

# MFJ

## *Screwdriver Antenna Controller™*

Model MFJ-1924



### INSTRUCTION MANUAL

**CAUTION: Read All Instructions Before Operating Equipment !**

## **MFJ ENTERPRISES, INC.**

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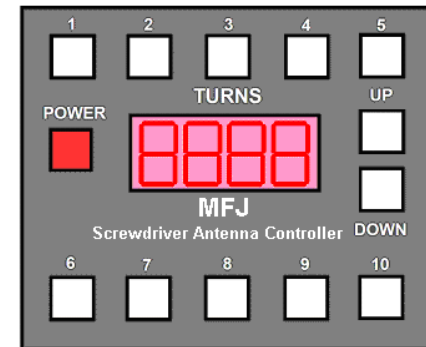
## Introduction

The MFJ-1924 Screwdriver Controller provides manual operation for tuning screwdriver antennas. In addition, tuned positions can be saved in one of the 10 presets so it can be recalled later. A 4-digit counter is used to display the current antenna position. A sensor is required for the counter and automatic operation to function properly. This controller is compatible with single and dual sensor setups. If your antenna does not have a sensor installed, contact the antenna manufacturer or MFJ.

## Features

- 4-Digit Turns Display
- 10 Programmable Presets
- Manual Up/Down Buttons
- Current Sensor Trip for Antenna/Motor Protection
- Auto-Park: Lowers antenna to lowest position and zeros counter
- Powered From 12V Vehicle Supply

## Front Panel



- **Power:** Push button switch powers the controller on and off.
- **Up:** Moves the screwdriver antenna up.
- **Down:** Moves the screwdriver antenna down.
- **Buttons 1 – 5:** Top bank of preset buttons.
- **Buttons 6 – 10:** Bottom bank of preset buttons.

**Installation (A)****Controllers that have six wires.**

There are six wires that need to be connected in order for the controller to function properly.

1. The red wire needs to be fused and connected to the vehicle's +12 VDC supply. The size of the fuse depends upon the current requirement of the antenna motor. Typically a 5 Amp slow-blow fuse will work. Some installations may require additional wire. Use 16 AWG wire to add additional length.
2. The black wire needs to be connected to the vehicle (station) ground. If the supplied red and black wires are not long enough, Use 16 AWG wire to add additional length.

**WARNING: Do not reverse the polarity of the Red and Black wires. Damage will occur to the controller.**

3. The remaining four wires are connected to the antenna. The Green and Yellow wires are connected to the motor. *The polarity of the motor connection determines the direction of the antenna.* If the motor moves in the wrong direction, swap the wires or see the menu setup section for setting the correct direction.
4. The Brown and White wires are the sensor wires and should be connected to the magnetic sensor on the antenna. *There is no polarity associated with these wires.* The following table shows the wire color and connections.

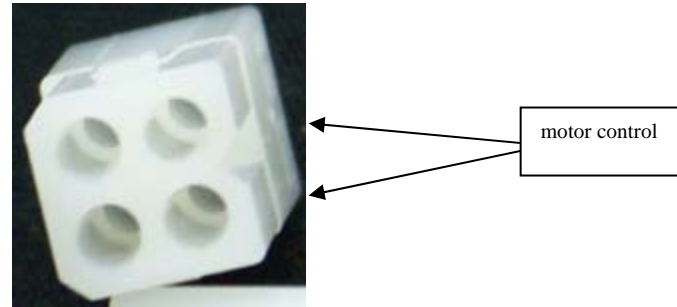
<b>Red</b>	<b>+12VDC</b>
<b>Black</b>	<b>Vehicle Ground</b>
<b>Green</b>	<b>Antenna Motor</b>
<b>Yellow</b>	<b>Antenna Motor</b>
<b>Brown</b>	<b>Magnetic Sensor</b>
<b>White</b>	<b>Magnetic Sensor</b>

You will need to connect wires to each of these four wires, so that they will reach your screwdriver antenna. Use quality insulated wire for these extensions. The motor control wires should be no smaller than 18 AWG. the sensor wires should be no smaller than 24 AWG. Take care and follow your antenna manufacturer's suggestions about routing these wires for a mobile installation. Avoid routing control wires with the feed line. Make sure a RF choke is placed around the control lines at the antenna.

**Installation (B)**

**Controllers that have the 4 pin Molex plug.**

1. The red wire needs to be fused and connected to the vehicle's +12 VDC supply. The size of the fuse depends upon the current requirement of the antenna motor. Typically a 5 Amp slow-blow fuse will work. Some installations may require additional wire. Use 16 AWG wire to add additional length.
2. The black wire needs to be connected to the vehicle (station) ground. If the supplied red and black wires are not long enough, Use 16 AWG wire to add additional length.
3. Connect the 4 pin Molex to the antenna.



**Antennas that do not have a 4 pin plug. The plug can be cut off. Use the chart below for wire color and its function.**

CONTROL CABLE

RED	MOTOR WIRE
BLACK	MOTOR WIRE
GREEN	SENSOR
WHITE	SENSOR

**WARNING:** An RF choke must be placed around the control lines at the antenna. The Controller may be damaged if an RF choke is not used.

**Motor Operating Voltage**

This control unit is designed to operate with a screwdriver antenna that operates on 12 volts. Many antennas operate on only 3 or 4 volts, a Dropping Resistor can be used inline with the motor wires to bring the voltage down. Consult your antenna manual or manufacturer for the operating voltage.

**Important:** Failure to adjust and operate your screwdriver antenna at the proper voltage will damage the antenna motor.

If a dropping resistor is necessary, a good value to try is 5  $\Omega$ /10 Watts. This resistor will need to be placed inline on one of the motor control lines anywhere in between the MFJ-1924 and the antenna. If you are not sure whether or not this resistor is necessary for your antenna, try it and inspect the torque and speed of the motor. If the motor is too slow, reduce or eliminate the resistance. Use of 12 volts with a 3 or 4-volt antenna will result in failure of the motor.

**WARNING:** Do not apply voltages greater than 18 volts to this unit, or permanent damage to the unit and antenna may result.

### Menu

The table below lists the features and options of the MFJ-1924. Use this table and the following section to adjust these settings specific to your screwdriver antenna and its requirements for proper operation.

Function	Activate By:	Description
Reset	Hold <i>Down</i> button while powering up unit.	Clears all memory positions
Auto Park	Depress <i>Up</i> and <i>Down</i> simultaneously for 2 seconds.	Bottoms antenna and zeros the counter
Current Mode	Press <i>Button 2</i> while powering up unit.	Displays Motor Current when moving antenna
Setup Menu	Press <i>Button 6</i> while powering up unit.	Allows setting the trip current and relay delay.

### **Setup Menu Flow**

Hold *Button 6* + Power On → Trip Current (C) → Relay Delay (d) → Set UP → Normal Operation

### Setup Menu

The MFJ-1924 controller must be calibrated for the screwdriver antenna that it will control. This includes calibration of the counter and the selection of the motor trip current.

### Setup Menu Navigation

After entering setup, the setting and the value are displayed. Pressing Up or Down changes the value. Pressing Buttons 1 – 10 will save the selected value and move to the next setting. After the end is reached the last value is saved and the controller continues with normal operation.

### **Trip Current**

This is shown in the menu with a “C” in the left-most digit. The other 3 digits will display the currently selected value. The trip current value is used to determine when the motor has stalled and immediately shuts the motor off. This feature protects the motor from damage if the antenna becomes stalled. The current is displayed as Cxxx, which translates into x.xx amps. The default setting is C075 or 0.75 amps. This is also the setting for use with the Ameritron SDA-100 Screwdriver Antenna.

### **Trip Current Selection**

The trip current value is used to determine when the motor has stalled and immediately shuts the motor off. In order to determine the trip current value that needs to be set, the controller can be turned on in current mode to display the current that is read from the current sensor. In this mode, when the antenna is moved, the current drawn by the motor is shown. Stalling the motor by moving the antenna all the way down will show the stall current of the motor. A value between  $\frac{1}{4}$  and  $\frac{3}{4}$  of the stall current should be enough for the trip current setting and is shown on the display in the same way as setting the trip current.

### **Relay Delay**

This setting controls the amount of time the relays are reversed when the motor is stopped. When the motor is stopped, the relay that was moving the motor is deactivated and the opposite relay is activated for the duration set in the menu. The default setting is 20ms. The values range from 0ms – 200ms.

### **UP**

This determines which button will move the antenna up. This can also be used to move the antenna correctly if the motor terminals are reversed. When UP is on the display, press the corresponding button (*Up* or *Down*), which moves the antenna up. This is then saved to memory. Pressing any other key will not make any changes and simply exit setup. Since this is the last setting in the setup menu. The controller will proceed with normal operation.

### **Saving Memory Positions**

To store memory press and hold any button 1 thru 10 until the display reads done.

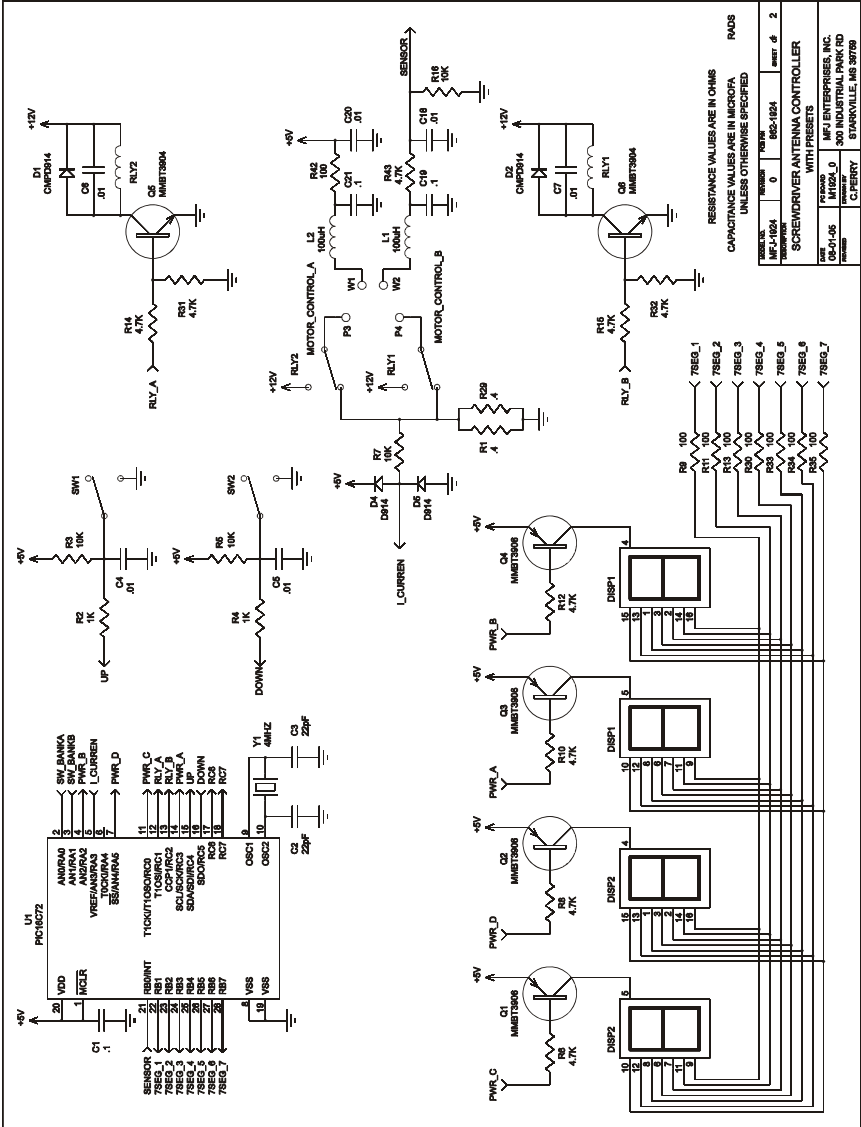
**TECHNICAL ASSISTANCE**

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 (FAX) to 662-323-6551; or by email to [techinfo@mfjenterprises.com](mailto: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.

**Schematic**





RESISTANCE VALUES ARE IN OHMS  
 CAPACITANCE VALUES ARE IN MICROFA  
 UNLESS OTHERWISE SPECIFIED

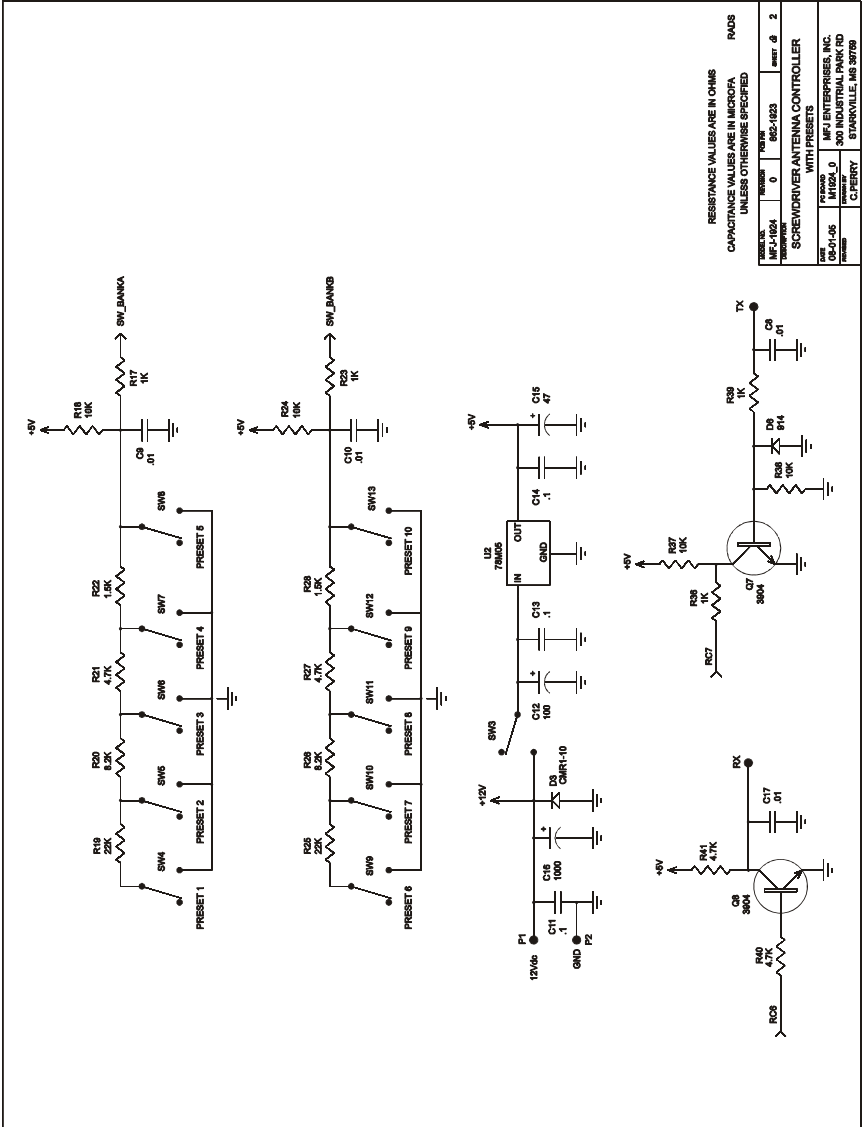
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MFJ-1924	0	02-2-02	MFJ		

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RAUS

SCREWDRIVER ANTENNA CONTROLLER  
 WITH PRESETS

MFJ ENTERPRISES, INC.  
 300 INDUSTRIAL PARK RD  
 STARBUCK, MD 20688  
 C. PERRY



**Trouble Shooting:**

Controller does not count but antenna moves up and Down

An. 1. Check the plug for loose connection.

2. Need to determine if it is the antenna or controller.

Disconnect the antenna from the controller. Take the end of the cable going to the controller. Press the Up or Down button and tap the two sensor pins together. The counter will increment each time the pins are touched together and then separated. (The up **or** down button must be press during the test) The controller is good if the counter increments. It will be the antenna at fault or a bad wire going to the antenna.

Display will not turn on.

1. Check the power lines to the controller for 12 to 15 Volts DC.

2. One of the momentary buttons could be stuck in the down position.

The Display reads TRIP when the up or down button is pressed.

1. Trip current set too low. (Ref page 6)

2. Antenna is in a bind.

3. Relay in controller stuck.

## **DISCLAIMER**

Information in this manual is designed for **user purposes only** and is **not** intended to supersede information contained in customer regulations, technical manuals/documents, positional handbooks, or other official publications. The copy of this manual provided to the customer will **not** be updated to reflect current data.

Customers using this manual should report errors or omissions, recommendations for improvements, or other comments to MFJ Enterprises, 300 Industrial Park Road, Starkville, MS 39759. Phone: (662) 323-5869; FAX: (662) 323-6551. Business hours: M-F 8-4:30 CDT



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