

MFJ

Transceiver Voltage Conditioner

Model MFJ-4403



INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.

300 Industrial Park Road
Starkville, MS 39759 USA
Tel: 662-323-5869 Fax: 662-323-6551

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 CST.

TABLE OF CONTENTS

<u>TOPIC</u>	<u>PAGE</u>
1. TABLE OF CONTENTS	2
2. LIST OF FIGURES AND TABLES	2
3. INTRODUCTION AND FEATURES	3
4. SYSTEM CONTROLS AND INDICATORS	4
5. THEORY OF OPERATION	6
5. EASY-START INSTRUCTIONS	6
7. OPERATION	7
8. IN CASE OF DIFFICULTY	9
9. TECHNICAL ASSISTANCE	10

LIST OF FIGURES

Figure 1	Front Panel Jacks and Controls	4
Figure 2	Rear Panel Jacks and Controls	5
Figure 3	Block Diagram	6
Figure 4	Schematic	8

INTRODUCTION & FEATURES

The MFJ-4403 Transceiver Voltage Conditioner was designed for the ultimate transceiver protection from even non-ideal voltage sources, which can cause major damage to radios and other equipment. This makes the MFJ-4403 particularly valuable for DXpeditions, mobile and portable operation. And even in the home, the MFJ-4403 provides protection from any potential power supply problems due to transients and noise induced on your transceiver's DC input by any AC or RF anomalies. With this in mind the MFJ-4403 provides the following protection to your equipment:

REVERSE POLARITY PROTECTION – If you accidentally reverse your input voltage connection, the bright red REVERSE POLARITY LED will alert you to this fact. And even if the MFJ-4403 is on during this condition, no damage will occur to the MFJ-4403 or your equipment!

TRANSIENT SUPPRESSION – Heavy duty transient suppressor clamps input transients to 15 volts and handles over 200 amps peak current to protect your equipment from vehicle start-up voltage spikes, and poorly regulated power supply transients.

SHORT CIRCUIT PROTECTION – Input and output fuses instantly protect you from short circuit conditions. Automotive Blade fuses are utilized for easy replacement.

NOISE AND RIPPLE FILTERING – A capacitor bank consisting of over 4 Farads of ultra high-value capacitors filter off virtually all power supply noise and ripple. This capacitor bank provides enough power supply buffering that even under-rated and marginal power supplies and wiring can run your HF transceiver. You can even run a full 100 watt SSB transceiver from your automotive cigarette lighter (accessory) socket for temporary mobile applications.

RUGGED CONSTRUCTION - Attractive all-metal cabinet and conservative component selection ensures solid performance for years to come. Fully covered by MFJ's "No Matter What" one year limited warranty.

Before attempting to operate your MFJ-4403, please read this manual thoroughly. It contains important detail about setting up your unit to obtain the best performance.

SYSTEM CONTROLS AND INDICATORS

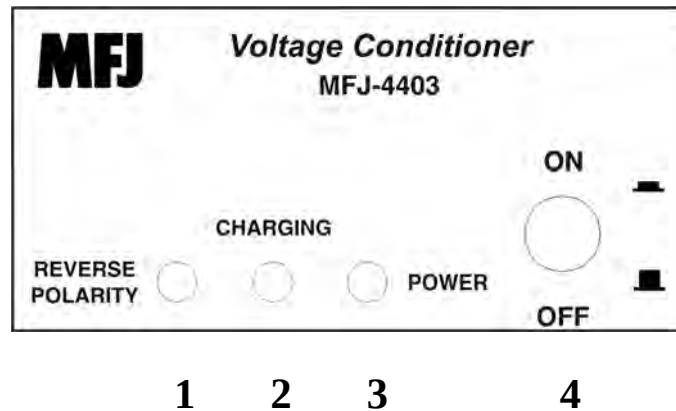
Front Panel Controls:

Figure 1: MFJ-4403 Front Panel Controls

- 1. Reverse Polarity LED:** This Red LED indicates that the input voltage applied to the unit is connected backwards. No damage will occur to the MFJ-4403 or any connected equipment. *However - Correct this situation immediately.*
- 2. Charging LED:** This Yellow LED indicates the capacitor bank is in initial charging mode. Do not power on your radio unit this LED extinguishes.
- 3. Power LED:** This green LED indicates that power is applied to the unit and the unit has been turned on. When the MFJ-4403 is turned off this LED remains illuminated until the capacitor bank discharges.
- 4. On/Off:** Enables or disables the MFJ-4403. When turned off, no current is drawn from the voltage source by the MFJ-4403 or any connected equipment. And when turned off, the MFJ-4403 provides an internal bleeder resistor to safely discharge the capacitor bank in about one minute.

SYSTEM CONTROLS AND INDICATORS

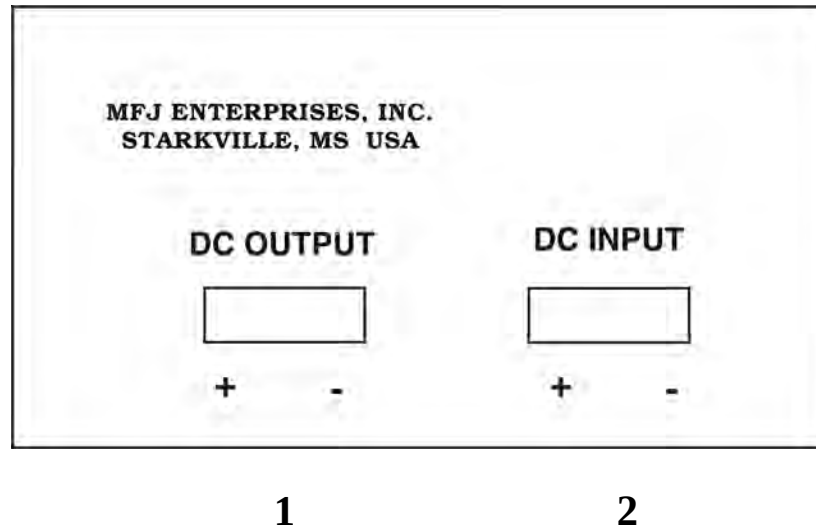
Rear Panel Jacks:

Figure 2: MFJ-4403 Rear Panel Jacks

1. DC Output: This is the 25-amp fused DC output that interfaces to your transceiver. Connect your Anderson Powerpole™ terminated transceiver DC cable here. Or use MFJ-5535M or MFJ-5512M pre-wired cables if desired. If making your own cables, use 12-gauge or larger wire and ensure that the polarity is correct. **There is no reverse polarity protection on the output, and your transceiver can be damaged if connected incorrectly.**

Note: If you accidentally connect your DC input voltage source to the DC Output connector, the 25-amp output fuse will blow or your input voltage source may trip-out if it is over-current protected.

2. DC Input: These Anderson PowerPole™ connectors are where the DC input from your power source is attached. When operating from an automotive accessory socket, the MFJ-5510M Cigarette Lighter cable is available for those who do not wish to construct their own automotive accessory socket cable. If you make your own DC input cable, use 12-gauge or larger wire.

THEORY OF OPERATION

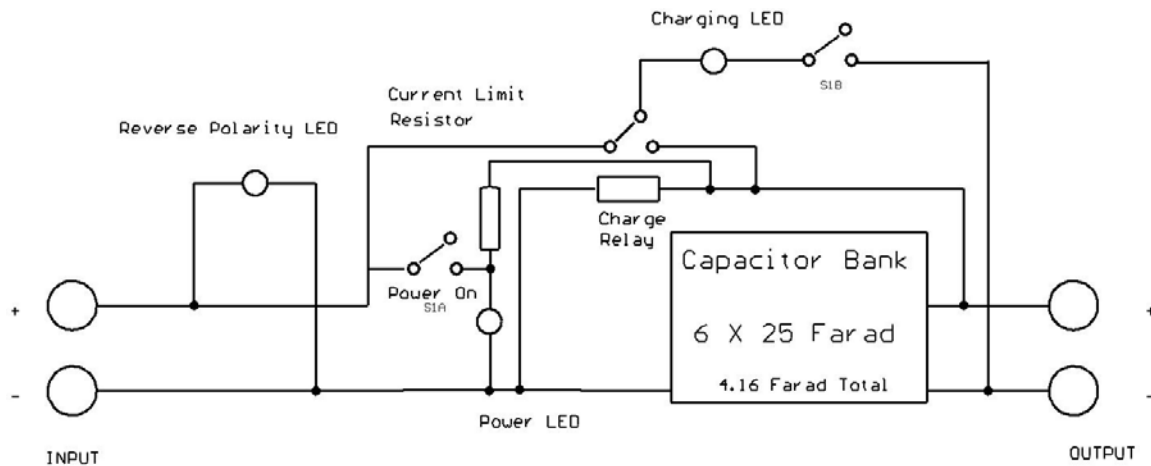


Figure 3: MFJ-4403 Block Diagram

Refer to the block diagram for this discussion of the theory of operation. The input voltage source is attached to a reverse connected LED diode that instantly shows if the input is hooked-up wrong. When the power switch is turned on the input voltage is fed through a current limiting resistor and turns on the Power and Charging LEDs. This current-limited voltage is also fed to the capacitor bank, allowing the capacitors to slowly charge up. This keeps the initial in-rush current from blowing the input fuse. After about 1 minute, the capacitor bank reaches a voltage of approximately 10 volts allowing the charging relay to close. This turns off the voltage to the Charging LED and allows full current to flow from the input to the output. After the capacitor bank is charged, any peak current that exceeds the input current source capability is provided by the capacitor bank. When the MFJ-4403 is turned off, a current limiting resistor is connected across the capacitor bank so as to discharge this capacitor bank within about a minute.

EASY START INSTRUCTIONS

With the unit off, simply attach your prepared or purchased input cable to the Input Anderson PowerPole™ connector. Then connect either your prepared transceiver cable, the MFJ-5535M HF power cable or the MFJ-5512M VHF/UHF cable to the Output PowerPole™ connector. Attach your radio and turn-on the MFJ-4403. After the Charge LED has extinguished, turn on your radio. The Charge LED may take up to a minute to extinguish.

OPERATION

The MFJ-4403 provides input transient voltage protection, reverse polarity protection, and extremely good power supply filtering. The MFJ-4403 also has the ability to provide peak current in excess of the current capability of the voltage source for lower duty cycle operating modes, such as SSB and CW. It does this because the extremely high-value capacitor bank can supply very high peak currents as long as the capacitor bank can be recharged during intervening lower-current events.

Operation from high-current voltage sources

There are no restrictions when operating your 100-watt transceiver from a voltage source able to supply full operating current. In this case you should replace the 15-amp input fuse with a 25-amp fuse, especially if you will be using high duty-cycle modes.

Operation from automotive accessory sockets

When operating from an automotive accessory socket, your 100-watt transceiver can be operated at full output power for SSB operation. For CW, the transceiver output should be reduced to 75 watts or less. For constant carrier modes, your transmit power should be reduced to no more than 50 watts.

Note: The accessory-socket capability is meant for temporary mobile installations. For permanent mobile installations, the cable connected to the input of the MFJ-4403 should be connected directly to the battery or other available high-current accessory connection. When connected directly to the battery or other high-current accessory connector, there are no restrictions on the current drawn and the 15-amp input fuse should be replaced with a 25 amp input fuse.

Caution: When the MFJ-4403 is turned off, the capacitor bank is discharged through a bleeder resistor. This discharge process takes approximately one-minute. Therefore it is important to avoid access to the output voltage connector for at least one-minute after turn-off, as significant energy is available from the capacitor bank until it is discharged.

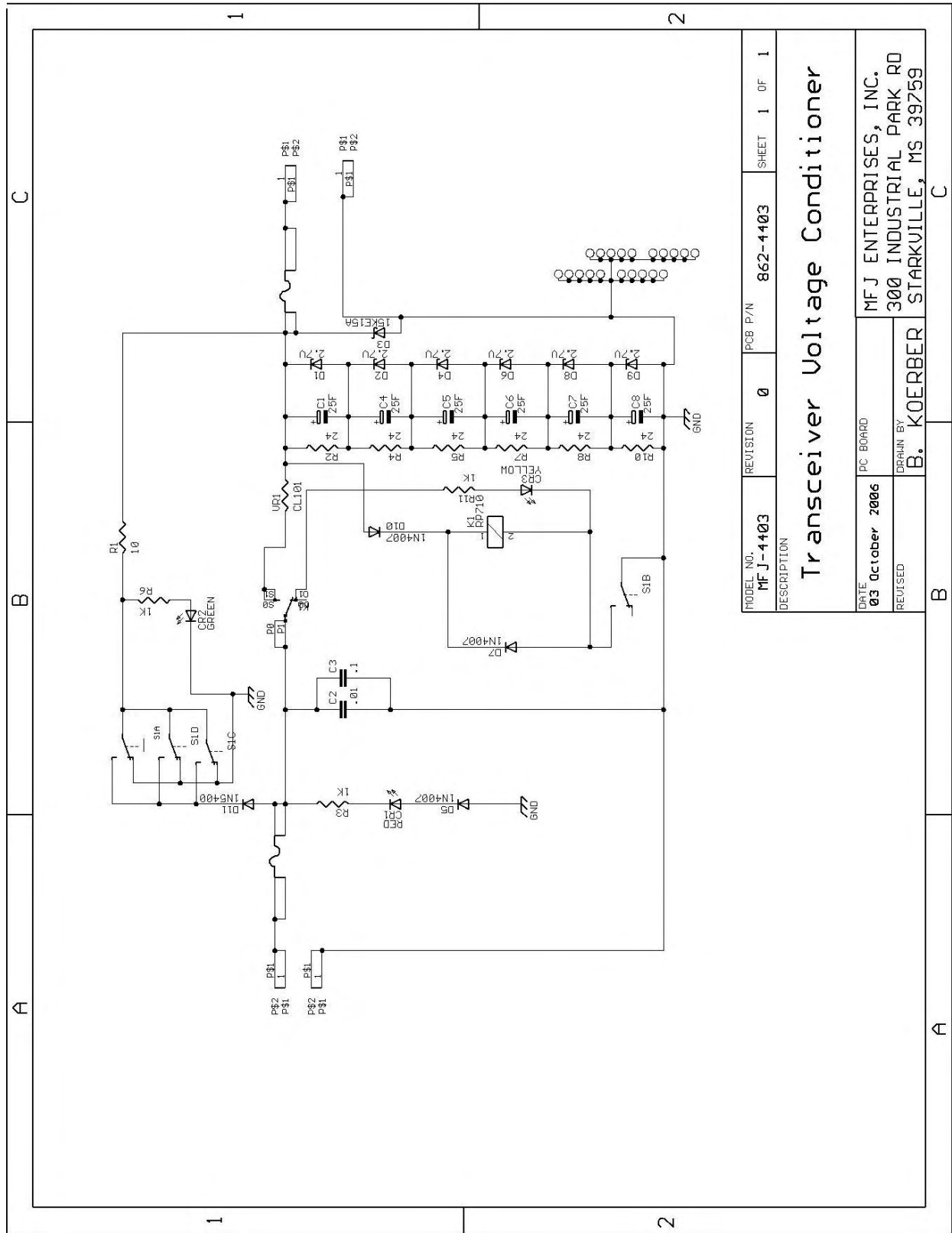


Figure 4: Schematic Diagram

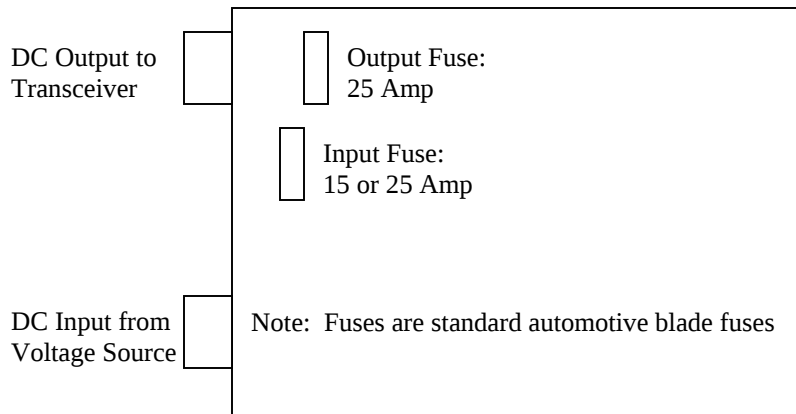


Figure 5: Input/Output Fuse Locations (Top View)

IN CASE OF DIFFICULTY

[] Reverse Polarity Indicator Illuminated: Remove Input voltage source and reverse polarity.

[] Charge LED Illuminates during use: This can occur if the input source current is low and a high current mode is being used. Your transceiver will probably start experiencing problems before the Charge LED illuminates, as the output voltage will have dropped to about 5-volts before this occurs. Either a higher current source is required or the load must be reduced by lowering transmit output power from the radio.

[] No output voltage and no LEDs are lit: Make sure the unit is ON. Verify that the 15-amp input fuse is not blown.

[] No output voltage but all LEDs light normally: Verify that the input and output cables are connected to the correct connectors. Verify that the 25-amp output fuse is not blown.

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 is 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 technician may ask.

You can also send questions by mail to MFJ Enterprises, Inc., 300 Industrial Park Road, Starkville, MS39759; by Facsimile (FAX) 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.

LIMITED 12 MONTH WARRANTY

MFJ Enterprises, Inc. warrants to the original owner of this product, if manufactured by MFJ Enterprises, Inc. and purchased from an authorized dealer or directly from MFJ Enterprises, Inc. to be free from defects in material and workmanship for a period of 12 months from date of purchase provided the following terms of this warranty are satisfied.

1. The purchaser must retain the dated proof-of-purchase (bill of sale, canceled check, credit card or money order receipt, etc.) describing the product to establish the validity of the warranty claim and submit the original or machine reproduction of such proof of purchase to MFJ Enterprises, Inc. at the time of warranty service. MFJ Enterprises, Inc. shall have the discretion to deny warranty without dated proof-of-purchase. Any evidence of alteration, erasure, or forgery shall be cause to void any and all warranty terms immediately.
2. MFJ Enterprises, Inc. agrees to repair or replace at MFJ's option without charge to the original owner any defective product under warrantee provided the product is returned postage prepaid to MFJ Enterprises, Inc. with a personal check, cashiers check, or money order for **\$7.00** covering postage and handling.
3. This warranty is **NOT** void for owners who attempt to repair defective units. Technical consultation is available by calling the Service Department at 662-323-0549 or the MFJ Factory at 662-323-5869.
4. This warranty does not apply to kits sold by or manufactured by MFJ Enterprises, Inc.
5. Wired and tested PC board products are covered by this warranty provided **only the wired and tested PC board product is returned**. Wired and tested PC boards installed in the owner's cabinet or connected to switches, jacks, or cables, etc. sent to MFJ Enterprises, Inc. will be returned at the owner's expense unrepaired.
6. Under no circumstances is MFJ Enterprises, Inc. liable for consequential damages to person or property by the use of any MFJ products.
7. **Out-of-Warranty Service:** MFJ Enterprises, Inc. will repair any out-of-warranty product provided the unit is shipped prepaid. All repaired units will be shipped COD to the owner. Repair charges will be added to the COD fee unless other arrangements are made.
8. This warranty is given in lieu of any other warranty expressed or implied.
9. MFJ Enterprises, Inc. reserves the right to make changes or improvements in design or manufacture without incurring any obligation to install such changes upon any of the products previously manufactured.
10. All MFJ products to be serviced in-warranty or out-of-warranty should be addressed to:

**MFJ Enterprises, Inc.,
300 Industrial Park Road
Starkville, Mississippi 39759 USA**

and must be accompanied by a letter describing the problem in detail along with a copy of your dated proof-of-purchase.

11. This warranty gives you specific rights, and you may also have other rights which vary from state to state.



MFJ ENTERPRISES, INC.
300 Industrial Park Road
Starkville, MS 39759 USA

MFJ-4403 Manual
Version 0A
Printed In U.S.A. 12/2006