unit while it is disassembled.

2. Set up your MFJ-422DX now, using the four internal jumpers, to the type of output keying required, the desired Iambic mode, and the speed range. Refer to items 3, 7 and 8 of the previous section for locations and meanings of these jumpers; also, refer to the "Jumper Settings" section on page 5 for the meanings of these jumpers.

3. If you wish to use a nine volt battery, install one now. A nine volt battery fits in the battery clip located inside the case. MFJ suggests the use of a good long-life alkaline battery for longest operation.

4. Remove the rubber foot from the bottom rear of the paddle.

5. Remove the plastic cable clamp from the bottom center of the paddle.

6. Slide the MFJ-422DX on to the back of the paddle. Thread the cable through the slot on the bottom of the MFJ-422DX. Secure the case with the rubber foot and new screws. The MFJ-564 Iambic Paddle has four additional holes to better secure the case of the paddle.

7. Connect the BARE wire of the cable to the middle terminal on the bottom of the paddle for GROUND.

8. If you normally operate the paddle *right-handed*, then connect the DOT (white or clear colored) wire to the *left* paddle terminal and the DASH (black) wire to the *right* terminal. Connect the wires the opposite way if you operate the paddle *left-handed*.

9. Place the cable in the plastic cable clamp and secure it with a screw. Fold any excess cable up into the unit.

Connections

1. A nine volt battery (not included) may be installed. Remove the case by removing the screws on the bottom that secure it to the paddle. A battery clip, located inside the case, is provided for installing a nine volt battery.

2. A 12 Vdc power supply may also be used to power the MFJ-422D. A 2.1mm coaxial plug with a positive center and a negative sleeve should be used to power this unit. The MFJ-1312B, an optional power adapter, is available from MFJ Enterprises, Inc. The battery is automatically disconnected when external power is used.

3. The keying circuit allows keying of grid-block and solid state transmitters. Keying output connection is made with a quality standard shielded RCA cable between your radio key input and the MFJ-422D's **Key Output** jack.

   Note: *Consult the transmitter's instruction manual to determine which output to use. When in doubt, try both jumper positions. The transmitter will key continuously or not at all when the jumpers are connected to the wrong positions.*

Keyer Operation

1. A nine volt battery or an optional power adapter may be used to supply power to the keyer.

2. The keyer should be turned on by pressing the **Power** button and the LED is lit.

3. The **Semi-Auto/Auto** button should be in the "out" position for automatic operation.

4. The user should now start sending with the paddle and adjust volume, tone, weight, and speed to his or her preference.

5. The dot and dash memories make sending easier. The memories allow the user to key a dot before the completion of a dash and vice versa. This feature can be checked by setting the keyer to the lowest speed and tapping first the dash lever and then the dot lever before the completion of the dash. The keyer will provide both the dash and the dot. The dash memory can be checked in a similar manner. The dot insertion feature allows the user to insert a dot by tapping the dot lever while holding the dash lever in. The dash insertion feature allows the user to insert a dash while holding the dot lever in. The Iambic operation feature allows sending of alternate dots and

dashes when both paddles are squeezed. The first paddle contacted will determine whether a dot or dash occurs first.

6. The user may select either **Iambic A** or **B** according to his or her preference.

Jumper Settings

JMP1	JMP2			Keying Mode
D	D			Direct *
D	G			Invalid
G	D			Invalid
G	G			Grid Block
		JMP3		Iambic Mode
		A		A *
		B		B
			JMP9	Speed Range
			L	5 - 65 WPM *
			H	10 - 40 WPM

* Factory defaults.

Morse Code Character Set[1]

A	di-dah	• –	N	dah-dit	– •
B	dah-di-di-dit	– • • •	O	dah-dah-dah	– – –
C	dah-di-dah-dit	– • – •	P	di-dah-dah-dit	• – – •
D	dah-di-dit	– • •	Q	dah-dah-di-dah	– – • –
E	dit	•	R	di-dah-dit	• – •
F	di-di-dah-dit	• • – •	S	di-di-dit	• • •
G	dah-dah-dit	– – •	T	dah	–
H	di-di-di-dit	• • • •	U	di-di-dah	• • –
I	di-dit	• •	V	di-di-di-dah	• • • –
J	di-dah-dah-dah	• – – –	W	di-dah-dah	• – –
K	dah-di-dah	– • –	X	dah-di-di-dah	– • • –
L	di-dah-di-dit	• – • •	Y	dah-di-dah-dah	– • – –
M	dah-dah	– –	Z	dah-dah-di-dit	– – • •

1	di-dah-dah-dah-dah	• – – – –	6	dah-di-di-di-dit	– • • • •
2	di-di-dah-dah-dah	• • – – –	7	dah-dah-di-di-dit	– – • • •
3	di-di-di-dah-dah	• • • – –	8	dah-dah-dah-di-dit	– – – • •
4	di-di-di-di-dah	• • • • –	9	dah-dah-dah-dah-dit	– – – – •
5	di-di-di-di-dit	• • • • •	0	dah-dah-dah-dah-dah	– – – – –

Period	[.]	di-dah-di-dah-di-dah	• – • – • –	$\overline{AAA}$
Comma	[,]	dah-dah-di-di-dah-dah	– – • • – –	$\overline{MIM}$
Question Mark or Request for Repetition	[?]	di-di-dah-dah-di-dit	• • – – • •	$\overline{IMI}$
Fraction Bar or Slash Bar	[/]	dah-di-di-dah-dit	– • • – •	$\overline{DN}$
End of Message, Plus Sign, or Cross	[+]	di-dah-di-dah-dit	• – • – •	$\overline{AR}$
End of Work		di-di-di-dah-di-dah	• • • – • –	$\overline{SK}$
Double Dash, Equal Sign, Pause, or Break	[=]	dah-di-di-di-dah	– • • • –	$\overline{BT}$
Semicolon	[;]	dah-di-dah-di-dah-dit	– • – • – •	$\overline{KR}$
Colon	[:]	dah-dah-dah-di-di-dit	– – – • • •	$\overline{OS}$
Apostrophe	[']	di-dah-dah-dah-dah-dit	• – – – – •	$\overline{WG}$
Quotation Mark	["]	di-dah-di-di-dah-dit	• – • • – •	$\overline{AF}$
Hyphen or Dash	[-]	dah-di-di-di-di-dah	– • • • • –	$\overline{DU}$
Underline	[_]	di-di-dah-dah-di-dah	• • – – • –	$\overline{IQ}$
Dollar Sign	[$]	di-di-di-dah-di-di-dah	• • • – • • –	$\overline{SX}$
Left Parenthesis or Go Only	[(]	dah-di-dah-dah-dit	– • – – •	$\overline{KN}$
Right Parenthesis	[)]	dah-di-dah-dah-di-dah	– • – – • –	$\overline{KK}$
Wait or Stand By		di-dah-di-di-dit	• – • • •	$\overline{AS}$
Understood		di-di-di-dah-dit	• • • – •	$\overline{SN}$
Starting Signal		dah-di-dah-di-dah	– • – • –	$\overline{KA}$
Error		di-di-di-di-di-di-di-dit	• • • • • • • •	$\overline{HH}$
Paragraph	[¶]	di-dah-di-dah-di-dit	• – • – • •	$\overline{AL}$
Invitation to Transmit or Go Ahead	[K]	dah-di-dah	– • –	K

1. FCC test requirement consists the 26 letters, the 10 numerals, the period, the comma, the question mark, $\overline{AR}$, $\overline{SK}$, $\overline{BT}$ and fraction bar $\overline{DN}$.

Signals Used In Other Radio Services

Interrogatory	di-di-dah-di-dah	• • – • –	$\overline{INT}$
Emergency Silence	di-di-di-di-dah-dah	• • • • – –	$\overline{HM}$
Executive Follows	di-di-dah-di-di-dah	• • – • • –	$\overline{IX}$
Break-in Signal	dah-dah-dah-dah-dah	– – – – –	$\overline{TTTTT}$
Emergency Signal	di-di-di-dah-dah-dah-di-di-dit	• • • – – – • • •	$\overline{SOS}$
Relay of Distress	dah-di-di-dah-di-di-dah-di-dit	– • • – • • – • •	$\overline{DDD}$

Technical Assistance

If you have any problem with this unit first check the appropriate section of this manual. If the manual does not reference your problem or your problem is not solved by reading the manual you may call *MFJ Technical Service* at **662-323-0549** or the *MFJ Factory* at **662-323-5869**. You will be best helped if you have your unit, manual and all information on your station handy so you can answer any questions the technicians may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS 39759; by Facsimile to 662-323-6551; or by email to techinfo@mfjenterprises.com. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

Notes

Schematic