



A TNC Control Program

© 1996, 1997 MFJ Enterprises *Version 1.2*

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Overview

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Overview

1. Overview

MFJCom for Windows is a software tool that simplifies the use of MFJ TNC. Instead of requiring you to memorize a large number of commands, all you need to do is "point and click" on easy-to-use icons and buttons on the screen. **MFJCom for Windows** does all the rest for you. If you need to enter more information, **MFJCom for Windows** displays simple "forms" for easy information entry.

MFJCom for Windows can also be used for some other TNC-2 TNCs made by other companies.

MFJCom for Windows lets you control your TNC in the way that's easiest for you: "point and click", or keystrokes. There's no need to use a mouse if you don't want to, but you can take full advantage of the Windows interface if you want. You can choose to have all controls displayed, ready for you to use, or you can have a clean, simple, uncluttered display if you want.

MFJCom for Windows supports the following modes on your MFJ TNC:

- Packet (HF and VHF)
- Pactor (FEC and ARQ modes) on the MFJ 1276 or MFJ 1278 series.

Packet mailbox mode can be used by directly entering TNC commands if you wish.

Installing MFJCom for Windows

2. Installing MFJCom for Windows

Installation is virtually the same in Windows 3.1 and Windows 95.

To install **MFJCom for Windows**, simply do the following:

1. Put the **MFJCom for Windows** "Setup" diskette in a floppy drive.
2. If you are using Windows 3.1, make sure either the Program Manager or File Manager window is visible.
 - select "**File**" from the menu bar at the top of the window
 - select "**Run**" from the File menu
 - enter: **a:setup** (or **b:setup** if you put the diskette in drive b:)
 - press the "**Enter**" key

If you are using Windows 95, click on the "**Start**" button at the lower left of your screen.

- select "**Run**" from the Start menu
 - enter: **a:setup** (or **b:setup** if you put the diskette in drive b:)
 - press the "**Enter**" key
3. The "Setup" program will run. Simply follow the instructions on the screen. You can quit at any time while Setup is running if you wish.

MFJCom for Windows shares some files with other Windows programs. When you are running the Setup program, you might get messages asking you if you want to replace a file on your computer with one from MFJCom for Windows. You should normally answer NO. This is because MFJCom for Windows can almost always use the file you already have, but other programs on your computer might not be able to use MFJCom's.

<p><i>Note: you must run Setup from Windows. You can't run it from DOS</i></p>
--

3. Running MFJCom for Windows



In Windows 3.1, you can run **MFJCom for Windows** from Program Manager (the most common way), or from File Manager.

In Windows 95, you can use Explorer, the Start menu, or drag the **MFJCom for Windows** icon (as a shortcut) to the desktop.

The following sections tell you how to run **MFJCom for Windows**.

3.1 Running From Program Manager (*Windows 3.1*)

Double-click the **MFJCom for Windows** Icon from the **MFJCom for Windows** program group. (Note that you can move the **MFJCom for Windows** icon to another group if you wish. Consult your Windows manual for more information.)

3.2 Running From File Manager(*Windows 3.1*) or Explorer (*Windows95*)

Select the directory containing **MFJCom for Windows** (this is usually C:\MFJWIN, but you may have specified a different directory when you installed **MFJCom for Windows**). Double-click "MFJWIN.EXE".

3.3 If This Is The First Time You've Run MFJCom for Windows...

If this is the first time you've run this program, make sure that you have the "Setup" floppy disk in drive a: or drive b: of your PC (this is the floppy disk you used to install MFJCom for Windows). Make sure your floppy is not write protected.

When you run **MFJCom for Windows** for the first time, you will see a screen asking you to enter your call sign. This is very important because many operating modes require your call sign in order to operate correctly. Your call sign will be copied onto the "Setup" floppy disk.

If you do not have your "Setup" floppy disk in your PC, you will not be able to continue.

You only need to have your "Setup" floppy disk in your PC the first time you run **MFJCom for Windows**. After that, you will not need to have it in your PC.

3.4 Software Control of the TNC: What to do if your TNC doesn't cooperate!

The TNC uses "open loop" control. That means that when the TNC receives a command (from **MFJCom for Windows**, or from you), **MFJCom for Windows** has no way of knowing if the TNC actually responded correctly¹. It also means that **MFJCom for Windows** can't tell if you sent a TNC control command directly from the keyboard (you could have gone so far as changing modes!).

If you find that **MFJCom for Windows** does not respond to your commands, it may have gotten "out of sync" with the TNC. This does not happen often, but it is possible. If it does happen, you should:

- enter "**CONTROL-C**" from the keyboard
- enter the "**ENTER**" key
- select the desired mode from the Mode menu in the menu bar

¹ There are several ways this could happen. For example, you may have an intermittent serial cable connection between your PC and TNC. Or, you may have turned the TNC off and on while **MFJCom for Windows** is operating.

Running MFJCom for Windows

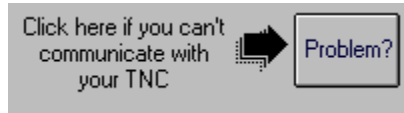
at the top of the window

If that doesn't work, enter the Command Key (normally **F3**, but may be F1 depending on what you specified in the Setup Options) and repeat the above steps.

This normally restores control to **MFJCom for Windows**.

3.5 Serial (COM) Ports: What to do if your PC and TNC Don't Communicate!

When you first start up **MFJCom for Windows**, you might see this symbol at the bottom of your screen:



Click on the button to get advice on possible ways to resolve your problem.

99% of the time, communications problems in Windows are due to conflicts between devices that use serial ports (your mouse, your modem, your serial port to your TNC, etc.). Even though these devices are connected to different ports, they can still 'conflict'.

If you are using "standard" IRQ (interrupt) settings on your serial port --most of us do--, check the following:

If your TNC uses:	then your mouse or modem should <u>not</u> use:
COM1	COM3
COM2	COM4
COM3	COM1
COM4	COM2

This table is based on the fact that COM1 and COM3 normally share IRQ 4, and COM2 and COM4 normally share IRQ3.

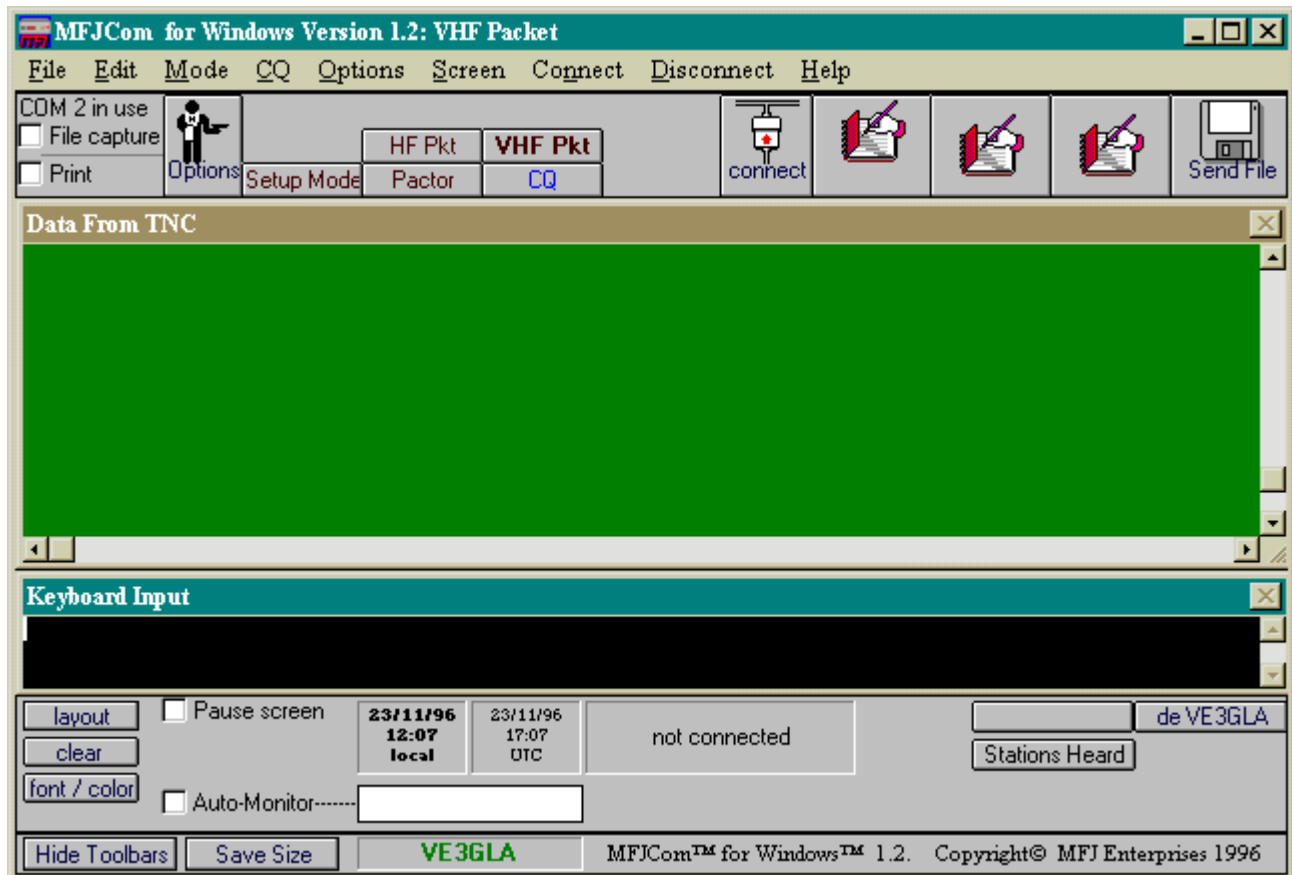
This sometimes can be restricting if you have more than two serial ports in use. One way around this is to setup a serial port with a *non-standard* IRQ. That usually requires changing a jumper on the serial card and setting some parameters in the "ports" section in the Windows Control Panel. If you do this, read your serial port and Windows manual very carefully. Take care not to create other IRQ conflicts with devices like your sound card or printer port.

Running MFJCom for Windows

3.6 The MFJCom for Windows Main Window

3.6.1 General Description

When you run **MFJCom for Windows**, you will see the "main window". It looks much like this:



Because you are using Windows, you will be able to switch to other Windows programs, re-size the **MFJCom for Windows** window, shrink the **MFJCom for Windows** window to an icon, and do anything else you can do in Windows.

The **MFJCom for Windows** window has several important parts. They are:

- the "Data From TNC" subwindow

This window show the data received from you TNC. That data includes:

- information received "off the air"
- command responses from the TNC (i.e. what the TNC sends back in response to commands sent to it by **MFJCom for Windows**)

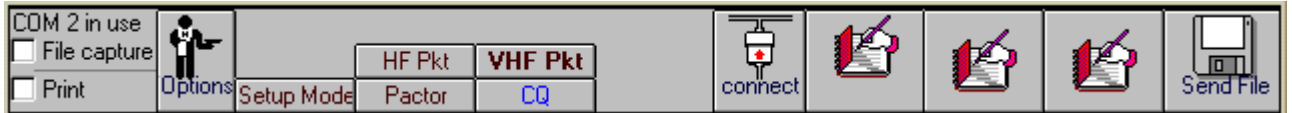
The Data From TNC window stores the last 300 lines (approximately) of data received. You can scroll back by clicking on the scroll bar at the right side of the window. When new data is received, the Data From TNC window scrolls back to the last line. You can prevent this by clicking on the "Pause Screen" button on the lower left of the **MFJCom for Windows** window (see "Lower Tool Bar"). Data from the TNC will not cause scrolling when the **Pause Screen** button is checked. Note: MFJCom for Windows will only store approximately the last 5000 characters received from the TNC when the **Pause Screen** button is checked.

Running MFJCom for Windows

- the **"Keyboard Input" subwindow.**

This window echoes your keystrokes, and keeps a record of what you entered. It also echoes any data sent when calling CQ automatically, or when text ("brag") or ASCII files are sent.

- the **"Upper Tool Bar"**



The Upper Tool Bar is located just above the Data From TNC window. You mostly use it to select operating modes, establish and break links (Pactor, Packet, Amtor), manage text "brag" files, and for printing and capture.

- the **"Lower Tool Bar"**



The Lower Tool Bar is located just below the Keyboard Input window. It has a variety of functions: control of the screen, time display, entry and sending of callsigns, as well as functions that depend on which mode you are in.

3.6.2 Upper Tool Bar Description

The functions of the Upper Tool Bar are described below:

- **"Data Capture" Check Boxes:**



These check boxes control capturing received data to the printer and/or the disk. Clicking on the appropriate box causes an 'x' to be displayed. That means the function is enabled. Clicking again on the box causes the function to be disabled, and the 'x' will disappear.

- **Operating Mode Buttons:**



The operating mode buttons are used to select the communication mode, and to enter the "setup" mode. If you are in "setup" mode, the mode buttons will appear like this:



Operation of the "Custom Mode" button is described elsewhere in this manual.

Running MFJCom for Windows

The mode you are currently using is shown in two ways:

- by the text in the main Title Bar at the top of the **MFJCom for Windows** window, and,
- by the "mode" buttons in the tool bar at the top of the **MFJCom for Windows** window.

You can easily change from one mode to another by clicking the mode buttons or by using menus. See Section 4.

- **Connect / Disconnect Buttons**



These are only displayed in Pactor, Packet and Amtor modes.

When you are not connected (linked) to another station, the "**Connect**" button is displayed. Click on this button to try to connect to another station. A menu will appear to prompt you for more information.

When you are connected, or attempting to connect, to another station, the "**Disconnect**" button will replace the **Connect** button on the toolbar. Click on the **Disconnect** button to disconnect ("drop") the connection or to abandon an attempted connection.

- **Text "Brag file" Buttons**

The 3 Text buttons are used to enter and send short files of text (up to 1500 characters) that you create using MFJCom for Windows built-in editor. Each mode (except Navtex and SSTV/Fax) has a different set of buttons. Graphics characters are supported in Packet and Pactor modes.



- **Send File Button**

The **Send File** button is used to send text from a file that you created with Notepad or some similar editor. Each mode (except Navtex and SSTV/Fax) has a text button. You can have as many ASCII files as you want. You would use this button for longer text files than you would with the **Text "Brag" files**.



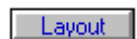
Note that ASCII text with this button are sent just as if you had entered it from the keyboard. No 'file transfer protocol' is used.

3.6.3 Lower Tool Bar Description

The functions of the Lower Tool Bar are described below.

- **"Layout" button**

Click on this button to re-arrange the Keyboard Entry and Data from TNC windows. Each click will change to a different format: either overlapped, vertical tiled, or horizontal tiled (the default, startup, format). Click until you find the format that you prefer.



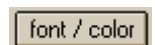
- **"Clear" button**

Click on this button to clear the screen. **MFJCom for Windows** will ask you to confirm this just to make sure you don't clear the screen by accident.

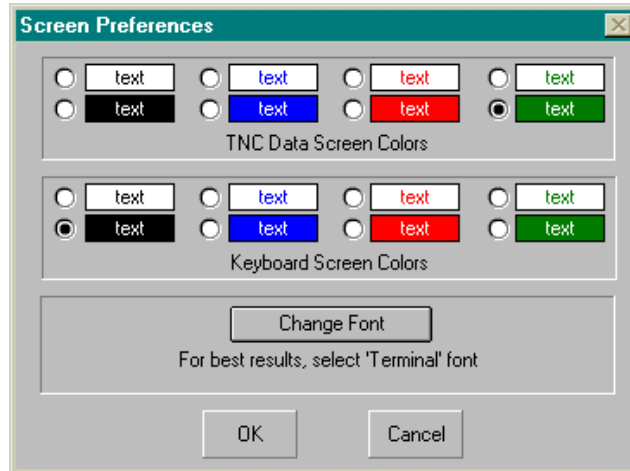


- **"Font/Color" button**

You can choose the colors and font for the Keyboard Input and Data from TNC subwindows by clicking the "**font/color**" button (alternately, you can use the "**Screen**" menu, and click on "**color**". **MFJCom for Windows** will show the following form:



Running MFJCom for Windows



Simply click your color choice for each window.

Click on "Change Font" to change the font. A menu will appear to let you choose a new font. Note: for best performance and to display ANSI graphics characters, you should choose the "Terminal" font.

Select OK to enable your choices, or Cancel if you do not wish to use your choices.

- **"Pause Screen" check box**



Click on this box to temporarily stop new data from being displayed in the Data From TNC window. An 'x' will appear in the box when the screen is paused. Click again to display all characters received while the screen was paused and all new characters (the 'x' will disappear). Use this function when you want to scroll through the Data From TNC window and don't want the display to bounce around with incoming data.

Note: MFJCom for Windows will only store approximately the last 5000 characters received from the TNC when the **Pause Screen** button is checked.

- **Time Display**

Local and UTC (GMT) times and dates are displayed.

- **Call Sign Transmission**

The "**de (callsign)**" button will send "de " followed by your callsign when clicked.



The "**Enter Call**" button will prompt you to enter a call in the button immediately to its right. You don't normally need to do this in Factor or Packet modes, since **MFJCom for Windows** can automatically determine the call of the station you are connecting or connected to.



The **callsign** button will send the callsign that is displayed on it. If no callsign is displayed, nothing will be sent. If necessary, use the "**Enter Call**" button to enter and display a call sign.

- **Send / Receive Control**

Transmit, Receive, "Over" buttons

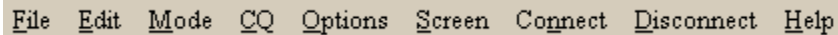


In some modes, a buttons will appear to alternated between transmitting and receiving

Running MFJCom for Windows

In Pactor, an "Over" button will appear instead which allows you to switch from sending to receiving. It will also enable you to "seize" the link from the other station if you wish.

3.6.4 Menu Bar Description



The menu bar is at the top of the **MFJCom for Windows** window. It allows you to perform almost all **MFJCom for Windows** functions with keystrokes instead of mouse clicks. Experienced users may find this a faster way to control **MFJCom for Windows**. To select a Menu bar item, either:

- click on it with the mouse,
- or:
- hit the "ALT" key
- enter the underlined letter of the desired menu. The desired menu will be displayed.

You can choose items from the menu by clicking on them or by using the ALT key / underlined character method described above.

3.6.5 Hiding/Showing Toolbars

The toolbars of MFJCom for Windows help make it easy to use, but they take up screen space.

You can hide the toolbars to make more screen space available to you. Simply click the Hide Toolbars button to make them disappear (the button will change to Show Toolbars). Almost all commands are



available with menu commands so you can have full control over MFJCom for Windows even with the toolbars hidden. If you want the toolbars to reappear, simply click on the Show Toolbars button.

3.6.6 Saving Screen Size

Once you have adjusted the screen size to the way you like it, and have decided if you prefer the toolbars to be visible or hidden, you can tell **MFJCom for**

Windows to appear the same way every time it is restarted. To do this, simply click the Save Size button.



Note: the keyboard and TNC windows layout is not saved when you click the Save Size button.

3.7 Setting Up MFJCom for Windows: Basic Information

MFJCom for Windows needs some basic information for all modes of operation.

Make sure you fill out the *Basic Information form* before using **MFJCom for Windows**. You can change the basic information any time you want later.

You select the *Basic Information Form* by selecting the "Setup" mode (either by clicking the "Setup" button or by selecting it from the Mode menu. This will cause the *Basic Information form* to be displayed. The *Basic Information form* is shown below. Each entry is described later in this section.

Running MFJCom for Windows

The screenshot shows the 'Basic Information' dialog box for MFJCom. It includes fields for 'Call' (VE3GLA), 'Name', 'Town/City', 'State/Province/Region', and 'Country'. It also features radio buttons for 'Preferred time is...' (Local selected), 'Preferred start-up mode is...' (VHFPacket selected), and 'PC to TNC Serial Port' (Com3 selected). There are checkboxes for 'adjust UTC by 30 minutes', 'VHF/HF button reminder disabled', and 'Show Tool Tips'. The 'HELP' key section has 'F1: Help; F3: Command Mode' selected. 'OK' and 'Cancel' buttons are at the bottom right.

- **Call Sign:**
This field is mandatory.
Make sure you include your portable designator, if applicable (e.g. VE3GLA/4).
Do NOT include a packet "SSID" (e.g. don't use VE3GLA-15). That can be added with the packet forms.

If you are not a ham, enter "SWL", or something similar.
- **Name, City, State/Province/Region, Country:**
These are optional fields. You don't have to enter them.
- **Preferred time:**
MFJCom for Windows displays the time in both Local and UTC (GMT) modes. Click "**Local**" if you want local time to be shown in bold characters. Click "**UTC**" if you want UTC to be bold. In order to display UTC time correctly, **MFJCom for Windows** needs to know how many hours your local time differs from UTC. Enter the data in the box. For example, USA Eastern Standard Time is 5 hours after UTC. If you live in a time zone that is 30 minutes off the hour (Newfoundland, Singapore, etc), then check the Adjust UTC by 30 Minutes box.
- **Preferred Startup Mode:**
You can specify which mode you will automatically enter after starting **MFJCom for Windows**. Simply click on the mode that you prefer. After **MFJCom for Windows** has started, you can easily change to other modes.
- **Radio Ports:**
Your HF and VHF radios are normally (but not always) connected to a different port at the back of your TNC.

Running MFJCom for Windows

Click on the port number for your HF and VHF radio. If you only have one radio, just click on the port number you are using for that radio. Check “radios must use different ports” if you want to ensure that the HF and VHF radios use different ports.

- **Computer Ports**

Your TNC is connected to your computer via a serial cable. You must specify what serial (“COM”) port that you are using in your computer. COM1 and COM2 are used most often.

- **PC to TNC Baud Rate**

Your TNC must communicate at the correct speed with your PC. Select the baud rate that your TNC is set for. You will have to click “OK”, exit **MFJCom for Windows**, then restart **MFJCom for Windows** to ensure reliable communications between **MFJCom for Windows** and your TNC.

- **Which key is the “HELP” key**

Most Windows applications use “F1” to go to the Help menu. However, DOS MFJCom users may prefer to use “F3” for help. Select your preference. See section 4 for more details about function keys.

- **Show Tool Tips**

If you choose Show Tool Tips, you will see informative messages appear when you let the cursor pause over buttons or other controls on most screens. These messages can be very helpful when you are learning MFJCom for Windows. Once you become familiar with this program, you may want to turn this option off.

- **Use/Cancel buttons**

Click on **Use** if you wish the form settings to be used.

Click on **Cancel** if you want to use the previous settings to be used (i.e. cancel the changes you have made on the form).

3.8 Function Keys: F1, F2 and F3

Three keys on your keyboard are especially important: **F1**, **F2** and **F3**. Through single keystrokes, you can:

- access on-line “Help”
- go to “converse mode” (in packet modes only)
- go to “command mode” for your TNC

F1 is normally the ‘help’ key. If you press **F1**, you will enter the on-line help system, Use this function to look up techniques, tips, or answers to your questions.

F2 is the “converse” key. If you are in VHF or HF packet mode, just hit **F2** and you will be in converse mode. Everything you type will be transmitted.

F3 is normally the “command” key. Hit **F3** and you will enter the TNC’s command mode. This is useful in packet to exit converse mode. It is also useful if your TNC gets into the wrong state for some reason.

MFJCom for Windows lets you switch the meanings of **F1** and **F3**. This allows **F1** to have the same function as the DOS version of MFJCom. You can switch meanings by using the Options menu in Setup mode (see chapter 3).

The following table summarizes the three function keys uses:

Running MFJCom for Windows

Key	Purpose (normal)	Purpose ('switched')
F1	access "Help"	enter command mode
F2	enter converse mode	enter converse mode
F3	enter command mode	access "Help"

Selecting Modes of Operation

4. Selecting Modes of Operation

The mode you are currently using is shown in two ways:

- by the text in the main Title Bar at the top of the **MFJCom for Windows** window,
- and,
- by the "mode" buttons in the tool bar at the top of the **MFJCom for Windows** window.

The caption for the current mode is shown in light grey. You can easily change from one mode to another by pressing the mode buttons or from menus.

Selecting modes: Mode Button method

	HF Pkt	VHF Pkt
Setup Mode	Pactor	CQ

Press the button for the desired new mode from the tool bar at the top of the **MFJCom for Windows** window.

Selecting modes: Menu method

Either:

- press: **ALT-M**
- press the letter for you desired mode, as shown in the mode menu (e.g. "**P**" for pactor, "**V**" for vhf packet, etc.).

Or:

- click the "Mode" menu item from the menu bar at the top of the window
- click the desired mode

Please don't switch modes by directly entering TNC mode change commands on the keyboard. If you do, **MFJCom for Windows** will think the TNC is in a different mode than the TNC actually is in. In that case, **MFJCom for Windows** will probably display the wrong buttons and not behave the way you want.

You should only switch modes using the Mode Button method or the Menu method.

5. Operating

5.1 Pactor Operation

Note: Pactor operation requires the MFJ 1276 or MFJ 1278 series of TNC's.

NOTE: You can only transmit on frequencies and modes permitted by your license class. Be sure to observe all rules and regulations!

5.1.1 Pactor Options

Enter data in the following form to control Pactor operation in **MFJCom for Windows**.

The screenshot shows the 'PACTOR Choices' dialog box. It contains the following settings:

- FEC Speed:** 100 baud (selected), 200 baud
- FEC Reliability:** normal (1 repeat;fast) (selected), reliable (2 repeats;slow), very reliable (3 repeats)
- Link Speed:** 100 baud only, Automatic 100/200 (selected)
- Memory ARQ:** Go to 200 baud after 6 good packets, Go to 100 baud after 5 bad packets, use up to 5 packets for memory ARQ
- Connects:** Normal (selected), Long Path

This form may be accessed while in Pactor mode either by:

- clicking the Options button at the top of the **MFJCom for Windows** window, or,
- selecting Options from the menu at the top of the **MFJCom for Windows** window.



- **FEC speed**
 - 100 baud** is slower, but may have fewer errors.
 - 200 baud** is faster and is most useful under good signal conditions.
- **Reliability**
 - choose "**normal**" under average to good conditions
 - choose "**reliable**" under poorer conditions. Transmission speed will be slower, but the other station will see fewer errors.
 - choose "**very reliable**" under very poor conditions. Transmission speed will be much slower, but you will have a better chance of being received with fewer errors.
- **Speed**
 - Click on **Automatic 100/200** normally.
 - Click on **100 only** when conditions are poor. This will reduce time wasted switching to 200 baud.
- **Memory ARQ**
 - Memory ARQ is used by Pactor to combat errors induced by QRM and QRN by combining error packets to see if a valid one can be created. The parameters in this part of the form control how this is accomplished.

Operating: Pactor

- **"Go to 200 baud..."**
This number determines how many error-free 100 baud packets need to be received before going to 200 baud. If too small a number is entered, you may waste time going to 200 baud under poor conditions that may not support 200 baud. A number of 6 is suggested as a good starting value.
- **"Go to 100 baud.."**
This number determines how many bad 200 baud packets need to be received before going to 100 baud. If too small a number is entered, you may waste time going to 100 baud when occasional brief QRM or QRN occurs. If too large a number is used, you may spend too long a 200 baud when conditions may not support 200 baud. A number of 6 is suggested as a good starting value.
- **"Use up to..."**
Pactor can combine a series of error packets to see if a good packet can be constructed. This can be very effective in getting data through in poor conditions. The number you enter here determines the maximum number of sequential error packets are used in this way. Too low a number will mean you don't get full benefit of this feature. Too high a number can also be bad under certain conditions. A starting value of 10 is suggested.
- **Connects**
Select **Normal** in almost all operating situations. Select **Long Path** only when communicating with very distant (over 10,000 km) stations, and only when needed.
- **Use / Cancel**
Click on **Use** to enable the changes you have made. Click on **Cancel** to ignore the change you have made.

5.1.2 Pactor QSO's

There are two different Pactor methods for QSO's. They are defined below, and are discussed in more detail in separate topics:

- **FEC mode:**
FEC stands for **F**orward **E**rror **C**orrecting mode. Despite it's name, it is more prone to errors than ARQ mode. FEC is useful for short contacts, and for calling CQ in Pactor mode.

Pactor FEC mode has different degrees of error correction available. With a high degree of correction, transmissions are slower, but the transmissions will have fewer errors. You can specify the amount of correction you want by clicking on the **"Options"** button when you are in Pactor mode.
- **ARQ mode:**
ARQ stands for **A**utomatic **R**etry **r**e**Q**uest mode. In this mode, the TNC checks each group of characters received, and if an error is detected, the TNC automatically asks the characters to be re-sent to you until they are received correctly. Only then are the characters displayed on your screen. This mode will eliminate virtually 100% of errors.



Most Pactor QSO's use the ARQ mode.

Operating: Pactor

5.1.2.1 Pactor FEC Mode Operation

You can listen to, and operate in both ARQ or FEC while in Pactor mode (this is different from the TNC's Amtor mode, which require a separate 'Listen' mode for copying ARQ transmissions).

The actual speed of transmission is set in the Pactor Options form.

To transmit in FEC mode, either click on the "**send**" button at the lower right of the screen, or type **CONTROL-T**. Your transceiver will transmit, and the "**send**" button will change into a "**receive**" button. Everything that you type will be transmitted. Characters will be echoed on the Data from TNC screen at the same speed as they are actually transmitted on the air.



When you are done transmitting, either click on the "**receive**" button or type **CONTROL-R**. The TNC will finish sending any data that has yet to be sent, then it will switch to receive, and the "**receive**" button will change to "**transmit**".



5.1.2.2 Pactor ARQ Mode Operation

You can listen to, and operate in both ARQ or FEC while in Pactor mode (this is different from the TNC's Amtor mode, which require a separate 'Listen' mode for copying ARQ transmissions).

Another station can call you, and the TNC will automatically establish the link ('connection'). **MFJCom for Windows** will display the other station's call in a 'button' at the bottom of the screen.

Alternatively, you can call another station to try to establish a link ('connection'). To do this, simply click on the **connect** button near the top of the screen (or select '**Connect**' from the menu bar). A form will appear, and you merely enter the call sign of the station that you want to connect to. The TNC will try to establish the connection. The message "Connection Attempted" will be shown at the bottom of the window. If successful, the message "Connected" will be shown at the bottom of the window. If you are not successful, simply click on the '**Disconnect**' button at the top of the screen (it replaced the '**Connect**' button).



Only one station can transmit at a time. You can 'type ahead' while the other station is sending to you, and what you have entered will be transmitted as soon as it is your turn to send. After you have finished your transmission, you turn it over to the other station by doing either:

- clicking on the "**over**" button at the lower right of the window,
- or
- entering "**CONTROL-R**" from the keyboard.

When you have finished your QSO, either station can "break", or "drop" the link. If you wish to break the link, simply click on the "**Disconnect**" button at the top of the window, or select the "**Disconnect**" menu item.

5.1.3 Calling CQ in Pactor

You can call CQ once, or send a repeated CQ message.

5.1.3.1 To call CQ a single time, or to Edit the CQ message:



Operating: Pactor

- Click on this button,
- or
- select 'CQ' from the menu bar at the top of the window,
- then
- select 'CQ Once' from the CQ menu.

This will cause the following form to be displayed. If you have already entered a CQ message, you will see it displayed.



If you want to enter a CQ message. press **Edit**.

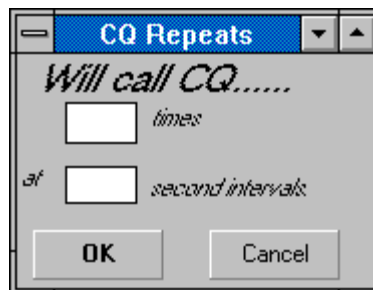
Click '**Send**' to transmit the CQ message.

5.1.3.2 To Call CQ automatically more than once:

- Click on this button,
- or
- select 'CQ' from the menu bar at the top of the window,
- then
- select 'CQ Once' from the CQ menu.



This will cause the following form to be displayed:



Enter the number of times you want CQ to be sent, and the time (in seconds) between calls. Note that the time interval is only approximate, so you may need to adjust it later.

Calling CQ will stop automatically in Pactor mode when a connection is made. If you want to stop calling CQ, click the "**Stop CQ**" button.

Operating: Packet

5.2 VHF and HF Packet Operation

5.2.1 VHF and HF Packet Options

There are separate menus for making your HF and VHF packet choices. The format of the forms is identical. The VHF packet form is shown below. The description of the choices that follows applies to both the HF and VHF packet forms.

Click on the “**Options**” button in either VHF or HF packet mode to display this form (it will look slightly different in HF packet and fewer options will be available):

The screenshot shows a dialog box titled "VHF Packet Choices". It contains several sections with radio buttons and text input fields. The "Connect Text" section has "Yes" (unchecked) and "No" (checked) options, with a text input field below. The "Beacon Text" section has "Yes" (unchecked) and "No" (checked) options, an "interval" section with radio buttons for "1 min" (checked), "5 min", "10 min", "30 min", and "60 min", and a text input field. The "Call Sign SSID" section has a "None" radio button (checked) and a grid of radio buttons for SSID values from -0 to -15. The "TXDelay (milliseconds)" section has a grid of radio buttons for values 10, 20, 30, 40, 50 (checked), 60, 70, 80, 100, and 120. The "Allow Digipeating?" section has "Yes" (unchecked) and "No" (checked) options. The "Mailbox Callsign" section has a text input field. At the bottom right are "Use" and "Cancel" buttons.

- **SSID**
Sometimes you may wish to add a SSID (e.g. '-7') after your call. If you wish, select a SSID number (0 to 15). Otherwise, select **None**.
- **TX Delay**
To enter the delay required for your rig to switch from receive to transmit, simply click on the appropriate value.
- **Connect Text**
Click '**Yes**' and enter a message if you want your TNC to send a message automatically when someone connects with you.
- **Beacon Text**
Click "**Yes**" if you want to send a beacon, and enter the message to be sent. Click on the interval between beacon messages. PLEASE don't send beacons unless you have a really good reason to!
- **Maximum Number of Retries Allowed Before Disconnecting**

Operating: Packet

When a TNC has trouble sending a packet because of interference or poor propagation, it re-sends the packet. This is called a 'retry'. If conditions are very poor, it is possible for the TNC to retry excessively and still get little or no data through. This situation only increases channel congestion, and serves no real purpose.

This option lets you limit the number of retries in a row before your TNC gives up and disconnects. You can also allow an infinite number of retries, but this is normally not a good idea.

- **Allow Digipeating**

Click "**Yes**" if you want to allow others to digipeat through your station. PLEASE don't allow digipeating on HF packet! It is inefficient on that mode, and only contributes to extra QRM.

Operating: Packet

5.2.2 VHF and HF Packet QSO's

- **General**

VHF and HF Packet operation with **MFJCom for Windows** is essentially identical. First you must have set up your 'choices' for the packet mode (VHF or HF) that you are using. You only need to do that once, but you can change your choices at any time if you want.

- **Establishing and Breaking Connections**

(Only use this procedure to make connections directly to a station or a node. Do Not use this method to connect from one node to another. Use the keyboard to enter the commands that the node needs)

Establishing a Connection

Either (your choice):

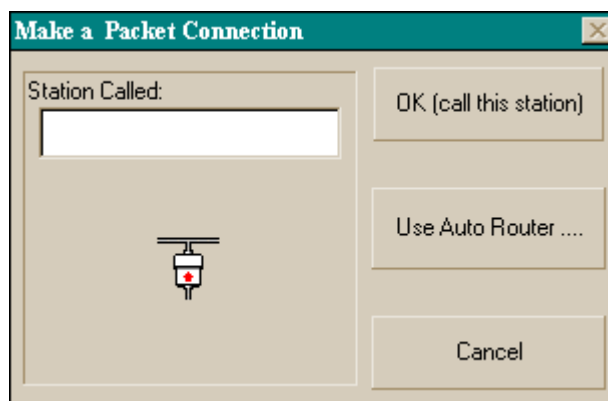
-click on the **Connect** button on the upper tool bar,

or..

-select **Connect** from the Menu bar.



A form will appear, asking for the call of the station you wish to connect to.

A screenshot of a dialog box titled 'Make a Packet Connection'. It has a teal header bar with a close button. The main area is light beige. On the left, there is a text label 'Station Called:' above a white text input field. Below the input field is a small icon of a radio tower with a red plus sign. On the right side, there are three buttons: 'OK (call this station)', 'Use Auto Router', and 'Cancel'.

Enter the call, click '**OK (call this station)**' and **MFJCom for Windows** will attempt to make the connection. If you are unsuccessful in making a connection, follow the "Breaking a Connection" procedure.

Breaking a Connection

Either (your choice):

-click on the **Disconnect** button on the upper tool bar,

or..

-select **Disconnect** from the Menu bar.



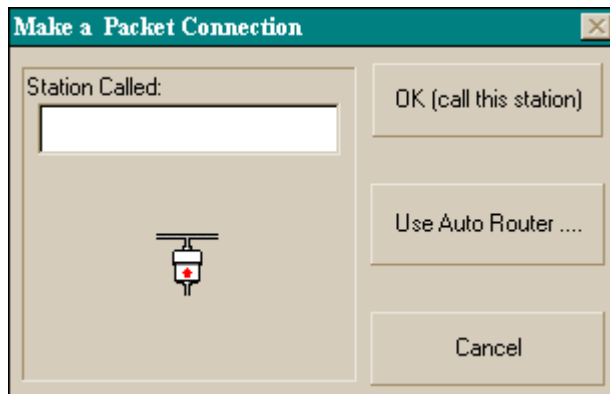
- **Auto Router (VHF Packet Only)**

MFJCom for Windows 'Auto Router' capability makes it very easy to make VHF packet connections through nodes to other packet stations and BBS's. With Auto Router, you can tell **MFJCom for Windows** which nodes you need to use. **MFJCom for Windows** will remember the paths, and from then on, all you need to do is 'click' on the desired path.

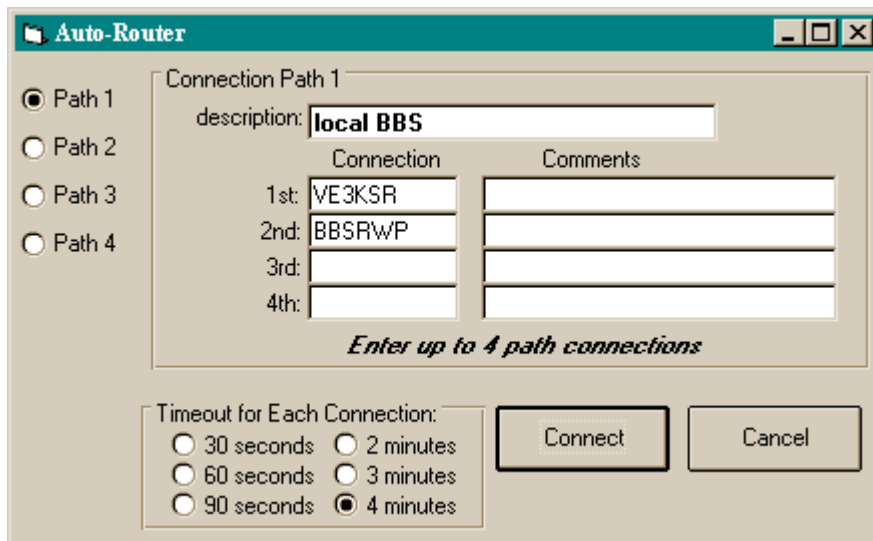
Up to 4 different routes, each with up to 4 'steps' can be specified.

Operating: Packet

To use this feature, first select "Connect" from the main tool bar. The following window will appear:



Click on the "Use Auto Router...." button to use the Auto Router feature. A form similar to the one below will appear:



Click on the "path" button for the path you want to use. In the form above, path 1 is selected. You can choose any of 4 paths.

You can enter a description of the path you are setting up, to help you remember what it is for. In this example, this is the path from the author's QTH to a local BBS.

You can enter up to 4 connections to reach your final destination. In this example, 2 connections are used to reach the BBS. The first connection is to VE3KSR. Once connected to VE3KSR, the second connection is to BBSRWP (the final destination). Enter the connections that you want.

Because making connections through nodes can be time consuming, you should specify the maximum time you will allow for each connection in the box in the form. If a connection does not occur in time, the connection process will be stopped.

Operating: Packet

When you have finished specifying the connections, click on "**Connect**". **MFJCom for Windows** will begin making the connections. **MFJCom for Windows** will also remember what you entered, so you won't have to re-enter the data next time. If you don't want to make the connection, click on "**Cancel**".

- **BBS and DX PacketCluster Menus**

MFJCom for Windows provides two menus that you can optionally display to help you use basic BBS and PacketCluster functions.

To enable a menu, simply click on the appropriate button in the lower toolbar.

BBS menu

DX Cluster menu

To turn a menu off, click on the button again, and the menu will disappear. They will also disappear if you click the "**disconnect**" button at the top of the screen, or if you change modes.

These menus are useful primarily to new or infrequent users and will reduce the need to memorize BBS commands. Because there is a wide variety of BBS's in use, these menus may not work in all situations.

The menus are in the form of "tool bars" that appear near the top of the screen. You can select either, or both, toolbars to appear.

The **BBS Menu** toolbar looks like this:

List bulletins	List from --to --	Read mine	Send Mail...	Stop Listing
List last --	List mine	Read msg #	Delete msg #	Quit BBS

The **DX Cluster Menu** toolbar looks like this:

Last 5 DX?	Report DX	WwV?	Set QTH
Last 10 DX?	MUF?	Sun?	Quit Clstr

The BBS Menu toolbar buttons letters are black and the DX Cluster Menu toolbar buttons are blue. That helps you to tell them apart when they are both displayed.

Remember, you can always use keyboard commands if you prefer when you are using BBS's and DX Cluster nodes.

- **Packet Defaults**

MFJCom for Windows sets the following defaults for VHF and HF Packet. In general, these follow the suggestions in the TNC manual. You can temporarily change these defaults by doing the following:

- enter CONTROL-C from the keyboard
- enter the parameter you wish in the format described in the TNC manual.

Operating: Packet

VHF Packet Defaults:	HF Packet Defaults:
NULLS 0	NULLS 0
NEWMODE ON	MONITOR ON
CONMODE C	DELETE OFF
MONITOR ON	CR ON
DELETE OFF	CPACTIME OFF
CR ON	PACLEN 32
PACTIME OFF	DWAIT 0
PACLEN 128	UNPROTO CQ
DWAIT 16	NUCR OFF
UNPROTO CQ	NULF OFF
NUCR OFF	AUTOLF ON
NULF OFF	AX25L2V2 OFF
AUTOLF ON	RESPTIME 0
AX25L2V2 ON	ACKPRIOR ON
RESPTIME 0	DEADTIME 33
ACKPRIOR ON	MAXFRAME 1
DEADTIME 33	FRACK 8
MAXFRAME 4	ACKTIME 13
FRACK 3	SLOTS 4
ACKTIME 13	CHECK 0
SLOTS 4	RETRY 0
RETRY 0	DAYUSA ON
DAYUSA ON	

5.2.3 YAPP File Transfers

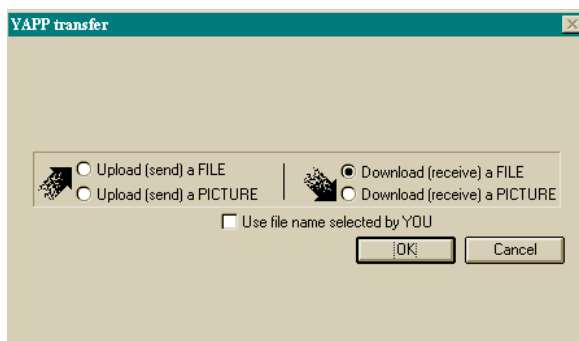
YAPP (“Yet **A**nother **P**acket **P**rotocol”) is a method of transferring “binary” files in packet. Using the YAPP features of **MFJCom for Windows**, you can:

- send files to other stations
- receive files from other stations

To use YAPP file transfer, you must be connected to another station and that station must be able to use the YAPP protocol.

5.2.3.1 Starting YAPP

When you are connected, you will see a **Picture and File transfer** button at the top toolbar (it is only visible when you are in VHF Packet mode and are connected to another station). Click on the Picture and File transfer button. You will see the following form appear:



Operating: Packet

5.2.3.2 *Sending YAPP Files*

You need to tell the other station that you want to send a file before proceeding before entering YAPP mode.

Next, enter YAPP mode.

Click on the “**Upload (send) a FILE**” button. **MFJCom for Windows** will ask you for the name of the file to send. Select the desired file, and click “**OK**”.

The file transfer will begin. A progress bar will soon appear showing you how much has been sent to the TNC. NOTE that the TNC may not have actually transmitted that much the channel activity, signal strength and other factors can mean that less than this has actually been transmitted. This is normal.

You will also see some information about the “state” of the transfer. This is normal, but not really important.

Usually everything goes smoothly. However, occasionally either station can get out of sync. If you think this has happened, simply cancel and try again.

5.2.3.3 *Receiving YAPP Files*

You need to tell the other station that you want to receive a file before proceeding before entering YAPP mode.

Enter YAPP mode.

Normally, you will want to save the received file with the same name that it has at the other station. However, if you want to save it with a different name, click “**Use File Name Selected by YOU**”. You will be prompted to enter a file name.

Click **OK** when you are ready to receive. A progress bar will show you how much of the file has been received.

You will also see some information about the “state” of the transfer. This is normal, but not really important.

Usually everything goes smoothly. However, occasionally either station can get out of sync. If you think this has happened, simply cancel and try again.

5.2.4 Packet Images for Windows

5.2.4.1 *General*

Packet Images is a new feature that allows you to send and receive images with other packet stations that use **MFJCom for Windows**. You can create and modify images with many different software packages.

MFJCom for Windows displays images line-by-line during reception. You do not have to wait for a whole image to be received before it is displayed.

Operating: Packet

You can even display pictures as they are being received from stations that do not **use MFJCom for Windows!** (those stations cannot display images that you send to them while the image is being received, however. Tell them to get **MFJCom for Windows!**)

5.2.4.2 *Packet Images is not the same as Packet Pix in DOS MFJCom*

MFJCom for Windows uses a different method of transmitting and receiving pictures than **MFJCom for DOS** does.

MFJCom for Windows uses the standard uncompressed and compressed “BMP” image file format. You can create such files with many software packages including the ones included with Windows 3.1 and Windows 95. Because of this, you can even display images as they are being received from stations that are not using MFJCom for Windows.

Unfortunately, **MFJCom for DOS** does not use standard “BMP” format. This means MFJCom for DOS cannot receive images from **MFJCom for Windows**.

5.2.4.3 *Image Format*

Packet Images uses the Windows standard “BMP” files that many software packages create. You can use those packages to create images that you want to send, or to view and modify ones that you have received. Best performance occurs when using compressed BMP images (sometimes called “RLE” images).

Packet Images cannot display images in other formats, such as TIFF, JPEG, PCX, etc.

5.2.4.4 *Compressed and Non-compressed images*

Images take a lot of bytes. The number of bytes depends on the amount of detail in the image and the image’s overall height and width. By using “compression”, you can store many images with fewer bytes. Compression can also significantly reduce the amount of time it takes to transmit an image: this reduces the amount of traffic on a packet channel, and makes this mode more enjoyable.

Some software packages can create compressed “BMP” files. The exact method of compression is an industry standard. One shareware package that does this is “WINJPEG”. WINJPEG is available from many on-line services or from companies that distribute shareware. **MFJCom for Windows** can also compress images for you before you transmit them (see “How to Use Packet Images” for more detail).

However, you are *not forced* to use compression. **MFJCom for Windows** automatically detects whether or not an image is compressed, and displays the image correctly.

Note that you cannot use compression schemes such as “ZIP” or “ARJ” if you want to display images while they are being received.

5.2.4.5 *How to Use Packet Images*

The instructions that follow assume that you are already connected to another station and that station is also using **MFJCom for Windows**.

5.2.4.5.1 *Sending Packet Images*

Tell the other station that you are going to send him / her a packet image. The other station must use **MFJCom for Windows** to display your image while it is being transmitted. That station should follow the “Receiving Packet Image” steps described in the following section.

Operating: Packet

Do the following steps:

1. Click on the **Image / File transfer** button on the toolbar (this button is only visible when you have established a VHF packet connection with another station; it is invisible all other times). The YAPP transfer form will appear on your screen.
2. Click the button to indicate that you are sending a picture. Do either step (a) or step (b) below

- *Step (a): Send the Image*
If you know the file name of the image file that you want to send, simply click the OK button. MFJCom for Windows will ask you for the file name, and will then show you the image. If that is the image you want to send, click **“Yes”**. If you accidentally chose the wrong image, or you have changed your mind, click **“No”**. MFJCom will then use the YAPP protocol to transmit your image to the other station.
- *Step (b): View and Compress an Image before Sending*
If you do not know the file name, or if you want to compress an image before sending it, click the **“View/Compress”** button. MFJCom will ask you for the file name (it will assume you want to look at “BMP” images, but you can ask it to look for other types). It will display your chosen image. Click **“Yes”** if you want to compress the file, or **“No”** if you do not.

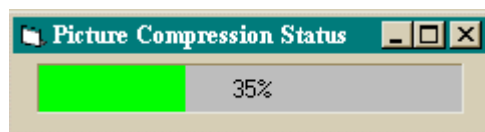
If you compress a file, it will give the compressed file the same name as the original “BMP” file, but will give it the extension “.RLE”. For example, if your image file was called”

myimage.bmp

MFJCom for Windows will call the compressed file

myimage.rle

You will see the following progress bar as compression takes place:



After compression is complete, you can go to Step (a) to proceed with transmitting the image.

The image may take a long time to send. The amount of time depends on the file size, the quality of the link, and the amount of activity on the channel.

5.2.4.5.2 Receiving Packet Images

You need to know that the other station is sending you a Packet Image.

Click on the **Image / File transfer** button on the toolbar (it is only visible when you have established a VHF packet connection with another station; it is invisible all other times).

Operating: Packet

A form will appear. Click on the button to indicate that you are going to receive a picture.

Because images are really data files, MFJCom for Windows automatically stores a copy of the image for you. Normally you will use the file name that the other user has given his/her image. However, you can indicate that you want to use a file name that you select if you want. If you select this option, MFJCom for Windows prompts you for a file name.

Click on **OK**. Image reception will begin when the other station begins sending it to you using the YAPP protocol.

Everything is automatic from that point on. A blank window will appear where the image will be displayed. You will see a series of messages at the top of that window, indicating the progress of the image exchange. These progress steps are:

1. **“Getting Ready”**. The file name, file size, and certain information about the image is being received. The size of the image form may change to accommodate the height and width of the image. No image is displayed at this point. If MFJCom for Windows determines that the image is not in BMP or RLE format, it will attempt to halt reception.
2. **“Receiving Color Map”**. About 1000 bytes of color information is received. No image is displayed at this point.
3. **“Receiving Image”**. The image is displayed as it is received. The image begins at the lower left corner of the form, and displays from bottom to top.

Note that you can move the image form around the screen with your mouse.

The image may take a long time to receive. The amount of time depends on the file size, the quality of the link, and the amount of activity on the channel.

The progress of the transfer is shown in the YAPP screen that is also visible.

5.2.4.5.3 How to Receive and Display Pictures from Users of Other Software Packages

Packet Images uses the amateur de-facto standard YAPP protocol to exchange images. That means that you can easily display images from any station that sends you a picture with YAPP. Here's what you do (assuming you have already made a connection with another station):

1. ask the other station to send you a picture in BMP (preferably compressed) file format.
2. the other station should start sending you the picture file with YAPP
3. you simply follow the same Image Reception procedure described in “How to Use Packet Images”.

That's all there is to it!

6. Time Saving Tips

6.1 *Sending an Identification Message*

You can quickly send identification messages like:
hisccall de yourcall

For example, if the other station is K1XYZ and your call is W9ABC, then the identification message would be:

K1XYZ de W9ABC

The other station's call must be displayed in the button beside the "**Enter Call**" button. That happens automatically when a Pactor or Packet connect occurs. In other modes, you should click on the "Enter Call" button to enter the other station's call into the appropriate button.

You can send an identification message in either of two ways:

- **Mouse method**

Click on:

- (1) the other stations call sign button in the lower right of the screen
- (2) the "de yourcall" button in the lower right of the screen.

- **Keyboard method**

From the File menu, select the **Send Id** item.

The shortcut way is to enter: **ALT-F** then **I**

6.2 *Sending the other station's Callsign*

You can type the other station's call, of course, from the keyboard. You can save keystrokes, though, by using some built-in features of **MFJCom for Windows**.

The other station's call must be displayed in the button beside the "**Enter Call**" button. That happens automatically when a Pactor or Packet connect occurs. In other modes, you should click on the "**Enter Call**" button to enter the other station's call into the appropriate button.

You can send the other station's callsign in one of two ways:

Mouse Method

Click on the other stations call sign button in the lower right of the screen.

Keyboard Method

From the File menu, select the **Send Callsign** item.

The shortcut way is to enter: **ALT-F** then **C**

6.3 *Sending Your Callsign*

You can type your callsign, of course, from the keyboard. However, you can save keystrokes by using some built-in features of **MFJCom for Windows**. Your callsign is displayed in a button near the bottom right corner of the screen.. You can send "de your callsign" in one of two ways:

Time Saving Tips

- **Mouse method**
Click on your call sign button in the lower right of the screen
- **Keyboard method**
From the File menu, select the **Send Callsign** item.

The shortcut way to do so is to enter: **ALT-F** then **C**

6.4 Using Text ("Brag") Files

Each operating mode can have 3 different files (sometimes called 'brag' files) that the user can edit and transmit whenever needed. **MFJCom for Windows** has a simple editor to help create those files. This editor can even handle graphics characters for operating modes that can use graphics characters (Pactor and Packet). In each operating mode, you will see 3 text file buttons at the top of the screen that look like this:

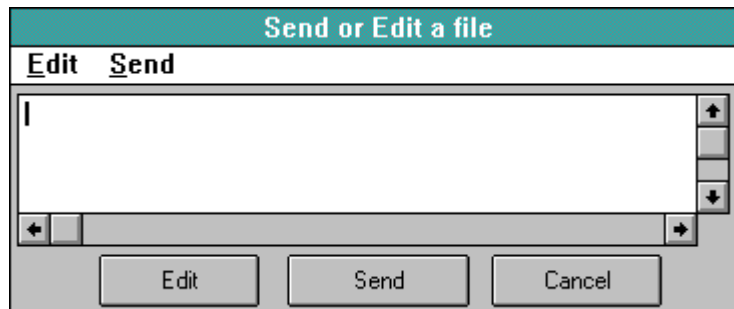


Underneath each button is a title that you can specify. There are different file buttons for each different operating.

You need to know two things to use text files:

- (1) how to edit them, and
- (2) how to transmit them.

Click on the button for the file you want to edit, or select the file number from the "**Edit**" menu. This will cause the following form to be displayed:



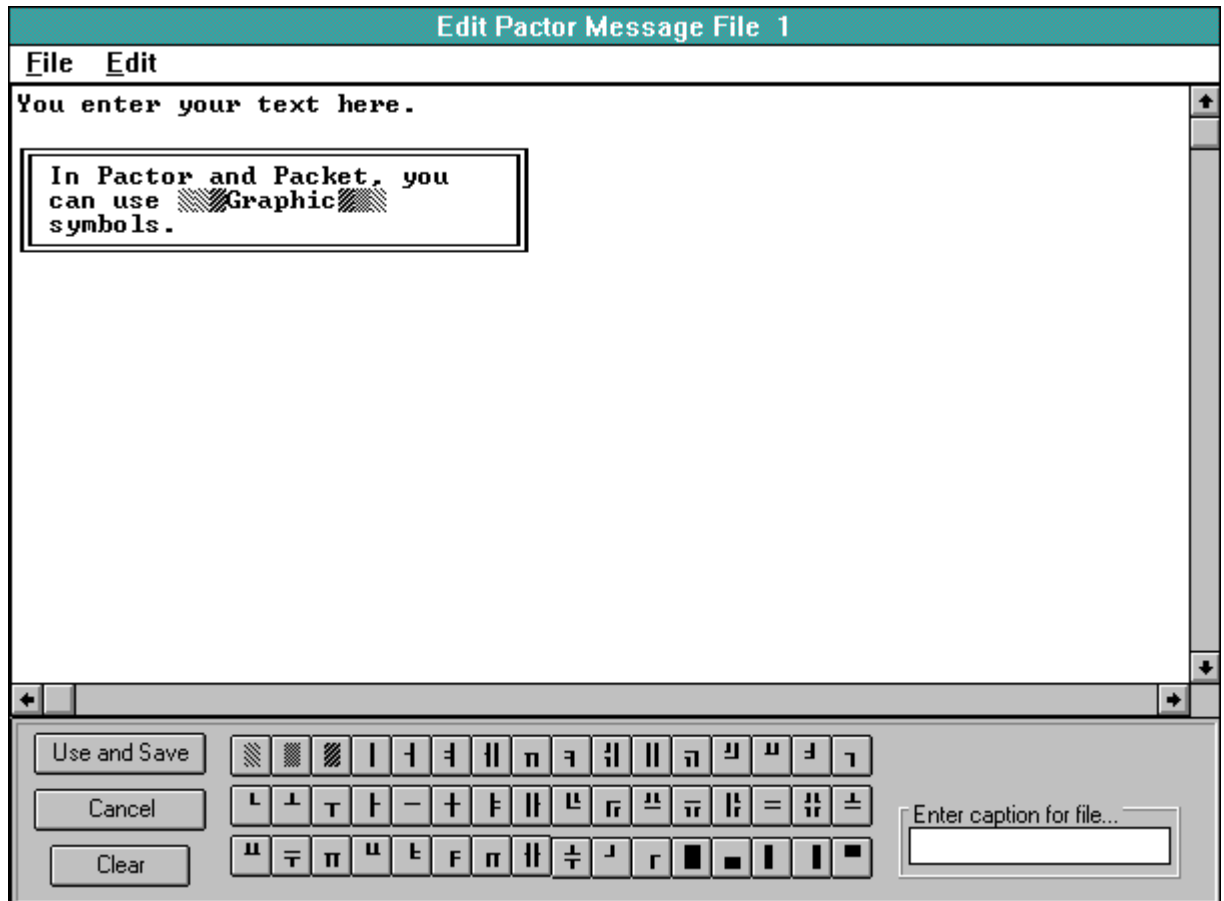
If there is already data in the file, it will be displayed in the window.

Click on "**Edit**" to edit the file, or "**Send**" to transmit the file.

If you decide to do nothing, then click on "**Cancel**" or use the Escape key.

- **Editing Text Files**
MFJCom for Windows will display a form with a large edit area at the top. It will look something like first picture on the following page:

Time Saving Tips



You can type in data just like any text editor.

You can cut and paste to other text files using the Edit menu

Click on the **"Clear"** button to clear the screen if you wish.

At the bottom of the form, you will see an array of graphics characters. To insert a graphics character into your text file, simply:

- click to the point in the file where you want the character to go,
- then..
- click on the graphics characters(s) you want to go into the file.

To make it easy to remember what is in your file, enter a "caption", or title, in the box at the bottom right of the form. This caption will be displayed under the appropriate file button on the main **MFJCom for Windows** screen.

When you are done, click on the **"Use and Save"** button.

If you decide to discard what you have entered, simply click on the "Cancel" button.

- **Transmitting Text Files**

The "Send" button will cause the file to be transmitted. You will see the characters in the file appear in the Keyboard Input window, just as if you typed them from the keyboard.

Time Saving Tips

6.5 Using ASCII Files

In addition to Text (“brag”) file, MFJCom for Windows lets you send text files that you have created with a text editor.

Text files must be in pure “ASCII” format. Windows Notepad is one tool for creating ASCII files. You can also use many word processors but you must be sure that you save files in “text” format.

To send an ASCII file, click on this button:



MFJCom for Windows will show a menu to select the file name that you want to send. Select your file, and click OK. The file will be sent for you.

Printing

7. Printing

You can have **MFJCom for Windows** print everything that is received from the TNC. Use either of the following methods to turn the printer On or Off:

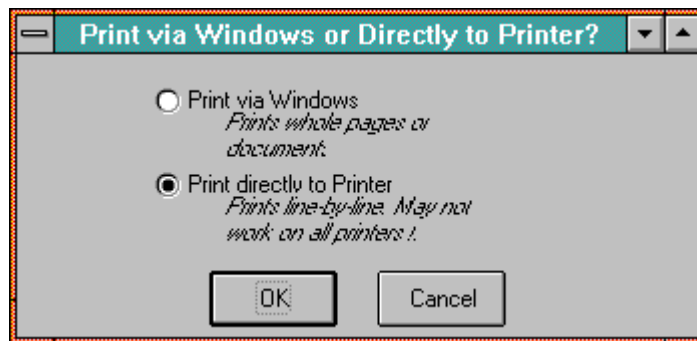
- **Mouse method**

Click on the "**Print**" check box near the upper left of the **MFJCom for Windows** window. This will start capturing printer data. Repeating this will cause capture of printer data to stop.

- **Keyboard method**

Select the file menu by entering "**ALT-F**". Then, select the Capture to Printer function by typing "P". (You can also use the mouse to select these menu items) This will start capturing printer Data. Repeating this will cause capture of printer data to stop.

The following form will appear:



If you choose "**Print via Windows**", all data from the TNC is then captured for printing. **MFJCom for Windows** uses the printing capabilities of Windows. All print lines will be saved, and are not printed immediately. To have your printer actually print the captured information, you can either:

- ..stop capture to printer,
- or,
- ..click on the "**Feed**" button near the "**Print**" check box.

If you choose "**Print Directly to Printer**", **MFJCom for Windows** will send data directly to the parallel printer port (only LPT1 is supported). This will only work if your printer can directly print ASCII characters. PostScript printers will not work in this mode.

Capture to Disk

8. Capture to Disk

You can save data from the TNC window in a disk file for later use. To do this, use either of the following methods:

- **Mouse Method**

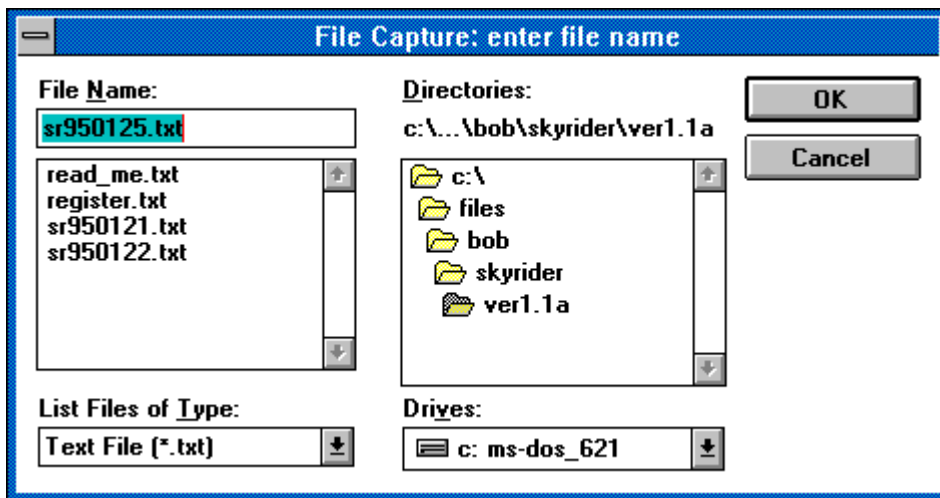
Click on the "File capture" check box near the upper left part of the screen. (Repeating this step will cause capturing to disk to stop.)

- **Keyboard Method**

Select the "File" menu by entering "ALT-F".

Select the "Capture to File" item by entering "F". (Repeating this step will cause capturing to disk to stop.)

A form will appear which will allow you to select a name for the file to be saved (the file names will be different on your computer):



MFJCom for Windows will suggest the following name:

SRyymmdd.SKY

where:

yy is the year (e.g. 95)
mm is the month (e.g. 01 for January)
dd is the day (e.g. 25)

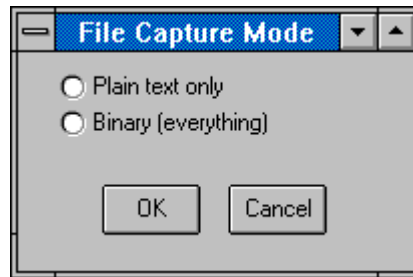
For example, if the date was 25 January 1997, **MFJCom for Windows** would suggest the name:

SR970125.SKY

You can choose a different name, or you can choose to add the captured data to a file that already exists on your disk. Click **OK** or **Cancel** when you have chosen a name.

The following form will then be displayed:

Capture to Disk



Click **"Plain text only"** to save "printable" text (no control codes will be saved). Click **"Binary"** to save everything received from the TNC.

If you choose **Plain text only**, the file is in "text" format, and can be read by any text editor, including Windows Notepad. Rows of "VVVVVV" in the file separate data saved at different times on the same day.

Controlling More Than One TNC at the Same Time

9. Controlling More than One TNC at the Same Time

Windows is a multitasking operating system. That means you can control more than one TNC with a single computer. All you need to do is:

1. Install **MFJCom for Windows** a second time. This time, you need to install it in a different directory of your choice (not the one that the Setup program suggests for you).
2. Connect the second TNC to a different serial port.
3. Run the second copy of **MFJCom for Windows**. When it starts up, click on the Options menu to tell **MFJCom for Windows** which serial port it should be using. Input your call and other information, too.

Simply run both copies that you've installed to control two TNC's at the same time!

There are some important things to consider about serial ports when running two copies of **MFJCom for Windows**:

- you will get best performance if your serial ports use '16550' type chips. Older '8250' chips will work fine, though.
- each copy of **MFJCom for Windows** must be connected to a different "Com" port.
- each Com port must have a different IRQ. *Refer to your serial card or computer manual to see how to set the IRQ. This may involve opening your computer and changing jumpers or DIP switches. Be CAREFUL when doing this.*
- the mouse must have a different IRQ than either of the Com ports connected to your TNCs (i.e. there must be unique IRQ settings for the mouse, TNC #1 and TNC #2).

If you do not do this, you may get very poor response times when operating more than one TNC at the same time.

Acknowledgments

10. Acknowledgments

MFJ and TNC are trademarks of MFJ Enterprises, Inc.

Windows is a trademark of Microsoft Corporation

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