MFJ-44X RTTY
Cross-Pattern Tuning Scope Adapter

Thank you for purchasing the new MFJ-44X RTTY *Cross-Pattern Tuning* Scope Adapter. The MFJ-44X can be used to filter the audio input of a Terminal Node Controller, Terminal Unit, or any equipment that decodes mark and space frequencies (**2125** and **2295 Hz)**. The MFJ-44X also provides the user with separate **Mark** and **Space** outputs that can be fed into a monitor scope or a regular oscilloscope. When viewed on a scope the output is an elliptical cross-hair display which provides a accurate means of tuning various amateur radio signals. The MFJ-44X will tune ASCII, RTTY, AMTOR, and PACTOR. The scope display can give the user useful information about the incoming signal, such as:

- Is the input Mark frequency high or low,
- Is the input Space frequency high or low,
- What is the actual frequency shift of the incoming signal?

Installation

JIM: Should we provide an interconnections diagram? It would be easier to follow

We will now cover installation of the MFJ-44X to a MFJ-1278 and scope. Installation with other demodulators will be virtually identical. Please follow the installation procedure closely.

1. Set the POWER switch to the OFF position. Connect an optional MFJ-1312B or compatible 12 to 16 VDC source to the MFJ-44X. The MFJ-1312B is available from MFJ. The power jack uses a 2.1mm coaxial connector with center conductor positive and sleeve ground. Incorrect power supply polarity can result in damage to the unit.

2. Connect the **AUDIO IN** jack, **J2** of the MFJ-44X, to either the headphones output or an **EXT** speaker output of your receiver. A 3.5mm stereo (or mono) plug should be used with the **TIP** signal and the **SLEEVE** ground. The **RING** portion of a stereo plug is **not used**.

3. Connect the **AUDIO OUT** jack, **J1** of the MFJ-44X, to the audio input of the MFJ-1278. A 3.5mm stereo (or mono) plug should be used with the **TIP** signal and the **SLEEVE** ground. The **RING** portion of a stereo plug is **not used**.

4. Connect the output of the **MARK** and **SPACE** filters, **J4** and **J5**, to your scope. The **MARK** and **SPACE** outputs are RCA phono jacks with the center conductor signal and the shield ground. The inputs on monitor scopes are usually RCA phono while oscilloscope inputs are BNC. Use a shielded RCA cable for your monitor scope or make a cable for your oscilloscope with the center pin signal and the shield ground.

   Connect the **MARK** portion to the horizontal (**X** on oscilloscopes) input, and the **SPACE** to the vertical (**Y** on oscilloscopes) input.

5. Verify that all connections are correct. If you made or bought pre-made cables they should be checked for continuity and for shorts (from the shield to the conductors).

6. (For Oscilloscopes) Place the **TIME/DIV** knob into the **XY** position.

This completes the connection of the MFJ-44X to the MFJ-1278. You are now ready to align the MFJ-44X to your monitor scope.

MFJ-44X to Monitor Scope Alignment

In this section we will align the MFJ-44X to your monitor scope. Please follow this procedure carefully.

NOTE: Before performing the MFJ-44X to scope adapter alignment it is a important that your demodulator is calibrated. Refer to your unit's instructions or refer to the following for calibrating a MFJ-1278/1278B.
Jim: you should probably divide the 1278 calibration and the 44 alignment. Also put the directions together and in order for each unit
MFJ-1278 calibration:

1. Apply power to your monitor scope and turn the unit "ON". You may want to turn the trace INTENSITY to minimum.
2. Place a push-on jumper at JMP4 in the MFJ-1278.
3. Short pins 1 and 4 of Radio Port 1 in the MFJ-1278.
4. Ensure that the POWER switch **SW1** on the MFJ-1278 is set to **OFF**.
5. Connect the computer and apply power to the MFJ-1278.
6. Set the POWER switch on the computer to the ON position.
7. Load and execute the computer terminal program
8. Set the **POWER** switch **SW1** to **ON**, and sign-on the MFJ-1278 to the computer.
9. Set the MFJ-1278 to the **HF RTTY** mode by typing:

   MODE HB **<ENTER>**

10. Set the MFJ-1278 into **Calibration** mode by typing:

    CALIBRATE <**ENTER**>
    CONVERS <**ENTER**> or **K**

11. Set the **AUDIO INPUT LEVEL** control **R11** on the MFJ-44X to the **mid-range** position.
12. Remove the top cover from the MFJ-44X.
13. Check the voltage on **pin 9** of **U16**. If the voltage is **-5 Vdc**, then set **R7** on the MFJ-44X, so the elliptical shaped trace on the scope is **horizontal**. Try to get this trace as horizontal as possible.

14. Adjust the **HORIZONTAL** and **VERTICAL** gain controls on your scope, to obtain the best elliptical shape possible.

15. Press the **SPACE BAR** one time. The voltage on **pin 9** of **U16** should **+5 Vdc**. If not, then press the **SPACE BAR** until it is **+5 Vdc**.

16. Set **R6** on the MFJ-44X so the elliptical trace on the scope is **vertical**. Try to get this trace as vertical as possible. You may need to fine adjust the **HORIZONTAL** and **VERTICAL** gain controls on your scope to obtain the best trace.

17. Perform steps 12 through 15 again. This is necessary due to the interaction between the filters stages.

18. Replace the top chassis cover of the MFJ-1278 and secure it with the screws removed earlier in the installation section.

This completes alignment of the MFJ-44 Mark and Space filter.

JIM: please insert the operation sections here.

Operation

Tuning RTTY

Tuning AMTOR/PACTOR

Calculating Frequency Shift

MFJ-44X Parts List

Component Id	Description	MFJ P/N
C1,C4	Capacitor, Polystyrene, 5% 1000 pF	202-0006
C11	Capacitor, Electrolytic, 25V, 100 uF	203-0015
C2,C3	Capacitor, Polystyrene, .1 uF	201-0007
C6	Capacitor, Electrolytic, 35V, 10 uF	203-1002
C8,C9,C10	Capacitor, Electrolytic, 50V, 1 uF	203-0006
CR1	LED, 5mm, Red, MV5753	320-0001
J1	Jack, Coaxial, 2.1 mm, Male	601-6021
J2,J3	Jack, 3.5mm, Miniature, Stereo	601-5003
J4,J5	Jack, RCA Phono, Right Angle	600-0011
R1	Resistor, 1/4 watt, 5%, 3 K	100-3300
R10	Resistor, Trimpot, Single Turn, 1K	130-3100
R11	Resistor, Trimpot, Single Turn, 10K	130-4100
R12	Resistor, 1/4 watt, 5%, 150 ohm	100-2150
R13	Resistor, 1/4 watt, 5%, 2.2 K	100-3220
R2,R3,R14,R15	Resistor, 1/4 watt, 5%, 10.0 K	100-4100
R4	Resistor, 1/4 watt, 5%, 3.3 K	100-3330
R6,R7	Resistor, Trimpot, Single Turn 10k	133-4100
R8,R9	Resistor, 1/4 watt, 5%, 4.7 K	100-3470
SW1	Switch, Push-Button, .5A, 4P2P	504-0023
For SW1	Button, Plastic, Red	760-2140
U1	Socket, IC,14 Pin,	625-0031
For U1	Op-Amp, Quad, LM348N	311-0004

Schematic

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