MFJ-1278B/1278BT

FAST-START

Easy to follow guide to connecting your new MFJ-1278B/1278BT Multi-Mode

INSTRUCTION MANUAL

CAUTION: Read All Instructions Before Operating Equipment

MFJ ENTERPRISES, INC.

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REVISION 4.2

MFJ-1278B/1278BT Fast Start™

Thank you for purchasing the MFJ-1278B/1278BT Multi-mode Data Controller. The MFJ-1278B now has the new PACTOR mode built-in. The PACTOR feature includes a new mailbox. Operation of PACTOR is not covered in the MFJ-1278B instruction main manual. Please use this FAST-START™ manual for information relating to PACTOR operation.

This MFJ-1278B FAST-START™ Manual is provided to give you the minimum information necessary to install your MFJ-1278B or MFJ-1278BT "Turbo" Multi-Mode quickly with minimum time required. This does not replace the MFJ-1278B Main Instruction Manual. For a more detailed explanation about the operation of the MFJ-1278B/1278BT, please refer to the MFJ-1278B Main Instruction Manual.

If you purchased the MFJ-1278BT "Turbo" unit, please note that the difference between the MFJ-1278B and the MFJ-1278BT is that the MFJ-1278BT has the MFJ-2400 modem installed. If your MFJ-1278B does not have the 2400 modem installed, it is available separately and easily installed by the user. With the MFJ-2400 installed, your MFJ-1278B can operate 300 baud, 1200 baud and 2400 bps packet. If you require 9600 bps operation, the MFJ-9600 is available for installation into the MFJ-1278B and MFJ-1278BT. With the MFJ-9600 installed, you may operate 300 baud, 1200 baud and 9600 bps packet. Unless specifically stated, all information for the MFJ-1278B in this FAST-START™ Manual, as well as in the main MFJ-1278B manual, directly applies to the model MFJ-1278BT.

The Computer Installation section of this FAST-START™ manual assumes that you have purchased one of the MFJ Starter Packs. If you are **not** using one of the MFJ Starter Packs, the user should refer to the main MFJ-1278B manual for computer interface connections. However, you may still use the Radio Installation and the other parts of the FAST-START™ manual.

The available MFJ Starter Packs consist of terminal emulation software and a serial cable to connect between the MFJ-1278B and your computer.

The Starter Packs available are the **MFJ-1289 MULTICOM** for IBM and compatible computers, **MFJ-1282B** for Commodore 64/128 computers, **MFJ-1290** for Amiga and **MFJ-1287B** for the Macintosh computer.

The MFJ-1289 Starter Pack includes the **ADVANCED** MULTICOM terminal program. The MULTICOM terminal program supports receiving and transmitting of multi-gray level FAX and COLOR SSTV pictures. It also supports the passing of VGA, EGA, and CGA packet pictures. Other unique features this program offers are: an Auto-Router that lets you store digipeater node routes for easy execution, the Multi-Word™ Text Editor, making it easy for you to transmit any portion of a file, Packet Multi-Plex™ lets you send and receive packet messages during binary file transfers. MULTICOM is fully menu driven, and it is very easy to use. It has dedicated function buffers for each mode of operation.

The MFJ-1289 MULTICOM terminal program is highly recommended, if you are using an IBM or compatible computer with your MFJ-1278B.

MFJ offers other Starter Packs to allow compatibility between the MFJ-1278B and other computers, besides IBM. These other Starter Packs are as follows:

MFJ-1282B for the Commodore C64/128
MFJ-1290 for Commodore Amiga
MFJ-1287B for the Apple Macintosh

The above Starter Packs offer multi-gray level operations with the specified computers.

I. INSTALLATION

A. Power Supply

The MFJ-1278B comes **standard** with its own power supply, the MFJ-1315. The power supply will plug into any standard 110 VAC outlet. Ensure the power switch on the front panel of the MFJ-1278B is **OFF**. Plug the power supply into a 110 VAC outlet, then plug the 2.1 mm coaxial plug into the "**POWER**" jack located on the rear panel of the MFJ-1278B.

For operation on an AC line voltage other than 110 VAC, you must obtain a suitable AC adapter that will provide 12 VDC at 500 mA to operate your MFJ-1278B. The MFJ-1315X AC adapter is available for 220/240 VAC operation.

CAUTION:

If it is necessary for you to wire the 2.1 mm coaxial plug for your power supply, wire the 2.1 mm plug so that the center pin is POSITIVE and the outside sleeve is GROUND.

B. Computer Interface

The computer installation section applies to those who are using one of the MFJ Starter Packs with an IBM or compatible, a Commodore C64/128, Amiga and Macintosh computers. If you are not using one of these computers, or if you are not using an MFJ Starter Pack, then you must refer to the main MFJ-1278B instruction manual for computer installation.

The cable supplied with the Starter Pack must be used in this installation. If you are not using the Starter Pack computer cable to make this connection, you should refer to the MFJ-1278B Main Instruction Manual, Chapter 2 "Computer Interfacing" to verify that the cable you are using is correctly wired.

WARNING: AN IMPROPERLY WIRED COMPUTER CABLE COULD DAMAGE YOUR MFJ-1278B AND/OR YOUR COMPUTER!!

1. Ensure the **POWER** switch on the computer and the MFJ-1278B are in the **OFF** position. If not, damage to the computer and/or the MFJ-1278B can result.

2. Connect the cable from the computer serial port to the port on the rear panel panel of the MFJ-1278B as follows:

IBM and compatibles:

Connect the cable end with DB-25 male connector to the back of the MFJ-1278B RS-232 connection marked "**RS-232C SERIAL**". Then connect the other end of the cable with DB-25 female to the COM 1 or COM 2 RS-232 port of your computer. If COM 1 and COM 2 are not available, then COM 3 and COM 4 are also supported.

The cable supplied with the MFJ-1289 Starter Pack is a DB-25 male to DB-25 female. If your computer has a DB-9 (9-pin) male connector you must use a 9-pin to 25-pin adapter **(not supplied)** to make this connection. If this adapter is not available, then you may contact MFJ Enterprises, Inc. for a cable exchange. We will exchange your starter pack RS-232 cable with a 25-pin to 9-pin RS-232 cable at no charge.

Commodore C64/128

Connect the cable end with the 8-pin **TTL** connector to the port on the back of the MFJ-1278B marked "**TTL**." Then connect the other end of the cable to the user port of the C64/128 computer. The computer end of the cable is **KEYED.** It is installed one way, with the wires on the underside of the connector.

Follow the instructions supplied with the Starter Pack very carefully. Make sure that the cable is correctly wired and make sure that the connector is oriented properly before plugging it to the MFJ-1278B and the computer.

Macintosh

Connect the cable end with DB-25 female to the back of the MFJ-1278B RS-232 connector marked "**RS-232C SERIAL**". Connect the other end of the cable to the computer modem port. This port may have a picture of a telephone **RECEIVER** above it.

Amiga

Connect the female end of RS-232 cable supplied with the MFJ-1290 Starter-Pack to the serial port of the Amiga computer and the other end to the RS-232 port of the MFJ-1278B.

3. Load the terminal program by following the procedure described in the terminal program documentation.

4. Make sure that the terminal program parameters are set as follows:

Baudrate:	9600 (4800 for C64/128)
Wordlength:	8
Stopbit:	1
Parity:	None

If your terminal program does not show the above parameters, follow the instruction in the terminal program to set the terminal parameters as shown above.

5. Turn on the MFJ-1278B, and notice that the Power, STA and CON LEDs on the MFJ-1278B will light.

6. Press the "Return" key several times in succession.

The MFJ-1278B will sign-on itself on to the terminal with the sign-on message, and end with the CMD: command prompt. The STA and CON LEDs should extinguish.

If the sign-on message is unreadable, then either the wordlength, parity or terminal baudrate of the MFJ-1278B is not matching up with the terminal parameters. You can reset the **bbRAM** of the MFJ-1278B by shorting the 2-pin header (JMP23) momentarily. The location of JMP 23 is next to the battery on the mother board. You can access JMP 23 on the MFJ-1278B mother board through the access hole labeled **RESET**. You can access this hole without removing the cover. The location **RESET** hole is on the front right hand side of the cover. Insert a small flat-tipped screwdriver into the **RESET** hole and momentarily short JMP 23.

NOTE: Momentarily shorting **JMP 23** will reset all MFJ-1278B parameters to their default values. The wordlength, and parity default values of the MFJ-1278B are 8 bits and no parity. The default state of the **AUTOBAUD** command is ON. This matches the terminal parameters as suggested in the above step 3.

7. After the MFJ-1278B has signed on and the CMD: command prompt is displayed, type "Display" and press the "Return" or "Enter" key.

   The MFJ-1278B will display a long list of parameters and end with the **CMD:** command prompt:

The above procedure verifies that the MFJ-1278B is communicating with your computer.

C. Radio Interface

The first step in connecting the MFJ-1278B to the radio is to wire an interconnect cable. This interconnect cable will connect one of the MFJ-1278B Radio Ports to the microphone or accessory connector of the radio. The two radio cables supplied with your MFJ-1278B have one end already wired with a 5-pin DIN connector. You will need to wire a connector to this cable that is compatible with your radio.

MFJ also offers optional pre-assembled cables to connect the MFJ-1278B to most radios. Please contact your MFJ dealer or MFJ for more information about these pre-assembled cables.

Available pre-assembled cables are as follows:

- **MFJ-5084 for MFJ-1278B to most ICOM 8-pin radios.**
- **MFJ-5086 for MFJ-1278B to most Kenwood and Alinco 8-pin radios.**
- **MFJ-5080 for MFJ-1278B to most Yaesu 8-pin radios.**
- **MFJ-5024 for MFJ-1278B to most ICOM/Yaesu/Radio Shack HTs.**
- **MFJ-5026 for MFJ-1278B to most Kenwood HTs.**

Also available from MFJ or from your MFJ dealer is a "TNC-to-Microphone" switch box, the MFJ-1272B or MFJ-1272M. The MFJ-1272B is compatible with most radios equipped with 8-pin microphone connectors. The MFJ-1272M is compatible with most radios equipped with 8-pin modular microphone connectors. These microphone switch boxes allow you to switch your radio to use the MFJ-1278B or to use the microphone without disconnecting cables. Please contact your MFJ or your MFJ dealer for more information concerning the TNC/MIC switch box.

If a pre-assembled cable or switch box is not available you must wire a cable to fit your radio. The manuals for both your radio and the MFJ-1278B should be used to wire this cable.

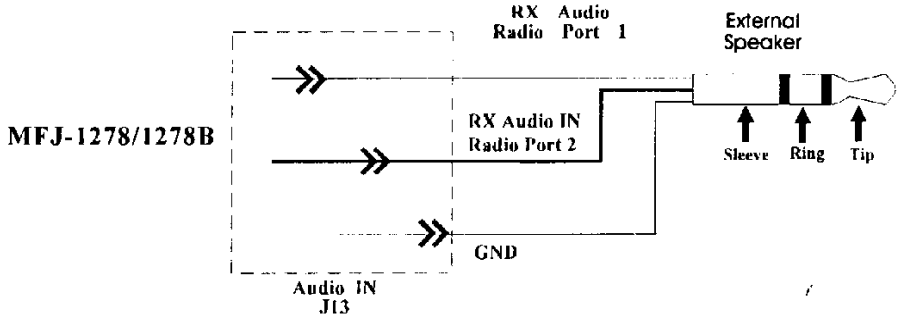
IMPORTANT: Connect the received audio from the radio to pin 4 of the radio port on the back of the MFJ-1278B. The MFJ-1278B has an "Audio Input" jack on the back panel that the received can be connected to. **DO NOT** feed received audio into the speaker jack in the rear of the MFJ-1278B. To use the "Audio Input" jack, you must have a stereo 3.5 mm plug (Radio Shack # 274-284). Connect the "**ring**" of the plug for Radio 1 and the "**tip**" of the plug for radio 2. Connect the sleeve to ground. **DO NOT** use a mono plug for this connection even if you are only connecting one radio to the MFJ-1278B. A mono plug will short out the input of the MFJ-1278B and will cause damage to the unit.

NOTE: The Speaker Jack is used to connect a speaker to monitor transmit and receive audio. It is NOT an audio input.

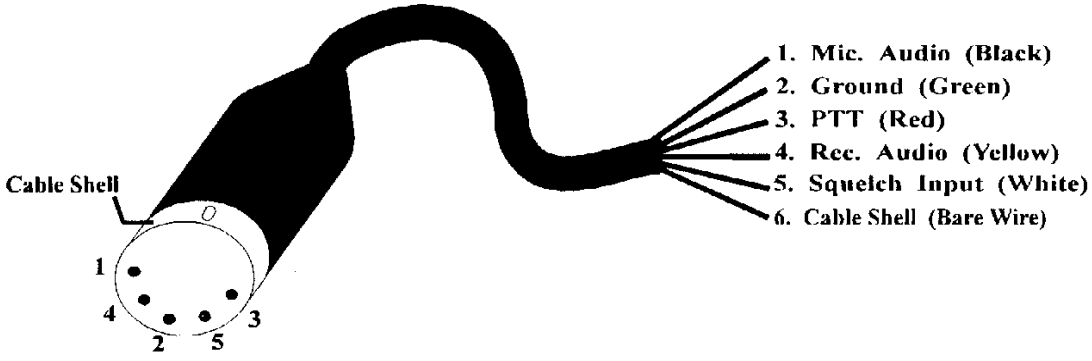
Receiver to MFJ-1278B Cable

If you want to connect the MFJ-1278B to a communications receiver, this is done very easily. There is an Audio IN jack, J13 on the back panel of the MFJ-1278B. Receiver audio is fed in at J13 if your are using a communications receiver. The connection to J13 is done through a 3.5mm stereo plug, following the diagram shown below. **DO NOT** feed audio input through the speaker jack in the rear of the MFJ-1278B.

NOTE: The Speaker Jack is used to connect a speaker to monitor transmit and receive audio signals. It is **NOT** an audio input.



1. Wire the radio interconnect cable to MFJ-1278B as shown by the following diagram:



NOTE: Specific wiring diagrams for many Kenwood, ICOM & Yaesu radios are shown at the end of this FAST-START™ manual. Check to see if your radio is listed.

2. Once the cable is wired properly, connect the 5-pin DIN end to either Radio port 1 or Radio port 2 of the MFJ-1278B. Connect the other end to the radio. The radio ports are not dedicated to either HF or VHF operations. Radio ports 1 and 2 are exactly the same. Either port can be use for HF or VHF operation.

There are some other possible connections that you may wish to make to your MFJ-1278B. Some of those connections are:

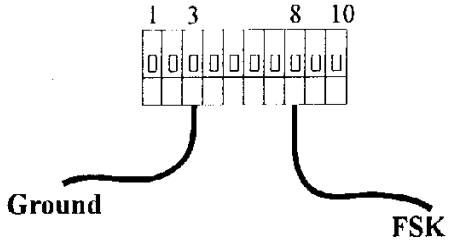
CW keying:

Connect a shielded audio cable from the **CW KEYING OUT** jack of the MFJ-1278B to the **KEY** input of your radio. The factory setting for the keying output of the MFJ-1278B is "**Direct keying**" which will work for most solid state type of radios. If your radio is the type with tube finals, then you will want to use the "**Grid Block**" keying. To setup the **KEYING OUTPUT** of the MFJ-1278B to "Grid Block" keying, you must move the shorting jumper of JMP 22 on the MFJ-1278B motherboard to position 1 & 2. Please refer to Appendix G at the end of the MFJ-1278B Main Instruction Manual to locate JMP 22. Wire the CW keying cable as shown in the diagram below:

CW Keying Cable

FSK Connection:

If your HF radio permits FSK operation, there is an FSK output pin on the TTL connector on the rear panel of the MFJ-1278B. Only two lines, Pin-8 FSK and Pin-3 ground are required in making the FSK connection to your radio. Use the 8-pin IDC connector supplied with your MFJ-1278B to make the FSK cable. See Diagram below.

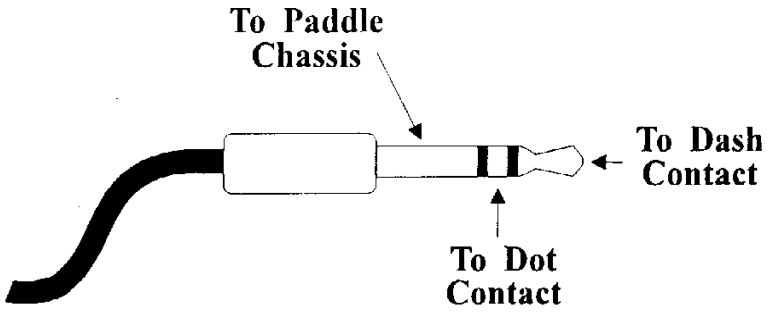


FSK Cable

NOTE: The factory polarity setting of the FSK signal is normal on the MFJ-1278B. If your radio requires you to provide a reverse FSK signal you will need to relocate the shorting jumper to position 2 & 3 of the JMP 14 header on the MFJ-1278B main board.

Key paddle:

The cable for the key paddle must be a shielded two conductor plus a shield for ground. Use a 3.5 mm miniature stereo plug (Radio Shack Cat #: 274-284) on one end of the cable. The other end of the cable is wired to the paddle. See figure below to wire your key paddle cable.



CW Key Paddle Cable

Speaker Connection:

The MFJ-1278B provides you with a speaker jack that is located on the back panel. You can attach a monitor speaker here so you can listen to both the received and transmitted side tones. The monitor speaker is for the monitoring of all signals including CW. It also serves as a packet connect alarm. Use a stereo 3.5 mm plug (Radio Shack P/N #: 274-284) for this connection.

Caution: **DO NOT** feed audio from the radio through this Speaker jack. Use pin 4 of the Radio Port for audio input.

Printer Connection:

The built-in **Parallel Printer Port** on the MFJ-1278B allows you to print text or pictures received without any special terminal program. If your terminal program does not support FAX or SSTV picture printing to the computer screen, printing of these pictures are possible through this built-in printer port. An EPSON or IBM graphic compatible parallel printer is required.

A standard IBM parallel printer cable is all that is needed to connect the printer to the MFJ-1278B. You may purchase the MFJ-12 cable from MFJ Enterprises, Inc. or from your MFJ dealer.

If you are using one of the MFJ Starter Pack terminal programs connect the printer to the computer printer port.

5. After properly connecting the MFJ-1278B to the computer and to your radio, you are ready to operate. Load the terminal program and make sure that the terminal program parameters are set as described earlier.

6. Turn on the MFJ-1278B. Press the "Return" key several times in succession. The MFJ-1278B will sign-on and display the sign-on message and end with the cmd: command prompt.

II. BASIC OPERATIONAL COMMANDS

The terminal program provided with the MFJ Starter Pack makes it easier and faster to use your MFJ-1278B. Some of the operational procedures given by the MFJ-1278B manual may be different from the procedure given by the documentation of the terminal program. If this is the case you should follow the procedure given by the terminal program documentation instead of the information given in the MFJ-1278B manual.

The MFJ-1278B is both **COMMAND** and **MENU** driven. This allows for greater operational flexibility and ease of use. Although most of the factory default settings of the MFJ-1278B commands allow you to operate any mode available. However, before you start to use your new MFJ-1278B, you must first enter your callsign into the MFJ-1278B memory.

To Enter Your Callsign:

Under cmd: prompt, type:

MYCALL xxxxxx <CR>

NOTE: **xxxxxx** is your call sign, and <**CR**> means to press the"Enter" or "Return" key on your computer.

NOTE: If you are using MFJ Multicom for IBM you must also enter your call sign in the terminal program. Follow the instructions given by the Multicom documentation to do this.

To change the operation mode:

Use the **MODE** command to change operation mode of the MFJ-1278B. The format of the **MODE** command is:

MODE xx,bbbb,m

where, **xx** is the operation mode, **bbbb** is the radio baud rate or speed and **m** is the modem selected to be used for that mode. In most cases you will not need to specify the modem (m) to be used. The defaulted modem will be matched to the mode of operation by the MFJ-1278B automatically.

The **MODE** command is very easy to use. Below are a few examples as to the use of the **MODE** command to change modes:

Using the MODE command:

a. To enter the CW mode at 13 wpm, you would type:

MODE CW,13 <CR>

If no radio baud rate or modem is selected, then the MFJ-1278B will use the defaulted radio baudrate/speed and modem.

b. To select the 300 baud HF packet, you would type:

MODE HP <CR>

MFJ-1278B will be set to operate 300 baud HP packet.

c. To enter the 1200 baud VHF packet, you would type:

MODE VP <CR>

MFJ-1278B will be set to operate 1200 baud packet.

d. To enter the PACTOR mode, type:

MODE PT <CR>

The MFJ-1278B will be set to the Pactor mode of operation.

Changing Modes with SET menu

We mentioned earlier that the MFJ-1278B is **COMMAND** and **MENU** driven. The **SET** menu is used to change several different operational parameters. For a listing of the **MODE** abbreviation, type:

SET <CR>

Verifying the Operational Mode:

Using the **MODE** command the operational mode is easily verified. Try typing:

MODE <CR>

Changing the Radio Port:

The radio port of the MFJ-1278B can be easily changed at any time. Try typing:

R 1 <CR>, for radio port 1

or

R 2 <CR>, for radio port 2

All operational modes of the MFJ-1278B have abbreviations. These abbreviations make the MFJ-1278B easier and faster to use. These abbreviations are used in conjunction with the MODE command. Below is a list of all operational mode abbreviations:

Operational Mode	Mode Abbreviation
VHF Packet	MODE VP
CW & Memory Keyer	MODE CW
HF Packet	MODE HP
Modulated CW	MODE MC
RTTY 850 Hz. Shift	MODE VB
RTTY 170 Hz. Shift	MODE HB
ASCII 850 Hz. Shift	MODE VA
ASCII 170 Hz. Shift	MODE HA
PACTOR	MODE PT
AMTOR and Navtex	MODE AM
SSTV	MODE TV
FAX	MODE FX

Mode Abbreviations

For a more detailed explanation of the operation in each operational mode except for PACTOR, refer to Chapter 4 of the MFJ-1278B main instruction manual.

III. TRANSMIT AUDIO LEVEL SETTING

Before you start to use the MFJ-1278B, you must set the transmit and receive audio levels properly. Let's start with the Transmit Audio levels. Since Radio ports 1 and 2 are independent, there are independent transmit audio levels controls. These controls must be set individually. The radio ports are not restricted to HF or VHF operation. This means either HF or VHF radios can be used on either port.

A. VHF Radio Transmit Audio Level Setting:

1. Connect the radio to a dummy load and listen to the transmission with another radio nearby.

2. With the MFJ-1278B in the VHF packet, **MODE VP** and under the cmd: command prompt, type:

   CALIBRA <CR>

3. Type **K**, then press the space bar for the higher of the two tones transmitted by the MFJ-1278B.

NOTE: The MFJ-1278B will unkey itself after a few seconds. This is due to the Watch-Dog timer timing out. The user can press the K key two times to key transmitter again. The user can defeat the Watch-Dog timer by placing a jumper on JMP4. If JMP4 is jumped, then before completion of this seciton the user must remember to remove the jumper from JMP4. This is because the Watch-Dog timer is a protective timer for the transmitter. If defeated, then the transmitter could possibly stay keyed for a very long time. This could cause damage to the transmitter and the MFJ-1278B.

4. The location of the transmit audio level controls are on the left side of the MFJ-1278B. The level control for Radio Port 1 is R157 and for Radio Port 2 is R158. With a small screwdriver turn the transmit control fully counter-clockwise (minimum).

5. Slowly turn the control in step #4 clockwise to increase until no increase in audio output level is heard at the monitoring receiver.

6. Rotate the the control in step #5 counter-clockwise until the audio signal on the monitoring receiver is reduced by half of the maximum level.

7. Type the **K** key to return to receive mode.

8. Type the **Q** key to exit the calibration routine.

B. HF Radio Transmit Audio Setting:

1. Connect the HF radio to a dummy load.

2. Set the HF radio controls as follows:

VOX	OFF
AGC	FAST
Speech Processor	OFF
Mode Selector	LSB
Meter Switch	Power Reading
Speaker Monitor	ON (if available)
Microphone Gain	1/4 Turn (most radios)

3. Under the cmd: command prompt, type:

   CALIBRA <CR>

4. Type **K**, then press the space bar for the lower of the two tones transmitted by the MFJ-1278B as heard over a monitor speaker. Note the MFJ-1278B will unkey itself after a few seconds. Press the **K**, if needed by pressing the **K** again to transmit.

5. The transmit audio level controls are located on the left side of the MFJ-1278B. With a small screwdriver turn the transmit control fully counter-clockwise (minimum).

6. Slowly turn it clockwise (increase) until at a point where output power is slightly below the rated output of your radio.

7. Type the **K** key to return to receive mode.

8. Type the **Q** key to exit the calibration routine.

IV. RECEIVER AUDIO SETTING

With your radio in the receive mode, open the squelch control you hear a steady hiss on the speaker. Set the volume control to minimum, then slowly increase it to a point that the MFJ 1278B tuning indicator moves toward the middle of the display. This is the minimun volume from your receiver to allow the MFJ-1278B to copy. Continue to increase the volume control until the audio level is about twice the minimum level.

The setting of the DCD Threshold control is essential for proper operation as well. While still listening to the unsquelched receiver noise, rotate the DCD Threshold control on the MFJ-1278B clockwise until the DCD LED just flickers with false data carrier indications.

Note that DCD Threshold setting may vary for other modes of operation. Follow the method for setting the DCD Threshold as described in the main instruction manual under each operation mode.

V. PACTOR

In this section of the Fast Start Manual we will talk about **PACTOR** operation. We will cover basic operation along with an explanation of the commands related to **PACTOR**. Before we talk about Basic Operation, let's explain a little about **PACTOR**.

What is Pactor?

PACTOR is a new form of digital communications. **PACTOR** was brought about to compensate for the shortcomings in both Packet and Amtor, for HF operation.

PACTOR combines some of the features of both the AMTOR and the HF Packet modes. Pactor retains the short frame sizes and synchronous transmission format of AMTOR. It also allows the data flexibility of which Packet users have grown accustomed to.

The radio used for PACTOR HF operations must be capable of switching between transmit and receive modes in 130 milliseconds. A radio capable of operating in the AMTOR mode will operate well in the PACTOR mode as well.

Now that we have explained a little about PACTOR, let's get into the Basic Operation.

PACTOR Operation

The PACTOR operation section will deal mainly with PACTOR operations. We will briefly explain about the different operating modes and what they will do. We will explain about the new PACTOR mailbox feature and how it works. So without any further delay here we go into PACTOR Operation.

First we need to get the MFJ-1278B to sign-on. To sign-on the MFJ-1278B please perform the following:

1. Verify the power switches to both the computer and the MFJ-1278B are OFF.

2. Connect the MFJ-1278B to both the radio and the computer.

3. Connect the radio to a dummy load.

4. Set the POWER switch on the computer to the ON position, then load the terminal program.

5. Turn the MFJ-1278B ON. Verify the POWER, STA and CON leds will light.

6. Then press the ENTER key several times in succession. The MFJ-1278B will then sign-on with the on message, and end with the cmd: prompt.

Now that we have the MFJ-1278B signed-on to the computer, let's put it into the PACTOR mode.

To put the MFJ-1278B into PACTOR mode, please type the following:

MODE PT <ENTER>

The MFJ-1278B will respond with:

Radio:1 Terminal:9600
Mode: PACTOR

[MFJ PACTOR]

p_cmd:

At the above prompt, you are in the PACTOR mode. Any commands entered such as TXDELAY or ECHO, will only affect the PACTOR mode. Many of the commands of PACTOR have the same name as the general commands but DO NOT share the same parameters. At the **p_cmd:** prompt, you can monitor AMTOR ARQ requests to your SELCALL, PACTOR ARQ requests, and PACTOR FEC.

Enter your call in the MYCALL parameter (up to 8 characters). The format of the **MYCALL** command is as follows:

MYCALL n <ENTER>

where **n** is your amateur callsign up to 8 characters.

PACTOR Mailbox

Now both the MFJ-1278B/MFJ-1278BT have a new Pactor Mailbox. The new Pactor Mailbox feature is valid only for the HF packet mode. A few of the features of the Pactor Mailbox are Packet Mailbox RAM sharing and Automatic Changeovers. The operation of the Pactor Mailbox is very simple and easy to use. There are two commands in the MFJ-1278B called **MAILBOX**. One MAILBOX command is in the standard packet command set, the other is in the Pactor command set. Both of these **MAILBOX** commands must be **ON** for the Pactor Mailbox to be active. Anyone who has operated the MFJ-1278B packet mailbox can operate the Pactor Mailbox. Anyone who can operate Pactor can access the MFJ-1278B Pactor Mailbox, by using the standard packet **CONNECT** command. Once any remote user connects to your Pactor Mailbox he can send messages, obtain a list of all messages, read messages addressed to him or ones he originated or kill any messages addressed to him.

The new Pactor Mailbox in the MFJ-1278B uses the same 32K RAM for message storage as the Packet mailbox. The mailbox RAM is in addition to the system RAM, it not shared. However, you can increase the amount of RAM available to the mailbox simply by replacing the mailbox box RAM chip on the MFJ-1278B motherboard. The mailbox RAM size can be increased to 128K or even to an enormous 512K. The mailbox RAM is battery backed-up by a lithium battery just like the system RAM. Additional RAM chips are available from MFJ Enterprises, Inc. and are easily installed by the user. Order the MFJ-45B for the 128K RAM or the MFJ-45C for the 512K RAM. The number of slots and space available fro each memory size are as follows:

Memory Size	*# of Slots*	*Bytes Avail.*
32K	1 Bank 99 Slots	32,000
128K	2 Banks 99 Slots Each	128,000
512K	8 Banks 99 Slots Each	512,000

Pactor Mailbox Setup

The new Pactor Mailbox needs to be operated from the Pactor mode. There is a **MAILBOX** command in both the Packet and the Pactor modes. Both **MAILBOX** commands must be **ON**. There are certain commands that must set properly. These commands will be explained later in this instruction.

NOTE: Whenever <CR> is found in this instruction this means to press the RETURN or ENTER key depending on which your keyboard has. This does not mean to type <CR>.

There are a few items that must be setup properly first before operating your new Pactor Mailbox. Please take a few minutes to follow the steps below to ensure the mailbox is setup properly. Please follow the steps below:

1. Under the p_cmd: prompt please type the following:

   MYcall n <CR>; where **n** is your standard Pactor callsign. This will be your Pactor Mailbox callsign.

2. If you want your messages time and date stamped, then set the **DAYTIME** parameter in the MFJ-1278B with the current information. Please refer to Chapter 6 of the MFJ-1278B Main Instruction manual, for instructions for setting the DAYTIME parameter. You will also need to set the **MSTAMP** command in the MFJ-1278B to ON. If using the MFJ Multicom terminal program issue the **ALT-D** command from the cmd: prompt. The ALT-D command will send the time and date information to the TNC based on the computer system clock.

NOTE: An optional TNC real-time clock module (MFJ-43) for the MFJ-1278B is available from MFJ Enterprises. With the MFJ-43 installed in your MFJ-1278B, the clock will continue to keep accurate time and date even when the MFJ-1278B is turned OFF. Using the MFJ-43 clock module will eliminate the necessity of setting the MFJ-1278B's **DAYTIME** parameter each time you turn the MFJ-1278B ON.

3. From the p_cmd: prompt type:

   MAILBOX ON <CR>

Now your MFJ-1278B is ready for Pactor Mailbox operations.

4. All SYSOP operations are accessed from the Packet mailbox. To access the SYSC mode type the following from the **p_cmd:** prompt:

   EXIT <CR>

the MFJ-1278B will respond by pulsing the STA led. The standard **cmd:** prompt w appear on the screen. You are still in the Pactor mode, even though you do not see tl p_cmd: prompt.

5. To enter the SYSOP mode please type the following:

   SYSOP <CR>

the MFJ-1278B will respond with the following:

| K [MFJ-2.1a-IH$]
Mailbox Ready
n free Mailbox (B, E, H(elp), J, K, L, M, R, S, T)>

Let's find out what the **n free** is for. The n free is a "Bytes Free" indicator. This applie only to the mailbox. Even though you are in the Packet mailbox SYSOP mode, the **n** sti indicates the proper "bytes free" for the Pactor mailbox too. This is a great featur because any remote user will always know how much message space there is in you mailbox. The mailbox will update the "Bytes Free" counter whenever messages ai forwarded, added or deleted.

The commands available in the SYSOP mode are explained in the MFJ-1278B Mai Instruction manual. To exit the SYSOP mode hold down the **CTRL** key and press the (key. The MFJ-1278B will respond with the **|Acmd:** prompt. The user must press th <ENTER> key to obtain the **cmd:** prompt. The user can re-enter the Pactor mode b typing:

MODE PT <ENTER>

The Pactor mailbox is accessed via a standard Pactor connect sequence. When a connec is fully established the remote the MFJ-1278B send an automatic changeover. Sending c the automatic changeover, **CTRL-Y** to the Pactor mailbox allows the mailbox to send it mailbox prompt. The Pactor mailbox prompt is shown below:

[MFJ-2.1pt-IH$]
n free ***callsign*** **(Help, K, L, R, S)>**

where the **n** free still indicates the free message space available in the mailbox. There ar fewer commands available than in the packet mailbox, but their functions are the same Below is a short explanation of the Pactor Mailbox commands available:

Help

This is the HELP list for the remote user. The HELP will list all commands availabl to the remote user. This is helpful, especially for new users.

Kill

This command allows you to **KILL** messages that are addressed to you. This work in conjunction with the Y flag in the message header. In order to perform a Globa Kill, first all messages to be killed must have the Y flag set in the header. Secondly all messages to killed must have the same callsign as MYMCALL.

K ##

This is the same as the standard KILL command, however it allows you to kill message in a certain slot number. Remote users may only kill messages addressed t them or messages that they originated. The local SYSOP can kill any messages.

List

The LIST command allows the remote user or local SYSOP to list all messages in th mailbox. All message slots that currently have messages in them will listed. Al listed messages will be in the following format:

 # T F Size To From Subject

This is the message number. Each message in the mailbox memory will have a number attached to it. This is the number used by the local SYSOP and all remote users to read, kill, or list messages.

Type

This is the message type indicator. This is the same as the packet mailbox message type indicator. There are a few message types, however here are a couple listed below:

1. "T" messages** These are **NTS** (National Traffic System) type messages. This message system was developed by the ARRL. NTS messagesmust be formatted in a certain way. Please refer to the **ARRL Net Directory** for a more detailed view and information on this message system.

2. "P" messages** These types of messages are private messages to the sender, recipient, and the SYSOP.

Flag

This is the message flag indicator. The message flag is now very important. All flags can be set via the S (send) or E (edit) commands. This flag will either be an N, Y, or F. This flag will appear next to the **To:** block in the message header. There are several different types of flags. A list of the types of flags along with an explanation are shown below:

N** Messages with this flag set are all able to be forwarded, providing all other criteria has been met for a message to be eligible for forwarding. Only the messages with the N flag set trigger the **"You have new mail!"** message.

T** Messages with the T flag set indicates that the message is an NTS type message.

Y** Messages with the Y flag set are eligible to be killed. To kill a message the K command must be used. If more than one message has the Y flag set then using the K command will perform a global kill on all messages with Y flags.

F** Messages with the F flag set indicates that forwarding has occured. In order a message to be eligible for forwarding the following criteria must be met:

1. All messages to be forwarded must have the N flag set.

2. Messages that have no @ addresses that are different from MYMcall.

P** Messages with the P flag set are private messages to the sender, recipient, or the SYSOP. Only the person to whom the message is addressed, the originator, or the local SYSOP can read or kill a private message. The local SYSOP can read or kill any message in the mailbox system.

Here is an example of a mailbox message with a Type and a Message flag inserted:

Slot: 1 PN To: KB5JNZ From: KF5C BBS Bulletin

The **P** in the Type block indicates the message is private for KB5JNZ. The N in the flag block tells you that the message has not been read by KB5JNZ. It also indicates the message can be forwarded to whereever KB5JNZ receives his mail. When KB5JNZ reads the messages the N flag will become a Y flag.

Size This is the actual size of the message in bytes.

To: This slot will contain the callsign of the person to whom the message is addressed. When the message header is edited for forwarding this block will also contain the @ address. The **@ address** is the destination BBS where the ***To: callsign*** receives his/her mail. The @ address must be the same callsign as the BBS callsign.

From: This slot will contain the callsign of the person who originated the message. This slot may contain the time and date of the message, if the message was time and date stamped by the sender.

Subject: This slot will contain the message title or subject. The subject slot can hold up 40 characters.

List ##

The List ## will instruct the mailbox to list a message in a certain number slot. All messages listed with this command will follow the same format as with the standard List command.

Read

This command enables you to READ messages that addressed to you. When you list the messages in the mailbox you will notice an N flag next to the messages that you have not read. Once you have read your messages, then the N flags will change to Y flags. This is an indicator to both you and SYSOP that you have read the messages. Once the messages have been read, either you or the SYSOP can kill the messages.

NOTE:

The only way an N flag is changed to a Y flag is when the message is read by the person it is addressed to. The message flag will not be changed by any other person who reads the messages. This also applies when private messages are read by the designated callsign.

Read ##

Allows you to read a message in a certain message slot. If you want to read the message in slot #10, you would send the command **R 10** to the mailbox. The mailbox will respond with the message in slot #10. The **R ##** works the same as the standard R command, except you are reading messages in certain slots.

S callsign

The Send command is used by the local SYSOP or remote user to send a message to the designated callsign. The "callsign" must be a valid callsign under the same format as the MYCALL, CONNECT or any callsign related commands. The format of the Send command is as shown below:

S CALLSIGN

where the ***callsign*** would be replaced by the callsign of the person to whom the message is being addressed. For example if you are sending a message to AA5MT you would type **S AA5MT** and press the <ENTER> key and a changeover. The mailbox will respond with:

Enter subject (Max. 40 Chars.):

the mailbox will send an automatic changeover and relinquish control to the remote user. The remote user will then type the message title or subject followed by pressing the <ENTER> key and a changeover. The mailbox will then respond with:

Enter msg, control-Z or /EX on its own line ends:

after receiving the mailbox data the remote user will start sending his/her message. The message can be an ascii text files, amateur bulletins, or even just a few lines. Depending on the mailbox RAM size you can send larger text files or bulletins. After the message has been completely sent, the user will end the message with a **CONTROL-Z** or **/EX**. The user must also send a changeover after sending the CONTROL-Z. The mailbox will respond with:

Message stored
n free de callsign (Help, K, L, R, S)>

The mailbox will then send an automatic changeover. The remote user will receive the mailbox response and become the **ISS**. From here the remote user can perform any other mailbox function available or disconnect from the mailbox.

When the mailbox disconnects the CON led will remain ON for about 25 seconds. This is completely normal. Even while the CON led is still ON, the mailbox can still be connected to.

SP callsign

This command is very similar to the standard S command. The SP command is used to send private messages to the designated callsign by the remote user or local SYSOP. A private message can be read or killed by the designated callsign or local SYSOP. The message will become a Y, but the Type flag does not change, it remains a P flag. The P flag can also be inserted by the originator or the local SYSOP through the Edit command.

Pactor Mailbox Operation

In this section of this instruction we will briefly cover the operation of the Pactor Mailbox. We cover from when the mailbox is first connected and then on to some of the different mailbox prompts and commands.

When we are finished you should have a better understanding of the Pactor Mailbox operation.

1. First establish a connection to the Pactor mailbox station.

2. If the Pactor mailbox of the station to which you are trying connect with is ON, then it will answer back with a standard Pactor **connect message:**

   p_cmd:* CONNECTED TO** ***callsign***

   where ***callsign*** is the Pactor station callsign. Once a connection is established to the Pactor mailbox, the MFJ-1278B sends an automatic changeover.

3. When the mailbox receives the changeover from the remote user, then it will send the following mailbox prompt back to the user:

   [MFJ-2.1pt-IH$]
   n free **de** ***callsign*** **(Help, K, L, R, S)>**

   When the mailbox is finished sending back its mailbox prompt it will send back an automatic changeover.

NOTE:

The ***n free*** indicates the amount of RAM space is available in the mailbox that you are connected to for messages. The n free will be no larger than 65K if a 128K or 512K RAM is used. If the mailbox is the standard 32K the number will be 32K.

Now you at the point where all the Pactor Mailbox commands are available to you. You may then execute any of the commands such as **Kill**, **Help**, **List**, **Read**, or **Send** on any message addressed to you.

4. To Send a message use the S or SP command. It must be used in conjunction with a callsign as in the examples below:

   S AA5XO <CR>, this will send a regular message to the callsign AA5XO.

   or

   SP AA5XO <CR> this will send a private to the callsign AA5XO.

The Pactor mailbox will respond with:

Enter subject (Max. 40 Chars.):

the mailbox will send an automatic changeover and relinquish control to the remote user. The remote user will then type the message title or subject followed by preesing the <ENTER> key along with a changeover. The mailbox will then respond with:

Enter msg, control-Z or /EX on its own line ends

the mailbox will then send an automatic changeover. The remote user will start sending the message. The message can be an ascii text file, amateur bulletins or even just a few lines to a friend. After the message has been completely sent, the user must end the message pressing the **<ENTER>** key followed by either a **CONTROL-Z** or **/EX**. The **/EX** or **CONTROL-Z** must be followed by a changeover. When the changeover is received by the mailbox, it will respond with:

Message Stored
n free de *callsign* (Help, K, L, R, S)>

The mailbox will update the "bytes free" counter and present the Pactor mailbox station callsign. The mailbox will send an automatic changeover after sending its mailbox prompt. At this point the user is again free to perform any mailbox function. If the Pactor mailbox RAM is 128K or 512K in size you can even upload disk files into the mailbox.

There are two (2) different ways to kill messages. The first method is shown in the example below:

a. **K##** <CR>; Where the ## is the number of the message you want to kill.

b. The Mailbox will respond with

FEC Unproto operation

There are two **FEC** modes, 100 baud and 200 baud. Properly tune the radio before entering either of the FEC modes. The reason for this is as soon as you initiate an **FEC** unproto mode the radio will start transmitting immediately. To initiate 100 baud FEC, please type the following from the **p_cmd:** prompt:

U1 <ENTER>

The cursor will go to the next line. At this point start typing whatever you want. You normally issue your CQ's in FEC mode. Someone will see your FEC mode CQ's and probably try to "connect" with you.

To terminate an unproto session type a CTRL-C followed by the letter D and the <ENTER> key. This is done after sending CQ or when terminating a Pactor contact. If the standard D command does not work, then use the DD command to terminate the unproto session.

The situations in which the two **FEC** modes are different. Generally, the **U1** or 100 Baud FEC mode is for use in **normal** HF band conditions, while the **U2** or 200 Baud FEC mode is for use in **clear** HF band conditions. Your transmitter must be capable of transmitting 100% duty cycle. Because when transmitting PACTOR FEC, you are **ALWAYS** transmitting a signal- just like RTTY.

PACTOR ARQ

For ARQ operation you will need to know the other person's callsign. Normally you can get the other person's call by monitoring the channel for connect requests or other ARQ contacts.

To establish contact with another station, you must be at the **p_cmd:** prompt. To initiate a connect sequence, please type the following:

C n <ENTER>

where **n** is the **CALLSIGN** of the station you want to connect with. The callsign is not to be over eight characters in length. Again, properly tune the radio, because you will immediately start transmitting packets.

When a station is over 40,000 Km away, the **LC** command should be used. The **LC** is the abbreviation for **Longpath Connect.** To initiate a Longpath Connect sequence, please type the following:

LC n <ENTER>

where **n** is the **CALLSIGN** of the station you want to connect with. Callsigns are not to be over 8 characters in length. Again properly tune the radio, because you will immediately start transmitting packets. If the **C** command does not work, the **LC** command might. Generally, if one command works the other will not.

Changeover

In AMTOR the changeover (from TX to RX) command is +?. In PACTOR the changeover command is CTRL-Y, i.e, hold down the CTRL key then press the Y key. The changeover character can be re-defined with the CHOCHAR command. How the CHOCHAR character is re-defined will discussed later.

A changeover can be forced by holding down the **CTRL** key, then pressing the **Y** key. During normal Pactor and Pactor Mailbox operations, the changeover is automatic, meaning there is no need to issue a manual changeover.

To terminate an ARQ contact, type CTRL-C, then **D**, then <ENTER>. This will cause a graceful disconnect at the other end. If you do a "**dirty disconnect**" or **DD**, the other Station will still be trying to acknowledge your packets. The use of **DD** automatically tears down the contact and does not wait for acknowledgments from the other station. The use of the **DD** command is considered bad manners. Always do a D disconnect, if possible.

Monitoring

While in the PACTOR mode, you are always in Listen mode. There is no listen command in the Pactor protocol. Therefore you do not need to issue listen command just to listen on a PACTOR frequency. To monitor a PACTOR conversation, just tune the signal in until the yellow DCD light is on solid as the packet is being received. Then adjust the VFO dial on the radio until one of the center LEDs on the tuning indicator is ON during the received packet. Fine tune the VFO dial until the CON and STA leds react to the incoming signal. The CON and STA led should alternate back and forth while monitoring a PACTOR QSO. First the CON light comes on, then the STA, then the CON again. When the CON LED comes on that second time, you will see the data printed to the screen. For further information how the CON and STA leds react to incoming signals please refer to the chart on Page 37 of this instruction.

Monitoring AMTOR ARQ requests

AMTOR ARQ requests monitored while the MFJ-1278B in PACTOR mode. If the controller detects your selcall in an AMTOR ARQ request packet, the controller will switch to AMTOR and try to establish the link. This feature allows someone who doesn't have PACTOR capability to connect to you in AMTOR mode. Upon termination of the link, the MFJ-1278B will switch back to the PACTOR. The **a_cmd:** is active when the MFJ-1278B switches to the AMTOR operation. When the MFJ-1278B switches back to the PACTOR, you will see the **p_cmd:** prompt again.

Exiting PACTOR Mode

To exit the PACTOR mode, please type CTRL-C and the **p_cmd:** prompt will appear. Once the p_cnd: prompt is on the computer screen, type the following:

EXIT <ENTER>

the MFJ-1278B will respond with the standard **cmd:** prompt. Once back at the cmd: prompt you can go to any other mode by use of the MODE command as discussed earlier in this instruction.

Operating Hints

Threshold Control Setting

Adjustment of the Threshold control on the MFJ-1278B is critical during PACTOR operations. Adjust the Threshold control until the DCD lights with each received packet and goes out when not receiving. If the threshold control is improperly adjust, communications will not be good. This could result in the inability to make a contact or monitor a PACTOR conversation.

TXDELAY (TXD)

Timing in PACTOR is more critical than any other mode. This is where the **TXDELAY** or **TXD** command comes into play. The **TXDELAY** command is one of the more critical parameters. If you are having problems connecting, try adjusting TXD a little higher than the default value of 2. This is especially good practice on the lower frequency bands such as 80 meters. A typical setting for 80 meters may be 4 or 6. The setting of TXDELAY is also dependent on the time required for the radio to switch between transmit and receive.

NO200

If you turn the parameter **NO200** to ON, the MFJ-1278B will stay in 100 baud. For noisy band conditions setting NO200 to ON may get your data through quicker. This is because if the controller switches to 200 baud you may have more retries on a noisy channel. It's better to have one retry at 100 baud than six retries at 200 baud.

As indicated in the preceding paragraph, the usual terminal/radio/modem parms are available.

The following PACTOR related commands are available at the packet "cmd:" prompt:

MODE PT {m}

using the MODE command with the optional modem designation. Works like MODE AM.

As in Packet, Pactor also contains **COMMAND** and **CONVERSE** modes. Please note that switching between them is modeled on the "NEWMODE ON" procedures in packet. The MFJ-1278B is in **COMMAND** mode, if the **p_cmd:** prompt is on the computer screen. To switch to **CONVERSE** mode from **COMMAND** mode the **K** key followed by an <ENTER> is issued by the user. The **CMDCHR** character switches the MFJ-1278B from **CONVERSE** mode back to **COMMAND** mode. The **CMDCHR** character is defined as **CTRL-C**. Once connected, the link acts much like AMTOR. The station originating the connection is the master and he remains in transmit mode until he or the slave initiates a changeover. Either station may reverse the direction of the link by issuing a control-Y changeover (^Y) in converse mode.

Pactor Feature Definitions

DIGITAL MEMORY ARQ

The MFJ-1278B's Pactor incorporates a Digital Memory ARQ mode. Digital Memory ARQ enables reconstruction of a good packet from a bad packet. A bad packet is one repeatedly received with on or more bit errors. Digital Memory ARQ accumulates the bit value, 1 or 0 derived from the RF port during successive reception of the same error-laden packet. These bit accumulations are sent to the receiver shift register. Thus a good packet is reconstructed from 2 or more "bad" packets.

The **MAXSUM** parameter controls the number of accumulations performed for each bit. Larger MAXSUM values increase the effectiveness of the Digital Memory ARQ scheme, but only to a certain point. The reception of an almost perfect packet will be inadequate to overcome the accumulated noise, if MAXSUM is too large. Also the presence of excessive QRM, QRN, or QSB effects the reception of good packets. On the other hand, if MAXSUM is too small the accumulation of samples will be too few to correct for moderate error rates. The factory setting for MAXSUM represents a good compromise--feel free to play with it.

FEC UNPROTO

Unproto: "FEC/UNPROTO" packets are transmitted UREPEATS+1 times. Selecting larger values of UREPEATS reduces throughput, but enhances reliability. To transmit in UNPROTO mode, issue the appropriate unproto command and type away. When done, break out to "p_cmd:" mode and type 'D' or 'DD' to terminate transmission.

MONITORING

Monitoring unproto: If **MONITOR** is **ON** the MFJ-1278B is always in **listen** mode, except when connected to another station. There are other situations occur that prevent the MFJ-1278B from being in listen mode. These other situations being:

a. When a 2-way Pactor contact has just been terminated.

b. When a disconnect was initiated from the other operator.

To prevent Uncontrolled Disconnects, we are unable to listen to all kinds of third party Pactor transmissions for (WAIT x Cycle_Time) seconds after receiving the other side's last disconnect. This includes all unproto and connected packets, along with connect requests. The actual cycle time is 1.25 or 1.4 seconds.

CONNECT

[Connect] message: The MFJ-1278B monitors connect attempts received from other station's with a message containing the called station's callsign when idle. To successfully monitor a connect attempt to someone else, the called callsign must be at least 4 characters in length, and the signal be of sufficient quality that the 200 baud area be error-free when received. Unfortunately, the callsign in the connect-attempt packet (unlike all other monitored data) is subject to corruption; the Pactor protocol did not provide for error- free connect packets. Therefore, you may at times see a garbled callsign in a [Connect] message, but it should be rare. Remember, this "garbling" affects only monitored connect-attempt packets. It does NOT affect ARQ or FEC data packets because they are error-protected by a sophisticated CRC checking scheme.

SPEEDUP/SPEEDdown

Speedup and **speeddown**: When the TNC is the receiving station or **IRS**, and after four consecutive failures to receive a 200 baud packet the TNC requests a **SPEEDDOWN** to 100 baud. A **SPEEDUP** occurs when the MFJ-1278B receives 10 error free 100 baud packets. If **NO200** is set to **ON** all **SPEEDUP** requests are inhibited

Bad band conditions: During poor band conditions links will be quicker by avoiding use of the 200 baud mode. Setting NO200 to ON instructs the TNC to avoid 200 baud operation in a compatible way.

AUTOMATIC ON-LINE COMPRESSION

Huffman coding: Huffman coding offers somewhere between 2:1 and 4:1 compression on lower case German and English plain text. In receiving modes, conversion to 8 bit data is automatic. On transmit, the TNC packetizes outgoing data and transparently selects the mode. Huffman coding will be used if a) all data are 7 bit ASCII characters, and b) Huffman coding is at least as efficient as straight 8-bit coding.

FLOW CONTROL

Flow control: Hardware flow control is always on. Software flow controls defaults to on using the XON and XOFF parameters. Unlike TNC operations, the same characters are used for receive flow control as for transmit flow control. Type-in flow control is only effective while entering commands at the "p_cmd:" prompt.

AMTOR while in PACTOR mode

AMTOR calls: MFJ's Pactor implementation is downward compatible with AMTOR-only stations. That is, even if the TNC is in Pactor "p_cmd:" mode it will automatically detect and respond to incoming AMTOR ARQ connection attempts. This allows your buddies with AMTOR- only controllers to call you even though you are in the Pactor mode. To enable the AMTOR call detection feature, you must have previously entered your AMTOR selective callsign in the "a_cmd:" MYSELCAL parameter. Furthermore, you must have the appropriate sideband (usually, LSB) selected because unlike PACTOR, AMTOR is polarity dependent.

How **AMTOR-while-in-PACTOR** mode detection works;

The MFJ-1278B's Pactor continuously monitors the channel for Pactor packets and for AMTOR call packets that match your AMTOR SELCALL. When PACTOR hears your AMTOR SELCALL, the TNC enters the "a_cmd:" AMTOR mode in an attempt to complete the link.

After entry into the AMTOR mode the MFJ-1278B will return to Pactor mode if the link is not established within 30 seconds. If the link is established, the TNC remains in AMTOR mode for the duration of the contact, and for an additional 30 seconds after the link terminates. Upon expiration of the 30 seconds, the return to PACTOR is performed automatically.

PACTOR Status Indicators

While in the PACTOR mode of operation, you have PACTOR mode Status Indicator avialable to you. These Status Indicators are comprised of the CON and STA leds. Thes leds react in different ways according to what is happening. Below is a table as to how th leds will act:

Status Indicator STA	CON	Pactor Status	
0	0	RX	N/A
		TX	N/A
		MON	The TNC is idling and has not monitored any information packets in the past second.
0	1	RX	Sending ack control signal
		TX	Last packet acknowledged
		MON	Received new packet
1	0	RX	Dupe rcvd; sending Request control signal
		TX	Received request control
		MON	Received dupe packet
1	1	RX	Info packet missing; sending request
		TX	Control sign missing; retransmitting
		MON	N/A

COMMANDS

The following commands are only valid when issued at the **p_cmd:** prompt. Note that a few of the parameters use the same names as packet commands. The parameters themselves are NOT shared between the different modes, and have completely different formats. Many of the commands can be entered via the highlighted abbreviations. This makes it easier to remember the command abbreviations and not the entire command.

AUtolf ON/OFF ON/OFF **Mode: Pactor** **Default: ON**

Parameters:

ON A linefeed character (<LF>) is sent to the terminal after each carriage return character (<CR>).

OFF A <LF> is not sent to the terminal after each <CR>.

The **AUTOLF** command controls the display of carriage return characters received during PACTOR monitoring, as well as echoing those that are typed in. For further information on this command please refer to the **AUTOLF** command in Chapter 6 Page 13 in the MFJ-1278B main instruction manual.

CBell ON/OFF ON/OFF **Mode: Pactor** **Default:OFF**

Parameters:

ON Allows the Connect bell to be heard over the monitor speaker.

OFF Dis-allows the Connect bell to be heard over the monitor speaker.

This command is exactly the same as the **CBELL** command used in packet. This command determines whether or not an ASCII $07 or CTRL-G (BELL) character is sent as part of the connected message. This command must be ON, if the **CHObell** command is to be used, otherwise the CHANGE OVER BELL will not work.

When the CBELL command is set to **ON**, the bell character immediately precedes the asterisk portion of the connected message, e.g.

<BELL>* Connected to: <CALLSIGN>**

When **CBELL** is **ON**, and a connect is made a tone will be heard on the external speaker. A ***speaker must be connected*** to the **SPEAKER** jack on the rear panel of the MFJ-1278B, in order to hear this tone.

CHObell ON/OFF **Mode: Pactor** **Default: ON**

Parameters:

ON An ASCII bell (0x07) character is sent to the terminal when the PACTOR link changes direction.

OFF An ASCII bell (0x07) character is not sent to the terminal when the PACTOR link changes direction.

The **CHOBELL** controls whether or not an ASCII BELL (0x07) is sent to the terminal, when the Pactor link changes direction. The terminal bell will sound only once.

In order for this to function properly, the **CBELL** command must be ON. If not, the CHANGE OVER BELL will not work properly.

CHOChar nnn: 0<=nn<=255 **Mode: Pactor** **Default: 25 (^Y)**

n Where the n variable equals 0 <=n<=255

The **CHOChar** character designates the Pactor changeover character. This character initiates a control direction change in the Pactor signal.

This character can be varied from 0 to 255 decimal, for computers which may not support the default. The default is **CTRL-Y**. A value of 0 disables the Pactor changeover.

CMDchr nnn: 0<=nn<=255 **Mode: Pactor** **Default: $03 (^C)**

Parameters:

n **<=nn<=**255, specifying an ASCII character code.

This character is used to change the **COMMAND MODE** entry character. You can enter the code in either hexadecimal or decimal form.

Command Mode is entered from **CONVERSE** Mode, when this character is typed. If you type the Command Mode entry character while you are in Command Mode, nothing will happen. This character must be entered before a disconnect can be issued, from either FEC calling mode or to issue a disconnect from a connected state.

Connect callsign **Mode: Pactor** **Immediate Command**

CONNECT is an immediate command. It initiates a connect request to the MFJ-1278B with **CALL** using regular timing. The CONNECT command should be used when initiating Short- Path Connect attempts.

CWidmode nn: 0<=nn<=255 **Mode: Pactor** **Default 0**

Should CW identification be required, the MFJ-1278B now supports 8 CW identification modes. Seven automatic modes are selected by the bit-mapped **CWIDMODE** parameter. Bit positions within the **CWIDMODE** parameter enable ***timed cw id, cwid on incoming events, cwid on outgoing events,*** and any combination of the three for a total of 7 modes.

The timed mode requires some explanation. The counter controlling the transmission of the timed CWID must be initially started at the beginning of each link with either the manual "ID" command or one of the initial CWIDMODE features selected by CWIDMODE bits 1 or 2. A fully automatic CW ID is achieved by setting CWIDMODE to 3. Reduced levels of automation are selected by other combinations. The eighth mode is manual cwid. Invoke manual CWID by issuing the "ID" command. Also see IDTIME

The CWIDMODE command in Pactor is very complex and provides several combination of CWID. Below is an example of how CWIDMODE functions:

CWID MODE	On Calling	On Connect	On Disc.	Man./ Auto	Comments
1				Man. Only	Mode 1 is manual ID only
2		IRS	IRS		
3	ISS,IRS	IRS	IRS	Auto ISS, ISR	Auto ID interval dependent on the IDTIME setting
4	ISS		ISS		If ISS does changeover, and new ISS disconnects, then the new ISS will ID
5	ISS		ISS	Auto ISS only	If ISS does changeover, then previous ISS auto ID is Disabled
6	ISS	IRS	ISS, IRS		Upon reciept of disconnect from ISS and the disconnect appears on IRS screen, the IRS will ID. After ID from IRS, the ISS will ID
7	ISS, IRS	IRS	IRS, ISS	Auto ISS, IRS	When ISS sends changeover, new ISS AUTO ID enabled. Auto ID for previous ISS is disabled. Disconnects are handled the same as Mode 6
8					CWIDMODE 8 is completely manual ID

DISplay **Mode: Pactor** **Immediate Comman**

The **DISPLAY** command will display all **PACTOR** commands and their settings. This the the same as the **DISPLAY** command used in the other modes.

DDisc **Mode: Pactor** **Immediate Command**

The **DDISC** command is used as a last resort for terminating a PACTOR link. This wi work where at times the standard **DISCONNECT** will not. The use of this type o termination is considered RUDE so this is why it is a last resort.

Disconnect **Mode: Pactor** **Immediate Command**

This command is exactly like the **DISCONNECT** command in Packet. When thi command is issued from the p_cmd: prompt a disconnect sequence is initiated. Th DISCONNECT command is what operators normally used to terminate a Pactor link.

EAa ON/OFF **Mode: Pactor** **Default ON**

"Echo as ACKd". When ON the TNC echos transmitted data to the terminal upon receipt of the remote's acknowledgement of the same data.

ECho ON/OFF **Mode: Pactor** **Default ON**

Same as 1278, except that echoing is deferred when EAA is ON as described above.

ERrstrin cccc **Mode: Pactor** **Default: [....]**

where cccc is 1 to 5 characters in length

The **ERrstrin** command designates the character string that is displayed when an unconnected packet is monitored out of sequence. To clear the string set the first character to % or &.

EXActcal ON/OFF **Mode: Pactor** **Default:ON**

When the **EXActcal** command is **ON**, the TNC responds to connect packets that match all the letters in your callsign and no more. When OFF, the looser "buggy" Pactor specification comes into play and your TNC responds to any connect packet containing at a minimum the contents of MYCALL. **EXACTCAL** matching will not always work to filter out improper callsigns when the offending unit is the pacomm Pactor version 1.0 unit because of its use of regular ascii 0x55 ("U") characters to fill and terminate callsigns. MFJ uses ascii 0x0f as specified in Pactor documents, instead of 0x55 to fill, and thus fixes the bug.

FLow ON/OFF **Mode: Pactor** **Default ON**

This operates basically the same as the MFJ-1278B packetcommand, but operates only in **p_cmd:** mode. This limitation is due to the rapidly changing transmit <> receive status of a Pactor link. Applying **FLOW** to data would improperly hold off the important changeover signal and is therefore disallowed.

ID **Mode: Pactor** **Default: 590**

The ID command is an immediate command that when used will invoke an immediate CWID to be sent. The ID will be sent at 20 WPM and will consist of the station callsign.

IDTime nnn: 6<=nnn<=255 **Mode: Pactor** **Immediate Command**

The **IDTime** parameter specifies the time interval between automatically generated CWID events. The actual time yielded is equal to **IDTIME** * 10 seconds. The **IDTime** parameter is relevant only when bit 0 of the CWIDMODE parameter is set to 0.

K (Converse) **Mode: Pactor** **Immediate Command**

This command will put the MFJ-1278B into **CONVERSE** mode from the **p_cmd:**. This is the same as the **K** command used in the other modes, such as Packet, RTTY, and CW.

LC callsign **Mode: Pactor** **Immediate Command**

Initiates an ARQ link to the specified callsign using extended **LONGPATH** timing to support long txdelays or long skip paths This type is generally used when the destination is over 40,000 Km away, where the standard Connect commanf timing will not work.

LEdmode 0/1 **Mode: Pactor** **Default: 1**

The LEdmode parameter controls whether the MFJ-1278B flashed it's LEDs radidly for each cycle a 200 baud packet is sent, received, or expected. The user may find the flashing of benefit in evaluating link quality. It is also an indication that the high-throughput 200 baud mode is active. Also see the NO200 parameter.

LFadd ON/OFF **Mode: Pactor** **Default OFF**

When **LFADD** is **ON** and **PACTOR** mode is selected, the MFJ-1278B will append an ASCII line feed character, $0A, to the transmission immediately after a carriage return is sent

LFADD should usually be switched to the OFF, as a vast majority of data controllers, including the MFJ-1278B are configured to automatically go to a new line whenever a carriage return is printed.

Also see: **AUTOLF** command

MAXDown nnn: 5<=nnn<=48 **Mode: Pactor** **Default 4**

MAXDown controls the number of 200 baud information-packets receive errors that the MFJ-1278B will tolerate prior to requesting a **SPEEDdown** to 100 baud.

MAXSum nnn: 5<=nnn<=120 **Mode: Pactor** **Default 30**

MAXSum specifies the number of cycles of error-laden information packets received that are accumulated in the **Digital Memory ARQ** sum buffer for reconstruction. When **MAXSUM** consecutive information receive errors occur, on the next receive cycle the sum buffers are re-initialized to inhibit the corruption of real-time reception by historical receive errors.

MAXUp nnn: 2<=nnn<=48 **Mode: Pactor** **Default 10**

MAXUp specifies how many consecutive good receptions of 100 baud information packets are required prior to the MFJ-1278B requests a **SPEEDUP** to 200 baud. Note that if **NO200** is set to **ON** then a **SPEEDUP** will not occur because the MFJ-1278B will never request a **SPEEDUP** regardless of the MAXUP value. The **MAXUP** value should be small enough to enable timely **SPEEDUP** in relatively good conditions, while being large enough to avoid pointless speedups during bad conditions.

Monitor ON/OFF **Mode: Pactor** **Default ON**

The **MONITOR** command in the **PACTOR** is the same as the in the other modes. When not connected and **MONITOR** is **ON**, the TNC displays monitored data and connect attempts.

MYcall callsign **Mode: Pactor** **Default: MFJPACTR**

The **MYCALL** command is the same as the **MYCALL** command used in the Packet mode. The **MYCALL** command can take callsigns up to 8 characters in length. The callsign used must be at least 4 characters in lengh.

NO200 ON/OFF **Mode: Pactor** **Default OFF**

Controls whether 200 baud links are to be discouraged. The TNC accomplishes this in two ways: (1) Speedups are inhibited, and (2) Incoming connect requests are acknowledged for 100 baud. NO200 works most effectively when both units are capable of NO200 operation. Regardless of the setting of NO200, the TNC complies. This ensures connectivity with non-MFJ units.

PASS nnn: 0<=nn<=255 **Mode: Pactor** **Default ^V**

The Pactor **PASS** command is the same as the PASS command in the other modes. The PASS command does not work for ^Y Changeover.

PTOver nnn: 0<=nn<=255 **Mode: Pactor** **Default: 25 (^Y)**

n Where the **n** variable equals 0 <=n<=255

The **PTOver** character designates the Pactor changeover character. The PTOver command was addded in order to make the MFJ-1278B command set compatible with other Pactor controllers. This character initiates a control direction change in the Pactor signal.

This character can be varied from 0 to 255 decimal, for computers which may not support the default. The default is **CTRL-Y**. A value of 0 disables the Pactor changeover.

PTSend **Mode: Pactor** **Immediate Command**

The **PTSend** command is basically the same as the U1 Unproto command. Entering **PTSend** from the p_cmd: prompt will invoke the 100 baud unproto mode. The PTSend is to make the MFJ-1278B's Pactor command set compatible with other Pactor controllers. For further information on the **PTSend** command please refer to the **U1 UNPROTO** command.

RETries nnn: 0<=nn<=255 **Mode: Pactor** **Default: 80**

The number of error cycles tolerated before unilaterally terminating the link. (Also see WAITDISC)

STatus **Mode: Pactor** **Immediate Command**

Displays debug information. This is helpful for troubleshooting Pactor problems. If any Pactor problems occur and you are still able to talk to the MFJ-1278B, then type this command from the p_cmd: prompt. The MFJ-1278B will send the Pactor Status to the screen. Copy all information on a piece of paper and call our technicians.

TRace ON/OFF **Mode: Pactor** **Default OFF**

This command displays continuous debug informationto the screen. This is the same as the TRACE command in the other MFJ-1278B modes.

TXDelay n **Mode: Pactor** **Default: 2 (60ms)**

Actual Delay Time equals **n + 10ms * 5ms**

Similar to **AMTOR's DELAY** and packet's **TXDELAY**. The actual delay yielded is equal to (10ms + (TXDELAY * 5ms)). If the combined TXDELAYs of both stations involved in the link exceeds about 180ms, then shortpath connections may not work, particularly at longer distances. If difficulty is experienced, try using the Longpath Connect ("LC") command to connect.

U1 UNPROTO **Mode: Pactor** **Immediate Command**

Issuing the **U1** command from the **p_cmd:** prompt initiates the 100 baud FEC. The **U1** mode is mainly used during poor band conditions. The MFJ-1278B will request a SPEEDdown to the **U1** mode depending on the number of error-laden 200 baud information packets recieved. (ALSO SEE MAXDdown and NO200)

U2 UNPROTO **Mode: Pactor** **Immediate Command**

Issuing the **U2** command from the **p_cmd:** prompt will initiate the 200 baud FEC mode.. The **U2** mode can also be used during good band condition where communications are real good. The MFJ-1278B will request a SPEEDUP to the 200 baud depending on the number consecutive good 100 baud information packets it receives. (ALSO SEE MAXUP and NO200)

URepeats nn: 1<=nn<=7 **Mode: Pactor** **Default 1**

The **UREPEATS** parameter specifies how many retransmissions to perform for each FEC data packet sent.
For example **UREPEATS** + 1 causes each FEC packet to be sent two times.

WAitdisc nn: 10<=nn<=255 **Mode: Pactor** **Default: 20**

The number of cycles MFJ-1278B waits to reply to the other TNC, that having requested a disconnect, fails to hear our disconnect acknowledgement.

XOFF nn: 0 <= nn <= 25 **Mode: Pactor** **Default: ^S**

This command determines the Flow Control STOP character. The Pactor XOFF command is the same as the **XOFF** command in the standard MFJ-1278B command set. For further information on the XOFF command please refer to the explanation of the XOFF command in Chapter 6 of the MFJ-1278B Main Instruction Manual.

XON nn: 0 <= nn <= 255 **Mode: Pactor** **Default: ^Q**

This command determines the Flow Control Start character. The Pactor XON command is the same as the XON command in the standard MFJ-1278B command set. For further information on the Pactor XON command please refer the explanation of the XON command in Chapter 6 of the MFJ-1278B Main Instruction Manual.

* see discussion above for more on XON/XOFF software flow control

APPENDIX

Radio Hookup

RADIO	CONNECTOR TYPE	MIC AUDIO to pin 1of J1	PTT to pin 3 of J1	RX AUDIO to pin 4 of J1	GROUND to pin 2 of J1
KENWOOD	4 pin	pin 1	pin 2	Speaker	pin 3,4
	5 pin	pin 1	pin 2	Speaker	pin 4,5
	6 pin	pin 1	pin 2	Speaker	pin 6
	8 pin	pin 1	pin 2	Speaker	pin 7,8
TR-2500	HTs	Tip-Lg	Sleeve-Lg	Tip-Sm	Sleeve-Sm
TR-x600	HTs	Ring-Lg	Sleeve-Lg	Tip-Sm	Sleeve-Sm
TR-x100	HTs	Ring-Lg	Sleeve-Lg	Tip-Sm	Sleeve-Sm
TR-x15	HTs	Ring-Lg	Sleeve-Lg	Tip-Sm	Sleeve-Sm
TR-x5	HTs	Ring-Lg	Sleeve-Lg	Tip-Sm	Sleeve-Sm
ICOM					
	5 pin	pin 1	pin 2	Speaker	pin 4,5
	5 pin	pin 1	pin 2	Spk or pin 8	pin 4,5
	HTs*	Tip-Sm	Tip-Sm	Tip-Lg	Sleeves
YAESU	5 pin	pin 1	pin 2	Speaker	pin 4,5
	5 pin	pin 1	pin 2	Speaker	pin 4,5
FT-208	HTs	pin 1	pin 3	pin 2	pin 4
FT-x09	HTs*	Tip-Sm	Tip-Sm	Tip-Lg	Sleeves
FT-x3	HTs*	Tip-Sm	Tip-Sm	Tip-Lg	Sleeves
FT-727	HTs*	Tip-Sm	Tip-Sm	Tip-Lg	Sleeves

Table A-1 Mic Cable Wiring

(Sm=Small Plug Lg=Large Plug Spk=Speaker)
* = Transmitter keyed by grounding microphone.

NOTE: The radio connection information listed in the previous chart is believed to be accurate. However, you should verify the accuracy of this information with the instruction manual for your radio. MFJ Enterprises is not responsible for any damage to radios as a result of inaccuracy of any information listed in the previous chart.

If your radio is not listed here, please refer to your radio manual for the microphone connector information. If you cannot find the microphone pin-out information, call the company that manufactures your particular radio.

Radio Port Connection

A 5-pin DIN cable has been provided for you to wire for your particular radio. You will need to decide as to the wiring of this cable. You can refer to Table A-2 for some already pre-determined microphone configurations. As we suggested previously, you may want to purchase the MFJ-1272B TNC or MFJ-1272M TNC/Microphone switch along with the pre-wired cables for your radio. The MFJ-1272B is compatible with most radios equipped with an 8-pin microphone connector. The MFJ-1272M is compatible with most radios that are equipped with an 8-pin modular microphone connector, like the Kenwood TM-741A. Either of these products are available from MFJ or your nearest MFJ dealer. This will make installation quicker and easier. The pin assignments and wire colors for the 5-pin DIN cable which is provided are shown below:

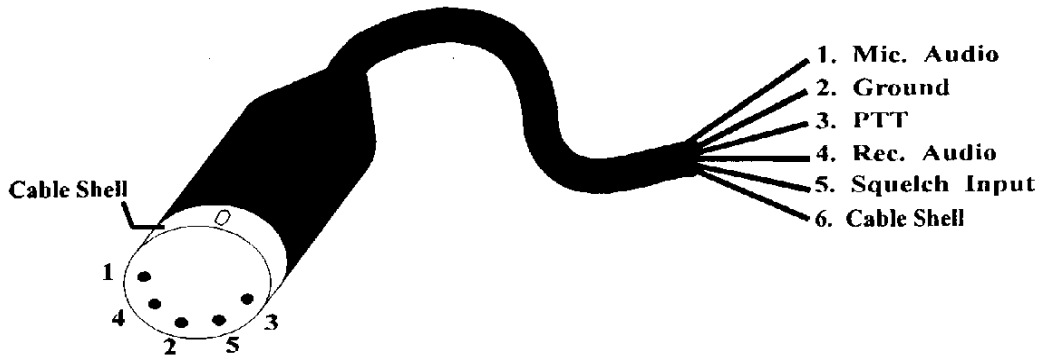


Fig. A-1 5 Pin Din Wire Colors

The have been significant changes made to the 5-pin din radio port cable that is suppiled with the MFJ TNC2. The changes made to the cable are to insure better RFI protection. The cable shell now has a ***ground wire*** connected to it. The cable conductors inside the cable insulation have been wrapped with a ***metal foil*** material. These changes will aid in the decrease of RFI being induced onto the cable conductors caused by stray RF.

The above diagram has been included to reflect the cable wiring and the wires colors in relation to the functions, such as TX Audio, RX Audio, etc. When wiring the appropriate radio microphone connector onto the open end, wire the ***BARE WIRE*** (**Cable Shell**) to the ***GREEN WIRE*** (**Cable Ground**).

However, if there any questions as to the wiring of the new cable, please feel free to give our Technical Staff a call at 1-800-647-8324. They will be happy to assist you.

Sometimes the user may not have access to the necessary information for wiring a radio cable. In this case MFJ offers pre-wired cables for many of the popular radios. Please contact MFJ or your nearest MFJ dealer for information regarding these pre-wired radio cables. A list of these cables are shown on the following page:

RADIO TYPES	ALL MFJ	PK-232 ™	PK-88 ™	KAM ™/KPC3
ICOM* and YAESU HTs	MFJ-5024 MFJ-5224+	MFJ-5024X	MFJ-5024Z	MFJ-5024YV
KENWOOD HTs**	MFJ-5026 MFJ-5226-	MFJ-5026X	MFJ-5026Z	MFJ-5026YV
YAESU 8 PIN RADIOS	MFJ-5080	MFJ-5080X	MFJ-5080Z	MFJ-5080YV MFJ-5080YH
ICOM*** 8 PIN RADIOS	MFJ-5084	MFJ-5084X	MFJ-5084Z	MFJ-5084YV MFJ-5084YH
KENWOOD/ALINCO 8 PIN RADIOS	MFJ-5086	MFJ-5086X	MFJ-5086Z	MFJ-5086YV MFJ-5086YH

Table A-2 Pre-wired TNC-to-Radio Cables

*Does not include IC-W2A**Does not include 2500
***Does not include 25A & 255A
+ Open ended cable for Icom/Yaesu handheld Radios
- Open ended cable for Kenwood handheld Radios

MFJ-5082 Open ended cable with standard 8-pin microphone connector
MFJ-5268 Open ended cable with 8-pin modular telephone type microphone connector for Yaesu FT-2400H, Kenwood TM641A, TM741A, and TM 732A

NOTE: The **YV** models connect to the **VHF port** of KAM/KPC3. The **YH** models connect to the **HF port** of KAM.

DECIMAL TO HEXADECIMAL CONVERSION

Dec	Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec	Hex	Dec	Hex
0	0	32	20	64	40	97	61	129	81	161	A1	193	C1	225	E1
1	1	33	21	65	41	98	62	130	82	162	A2	194	C2	226	E2
2	2	34	22	66	42	99	63	131	83	163	A3	195	C3	227	E3
3	3	35	23	67	43	100	64	132	84	164	A4	196	C4	228	E4
4	4	36	24	68	44	101	65	133	85	165	A5	197	C5	229	E5
5	5	37	25	70	46	102	66	134	86	166	A6	198	C6	230	E6
6	6	38	26	71	47	103	67	135	87	167	A7	199	C7	231	E7
7	7	39	27	72	48	104	68	136	88	168	A8	200	C8	232	E8
8	8	40	28	73	49	105	69	137	89	169	A9	201	C9	233	E9
9	9	41	29	74	4A	106	6A	138	8A	170	AA	202	CA	234	EA
10	A	42	2A	75	4B	107	6B	139	8B	171	AB	203	CB	235	EB
11	B	43	2B	76	4C	108	6C	140	8C	172	AC	204	CC	236	EC
12	C	44	2C	77	4D	109	6D	141	8D	173	AD	205	CD	237	ED
13	D	45	2D	78	4E	110	6E	142	8E	174	AE	206	CE	238	EE
14	E	46	2E	79	4F	111	6F	143	8F	175	AF	207	CF	239	EF
15	F	47	2F	80	50	112	70	144	90	176	B0	208	D0	239	EF
16	10	48	30	81	51	113	71	145	91	177	B1	209	D1	240	F0
17	11	49	31	82	52	114	72	146	92	178	B2	210	D2	241	F1
18	12	50	32	83	53	115	73	147	93	179	B3	211	D3	242	F2
19	13	51	33	84	54	116	74	148	94	180	B4	212	D4	243	F3
20	14	52	34	85	55	117	75	149	95	181	B5	213	D5	244	F4
21	15	53	35	86	56	118	76	150	96	182	B6	214	D6	245	F5
22	16	54	36	87	57	119	77	151	97	183	B7	215	D7	246	F6
23	17	55	37	88	58	120	78	152	98	184	B8	216	D8	247	F7
24	18	56	38	89	59	121	79	153	992	185	B9	217	D9	248	F8
25	19	57	39	90	5A	122	7A	154	9A	186	BA	218	DA	249	F9
26	1A	58	3A	91	5B	123	7B	155	9B	187	BB	219	DB	250	FA
27	1B	59	3B	92	5C	124	7C	156	9C	188	BC	220	DC	251	FB
28	1C	60	3C	93	5D	125	7D	157	9D	189	BD	221	DD	252	FC
29	1D	61	3D	94	5E	126	7E	158	9E	190	BE	222	DE	253	FD
30	1E	62	3E	95	5F	127	7F	159	9F	191	BF	223	DF	254	FE
31	1F	63	3F	96	60	128	80	160	A0	192	C0	224	E0	255	FF

Table A-3 Decimal to Hexadecimal Conversion Table

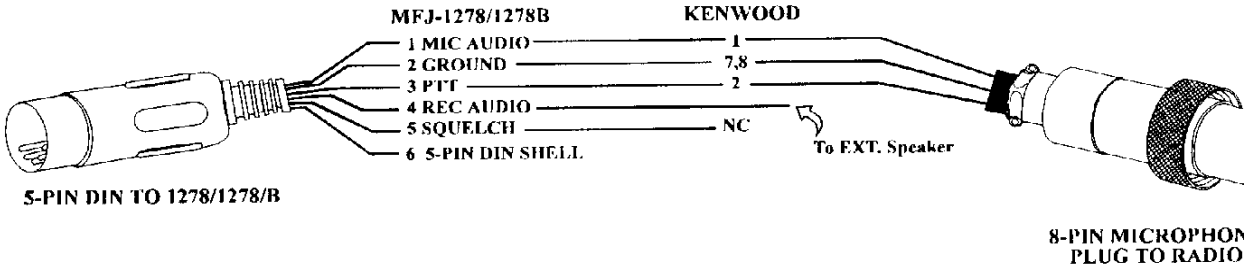
VII. RADIO CABLE WIRING DIAGRAMS

The radio connection information listed in this section is believed to be accurate. However, you should check the accuracy of this information with the instruction manual of your radio. MFJ Enterprises, Inc. is not responsible for any inaccuracy of the information provided by the diagrams and charts in this instruction manual.

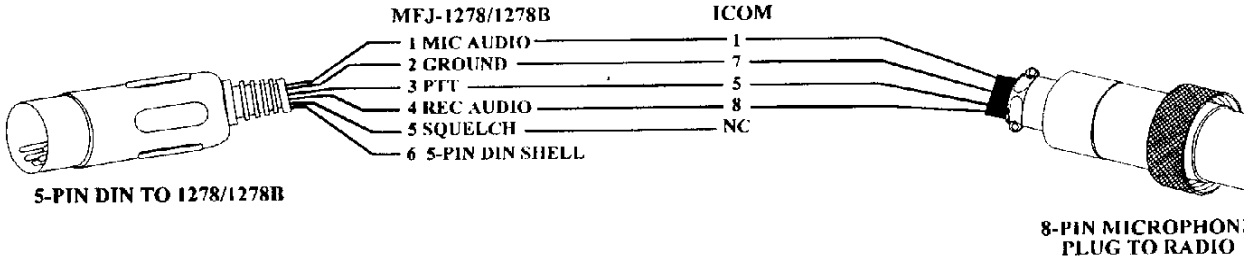
Optional pre-assembled cables to connect the MFJ-1278B to some radios are available. Contact MFJ dealers or MFJ Enterprises, Inc. for detail concerning these cables.

A. 8-pin Microphone Connector:

o **Kenwood:**

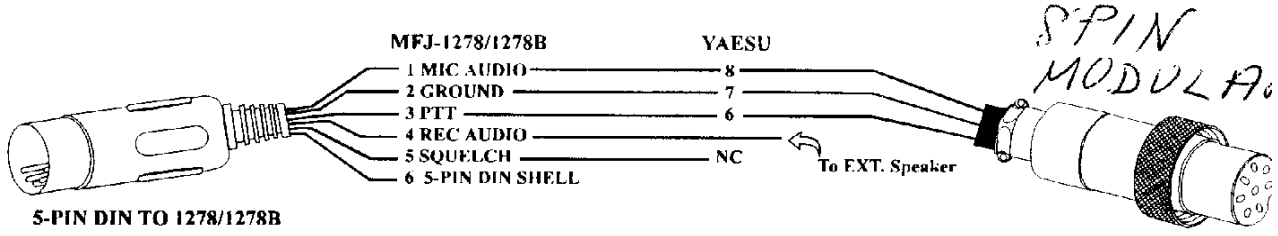


o **Icom**:



A. **8-Pin Microphone Connector** (Cont.)

o **Yaesu:**

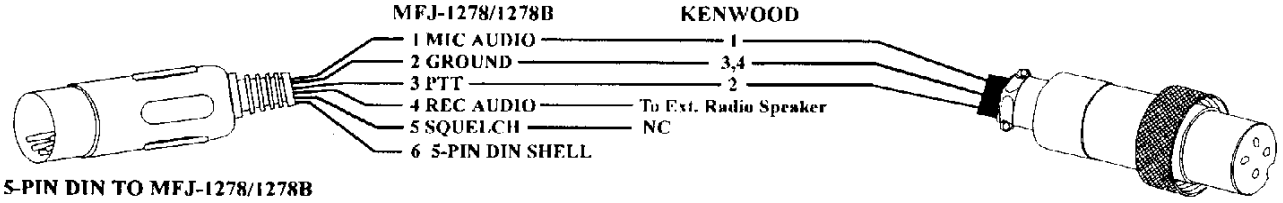


5-PIN DIN TO 1278/1278B

8-PIN MICROPHONE PLUG TO RADIO

B. **4-pin Microphone Connector:**

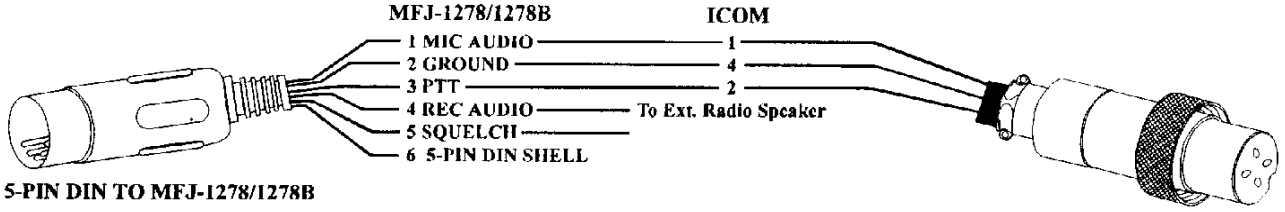
o **Kenwood**:



5-PIN DIN TO MFJ-1278/1278B

4-PIN MICROPHONE PLUG TO RADIO

o **Icom**:

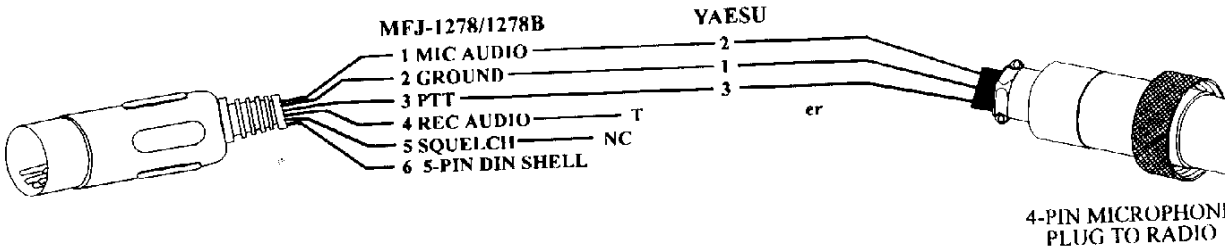


5-PIN DIN TO MFJ-1278/1278B

4-PIN MICROPHONE PLUG TO RADIO

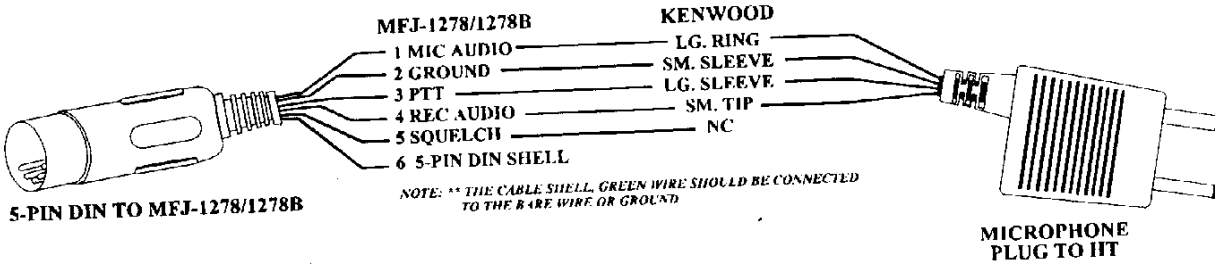
B. 4-Pin Microphone Connector (Cont.)

o **Yaesu:**

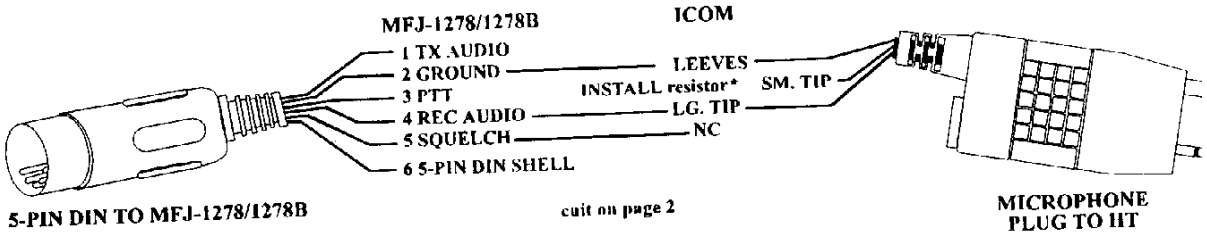


C. Handheld Radio Connector:

o **Kenwood**: x600, x1, x15, x5 and other models that are pin compatible with these radios.

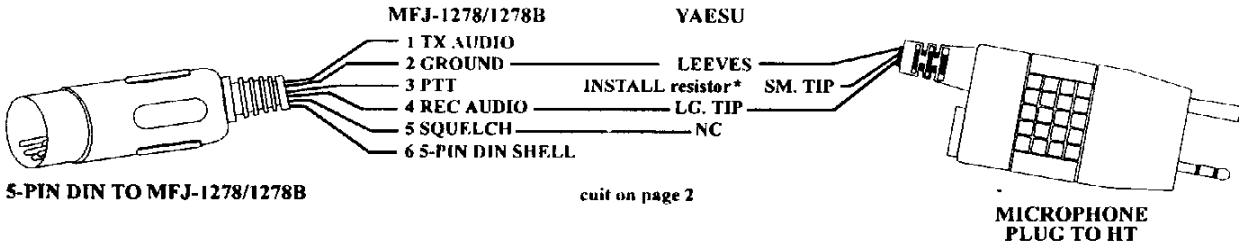


o **ICOM**: All models



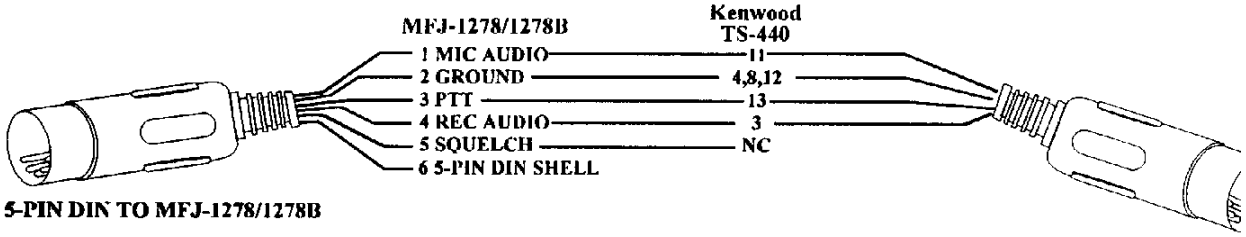
cuit on page 2

o **Yaesu**: FT-x09, FT-x3, FT-727, FT-470, FT-X11 and other models that are pin compatible with these radios.



D. Using the Accessory Jack

o **Kenwood**: TS-440S (ACC 2)



o **Icom**: IC-735 (ACC 1)