SOFTWARE CONSIDERATIONS

SHAREWARE

The CD shipped with the MFJ-1273B/1273BM contains shareware. This CD will automatically run the *MFJ Sound Card Interface Software Installation Menu* upon startup. If the CD does not automatically run in your system, you can manually start the installation menu. To do this, follow the steps listed below:

1. With the Shareware CD in the CD drive, click on the Start button at the bottom left of the screen.
2. Click on RUN. This will bring up a command window.
3. Click the Browse button.
4. When the browse window is open, double click on the CD drive.
5. Double click on the autorun.exe program.
6. The autorun.exe program will now appear in the command window.
7. Click OK, and the *MFJ Sound Card Interface Software Installation Menu* will begin to run.

From the menu, you may choose any shareware program(s) you wish to install. Though effective, this software is limited in its uses. To get the full experience with your unit, MFJ recommends that you purchase either the MFJ-1296 or the MFJ-1298 Sound Card Program.

MFJ-1296 & MFJ-1298 SOFTWARE PACKAGES

The MFJ-1296, RadioCom4, and the MFJ-1298, RadioCom5, are the best programs for soundcard interfaces and amateur radio.

Some features of the MFJ-1296 and the MFJ-1298 include:

- PSK: Supports PSL-31, Q and B PSK
- SSTV: 32-bit color, supports all SSTV formats, screen sizes/SSTV parameters are all variable.
- FAX: Supports AM/FM bands. Includes Weather FAX and satellite FAX direct. Supports ICO 267, 288, 352, and 567. RPM 48, 60, 90, 120, 180, and 240. FAX resolution is up to 1810 dpi, FAX features IOC and slant-correction. FAX pictures can be saved, printed, retransmitted.
- CW: Features automatic speed tracking, DSP notch and bandpass filters.
- RTTY: Supports all standard shifts and speeds. X/Y scope and frequency spectrum display makes tuning RTTY a breeze. Also supports NAVTEX, European SYNOP, Baudot, and Sitor-B.
- Radio control for over 80 radios.
- DSP Audio Filters and Analyzer.
- RS-232 Level Converter.

The MFJ-1298 has additional features that include Spectrum Analyzer, Dual Scope Display, Sound Recorder, Time/Frequency Management, Frequency Analyzer, 3-D Scanner, Satellite Tracking, and much more!

The MFJ RadioCom requires a computer with a minimum 200 MHz, Pentium/Celeron processor, at least 64 MB of RAM, and Win95/98/ME/2000/NT operating system.

These fully integrated software packages can be purchased from MFJ and are fully supported by MFJ.

TABLE OF CONTENTS

INTRODUCTION

Thank you for purchasing the MFJ-1273B (MFJ-1273BM) *Sound Card Radio Interface*. The MFJ-1273B was designed for use in all sound card to radio applications. This interface is for those who operate mostly digital modes and do not need a microphone input. Great care was taken to make sure hum, noise, and distortion are minimized or eliminated, insuring the best possible signal from your equipment.

Before attempting to use the MFJ-1273B, please read section 2.0. This section contains important information about interfacing the MFJ-1273B with your transceiver. We will start with a brief introduction into the special features that make your *Sound Card Radio Interface* an important addition to Amateur station with a computer.

MFJ-1273B Features:

Serial Port: This port allows the computer to control the push-to-talk of your radio.

Microphone/Radio plug-in jumpers: Internal jumpers program microphone wiring for any brand or model of radio with the appropriate 8-pin connector. There is no need to solder tiny plugs and wires or purchase adapters.

RFI Proof Circuitry: RF suppression and line isolation virtually eliminates RF feedback, hum, and distortion. An isolation transformer prevents audio ground loops.

Level control: A receiver-to-sound card drive level control is supplied. No need to adjust sound card level settings every time you change modes.

Power supply: No external power is needed.

Rugged Construction: A solid all aluminum cabinet and sturdy construction gives the MFJ-1273B mechanical and electrical durability.

Also included: CD, RS-232 cable, audio cables and microphone cable.

1.0 CONNECTING THE MFJ-1273B

SOUND CARD AUDIO	3.5mm stereo jack connects to sound card output
COMPUTER SPEAKER	3.5mm stereo jack connects to computer speaker
COMPUTER RS232C	DB-9 female serial (COM port) connection
MIC	8-pin microphone cable connects to microphone jack of radio (8-pin modular for the MFJ-1273BM)

2.0 MICROPHONE AND RADIO CONNECTIONS

Different manufacturers and different radios may wire the same style connectors differently. The MFJ-1273B and 1273BM have internal headers that use small moveable jumpers. The MFJ-1273B uses common round 8-pin microphone connectors found on most transceivers. The MFJ-1273BM comes with a modular microphone jack (like telephones might use).

Internal jumpers are used to program connections for any radio that connects to the prewired connectors. This feature eliminates the need for soldering jacks or purchasing adapter cables. **The MFJ-1273B/1273BM must be configured using the internal jumpers before use** (see section 2.1 and 2.2).

The microphone/radio setup procedure requires a few minutes of time. Before you start, you will need the manual of your radio readily available.

2.1 INTERNAL HEADER AND JUMPER CONNECTION DESCRIPTION

The jumpers in this unit are grouped by connection type, with all eight microphone pins in a row. There are eight rows of jumpers (16 pins) in each header. Each pin represents pins one through eight of the microphone connectors. The connection blocks are:

JMP1 Audio to radio via the microphone jack

This header is for the microphone's audio output lead. This pin should match the radio's "hot" audio input lead from the microphone.

JMP2 Audio ground (***NOT*** the same as ***chassis*** ground)

This header connects to the microphone audio ground. The pin selected here should match the *audio* ground lead on the radio and microphone. This ground is normally ***not*** connected to the chassis ground, except in the radio itself.

Note: If the audio ground connects to a chassis somewhere outside the radio, the result can be audio hum or distortion.

JMP3 PTT ground

This header makes a connection to PTT (chassis) ground.

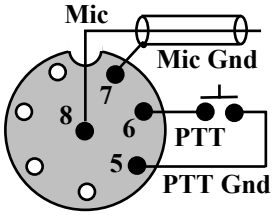
JMP4 PTT line to radio via the microphone jack

This header is for the radio's PTT (push-to-talk) lead. This pin should match the radio's "hot" PTT lead.

2.2 PROGRAMMING INTERNAL JUMPERS

Begin by removing the screws from the sides of the cabinet. Lift the cover off. Look from the front view and notice the group of pins and black jumpers toward the rear of the unit. Notice the pins are labeled 1 through 8.

To configure your interface, look at the radio's manual. Find the page that shows the microphone wiring. This is a sample Yaesu-style connection.



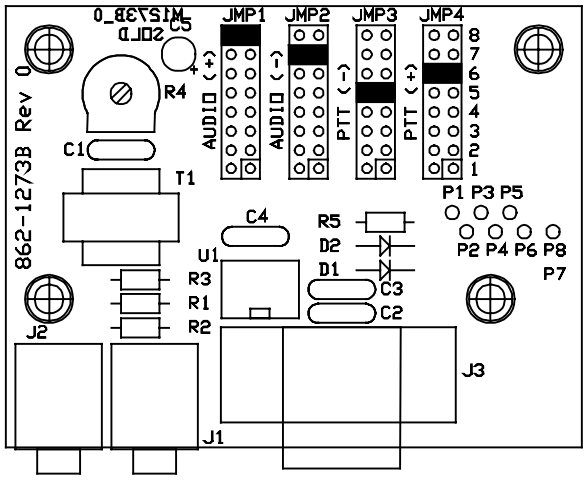
Yaesu Mic Jack Pin-out, Front View

If you compare table 1 to this connector, you will see it is laid out for this radio.

Table 1. Yaesu FT-1000 series

Pin	JMP1 Audio "hot"	JMP 2 Audio GND	JMP 3 PTT GND	JMP 4 PTT "hot"
1				
2				
3				
4				
5			X	
6				X
7		X		
8	X			

Place jumpers at pins marked with "X":



Yaesu FT-1000 series setup

Look at the microphone-wiring diagram and connect the PTT and microphone leads as described. A blank chart has been provided for you to fill in. You can look in your radio's manual, and fill in the chart. This will assist you in properly setting the jumpers for your radio.

Pin	JMP1 Audio "hot"	JMP 2 Audio GND	JMP 3 PTT GND	JMP 4 PTT "hot"
1				
2				
3				
4				
5				
6				
7				
8				

Never ground the microphone ground to the chassis ground! JMP2 and JMP3 should never be connected to the same pin number!

3.0 CONNECTIONS

The rear panel has two audio jacks, one computer port and a microphone cable.

COMPUTER RS-232C: This port is a standard female DB-9 connector. It should connect to an active COM port on your computer. This connection allows the computer to watch the PTT line from your microphone, and the computer to control the transmitter PTT line.

COMPUTER SPEAKER: This 3.5mm stereo jack connects to the computer's external speaker system. This jack is routed through the MFJ-1273B to the sound card's audio out.

SOUND CARD AUDIO: This 3.5mm stereo jack connects to the sound card's audio output.

MIC: This 8 pin cable connects to the microphone input of the radio.

4.0 OPERATING SUGGESTION

4.1 PLACEMENT OF THIS UNIT

We recommend placing this unit as close to the radio and computer as possible. Do not place this unit within one foot of power transformers, video monitors, or anything that emits strong varying magnetic fields. If you locate this unit near a monitor, the sweep circuits can introduce hum and noise into your signal. If there is a powerline-operated transformer within several inches and if it has flux leakage, 60-cycle hum can be introduced into your stations audio systems.

4.2 HUM, SQUEALS, AND DISTORTION

When equipment is interconnected, ground loops can be created. A ground loop occurs when a modest amount of AC or DC power flows between equipment grounds through cables that normally carry low-level signals, such as audio or microphone wiring. Unwanted hum, distortion, squeals, and/or erratic operation may result. Power supply ground loops are often misdiagnosed as "RF feedback".

To cure distortion, hum, or erratic operation it is often necessary to find the cause. To eliminate RF feedback as a cause, replace the antenna with a dummy load. Ground the shield of the dummy load to the normal antenna lead shield, so you do not disturb any possible ground paths. If the problem persists, it is probably caused by a ground loop. If the problem disappears, it is almost certainly RF related. Be sure your station ground is good, all the equipment is grounded together properly with a wide smooth conductor, and you have followed all station wiring suggestions found in *reliable* sources such as the ARRL Handbook.

If the problem occurs even while transmitting on a dummy load, the problem is almost certainly a ground loop or wiring error. Be sure microphone wiring and jumpers are installed correctly, as outlined in section 2 of this manual. Be sure microphone ground connections have continuity throughout the entire system, and that the microphone ground is *NOT* connected to any other ground or chassis connection outside of the radio.

Check the sound card volume control settings, and the gain settings of the radio. Be sure they are close to normal operating settings, and not set too high. Be sure you have turned the radio's monitor feature OFF when working digital, to prevent audio from looping back through the computer.

For extreme problems and for improved lightning protect to your equipment, we have provided a ground screw to allow grounding of our unit to the computer case, station ground, or radio ground. Some manufactures actually think that NOT providing a ground connection is doing you a service, and tout the lack of a ground as an advantage!

4.3 OPERATING ADJUSTMENTS

One of the most common problems using digital modes is improper system level. Even at best, digital modes have limited dynamic range* compared to modes that closely "fit" filter bandwidths in the transmitter and receiver. When the radio filter is wider than the mode being used, the system depends heavily on having absolutely no distortion at any place in the system. Adjustments and levels throughout the entire system affect bandwidth and quality of transmitted and received signals.

When transmitting, it is extremely important to use correct gain levels. If the input of a transceiver is overdriven, the signal will contain unwanted products. Problems might not show on spectrum or IMD displays and if they do, many people do not recognize them. Excessive level into the radio can aggravate harmonic distortion (this often does not register on IMD or displays), causing transmissions on multiple frequencies. For example a PSK transmitter using 1,000 Hertz offset will have some signal level at 2,000 Hertz and every other multiple of 1,000 Hertz. These harmonics might make it back through a narrow filter, and while they cause others interference they will not show on a spectrum display! The same is true for poor carrier suppression. Since the carrier can be outside the passband of a receiver, it will not always show on displays of people you are working.

**Dynamic range is the ratio of strongest undesired signal tolerated to weakest signal that can be copied.*

Problems also occur when audio levels are too low. If audio level from the sound card or interface is too low, the ratio of signal to hum and/or noise will also be reduced. The proper setting is generally one that allows the microphone and receiver gain to be set at normal operating levels for SSB. Power is reduced or adjusted by fine-tuning levels with the controls inside the MFJ-1273B/1273BT. The best way to check for proper transmission is to listen to your own signal on a separate receiver. Use a narrow filter, and take care to avoid overloading the receiver.

If you cannot listen through a separate receiver, the best general guideline is to use normal microphone gain settings and approximately half volume on the sound card "Volume" settings. Adjust the transmitter level control (R4) in the MFJ-1273B/1273BT for normal transmitter drive (just at the start of ALC action) and use the microphone gain on the transmitter (or sound card volume) for fine adjustment. Use a normal receiver volume setting, and adjust the sound card microphone level (make sure any extra gain options are off) to approximately half scale.

Regardless of what you do, it is always a good idea to have someone listen to your signal when the band is empty, signals are strong, or noise is very low. They should look carefully for spurious signals, noise, and hum.

When transmitting on modes like MFSK and PSK, always try to use a frequency setting of more than 1500 Hz and less than 2500 Hz. This will allow the transmitter's SSB filter to suppress unwanted harmonics from the audio system driving the transmitter.

Remember it is sometimes necessary to select the narrowest filter possible in the receiver, rather than depending on the computer to filter out strong unwanted stations. If you depend only on the sound card, you will find that even very clean strong signals overload your system. The problem is often in YOUR receiver system, not in the offending transmitter. Many transceivers allow a selection of narrow filters while operating SSB, or include passband-tuning controls. If you have trouble with a strong station nearby causing interference, try using more selectivity or using the receiver's notch filter to reduce the signal level.

5.0 SOFTWARE

The CD included with the MFJ-1273B/1273BM contains a collection of shareware programs that will operate PSK-31, RTTY, SSTV, Packet, AMTOR, CW, and other modes. These programs are shareware. They are not supported by MFJ Enterprises, Inc. Some programs in the CD are feature limited, some have limited time of use and some are trial versions. Please contact the author to obtain a full version. MFJ Enterprises, Inc. offers two software packages specifically designed for sound cards. These software packages are fully supported by MFJ.

MFJ-1296 RadioCom 4 sound card program for PSK-31, RTTY, SSTV, Packet, AMTOR, and FAX/SatFAX also features DSP filter and Radio Control programs. A RS-232 radio control interface is included.

MFJ-1298 RadioCom 5 sound card program has all the features of the RadioCom 4.0 plus a DSP Filter Analyzer, Spectrum Analyzer, Audio Equalizer, Satellite Tracking, and Radio Control for over 80 receivers and transceivers. A RS-232 radio control interface is also included.
Trail versions of these programs can be downloaded. For more information about the MFJ RadioCom programs, please call MFJ Enterprises, Inc. at 1-800-647-1800 or visit us online at www.MFJEnterprises.com or www.Bonita.net.

6.0 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. Send a complete description of your problem, an explanation of exactly how you are using your unit, and a complete description of your station.

7.0 SCHEMATIC