UPGRADE FOR MFJ-1278 and 1278T

Introduction

The MFJ-48 is the latest firmware upgrade for the MFJ-1278 and MFJ-1278T Multi-Mode Data Controllers. This firmware eprom is **Release 3.7**. If the MFJ-1278 has one of the Mailbox Memory Expansion board installed, MFJ-56A, B, or C, user must use firmware Release 4.2 which is supplied with the Mailbox Memory Expansion board. Except as noted information in this instruction applies to firmware Release 3.7. Firmware Release 3.7 wil not function with the MFJ-56A, B, or C Memory Expansion Board.

Firmware Release 3.7 features:

1. Supports 16 Gray Level FAX with the Multi-Gray Level modem installed.
2. Supports transmit and receive of 16 Gray Level and Color SSTV with the Multi-Gray Level modem installed.
3. Enhanced mailbox that allows a separate callsign for the mailbox. The Mailbox now stays ON all of the time during packet connects.
4. Other mailbox features are: Auto and manual mail forwarding, reverse mail forwarding, remote sysop access, sysop paging, chat mode, mailbox Ctext just to mention a few.
5. Dedicated Mars mode.
6. Improved Automatic Signal Analysis (ASA).
7. Host mode.
8. An echo-as-sent command is installed to allow echoing of each character to the screen as its being transmit in CW, RTTY and ASCII.
9. Support for the Global Positioning System.
10. Packet CWID for Identification purposes while in Packet mode.
11. A new P-Persistance channel sharing feature

This firmware upgrade can be installed in any MFJ-1278 and MFJ-1278T controller. This firmware can also be used in any MFJ-1278 or MFJ-1278T with or without the Multi-Gray level FAX/SSTV modem installed. As mentioned earlier at the beginning of this section, firmware Release 3.7 cannot be used with an MFJ-1278 or MFJ-1278T with an MFJ-56A, B, or C installed. It is **very important** that you *read* this instruction booklet concerning Release 3.7, before you install the firmware.

Upgrade of MFJ-1278 WITHOUT Multi-Gray Level Modem

If you have purchased the MFJ-48 and installed it in an MFJ-1278 or MFJ-1278T that does not have a Multi-Gray Level Modem installed, you should be aware that the features and commands related to the use of the Multi-Gray

Level Modem will not apply to you. The MFJ-1278 or MFJ-1278T Multi-Gray Level Modem board would be mounted vertically on the right-hand side and it is connected to the mother board by a 20-line ribbon cable. If this board is not present in your MFJ-1278 or MFJ-1278T, then you **do not** have Multi-Gray level capability.

If your MFJ-1278 or MFJ-1278T does not have the Multi-Gray Level Modem board and you wish to install it, contact MFJ Enterprises, Inc. for information concerning the Multi-Gray Level modem board. The Multi-Gray Level Modem board, for FAX/SSTV operations, requires factory installation.

Without the Multi-Gray Level Modem board installed in your MFJ-1278 or MFJ-1278T, operation of Multi-Gray Level SSTV and FAX, or Color SSTV, will not be possible even if you have installed the Release 3.7 firmware. However, without the multi-gray level board you can still operate 2-level FAX and use other features that are not related to SSTV and multi-gray level FAX, when firmware 3.7 is installed.

Features & Commands not Related to Fax or SSTV

The following features and commands installed in firmware Release 3.7 are not related to multi-gray level FAX and SSTV operation and will function without the Multi-Gray Level Modem board.

1. **MAILLED**: This is the *Mail Waiting* indicator, which utilizes the **STA LED** to show that you have mail present in your Easy-mail mailbox, depending on the flag conditions of the existing messages. The Mail Waiting indicator is not functional, if your Mailbox is turned **OFF**.

2. **RBITMASK**: In RTTY/ASCII receiving, you can use the RBITMASK command to set the bit inversion pattern to receive some encrypted signals in RTTY/ASCII.

3. **FIRMRNR**: Used to control the handling of busy states by the MFJ-1278.

4. **ASA** (**A**utomatic **S**ignal **A**nalysis): Automatically identifies HF packet, RTTY, ASCII and AMTOR signals. **ASA** works with the OK command to accept the mode.

5. **PROFMARS**: This is a command that automatically sets up any of the MFJ-1278 model controllers for Mars operation.

6. All **Easy-Mail**™ Mailbox functions with or without the Mailbox Mailbox Memory Expansion board, **MFJ-56A, B, or C**.

7. **ANSWRQRA**: This is a command which polls all the packet stations within range, with a "**QRA ping**". When the MFJ-1278 or MFJ-1278 receives a non-digipeated UI frame that is addressed to QRA, then it will respond with an **empty ID packet**.

8. The use of the **echo-as-sent**, **EAS** command in CW, RTTY and ASCII modes.

Upgrade of MFJ-1278 *WITH* the Multi-Gray Level Modem

All MFJ-1278 or MFJ-1278T controllers after Revision 6, come standard with the Multi-Gray Level Modem factory installed. If your MFJ-1278 or MFJ-1278T controller has the Multi-Gray Level modem board installed, then you will have all the features and commands described in the previous section. In addition you will be able to transmit and receive up to 16 gray levels in FAX and SSTV modes, along with Color images in the SSTV mode. Note that the operation of Multi-Gray Level FAX and SSTV, requires also an appropriate terminal program such as the MFJ-1289 or MFJ-1289M MULTICOM for IBM and compatible computers, the MFJ-1282B for the C64/128 computers, the MFJ-1287B for Macintosh computer, and MFJ-1290 for Amiga computer.

The following are important notes concerning the Release 3.7 upgrade for MFJ-1278 with Multi-Gray Level Modem board.

Multi-Level Operation without a Special Terminal Program

If you are **NOT** using a special terminal program that allows printing of Multi-Gray Level pictures to the computer screen, you may attach an Epson or IBM graphics compatible printer to the MFJ-1278 or MFJ-1278T printer port to receive SSTV and FAX pictures. **SSTV** pictures printed on the MFJ-1278 printer port will be in **4 gray levels** and **FAX** pictures will be in **2 levels of gray**.

Multi-Level Operation with Special Terminal Program

If you are using special terminal software as described below, your MFJ-1278 can transmit and receive up to 16 gray levels in FAX and SSTV modes. The MFJ-1278 is also capable of transmitting and receiving **COLOR SSTV** and COLOR FAX, provided a special terminal program is used.

<u>**Special Terminal Programs**</u>

In this section we will briefly go over some of the different computers that can be used with the Release 3.7 firmware. Firmware release 3.7 for the MFJ-1278 or MFJ-1278T will perform well with a number of different computers and terminals. We are going to give you some brief information as to what computers Release 3.7 will work with.

<u>**IBM**</u> <u>**and**</u> <u>**Compatible**</u> <u>**Computers**</u>

The MFJ Advanced Starter Pack, MFJ-1289 MULTICOM, Version 3.11 terminal program for IBM and compatible computers lets you transmit and receive Multi-Gray Level FAX and color SSTV.

If you have an earlier MFJ terminal program, MFJ-1284, MFJCOM or MULTICOM, Version 1.4b, you can upgrade it to the new MULTICOM, Version 3.11 terminal program by ordering the MFJ-49B for 5 1/4" disk or MFJ-49BM for 3 1/2" disk.

<u>**Commodore**</u> <u>**C64/C128**</u> <u>**Computers**</u>

The C64/128 Starter Pack, MFJ-1282B, MULTICOM64 terminal program supports Multi-Gray Level SSTV and FAX operation. MULTICOM64 receives and transmits in **4 levels of gray** in both the **SSTV** and the **FAX** modes.

If you have an earlier version of the MFJ C64/128 terminal program, MFJ-1282, that does not support Multi-Gray Level operation, you may contact MFJ for upgrade information.

<u>**Macintosh**</u> <u>**Computers**</u>

The MFJ-1287B Starter Pack for the Macintosh computer has the MFJ MULTICOMMAC terminal program that supports Multi-Gray Level FAX and SSTV, along with Color SSTV operation. If you have an earlier version of Macintosh terminal program, MFJ-1287, please contact MFJ for upgrade information.

<u>**Amiga**</u> <u>**Computers**</u>

The MFJ-1290 Starter Pack for the Amiga computer has the MulticomAM terminal program and a cable. It supports 8 levels of gray in FAX and SSTV mode.

<u>**TERMINAL PARAMETER CHANGES**</u>

The MFJ-1278 parameters, **AWLEN** and **PARITY** default values were changed from what you may have had before in a previous firmware release.

Please note that the **STOPBITS** parameter can not be changed in the MFJ-1278 or MFJ-1278T. The **STOPBITS** parameter is changeable only in some terminal programs that can be used with firmware Release 3.7. If using the MFJ-1289, MultiCom, then the **STOPBITS** parameter is also not changeable. These changes will affect the upgrade **with** or **without** the Multi-Gray Level Modem board installed in the MFJ-1278 or MFJ-1278T. **Please read the information below very carefully.**   Reading and understanding the information as to how to set the terminal program, could make the difference between a working and non-working installation.

> **AWLEN**   **8**
> **STOPBIT**   **1**
> **PARITY**   **NONE**

In previous MFJ-1278 or MFJ-1278T firmware releases, Release 2.3 and earlier, **AWLEN** was defaulted to **7** and **PARITY** to **EVEN**. In **all MFJ-1278** firmware releasesafter Release 2.3, **AWLEN** is defaulted to **8** and **PARITY** to **NONE**. If your terminal program parameters are set to match the old MFJ-1278 firmware parameters, then you must change the AWLEN and PARITY parameters in your terminal program to:

> **AWLEN**   **8**
> **STOPBITS**   **1**
> **PARITY**   **NONE**

Failure to match your computer's terminal parameters to the newly, above mentioned parameters will cause the MFJ-1278 or MFJ-1278 to print "garbage" on the terminal screen or it may cause the computer to lockup.

Optional Items Available for your MFJ-1278 or MFJ-1278T

Model No	Description
MFJ-1272B	TNC to Microphone switch box
MFJ-280	Monitor speaker for transmit/receiver audio
MFJ-1292	Video digitizer for creating FAX & SSTV pic*****
MFJ-43	TNC Real time clock, keeps your 1278 on-time
MFJ-44X	External Scope Tuning Adaptor for standard MFJ-1278
MFJ-56A	32K RAM Packet mailbox expansion board
MFJ-56B	128K RAM Packet mailbox expansion board
MFJ-56C	512K RAM Packet mailbox expansion board
MFJ-48E	Special firmware with packet encryption mode******

* Digitizer available for IBM & compatible computers only.

**This special MFJ-1278 EPROM firmware release features encrypted packet mode. This is designed for commerical use only. Contact MFJ Enterprises, Inc. for more detail. Above optional items are available from MFJ dealers or directly from MFJ Enterprises, Inc.

FIRMWARE INSTALLATION

This section of this instruction manual will deal with the Installation of Release 3.7 firmware. Please follow this procedure very carefully, to ensure a proper installation is done. This section will mainly deal with the MFJ-1278. Installation of this firmware into an MFJ-1278 with an MFJ-56A, B, or C installed, is not possible. This firmware upgrade cannot be used in an MFJ-1278 or MFJ-1278T, with an MFJ-56 Mailbox Memory Expansion board installed. Remember that an MFJ-1278 or MFJ-1278T with the MFJ-56A, B, or C installed, requires firmware Release 4.2. Please refer to Figure 1, Page 8 during the installation of this upgrade into an MFJ-1278 or MFJ-1278T.

Firmware Installation Procedure

1.   Remove all power from the MFJ-1278, that the new firmware is to be installed.

2.   Remove all external cables from the MFJ-1278, that the new firmware is to be installed.

3.   Remove the mounting screws on the sides of the cabinet, then remove the top cover.

4.   Remove JMP5 jumper to disconnect the Lithium battery. JMP 5 is located in the front right-hand corner of the motherboard, on either the MFJ-1278 or MFJ-1278.

5.   Using a small flat-tipped screwdriver, carefully remove the EPROM, U23, from the MFJ-1278 board. Make note of the orientation, by noting the position of the **notch** on the IC, *NOT* the label on the IC. This is best done with the front panel facing you. The location of the **NOTCH** will be on the left. Again *DO NOT* concern yourself with how the IC label is positioned.

6.   Install the new firmware EPROM on the MFJ-1278 board at U23. Make sure that no IC pins are bent under the IC, or that no IC pins are broken off during the installation process. Make sure that the notch on the IC is pointed in the **same direction as the old EPROM**. This should be to your left with the front panel facing you. Please refer to Figure 1, Page 8, for assistance during installation. If the IC is installed wrong, damage to the IC and the MFJ-1278 or both can result!

7.   Re-install the battery jumper, JMP5.

8.   Replace the cover of the cabinet, and secure it with the screws removed in step #3.

9.   Apply power and connect all necessary external cables to the MFJ-1278 or MFJ-1278T. Ensure the MFJ-1278 or MFJ-1278T signs-on. If not, go back and check for IC pins bent under the IC, or IC pins which are broken off.
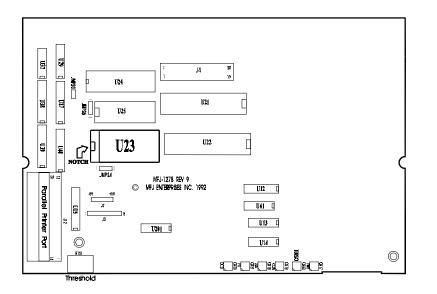

Figure 1 MFJ-1278/1278T Installation

DOCUMENTATION UPDATE

This documentation covers all firmware releases since firmware Release 3.4. If your current firmware is Release 3.3 or older, you may purchase a new consolidated MFJ-1278 master manual, 5th Edition, from MFJ Enterprises, Inc. for $12.95 shipping included.

FIRMWARE RELEASE 3.7 DOCUMENTATION

The MFJ-1278 is designed to keep pace with the ever changing field of digital communication technology. By simply changing the firmware, you change the personality of the MFJ-1278 by adding new features, or improving existing features.

The following section of this manual documents the improved features as well as the new features, added since the last printing of the main manual supplied with your MFJ-1278. If you do not have the latest MFJ-1278 manual, the 5th Edition, you may purchase it from MFJ for $12.95 shipping included.

AUTOMATIC SIGNAL ANALYSIS (ASA)

The **ASA**, or **A**utomatic **S**ignal **A**nalysis feature, has been greatly improved in firmware release 3.7. **ASA** can analyze received signals such as RTTY, ASCII, AMTOR Mode B and HF Packet. It will tell you the **speed**, **data bits** and whether or not the signal is **inverted**. ASA automatically switches the MFJ-1278 to the correct mode once you accept the results of the signal analysis by typing **OK** and **<CR>**. As you see **ASA** is extremely helpful when tuning across the amateur or the shortwave bands. Let **ASA** help you determine what kind of signals you are listening to.

ASA OPERATION

ASA is effective in analyzing RTTY, ASCII, AMTOR FEC Mode B and HF Packet. Once invoked, ASA only takes a few seconds to analyze the tuned-in signal. Once the result is displayed, the user can decide whether to accept by issuing the **OK** command. If the user questions the results, ASA will continue to analyze the signal and will display the results after each cycle.

When the ASA mode is entered, the MFJ-1278 will enter the "converse" mode automatically and display: **Wtg:CD,**

All the you have to do now is to tune in the signal you wish to decode. This is done in accordance with the MFJ-1278 operations manual.

Once invoked, ASA will first display the **speed** and then the **confidence factor** followed by a pause. After a 5 to 10 second pause it will display the **speed of modem** used to analyze the signal, **data bits** of the signal which will be either **5, 6, 7 or 8**.   Any data bit analysis of 6 should not be used and the signal should be re-analyzed. Last it will display the setting of what it will change the RXInvert command to (On or Off). This is what ASA will switch the MFJ-1278 to, if the user accepts its result.

The display is in the following format:

<Speed><Confidence Factor>.<Speed><Data Bits><RXInvert On/Off>

A typical result will look like this:

80 baud, 90% Confidence. 75 baud used 7 bits, RXInvert Off

Once the result is displayed, the user can exit ASA signal mode by pressing any key. MFJ-1278 will return cmd: command prompt without changing the operation mode.

If the analyzed result is acceptable, the user will simply type:

        OK   <CR>

The MFJ-1278 will switch to the analyzed mode, display the mode status, enter the "Converse" mode and proceed to receive data.

In the case of analyzing a 300 baud signal, the MFJ-1278 will prompt the user that the signal could be PACKET. If this occurs then the user can enter the following command from the cmd: prompt:

        OK Packet   **<CR>**

MFJ-1278 will switch to 300 baud HF packet.

If the user does not issue the OK Packet command and issues just the OK command because you know that the signal is not packet, then the MFJ-1278 will switch to 300 baud RTTY or ASCII, depending on how data bits ASA said the signal had in it's analysis. If data bits was 5 then ASA will switch the MFJ-1278 into RTTY mode. If the data bits were 7 ASA will switch the MFJ-1278 into ASCII mode.

If the ASA result is a 100 baud signal, the MFJ-1278 will prompt the user that the signal could be AMTOR. If this occurs then the user can enter the following from the cmd: command prompt:

    OK AMTOR   <CR>

When the "**OK AMTOR**" command is given the MFJ-1278 will switch to AMTOR mode B. Follow the AMTOR operating procedure to go to any of the other AMTOR modes.

If the user does not issue the "OK AMTOR" command the MFJ-1278 will switch to 100 baud RTTY.

Note that if RTTY or ASCII signals are analyzed, and the user accepted the result (by typing OK) and the MFJ-1278 still does not copying the signal correctly. This may due to the signal being encrypted with bit inversion. Most of the time, two or three bits of the RTTY character may be inverted and it is possible for all 7 bits to be inverted.

If the baud rate and the type of signal has been determined by ASA and the MFJ-1278 still does not copy correctly, the signal may be encrypted with bit inversion. In this case, you may want to try to use the **RB**itmask command to set various inversion patterns to match the receive signal, but manual setting of the RBitmask command is not necessary. The RBitmask command can be invoked when the MFJ-1278 is in the RTTY or ASCII receive mode by simply issuing the "CTRL-U" while the MFJ-1278 is in converse mode.

Once "CTRL-U" is pressed, MFJ-1278 will automatically cycle through each of the bit combinations, and then display a sample text of each one of the combination on the screen. Examine the list of the displayed text on the screen and if one of the 32 sample text looks normal then make note of the combination number next to the text.   Do the following to select this combination:

Press **CTRL-C** to go into the cmd: prompt, then type the number noted above with the RBIT command. For example if the combination is 12 you will type:

RBIT 12   **<CR>**, then type: **K** followed a <**CR**>

The MFJ-1278 will enter converse mode and begin to display text normally.

If another RTTY or ASCII signal from another station is received, RBIT must be reset to copy that signal by following the same procedure as described above. RBIT can be set to normal (no inversion) by setting it to "RBIT 0".

> *Note that when using ASA, noise will have major effect on the degree of its effectiveness. If no signal is present while the MFJ-1278 is in ASA mode, Wtg:CD, will display:*

User will simply press the "Return" key to return to CMD: command prompt. There is no need to type **ASA** to go back into the ASA mode, because once invoked ASA is always active.

<u>MARS</u> <u>Operation</u>

Firmware Release 3.7 provides special commands to simplify MARS operation. These commands are **PROfmars** and **MARsmode**.

With PROfmars and MARsmode, the MFJ-1278 is more compatible with MARS system than ever before. We have made operating MARS with the MFJ-1278 more fun and enjoyable. The following section should be very useful to the MARS operator.

<u>Mars Operation</u>

When **PROfmars** is ON, the MFJ-1278 profiles the MFJ-1278 for MARS operations. When this command is invoked, it sets the following parameters as specified.

AUTOLF	**OFF**
CCITT	**OFF**
DIDDLE	**OFF**
LFADDALT	**OFF**
LFIGNORE	**OFF**
MARSMODE	**$01**
UNSHIFT	**OFF**
RXLFNOCR	**ON**

Once the MFJ-1278 is profiled for MARS operations, the user must set the MFJ-1278 into HF RTTY mode by typing: **MODE HB,75   <CR>**

Now the 75 specifies the speed at which the MARS operation will be run in this case. This speed is the one which NAVY/MARINE CORPS MARS uses. Other types of MARS may run at different speeds, so it will be necessary to insert the proper speed for the type of MARS for which you will be running. Once you have set your operating mode, the user must press the **K** key and a **<CR>** in order to enter RECEIVE mode. The MARS operator is now ready to receive MARS traffic.

The operator must then tune the VFO on the radio so the tuning indicator on the MFJ-1278 is centered on the bar graph display. The received traffic should be coming to the screen, in the proper MARS format.

Operation Hints for Mars Operation using Multicom for IBM

Here's a good feature of using the MFJ-1278 with the MFJ MULTICOM software. Let us say that by the end of day and the operator has 20 pieces of traffic, but only 10 of them need to be sent. This is where the MULTICOM EDITOR comes in handy. You see everything which has come into the Multicom program is saved to a COMM buffer inside the program. So, at anytime the operator can see all traffic which has been received. The operator can go into the EDITOR by pressing the **F10** key along with an **ALT-B**. The **ALT-B** command fills the EDITOR with the contents of the COMM buffer.

Now the operator still being in MARS receive mode, can press a **CTRL-T** to go into transmit mode.

Pressing the **F10** key takes the user into the TEXT EDITOR. Using the EDITOR commands take and block off the pieces of traffic which needs to be sent. After blocking off the traffic, use **F9** to send the traffic to the MFJ-1278 to be transmitted.

The operator will need to perform this operation for each piece of traffic to be sent. If all pieces of traffic are all together, one right after the other then the procedure will only need to be done once. After all the traffic is sent the operator can go back to receive by pressing a **CTRL-R**.

The **MARsmode** Command

The **MARsmode** command provides two levels of MARS compatibility. Minimal translation is provided by "QSO" mode. The MFJ-1278 assumes the user is manually sending and receiving. Maximum translation is provided for sending and storing files of MARS messages while preserving all of the formatting information using the special MARS ASCII equivalent characters and differs from QSO mode only because of its extra ASCII output translations.

SSTV OPERATION UPDATE

For those users who have the Multi-Gray Level modem board installed, the MFJ-1278 now supports Color, 16 gray level, along with black and white SSTV. The following SSTV formats are supported:

- Robot B&W: 8, 12, 24, and 36 seconds.
- Robot Color: 36 and 72 seconds.
- Scotty Color: 1, 2
- Martin Color: 1, 2

NOTE: To support Color or 16 gray level SSTV and operations a special terminal program such as the MFJ-1289 or MFJ-1289M, Multicom for the IBM and compatible computers must be used. When using a standard terminal program the MFJ-1278 will support SSTV in 8, 12, 24 and 36 seconds B & W Robot formats in 4 gray levels thru it's built-in printer port.

The MFJ-1278 can be set to operate SSTV both in Color and 16 gray levels by turning the command **16Levels** ON and the command **8Levels** OFF.

If your terminal program does not support 16 gray levels, the **16Levels** command must be turned **OFF**, and you must follow the instructions given by your terminal program to operate SSTV. If your terminal program does not support SSTV you must follow the instructions given in the main MFJ-1278 manual to operate SSTV thru its built-in printer port.

The **TVBreak** and **RXBright** commands have been updated to support the 16 gray levels.

TVBreaks are arranged in the format:

```
Sync Whit Area          |    Gray Area           |  Blac Area     |
     e                  |                        |  k             |
$ss, $aa, $bb, $cc $dd $ee $ff, $gg, $hh $i $j $kk $ll, $mm, $nn |
          ,    ,    ,                   ,  i, j, ,
```

The default TVBreak values are:

TVB $80, $46, $47, $48, $4C, $4F, $52, $54, $59, $5C, $5E, $60, $63, $67, $69

The **RXBright** command has been updated to support the 16 levels gray. The new RXBright values are as follows:

0 TVB $80	$46	$47	$48	$4C	$4F	$52	$54	$59	$5C	$5E	$60	$63	$67	$69
1 TVB $80	$48	$4A	$4C	$4E	$50	$52	$54	$56	$58	$5A	$5C	$5E	$60	$62
2 TVB $80	$49	$4B	$4D	$4F	$51	$53	$55	$57	$59	$5B	$5D	$5F	$61	$63
3 TVB $80	$4A	$4C	$4E	$50	$52	$54	$56	$58	$5A	$5C	$5E	$60	$62	$64
4 TVB $80	$4B	$4D	$4F	$51	$53	$55	$57	$59	$5B	$5D	$5F	$61	$63	$65
5 TVB $80	$4C	$4E	$50	$52	$54	$56	$58	$5A	$5C	$5E	$60	$62	$64	$66
6 TVB $80	$4E	$50	$52	$54	$56	$58	$5A	$5C	$5E	$60	$62	$64	$66	$68
7 TVB $80	$4F	$51	$53	$55	$57	$59	$5B	$5D	$5F	$61	$63	$65	$67	$69
8 TVB $80	$50	$52	$54	$56	$58	$5A	$5C	$5E	$60	$62	$64	$66	$68	$6A
9 TVB $80	$59	$5B	$5D	$5F	$61	$63	$65	$67	$69	$6B	$51	$53	$55	$57

The default RXBright is 4. Remember that the higher RXBright value (from 1-9) the brighter the received picture will be.

If your terminal program does not support 16 gray levels, remember to set the command **8 Levels** on and **16 Levels** off. MFJ-1278 will automatically select 8 TVBreak values.

The PIXTONES command has been updated for 16Level SSTV and FAX use. Below are the new default values for the PIXTONES command:

PIX $BF,$BB,$BD,$B9,$BE,$BA,$BC,$B8,$98,$A8,$88,$B0,$90,$A0,$58,$40

Pixtones command serve the same function as the values in the **TVB**reaks, but in transmitting of SSTV and FAX pictures.

The brightness of the transmitting SSTV and FAX pictures can be adjusted by using the PIXTONES command. The higher PIXTONE values, the brighter the transmitted image will become.

FAX OPERATION UPDATE

FAX operation has been updated from 8 gray levels to 16 gray levels. Color FAX is also supported. Note that as in the case SSTV, multi-gray level and color FAX must be supported by using a special terminal program.

If you are not using a special terminal program which supports multi-gray or color FAX operation, you must use the MFJ-1278 built-in printer port to receive FAX pictures. The MFJ-1278 printer port will only display FAX pictures in 2- levels, not in color or multi-gray levels.

If you are using a special terminal program which supports multi-gray levels and color FAX operation, you must follow the instruction given by the terminal program to operate FAX.

To operate COLOR or 16 gray levels FAX, the commands **8LEvels** must be turned OFF and **16LEvels** turned ON.

Note that the commands which affect the brightness and color tint of the received and transmitted pictures are the same as in the case of SSTV. These commands are TVBreaks and RXBright for receiving and **PIXT**ones for transmitting.

HOST MODE

The Host Mode installed in the MFJ-1278 requires a special terminal program to operate. Documentation for Host Mode is available on disk from MFJ upon request.

MODEM CALIBRATION PROCEDURE UPDATE

The Modem Calibration procedure for the MFJ-1278 has been updated for firmware Release 3.7. In Appendix B of the MFJ-1278 manual, modem calibration procedure method I (page 2 thru page 5) should be replaced by the following procedure:

Method I

Test equipment needed: Frequency Counter and probe.

For all modes:

1. Install jumpers on JMP4 and JMP7.

2. Place frequency counter at Pin 1 of JMP 9. Pin 1 is the top pin of JMP 9.

3. In the following procedure all frequencies must be calibrated to within +/- 2 Hz.

4. Type: **TUNEPROC <CR>**

    The MFJ-1278 will respond with:

    > Calibration
    > Install loopback for TX alignment
    > R139 For 700Hz..
    > Adjust R139 for 700Hz +/- 2Hz. Press the SPACE BAR on the computer keyboard.

5. Adjust R138 for 1500Hz +/- 2Hz. Press the SPACE BAR.

6. Adjust R78 for 1200Hz +/- 2Hz. Press the SPACE BAR.

7. Adjust R77 for 2200Hz +/- 2Hz. Press the SPACE BAR.

8. Adjust R105 for 2295Hz +/- 2Hz. Press the SPACE BAR.

9. Adjust R106 for 2125Hz +/- 2Hz. Press the SPACE BAR.

10. Adjust R122 for 2125Hz +/- 2Hz. Press the SPACE BAR.

11. Adjust R119 for 2975Hz +/- 2Hz.

12.   Press the SPACE BAR. The MFJ-1278 will respond with:

      Multilevel xmit...1900

13.   Adjust R307 for a reading of 1900Hz. +/- 1Hz.

NOTE: For step 14 the frequency readings on the frequency counter should be compared to the frequency readouts indicated by the MFJ-1278. Note that the difference in the two readings can be as much as 20Hz, this is normal.

---

14.   With each press of the SPACE BAR, the MFJ-1278 will display the following frequencies:

      1550Hz.....+/- 20Hz.
      1600Hz.....   "
      1650Hz.....   "
      1700Hz.....   "
      1750Hz.....   "
      1800Hz.....   "
      1850Hz.....   "
      1950Hz.....   "
      2000Hz.....   "
      2050Hz.....   "
      2100Hz.....   "
      2150Hz.....   "
      2200Hz.....   "
      2250Hz.....   "

15.   Press the SPACE BAR. The MFJ-1278 will display:

      Multilevel demod: 307 {154}KHz.
      1550 Hz: 106 {53}

At this time there will be some numbers scrolling on the computer screen. The numbers on the screen will vary from 50 to 57.

16. Press the SPACE BAR. The MFJ-1278 will display:

      2250 Hz: 70 {35}

NOTE:This may take a few seconds to appear due to the sampling rate of the MFJ-1278. The numbers on the screen again will vary from 32 to 37.

---

17. Press the SPACE BAR. The MFJ-1278 will respond:

     DEMODULATOR ALIGNMENT.
     Tune R113 until STA & CON LEDS ALTERNATE;
     then, tune R212 until 10th LED from
     the LEFT is lit..

18. Adjust R113 until the STA & CON LEDS alternate back and forth. This means neither one should stay ON all of the time.

19. Then adjust R212 until the 10th LED from the LEFT on the tuning indicator is lit.

20. Press the SPACE BAR. The MFJ-1278 will respond:

     Tune trimpot indicated until the 10th LED from the LEFT is lit.

     R115

21. Adjust R115 until the 10th LED from LEFT on the tuning indicator is lit.

22. Press the SPACE BAR. The MFJ-1278 will respond:

     R79

23. Adjust R79 until the 10th LED from the LEFT on the tuning indicator is lit.

24. Press the SPACE BAR. The MFJ-1278 will respond:

     Tune R114 until the 6th LED from the LEFT is lit.

25. Adjust R114 until the 6th LED from the LEFT on the tuning indicator is lit.

26. Press the SPACE BAR. The MFJ-1278 will display the CMD: prompt.

This completes the MODULATOR and DEMODULATOR CALIBRATION.

Calset Values Update

Under Appendix B, page 12 of the MFJ-1278 manual, add the following Calset values to the table listed.

Tone	CALSET#	Adjust	Modem/Remarks
2125	248	R106	Amateur RTTY std.
2295	229	R105	Works well on HF Packet
700	751	R139	CW

Documentation Updates

This section is dedicated to documentation updates as they pertain to the MFJ-1278 or MFJ-1278T. Any type of update information will be contained in this section

MFJ-1278 PACKET MAILBOX UPDATE

In firmware Release 3.7, major improvements have been made to the Easy-mail Mailbox feature. Release 3.7 is also fully compatible with the MFJ-1278T. When installed in the MFJ-1278 or MFJ-1278T, firmware Release 3.7 gives the user approximately 3.5K of message storage space. This additional memory is also battery back-up by the lithium battery on the MFJ-1278 motherboard. The Mailbox memory cannot be expanded to 32K, 128K, or 512K when using Release 3.7. In order to expand the Mailbox memory, you must install either the MFJ-56A, B, or C in your MFJ-1278 or MFJ-1278T controller. As mentioned earlier in this instruction, the MFJ-56A, B, or C, comes with firmware Release 4.2, and that the Mailbox memory is expandable to 32K, 128K, or 512K. You must remember to order Release 3.7 when ordering future firmware upgrades for you MFJ-1278 or MFJ-1278T Multi-Mode Data Controller.

Mailbox Memory Expansion

The Mailbox memory RAM is expandable from the 3.5K available in Release 3.7 to either 32K, 128K, or even 512K, when the user installs either the MFJ-56A, B, or C Mailbox Memory Expansion board into either the MFJ-1278 or MFJ-1278T controller. The Mailbox Memory Expansion boards, allow the user to expand the Mailbox Memory or RAM dedicated to the Easy-Mailbox.

The different versions of the mailbox memory boards are listed below:

Model No.	Mailbox RAM Size
MFJ-56A	32K
MFJ-56B	128K
MFJ-56C	512K

MFJ-1278/1278T Mailbox Mailbox Memory Expansion

The Mailbox Memory Expansion boards mentioned come equipped with firmware Release 4.2, and are available from an MFJ dealer or from MFJ Enterprises, Inc.

Mailbox RAM Expansion with MFJ-56

If you have an MFJ-1278 or MFJ-1278T with an MFJ-56A, B, or C installed and you see the need for more RAM, then simply replace the Mailbox RAM in IC socket U424 on the MFJ-56. The Mailbox RAM kits listed below are available from MFJ Enterprises, Inc, and easily installed by the user. Please note that if you have an MFJ-56C installed in your MFJ-1278 or MFJ-1278T, the RAM is not expandable beyond the standard 512K. The MFJ-56C RAM must be replaced by another 512K RAM or 32K or 128K RAM.

The different versions of the mailbox memory boards are listed below:

Model No.	Mailbox RAM Size
MFJ-45A	32K
MFJ-45B	128K
MFJ-45C	512K

Mailbox Memory Expansion Kits

Setting Up your Easy-Mail Mailbox

The MFJ Easy-Mail Mailbox in firmware Release 3.7, is now a **Single-user** device. The Mailbox can now be operated independently from the standard packet operation. There are certain commands that need to be set. These will be explained later in this instruction. This procedure for mailbox operation replaces the procedure given in the main MFJ-1278 manual (Chapter 5, page 21-25).

NOTE: Whenever <CR> is found in this instruction this means to press the RETURN key, not to type <CR>.

1. Under the cmd: prompt enter your callsign that you want to use as your **MAILBOX** callsign , by typing:

   MYMCALL **n**   **<CR>**; where **n** is the callsign you wish to use for your mailbox.

2. Also from the cmd: prompt, set the USERS command as shown below by typing: **USERS 1** <**CR**>

3. If you want your messages time and date stamped, then set **DAYTIME** with the current information. Please refer to Chapter 6 in your MFJ-1278 or MFJ-1278 operations manual, as to how to set the **DAYTIME** parameter.

NOTE: An optional TNC real-time clock (MFJ-43) for the MFJ-1278 is available from MFJ Enterprises. With this real-time clock module installed in your MFJ-1278, the clock will continue to keep time even when the MFJ-1278 turned off. You will not have to set your MFJ-1278s "DAYTIME" every time your MFJ-1278 is powered up.

4. Ensure that the MAILBOX is activated by typing:

   MAILBOX ON <CR>

Now your MFJ-1278 is ready for simultaneous Mailbox/Packet operations.

You as the SYSOP can access your new Enhanced Mailbox by typing:

   SYSOP <ENTER>

 Your MFJ-1278 or MFJ-1278T will respond with:

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

First of all lets find out what the *n free* is for. The *n free* is a "Bytes Free" indicator. This applies only to the Mailbox. This is a great feature, because any remote user will know how much space is left in your Mailbox, whenever the Mailbox prompt comes back the remote user.. The Mailbox always update the "Bytes Free" indicator whenever messages are forwarded, added or deleted.

Now you are ready to operate your mailbox. However, lets take first things first. You very well cannot operate the Mailbox without knowing the functions of the commands. So, lets take a look at the functions of the Mailbox commands. The Enhanced Mailbox functions are as follows:

Bye

> **Logout**: The **B**ye command logs the remote user off the Mailbox by performing a disconnect sequence.

Edit

> **Edit Message Header**: This allows editing of the message header. This is necessary for the Forward and Reverse Forward functions of the Mailbox. The current is first displayed, then the Mailbox gets the new values, according to what is entered at the prompts it gives the user. The local and remote SYSOPs may edit any messages in the Mailbox. Remote users may only messages TO and FROM himself, and any message of 'T'raffic. Below are the edit prompts and an explanation as to what their functions are:

> **To:** The callsign of the person the message is going to goes here. It must be different than **MY**call or **MYM**call.

> **@:** The callsign of the BBS you wish to Forward the message to is placed here. This BBS should be the one where the person whom you are sending the message to gets his mail. Message handling with @ addresses with hyphens is much improved over the previous firmware release. Re-forwarding will not occur if an incoming message is received with the **SP** command, such as "**SP KB5JNZ @ KB5JNZ-1**".

> **From:** The callsign of the person who originated the message is placed here.

> **Type:** The Type of message you are sending is placed here. This will turn on the **Type Flag**. There are a few message types, and here are a couple listed below:
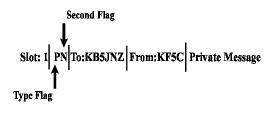
> **1.** "**T**" messages-- These are **NTS** or **N**ational **T**raffic **S**ystem type messages. This message system was developed by the ARRL. These messages must be formatted in a certain way. Please refer to the **ARRL Net Directory** for more detailed view and information on this message system. A "**T**" will appear in the **Type Flag** box in the message header. When an NTS message is received the second flag is set to an "**N**". An "**N**" flag means that the message is eligible for forwarding to the callsign

it is addressed to. Once the message is forwarded by the originator the "**N**" flag is set to an "**F**" flag, which means that the message has been forwarded.

2. "**P**" messages-- These types of messages are still **private** to the sender, recipient, and the SYSOP. A "**P**" will appear in the **Type Flag** box of the message header. When a private message is received the second flag is set to an "**N**". An "**N**" flag means that the message is eligible for forwarding to the callsign it is addressed to. Once the message is forwarded by the originator the "**N**" flag is set to an "**F**" flag, which means that the message has been forwarded.

3. "**B**" messages-- "**B**" type messages are **BULLETINS**. A bulletin type message may be addressed to anybody by using the **SB** command. A "**B**" will appear in the **Type Flag** box of the message header. If a BBS initiates forwarding of a bulletin to someone like a club member, the second flag starts out as an "**N**". When the forwarded bulletin is received by the club member, the second gets set to an "**H**". The "**H**" flag indicates that the bulletin is not eligible for re-forwarding., thus no duplicate messages show up in the BBS message system or on other message systems. Once the BBS is finished forwarding the bulletin, the second flag becomes an "**F**". The "**F**" flag indicates to the operator that the message has been forwarded, and is not eligible for re-forwarding.

There are other types of messages supported by the Mailbox but without special features.

Flag: The message Flag is now very important. All of the flags can be set via the **S** (send) or **E** (edit) commands. The message flags will either be an **N, F, B, T, P, H or Y**. These flags will appear in the **Type** and **second** flag blocks closest to **To:** block in the message header. There are different types of flags that are used as indicators. Let just discuss the different types of indicators flags used in the MFJ Enhanced Mailbox.

Second Flag

Slot: 1 | PN | To:KB5JNZ | From:KF5C | Private Message

Type Flag

Example 1 Indicator Flags

Referring to the **Example 1**, let us take a look at the different indicator flags, starting with the **Type Flags**:

T

The T flag indicates that the message is an **NTS** message.

P

Messages with this flag set are private to the sender, recipient, and the SYSOP. Only the person to which the message is addressed to can read or kill it. The local or remote SYSOP can read or kill any message in the system. Here is an example of a Mailbox message with a Type flag and a message flag inserted:

Slot:1 PN To:KB5JNZ   From:KF5C   PRIVATE MESSAGE

The P is in the Type flag block, which indicates that the message is a Private message. The N is in the Message flag block, which tells you that the message has not been read by the callsign KB5JNZ. When KB5JNZ reads the message the N flag will become a Y flag.

B

Messages with the **B** flag set are **BULLETINS**. A bulletin type message may be addressed to anybody by using the **SB** command.   A "**B**" will appear in the **Type Flag** box of the message header. If a BBS initiates forwarding of a bulletin to someone like a club member, the second flag starts out as an "**N**". When the forwarded bulletin is received by the club member, the second gets set to an "**H**". The "**H**" flag indicates that the bulletin is not eligible for re-forwarding., thus no duplicate messages show up in the BBS message system or on other message systems. Once the BBS is finished forwarding the bulletin, the second flag becomes an "**F**". The "**F**" flag indicates to the operator that the message has been forwarded, and is not eligible for re-forwarding.

Now let's take a look at the flag that will appear in the second flag box, during your Mailbox operations

N

Messages with this flag set are all eligible for forwarding, providing all other criteria is met for a message to be forwardable. The **N** flag will appear in the space right next to the **To: Callsign**. Only messages with the **N** flag set, trigger the "**You have new mail!**" message. The **N** flag will remain set until the message reaches it's destination address. After reaching the destination address the **N** flag is set to an **F** flag. The **F** flag means that the message is **not eligible** for forwarding.

Y

Messages with the Y flag set are eligible to be killed by the "K" global kill command.
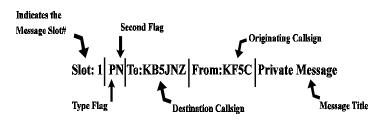
F

This flag is set when a message is forwarded. Messages which are eligible to forwarded are:

1. Messages where the N flag is set.
2. Messages that have no @ addresses that are different from MYMcall.

H

Messages with this flag set have been are bulletins, and have been forwarded, and have reached their destination. The H flag indicates that the message will not be forwarded or reverse forwarded. This prevents messages from being duplicated on BBS Message Systems as well as other Mailbox Systems. The H flag will appear in the **Second Flag** box, right next to the **To: Callsign**. The H flag will not be set unless the bulletin has reached it's destination.

The messages in the Enhanced Mailbox can be listed and are displayed in a certain format. Below is a sample message showing the different message fields

Using the above sample message, we are going to briefly explain the different message fields.

Slot#1:

This message field holds the **MESSAGE SLOT** number. The **MESSAGE SLOT** number is the slot number to which the message is assigned. Slot numbers are changeable.

PN

The message field where the **PN** is shown is called the **FLAG FIELD**. The P indicates the message type, in this case it is a **PRIVATE** message. The **N** indicates the message condition or status, in this case indicating that the message is eligible for forwarding.

To:KB5JNZ

This message field holds the message **To:** *CALLSIGN* address.   The amateur callsign to which the message is addressed is placed here. When editing the message header for a forwarding process, will also the @ callsign address. The @ callsign address is the callsign of the BBS or message system where the **To:** *CALLSIGN* gets his or her mail.

From:KF5C

This message field holds the message **From:** *CALLSIGN* address. The amatueur callsign of the operator who originated the message.

Private Message

This message field holds the **MESSAGE TITLE**. The text that is entered at the **TITLE** prompt when sending a message is placed.

There are several commands which are applicable to the new Enhanced Mailbox. The Mailbox command line is shown below:

nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

Using the command line shown above let's discuss the different commands and what they do.

H(elp)

This command displays the Mailbox command list. A brief description of the Mailbox commands available to user is displayed The remote users can also access the **H**elp list.

J

This command replies with a list of up to (**11**) eleven most recently heard station callsigns. When the heard list becomes full, then the next oldest station is discarded from the list. DO NOT get this heard list mixed up with the standard **MHEARD** list which is set to **18** stations. The "J" command only applies to remote users. If the "J" command is accessed from the SYSOP mode, the error message shown below will be displayed:

?Not a local command

K

Allows you to kill messages which are addressed to you. This works in conjunction with the Y flag. In order to perform a Global Kill, first of all of the messages to be killed during this must have the Y flag set in the header. Secondly, all messages to be killed must have the same callsign as MYMcall.

K##

Allows you kill the message in slot nn, where nn is a particular slot number. Remote users may only kill messages which are addressed only to them or originated by them. The local and remote SYSOP can kill any messages, depending on the setting of the new command REMsysop. Please refer to the REMsysop for more detailed information.

L

This command allows the remote user, local or remote SYSOP to list all messages in the mailbox. All of slots which are currently in use will be listed. They all will have the slot number, flag field, the destination call-sign, originator callsign, message title fields. Also the Mailbox command line will be on the next line.

M

This allows the remote user, local or remote SYSOP to change memory banks in the mailbox ram. The current memory bank is indicated on the mailbox command line. The bank will be inside a pair of {}, which will be after the "bytes free" indicator. Below is an example of a typical command line from the mailbox:

nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

Where {**n**} is the bank number. The bank number will vary from 0 to 7 depending on the size of the expanded memory ram. The bank numbers in relation to the RAM size are as follows:

MEMORY SIZE	BANK NUMBERS
32K	0
128K	0 or 1
512K	0 thru 7

NOTE: There will be only one (1) number in the { } at anytime.

For example let's say that you are running a 128K mailbox, and a remote user wants to access memory bank #1, but your Mailbox is set to Bank #2. First a connection to your mailbox must be made. Once the Mailbox command line is obtained the user will type:

M 0 <CR>

This will be received by your Mailbox and then your Mailbox will send back a new Mailbox command line:

nn free {0} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

Thus the {0} indicates the memory bank has been switched to bank #1.

NOTE: The "M" function applies only to an MFJ-1278. This function also applies to an MFJ-1278, that has the MFJ-56A,B, or C expansion board installed and Release 4.1 or greater.

R

This command lets you read messages addressed to you. When you list the messages in the mailbox you notice an N flag next to the messages which you have not read. Once you read those messages the N flag will change to a Y flag. This is an indicator to both you and the SYSOP that the messages have been read. From there you can perform a global kill on all of your messages or the SYSOP can kill them individually.

NOTE: The only way an N flag can get changed to a Y flag during a read is that the person who the message is addressed to, reads it. The flag will not change if any other person reads the message.

R##

Allows you to read the message in slot nn. Where nn is a particular slot number. This command works the same as the R command, except its for reading the individual slots.

S Call

This allows the remote user, local or remote SYSOP to send a message to the designated callsign. "CALL" must be a callsign valid under the same format as the MYCALL, CONNECT or other callsign commands. You can also send messages in NTS (National Traffic System) format. You will need to refer to the ARRL NET DIRECTORY for more detailed information on the NTS system.

SP Call

This allows the remote user, local or remote SYSOP to send a personal message to the designated callsign. This is a private message and only the person to whom the message is addressed can read or kill it. The SYSOP can also read the private messages. When a private message is listed a P flag is shown in the "Message Type" flag block. The P flag can also be inserted by the originator or the SYSOP through the Edit command.

SB Call

This allows the remote user, local or remote SYSOP to send a bulletin to the designated callsign. This bulletin can only be read or killed by the person to whom the message is addressed. The SYSOP can also read the bulletin also. When a bulletin is listed a B flag is shown in the "Message Type" flag block. The B flag can also be inserted by the originator or the SYSOP through the Edit command.

T

This command allows the remote user to page the SYSOP. When the T command is invoked from the remote user the following message appears on the SYSOP's computer screen and it also is sent back to the remote user's screen:

Paging SYSOP; any key aborts...

The Mailbox will page the SYSOP by ringing the SYSOP's terminal bell 30 times. If the SYSOP is at his or her terminal, the asterisk character will appear on the screen every time the terminal bell (CTRL-G) rings.

If the SYSOP does not answer the Mailbox will send the message back to the user saying no answer. Below is an example of a typical screen:

> **Paging SYSOP; any key aborts...**
> *******************************No answer**

The remote user may abort the SYSOP page by sending packet to the Mailbox. If the SYSOP does answer the page then the SYSOP can enter CHAT command, then converse one-on-one with the remote user.

This concludes the explanation of the commands which are on the Mailbox command line. Now lets get into a little of the Mailbox operation. If you have any questions about the Mailbox commands, we believe they will be answered in this section.

Mailbox Operation

1. First establish a connection to the Mailbox station.

2. If the Mailbox of the station to which you are trying to connect with is ON, then it will answer back with the Mailbox prompt:

   Mailbox Ready
   nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

NOTE: The nn free indicates the amount of RAM space available for messages in the Mailbox to which you are connected to. The nn will be no higher than 65K, if a 512K or a 128K Mailbox is in operation. If the Mailbox is 32K then nn will be 32K.

NOTE: The {n} indicates the current Mailbox memory bank in use. Please refer to the explanation of the M command for the Mailbox, in this section.

Now at this point all of the Mailbox commands are available to you. You may then type M to switch the memory bank of the Mailbox, K to kill a message, L to list all messages, R to read the messages, S to send a message, B to logout and disconnect from the Mailbox or H for the HELP menu.

3. To send a message the S, SP, or SB commands must be used. They must be used in conjunction with a callsign as in the examples below:

   S KB5JNZ   <CR>, will send an ordinary message to the callsign KB5JNZ.
   or
   SP KB5JNZ <CR>, will send a private message to the callsign KB5JNZ.
   or
   SB KB5JNZ <CR>, will send a message bulletin to the callsign KB5JNZ

   The Mailbox will respond with:
   Title:

   _

   The user will enter the message title at the cursor prompt, then press the "RETURN" key.

   The Mailbox will respond with:

   Send msg; Control-Z or /EX to end:

The user will then enter the message at the cursor prompt. If you are using a 512K or 128K Mailbox then you can actually upload disk files into the Mailbox. The 32K version has the same capability but with 32K RAM capacity. At the end of the message press a Control-Z and the RETURN key. The message will be sent. Your message will be seen on the mailbox station's screen, then the mailbox will respond with   the mailbox command prompt:

nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

Where **nn** is the "bytes free" indicator. This tells the user how much ram space is available in your Mailbox. Also {n} is the indicator of the current memory bank in use by the Mailbox.

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

To kill a message in a particular slot type:

K##   <CR>

Where the **##** is the message number you want to kill.

The Mailbox will respond with:

Message ## deleted;
nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >

This is whether or not the message flag is set to an N or a Y. Note that the remote users may only kill messages which are addressed them. The originator can also kill the message. The local SYSOP can kill any or all messages in the Mailbox. You can perform a Global Kill on a group of messages which are under the same callsign. To perform this two (2) conditions must be met:

• All messages must have been read and the message flag must be a Y.
• The callsign contained in the MYMcall must be the same as the callsign in the MYcall command.

If the above conditions are met then all the user must type:

K   <CR>

This will go out to Mailbox, then all of the messages with the message flags set to Y and all of the proper callsigns will be killed. The Mailbox will respond back to the remote user with all message numbers killed during the Global Kill process. Also the Mailbox prompt will be given again. The "**bytes free**"

indicator will be updated too. The SYSOP either remote or local can do a Global Kill. The SYSOP must individually kill any messages.

5. The remote user or local SYSOP can List messages from the Mailbox. In order to do this first the Mailbox prompt must be obtained by either a connection to the Mailbox or through the local SYSOP command. Then to List messages from the Mailbox, type:

>   **L   <CR>**

The Mailbox will respond with a list of currently used slots in the following format:

>   **Slot:## To: From: Subject:**

Where Slot## column is the number of the slot which the messages are in. The lower case t is the **Type Flag** block. The lower case m is the **Message Flag** block. The To: column will contain the callsign of the person who the message is addressed to. The From: column will contain the callsign of the person who left the message. The Subject: column will contain a brief message title.

Note that the number of slots for an MFJ-1278 without Mailbox Memory Expansion board is 30.   For an MFJ-1278 with the Mailbox Memory Expansion installed the maximum slots per memory bank is 99.   The messsage slots are all soft partitioned within the Mailbox memory. This simply means that 1 message can take up all of the Mailbox RAM space, or the Mailbox RAM can be divided up within the Mailbox RAM. After the Mailbox lists all messages it will issue the Mailbox prompt:

>   **nn free {n} Mailbox (B,E,H(elp),J,K,L,M,R,S,T) >**

6. Anyone who accesses the Mailbox can read messages which are addressed to him/her. Also a message which is a addressed to ALL, such as bulletins can be read by anyone. Messages can be read by two (2) different methods. Below are the two methods that are used for killing messages within the Easy-Mail Maildrop:

a. This method will allow the remote user, local or remote SYSOP to read a group of messages. This is only good for a group of messages with the same callsign as MYcall. The set conditions of the Type or message flags have an effect on a read process. They can be set to an N, Y or an F.

To perform this type of read process the user would type the following::

   R   <CR>

b. Messages can also be read individually by the slot number. This is good for reading other messages like bulletins or messages addressed to ALL. In order do an individual read type:

   R##   <CR>

Where ## is the slot number of the message that you wish to read. The Mailbox will respond with the message from the slot specified.

   All messages read will be in the following format:

   Slot##   mt To: From: Subject:
   This is an example of a message from the Mailbox

Where **Slot##** column is the number of the slot which the messages are in. The lower case **t** is the **Type Flag** block. The lower case **m** is the **Message Flag** block. The **To:** column will contain the callsign of the person who the message is addressed to. The **From:** column will contain the callsign of the person who left the message. The **Subject:** column will contain a brief message title. Then at the end of the message the Mailbox prompt will be issued.

7. The remote user can also disconnect from the Mailbox without having to issue a **CTRL-C**, **D** and a **RETURN**. All that needs to be done is to type: **B** to logout of the Mailbox and disconnect from the it. If you access your Mailbox via the SYsop command, then you must issue a **CTRL-C** to exit the Mailbox and return to command mode. The command prompt will indicate the stream you are on. The command prompt may look like this:

   |Acmd: where |A indicates that you are on packet stream A.

This is the only way the remote users can access your Mailbox.

If you stay in the SYSop mode then when a user tries to connect to your Mailbox he will a message like this:

> *****CALLSIGN Busy**
> **Disconnected**

The SYSOP will receive a message like the example below when he is in the SYSOP mode and someone tries a connect: *****connect request: CALLSIGN**.

Additional Mailbox Features

The Easy Mail Mailbox has been significantly improved. There are many new features, such as forwarding, reverse forwarding, a chat mode to name just a few. So let's discuss these new features and what they will do you.

Forwarding:

The MFJ-1278 Mailbox now has the ability to Forward mail to most full service and personal mailboxes. This feature allows you to compose your mail on your TNC, at your leisure, and then Forward the resulting messages for eventual delivery.

Messages may be forwarded any one of three ways either manually, by command, or by automatic forward. You can either forward messages hourly, or by your local full-service mailbox's reverse forward request.

Manual and hourly forwards may proceed through up to eight (8) digipeaters, allowing the messages to be forwarded through ROSE switches. Also NODE forwarding can be done too, thus allowing you to forward mail through NETROM, THENET, and KA-NODE switches. Please refer to the **NOD**eforw command in this manual.

In order to conserve RAM, space the SYSOP may specify that forwarded messages be killed upon successful forwarding. However, if conserving RAM is not a concern, then forwarded messages will be flagged "F". This flag will appear in the message flag block. Messages with F flags will be saved in the mailbox for the SYSOP's disposition. All forwarding events are monitored on the screen, in order to inform the SYSOP of the forwarding progress. In order for a message to be eligible for the forwarding process two (2) conditions must be met:

  1. Messages must have N flags in the message flag block.
  2. All messages must have an @ callsign in the message header.

The command used to forward a message is **FO**. All forwards must be done in the stream cmd: mode. This command is by pressing a CTRL-C while in the SYSOP mode. Below is a typical example as to how to use the FO command:

     FO CALLSIGN   <CR>

Where **CALLSIGN** is the callsign of the destination mailbox. This callsign must also reside in the message header to be forwarded. The message header can be altered through the Mailbox **E**dit command. Please refer to the **EDIT** command in this manual. When the **FO CALLSIGN** is issued the MFJ-1278 will initiate a connect request to the destination BBS. If the connection is successful the your mailbox will proceed to send the message to the destination BBS.

<u>Eliciting Reverse Forwards:</u>
This very unique feature, when combined with the hourly automatic forward, enables the MFJ mailbox to query another BBS, regularly and automatically, for the purpose of polling the other BBS for the TNC user's mail. Thus, even if your local full-service BBS operator is unwilling to forward to you, you can still have most of the benefits of auto-forwarding because your own TNC will elicit your mail for you on an hourly basis.

Reverse forwards may be restricted to a particular callsign. This prevents other users from "stripping" messages off of the mailbox prior to their being forwarded to the legitimate destination. When all messages are forwarded, if the destination mailbox supports reverse forwarding, as determined by **$** in it's **SSID**, then the MFJ-1278 will attempt to elicit a reverse forward.

<u>Remote Heard Log:</u>
This handy feature allows the remote user to query the TNC heard log at any time. From this log the remote can determine band conditions, or just see who has been around. The log holds **eleven** (**11**) of the most recently stations. The Remote Heard Log can be accessed by the remote user by use of the Mailbox **J** command. This heard log is separate from the standard **Packet <u>MH</u>**eard log, which holds **18** stations.

<u>Chat Mode:</u>
The Chat mode feature in the MFJ-1278 Mailbox is similar to the standard TNC "converse mode". It enables the SYSOP to break onto a mailbox link, and get one-on-one with mailbox user. This is just like a regular "Packet QSO". This is good for discussing problems maybe with the link or with the mailbox in general. Chat mode terminates any user or forwarding operation in progress. The mailbox will stay in Chat mode until the SYSOP returns to command mode.
<u>Page SYSOP:</u>

This allows the remote user to "Page" the SYSOP by ringing the SYSOP's terminal bell. This is done by the SYSOP's mailbox sending a CTRL-G to the SYSOP's terminal. The SYSOP's mailbox will poll the terminal's bell 30 times. If the SYSOP does not answer the remote user will receive a message back saying No Answer. If the SYSOP does answer then he can go into the Chat mode, and converse with the remote user. For more detailed information on this feature please refer to the section on Mailbox Set Up in this manual.

Remote SYSOP:

The Mailbox has the capability to be remotely controlled. A callsign can be specified by the SYSOP for this purpose. This would be useful in the case where the SYSOP is out in the field. It would allow him to control the mailbox, and do most of the local SYSOP's duties, such as killing messages, reading, editing message headers for forwarding purposes.

Mailbox CText:

This is a message dedicated to the Mailbox, but is used when a connect is made to the MYMcall callsign. It is limited to 120 characters in length. If **MCT**ext is empty, then no message will be sent.

Idle Timeout:

The Mailbox incorporates an idle timeout function. This is to ensure that the mailbox is still accessible in the event of a remote user drop out during a connection or walks away from the TNC for too long. The Mailbox will automatically do a disconnect from the link after the time which the SYSOP specifies.

Abort:

This command gives the SYSOP control over the mailbox by allowing him to force a disconnect on the mailbox link. It may also be used to avoid any QRM, to abort a forward-in-progress. You can also use it to terminate mailbox usage by an unwelcome user.

The new Mailbox system is fully compatible with NTS packet messages also. It allows you to format NTS type messages, and send them to another destination.   The MFJ-1278 also incorporates a new "bytes free" counter. It is updated as the mailbox fills or empties. In the case of an MFJ-1278 or MFJ-1278Twith an MFJ-56A, B, or C Mailbox Mailbox Memory Expansion board installed, it keeps up with the available RAM in multiple memory banks.

MFJ Easy-Mail Update

The following is an update to the MFJ Easy-Mail™ Mailbox System. The Easy-Mail™ Mailbox feature improved message handling when the @ addresses contain hyphens. The Mailbox supports more reliable 'dropping' of all types of mail from full-service BBSs without fear of generating duplicate messages. The Mailbox SID is changed to **[MFJ-2.1b-IH$]** to reflect the maildrop changes. This documentation is should clear up some of the questions related to mail Forwarding and Reverase forwarding. The following is a better explanation of the **TIMECMD** command

TIMECMD:

The **TIMECMD** command will hold a command string up to 119 characters long. The command string will be a forward, **FO** command, such as **FO KB5JNZ VIA KF5C**. This in conjunction with the **TIMEMIN** command will allow automatic forwards at a particular time interval, if the **DAYTIME** clock is set.

Forwarding & Reverse-Forwarding

The MFJ Easy-Mail Mailbox is compatible with BBS systems compliant with the final draft of the ARRL's protocol. This protocol provides for recommendations for the Interchange of Messages between Amateur radio and BBS systems including, AA4RE, MSYS, and FBB type systems. To perform reverse-forwards the SYSOP of the BBS, which the reverse-forward is being attempted with, must set up the remote user for reverse-forwards by a three (3) step process. This three step process being:

1.   Indentify the remote user as either:

    a.   A full service BBS system
    b.   A Personal Mailbox system
2.   Tag the remote users callsign for reverse-forwarding eligibility.
3.   Add a forward entry for the remote MFJ user.

If either of these three (3) steps is performed incorrectly, or not at all, then the reverse-forwarding will not work properly. To re-enforce again, this must be done by the SYSOP of the BBS which the reverse-forward is attempted with. When the BBS is trying to get it's mail from an MFJ Mailbox, first a standard Packet connection is established. Once the connection is made, then the MFJ Mailbox sends it's **SSID**, **IH$**, back to the BBS. In turn the BBS responds with it's **SSID**. The key here is the **$** in the SSID. The $ character must be the last character in the SSID. When the BBS's SSID is received by the MFJ unit, then the MFJ Mailbox sends an **F>** back to the BBS, then shortly after that the reverse-forward starts.

Forwarding & Reverse-Forwarding (Cont.)

All messages arriving on the '**maildrop**' that have an @ address not equal to **MYMCALL** are marked with an '**H**' flag. Since **FORWARD** or **REVERSE-FORWARD** only sends messages with an '**N**' flag that have an "**@**" different from **MYMCALL**, incoming messages cannot be duplicated unless you manually change the flag from an '**H**' to an '**N**'.

Mailbox Commands Update

ABOrt   Mode: Mailbox   Immediate command

This command gives the **SYSOP** total control over the Mailbox by allowing him to force a disconnect on the Mailbox link. It immediately terminates any mailbox activity currently in progress. You may use it to cancel an erroneous **FORWARD** or **NODEFORW** command, to eliminate unwelcome mailbox users, or at any other time you wish to terminate the mailbox process.

CHAT   Mode: Mailbox   Immediate command

The SYSOP may, at any time, break onto the mailbox's connected link. The resulting mode is like the a typical CONVERS mode packet connection. CHAT immediately terminates any user or forwarding operation in progress. At the point when the SYSOP invokes Chat mode, the SYSOP and the connectee are in an actual packet QSO. This is good to discuss problems with the Mailbox or equipment failure. CHAT mode continues until the SYSOP returns to command mode.

FOrward (dest bbs,[optional via])   Mode: Packet   Immediate Command

FOrward is an immediate command. Messages can be forwarded manually, by command, or automatically. They can also be forwarded hourly or by your local full-service mailbox reverse forward request. When invoked the mailbox initiates a connect to the callsign of the destination BBS. When a connect is established the mailbox will proceed to send your messages. Messages that qualify for forwarding must meet two conditions, they are:

• Have flags of 'N'ot read
• Must have a callsign in the @ addresses that are different from MYMCALL.

After forwarding, each message's flag is set to 'F' to prevent further forwards. When all messages are forwarded, if the dest bbs supports reverse forwarding (as determined by "$" in its SID) then TNC will attempt to elicit a reverse forward. For more information on Forwarding and Reverse Forwarding can be found in the Mailbox Features section of this manual.

KILonfwd **ON/OFF**   Mode: Mailbox   Default: OFF

Parameters:

ON Messages forwarded out of Mailbox will be killed after forwarding process is complete.

OFF Default; Messages forwarded out of the Mailbox are not killed after forwarding process is completed.

The setting of **KILONFWD** determines whether or not the TNC deletes a message after it has been forwarded. If Mailbox RAM space is critical then you might want to set this command ON. Setting this command to ON, could cause problems, because once a message is killed it cannot be recovered.

MCText   Mode: Mailbox   Default: " "

Text: Any combination of characters and spaces, up to 120 characters in length.

This command works like **CT**EXT, except that **MCT**EXT is sent only when the mailbox MYMcall is connected to. There is no express equivalent to the CMSG ON/OFF command. If MCText is empty, no string is sent. If the is message longer than 120 characters an error message will be given and the command is ignored.

The command string can be cleared by typing the command, and then entering the % sign where the text would normally be entered. Also the RESET command will empty the MCText command. For example you might want to set your MCText to:

Welcome to the Mailbox... I'm not here right now, but ENJOY the system!

MTimeout n   Mode: Packet   Default: 30

Parameters:

n   0 - 250, specifying 10 sec. intervals

If non-zero, this is the timeout value expressed as 10s of seconds. Timeouts on the mailbox apply only to remote users (the SYSOP can never time out). The mailbox will timeout and discon-nect after n*10 seconds of mailbox inactivity. Note that the synchronous 10 second clock may cause the timeout to occur as much as 10 seconds before the calculated timeout time. So, if you want to set your Mailbox timeout to 5 minutes then you set the MTimeout command to 30, which would specify a time-out of 300 seconds.

MYHIerad   Mode: Mailbox   Default: " "

> **Text:**   Any combination of characters and spaces, up to 60 characters in length.

You may use this parameter to generate a customized "@:" portion of the tagline your TNC will insert in forwarded messages. If MYHIERAD is blank, the default @ portion will read "@:<mymcall>". It is suggested that you insert your hierarchical address, location, and zip/postal code in this parameter. Example: MYHIER for N2WX in Sebastian Florida in the Melbourne LAN at zipcode 32958, using N5AUV as the home bbs, would be entered like this:

cmd:MYHIER N5AUV.#MLBFL.FL.USA.NA [N2WX User/Sebastian] Z:32958

and the tagline would look like this:

"R:920801/1200 @:N5AUV.#MLBFL.FL.USA.NA [N2WX User/Sebastian] Z:32958 #:8"

MYMcall **[callsign]**   Mode: Packet Mailbox   Default: blank

This is the dedicated callsign for the mailbox. If **MYMCALL** equals **MYCALL**, the TNC responds to incoming connections in mailbox mode. When there is no callsign put in MMcall, the mailbox is inaccessible to remote users.

NODeforw   Mode: Mailbox   Default " "

> **node** [via x...], up to 8 vias

This is an immediate command. It is similar to the **FORWARD** command except that the **NODEFORW** parameter is the callsign+via path to your **NETROM**, **THENET**, or **KA node**. When your TNC establishes the connection to the 'node', it sends the text in **NODEPATH** to establish a network link to the receiving BBS.

If all goes well, the forwardee will send its signon string, and forwarding will commence. To detect failure, **NODEFORW** looks for two strings - "**BUSY**" and "**RETR**" - as node connection failure indications. Upon finding "**BUSY**" or "**RETR**", the forward attempt is considered failed, and the TNC disconnects from the node. The command can contain the callsign of the "node" and up to 8 vias.

NODEPath   Mode: Mailbox   Default:" "

Enter the command the TNC will issue to command the node connected by the NODEFORW command to link with the receiving BBS.

Example:
> **cmd:NODEPATH C KB4VOL**
> **cmd:NODEFORW PSL5**

This sequence first connects to the PSL5 node. When connected, the TNC sends the node connect command "C KB4VOL" to establish a link with the receiving bbs, KB4VOL.

REMsysop **call[-n]**   Mode: Mailbox   Default: Blank

  Parameters:

   Call: Callsign to be used for Remote SYSOP ops

   -n 0 - 15, optionally specified sub-station ID (SSID)

Entering a callsign here permits the owner of the call to perform sysop functions remotely. Sysop functions include editing, reading, and killing any mailbox message. When this parameter is blank, the remote user may only read non- P messages and messages to or from himself. Furthermore, he may only kill messages to or from himself plus any messages of type "T"(raffic). This parameter may be reset to the blank (no remote sysop) state by entering a "%" or "&" blanking code.

RVfalway **ON|OFF**   Mode: Mailbox   Default: ON

  Parameters:

   ON   Initiates forwards and reverse forwards of all forwardable messages
   OFF   Mailbox ignores Forward and NODEforw commands

The setting of RVFALWAY(s) controls whether the TNC will initiate forward events (FORWARD, NODEFORW) in the absence of forwardable messages. If OFF, the TNC will ignore FORWARD and NODEFORW commands entered in the absence of forwardable messages. When ON, the TNC runs the event for the sole purpose of eliciting reverse-forwardable messages from the remote BBS.

REVFlim **call[-n]**   Mode: Mailbox   Default: " "

  Parameters:

   Call: Callsign of BBS to enable Reverse-forwards

    -n; 0 - 15, an optionally specified sub-station ID (SSID).

When this parameter is empty, the mailbox reverse forwards all of its messages eligible for forwarding to the first **SID** compatible BBS to elicit a reverse forward with "**F>**." Since this permissive technique is vulnerable to a malevolent operator who might attempt to connect and force your mailbox to forward to him, the **REVFLIM** parameter is provided to limit your mailbox's response to other's reverse forward requests. Simply place the callsign of the BBS you wish to enable reverse forwarding to in this parameter to limit remotely-initiated reverse forwarding to only that callsign.

TImedcmd   Mode: Mailbox   Default:" "

  [string- max 119 chars]

This string in the **TIMEDCMD** parameter is executed as a TNC command whenever the minutes register in the time of day clock equals the value in the **TIMEDMIN** parameter. The string is executed when seconds equals one; execution is deferred while the user is entering a command.

TIMEDMin **n**   Mode: Mailbox   Default: 60

  Parameters:

   n   0 - 60, specifying 1 minute intervals

The **TIMEDMIN** parameter is compared against the minutes register of the real time clock to determine when the **TIMEDCMD** string is sent to the command interpreter. Setting this parameter to 60   disables the feature. Combined with the **TIMEDCMD** string, the user may configure his TNC to perform hourly automatic forwards and reverse forwards.

Global Positioning System Compatible

The MFJ-1278 and MFJ-1278T Data Controllers now incorporate Global Positioning System compatibility. This is a dedicated mode enabling the broadcast of one or two NMEA version 2.00, and compatible sentences to the unproto address. When placed in NMEA mode with a non-zero value in the NMEABCN parameter, the TNC broadcasts the most recently received sentences that were received from the attached NMEA talker on the radio link. No other outgoing transmissions are permitted with the exception of indentification, beacons, CTEXT, and mailbox data, is now supported.

NMEA devices provide an ASCII output at 4800 baud, 8 data bits, no parity, and 1 stop bit, consisting of one or more types of sentences containing various types of data. Most commonly this data contains navigation fixes. For example, the author's global positioning system receiver, a Garmin model GPS-55AVD, generates sentences containing the receiver's longitude and latitude, time of the fix, groundspeed, waypoint data, and the like. An example of a GPS sentence is shown below:

　　$GPRMC, 034523, Y, 02754.31, N, 08023.03, W, 1.5, 035, 031294, 4 W*23<CR><LF>

Like we mentioned earlier, this sentence is only an example, for it is not actual GPS generated sentence. For this reason, the checksum is probably wrong. We will now break the sentence down into it's parts and tell you what they mean.

$GPRMC: Indicates the type of data, with RMC being the minimum recommended GPS sentence.

034523: This is the time of the transmission in UTC format. hh/mm/ss. The format is simplified below:

　　　　　　　hh　　/　　mm　　/　　ss
　　　　　　　Hour　/　　minutes　/　　seconds

Y: Indicates that the data is valid.

02754.31, N: This is the longitude fix. The longitude in this example would be 27° 54.31 minutes North longitude.

08023.03, W: This is the latitude fix. The latitude in the example would be 80 ° 23.03 Minutes West latitude.

1.5: This is the groundspeed.

035: This indicates that the track was made good over the ground; True degrees.

031294: This is the date of the sentence transmission, in the format dd/mm/yy. The format is simplified below:

dd	**/**	**mm**	**/**	**yy**
day	**/**	**month**	**/**	**year**

4,W: This is the magnetic variation indicator, West.

23: This is the sentence checksum, that is ignored by the TNC.

Please note that the sentences are sent in the non-protocol mode, thus there is a distinct possibility that the intended recipient may not receive the broadcast. Users desiring a gauranteed link should NOT use this new mode and should continue to utilize the TNC in connected mode.

NMEA Commands

NMeabcn n   Mode: GPS   Default: 0

   Parameters:

      n 0 - 254; defining the broadcast time period in 10 second intervals.

The **NMEABCN** parameter defines the **10-second time interval** between groadcasts of the one or two recently received **NMEA** sentences to the **UNPROTO** address =. If none of the selected sentences were received since the last power on, no broadcast is made. Normal TNC operation is enabled when the parameter is 0. NMEA mode is enabled when a non-zero value is present, and the TNC is powered up in the selected CONMODE. **CONMODE** "*must*" be set to **CONVERSE**, **SENDPAC** to **$0D**, and **CR** to **ON**, for the NMEA parsing to work correctly. These setting are normal TNC defaults.

NMEAFLT1 ssssss   Mode: GPS   Default: Empty
NMEAFLT2 ssssss

   Parameter:

      ssssss: This is the 5 character NMEA preamble that defines the device and the sentence types. The parameter must be coded exclusive of the leading "$" character.

A couple of examples as to the use of this command are given on the next page.

Example 1

> The user desires to broadcast the GPS fix and UTC sentences produced
> by a GPS board.
>
> **cmd: NMEAFLT1 GPGGA**
> **NMEAFLT1 was**
> **cmd: NMEAFLT2 GPZDA**
> **MNEAFLT2 was**
> **cmd:**

Example 2

> The user now only wishes to broadcast wind vector data from a weather
> station.
>
> **cmd: MNEAFLT1 WIMWV**
> **NMEAFLT1 was GPGGA**
> **cmd: NMEAFLT2 %**
> **NMEAFLT2 was GPZDA**
> **cmd:**

Notes
- To enable NMEA compatibility, the TNC must be configured to 4800
  baud, 8 data bits, no parity operation.
- NMEA defines a balanced RS-422 interface. A particular NMEA device
  may or may not function with the TNC-2's RS-232 interface.   In the
  perfect world, everyone would attach the devices with an RS-422<>RS-
  232 converter, and the author **recommends** that one be used. Therefore
  the user assumes the entire risk of attaching the RS-422 NMEA device to
  the TNC-2 RS-232 port, including permanent damage to the NMEA
  device, or the TNC, or both.

Modified P-Persistance

P-Persistance is a channel sharing technique that has gained great favor in the TCP/IP world. A modified form of **P-Persistance** is now included in the TAPR TNC-2 as an alternative to priorized acknowledgements and **DWAIT**. Modified P-Persistance relies on two principles to achieve a more equitable sharing of the common frequency.

First, when the TNC waits a random multiple of **DWAIT** after hearing another station before it transmits. The upper limit of the random value is user defined by the PERSIST parameter to prevent frequency monopolization by stations placing unusually heavy demands on the frequency, as with the case of a file transfer. Modified P-Persistance increases the likelihood that a station with higher priority traffic can acquire the channel.

The second way modified P-Persistance promotes channel sharing is by gradually increasing the wait time when the TNC executes retry transmissions.

Modified P-Persistance as implemented in TNC-2 differs from standard P-Persistance in that acknowledged retries do not cause the time delays to cumulate. After a retry is successfully acknowledged the TNC reverts to the shorter delay that assumes a perfect channel. Another difference is that the retry delay is applied only to connections on stream A.

Modified P-Persistance is selected by setting **PPERSIST** to **ON** and **ACKPRIOR** to **OFF**.

P-Persistance Commands:

PERSIST **n n = 0 to 254** Mode: Packet   Default: 8

Defines the persistance, or delay, the station tolerates. The actual delay is a random period of time between one DWAIT period and PERSIST DWAIT periods. The default value is appropriate for keyboard users and most digipeater installations. Higher values around 16 or 24 are appropriate for file transfers.

PPERSIST **ON/OFF**   Mode: Packet   Default: OFF

PPERSIST **ON** enables the P-persistant function described above. The **ACKPRIOR** must be turned **OFF** for this feature to function.

Standard TNC2 Command Updates

The following commands have been added or updated in firmware Release 3.7. Please pay close attention to these changes as they do effect the way that the MFJ-1278 or MFJ-1278T operates in it's different modes.

ANSWRQRA ON|OFF   Mode: Packet   Default: ON

Parameter:

ON MFJ-1278 responds to non-digipeated UI frames addressed to QRA, within 1 to 16 seconds, with an empty ID packet.

OFF Disables MFJ-1278's ping-response function.

QRA ("Who are you") pinging is supported in firmware release 3.7 of your MFJ-1278. A QRA ping polls all of the TNCs within range. A random number of seconds later, each TNC that heard the QRA ping will transmit its identification packet. The purpose of this feature is to reveal to the packeteer, particularly the transient one, the names of all reachable TNCs and digipeaters.

Sending a QRA ping:

1) Set the unprotocol callsign to QRA

   cmd: UNPROTO QRA<cr>

2) Manually send an unconnected packet

   cmd: CONVERSE<cr>
   <CR>
   ^C
   cmd:

This sequence will send an unconnected packet. Once the local TNCs have responded with ID packets, then the user can press a "CRTL-C". The MFJ-1278 will respond with the cmd: prompt.

<u>**ASA**</u>   Mode: Packet/ASCII/RTTY/AMTOR

ASA is an immediate command. When invoked the MFJ-1278 will analyze incoming signals such as RTTY, ASCII, AMTOR and HF packet. It will display the result for speed, data bits and whether or not the signal is inverted.

When invoked and the MFJ-1278 has analyzed the incoming signal a message will be generated in the following format:

<Speed> <Confidence Factor>. <Data Bit> <RXInvert On/Off>

ASA will be used in conjunction with the OK command.

Once the user accepted the results given by the ASA, MFJ-1278 will select the appreciate modem, match the data rate, set the RXInvert and will be ready to receive the signal.

ASA is not effective in analyzing FAX, SSTV, CW signals and noise.

<u>**OK**</u>   Mode: ASA   Immediate Command

OK is an immediate command when used in conjunction with the ASA command.

When the results are displayed when using the ASA mode, the user can issue the OK command to accept the results analyzed by ASA.

Typing OK will cause the MFJ-1278 to select the operation mode and match the speed automatically against the signal being analyzed.

CWId {**ON/OFF**}   Mode: Packet   Default: OFF

An FSK CW Identification feature is now available in all MFJ TNCs, from the Multi-Mode Data Controller, MFJ-1278B to the MFJ-1270C Packet Controller. When the **CWID** command is **ON**, the string in the **IDTEXT** parameter, is sent at **20 WPM** in international morse code at the times described for the **HID** command. If text is not present in the **IDTEXT** parameter, no **CWID** code will be sent. The feature will not send correct code if the on-board NRZ->NRZI converter is bypassed.

When using the **CWID**er, the **HID** function, HDLC identification, must be set to **OFF** or CW identifier may not automatically be transmitted at the **9 1/2 minute interval**. A CWID packet will also occur on connection activation, outgiong connect attempt success, upon a complete disconnect or when the disconnect is forced.

Because current regulations do not require a morse identifier within the United States, users are requested to leave CWID set to the defaulted OFF position lest they burden the channel with unecessary identification.

EAS **ON|OFF**   Mode: CW, RTTY, ASCII   Default: OFF

   Parameter:

      ON Enables Real Time echoing of out-going CW, RTTY, and ASCII
              text

      OFF Disables Real Time echoing of out-going CW, RTTY, and ASCII
              text

ECHO-**A**S **S**ENT is basically the same as the EAS in AMTOR, but is a separate command from AMTOR. This command must be set independently from the AMTOR EAS command. When issued from the cmd: prompt, enables Real Time echoing of out-going CW, RTTY, and ASCII text. When EAS is ON and ECHO is OFF real time echoing of all transmitted CW, RTTY, and ASCII text is enabled.

MARSMODE n   Mode: RTTY/ASCII   Default: 0

   n   n=0 to 3   for n=0, MARS QSO mode

- TX Translations:

CR's converted to CR/CR/LF or to LF only if preceding character was also CR.

"NNNN" is sent as "NNNN" followed by 12 LTRS.

- Characters translations are as follows:

      *   CR   \   NULL
      =   LF   >   FIGS
      +   12 LTRS   <   LTRS
      @   BELL

- TX translations are the Same as for QSO mode, plus these RX translations:

      CR   *   BELL   @
      **LF   =   NULL **

MNONPrin **ON|OFF**   Default: ON

   Parameter:

      ON   Enables printing Non-Printable Characters
      OFF   Discards all Packets containing Non-Printable Characters

The setting of the **MNONPRIN** command determines whether or not packets containing non-printable characters are monitored or simply discarded. Non-printable characters means any ASCII character less than the space character except for **BELL**, **LF**, and **CR**, and the **DEL** character, and not between $20 and $7E hexidecimal. The test occurs after masking off the high order bit. By setting **MNONPRIN** to **OFF**, and in concert with **MNONAX25** set to **OFF**, the TNC will filter nearly all screen-garbage inducing monitored packets. When **MNONPRIN** is **OFF**, information packets containing one or more non-printable characters are discarded.   You may find this command helpful when there are binary transfers on the channel that you'd rather not monitor. **MNONPRIN** has no effect on data received during connections.
 PROFMARS   Mode: RTTY/ASCII   Immediate command

PROfmars command causes the MFJ-1278 to set the following parameters for MARS operation:

AUTOLF	**OFF**	**CCITT**	**OFF**
DIDDLE	**OFF**	**LFADDALT**	**OFF**
LFIGNORE	**OFF**	**MARSMODE**	**$01**
UNSHIFT	**OFF**	**RXLFNOCR**	**ON**

RXBRIGHT n   Mode: FAX/SSTV   Default: 4

   Parameter:

   when **n = 0**,   **RXBR**ight assumes the current values of TVBreak.

   when **n=1 to 9**, **RXBR**ight assumes the following TVB values:

n	TVBreak Values
0	TVB $80,$46,$47,$48,$4C,$4F,$52,$54,$59,$5C,$5E,$60,$63,$67,$69
1	TVB $80,$48,$4A,$4C,$4E,$50,$52,$54,$56,$58,$5A,$5C,$5E,$60,$62
2	TVB $80,$49,$4B,$4D,$4F,$51,$53,$55,$57,$59,$5B,$5D,$5F,$61,$63
3	TVB $80,$4A,$4C,$4E,$50,$52,$54,$56,$58,$5A,$5C,$5E,$60,$62,$64
4	TVB $80,$4B,$4D,$4F,$51,$53,$55,$57,$59,$5B,$5D,$5F,$61,$63,$65
5	TVB $80,$4C,$4E,$50,$52,$54,$56,$58,$5A,$5C,$5E,$60,$62,$64,$66
6	TVB $80,$4E,$50,$52,$54,$56,$58,$5A,$5C,$5E,$60,$62,$64,$66,$68
7	TVB $80,$4F,$51,$53,$55,$57,$59,$5B,$5D,$5F,$61,$63,$65,$67,$69
8	TVB $80,$50,$52,$54,$56,$58,$5A,$5C,$5E,$60,$62,$64,$66,$68,$6A
9	TVB $80,$51,$53,$55,$57,$59,$5B,$5D,$5F,$61,$63,$65,$67,$69,$6B

Note the larger **n** is the darker the picture. The TVBreak default values are:

TVB $80,$46,$47,$48,$4C,$4F,$52,$54,$59,$5C,$5E,$60,$63,$67,$69

TXDIDDLE ON|OFF   Mode: Packet   Default: OFF

TXDIDDLE determines whether or not the MFJ-1278 uses a highly efficient square wave signal in place of flags during the transmitter delay (TXDELAY) period. When **TXDIDDLE** is ON, you may select even smaller TXDELAY intervals because the square wave presents four times as many transitions as **TXDIDDLE** OFF does for your connectees' receive synchronization.

TXDIDDLE is defaulted to the ON setting to reflect the increased efficiency. However there are a number of TNCs on the market which purport to be AX.25 compatible but do not recognize valid AX.25 packets preceded by the TXDIDDLE keyup technique.   You may recognize the need to set **TXDIDDLE** OFF if it appears that the station you're working is unable to successfully receive your packets despite your adequate signal.

This failure of some TNCs to receive TXDIDDLEd packets may be a result of some software carrier-detect schemes.   All TAPR and derivative TNCs utilizing hardware-generated carrier-detect receive both TXDIDDLEd and non-TXDIDDLEd packets with equal efficiency.

Note that when **TXDIDDLE** is OFF, TXDELAYC is irrelevant! Therefore, the actual TXDELAY yielded when TXDIDDLE is OFF is equal to TXDELAY*100ms plus any AXDELAY time.

16Levels   ON|OFF   Mode: FAX/SSTV   Default: ON

   Parameters:

     ON   The MFJ-1278 will transmit and receive FAX and SSTV in 16 gray
          levels

     OFF The MFJ-1278 will transmit and receive FAX and SSTV in 8 or 4
          gray levels depending on the setting of the MULTIFAX command.

In FAX and SSTV modes, if **16L**evels is **ON** and **8L**evels is **OFF**, the MFJ-1278 will receive and transmit FAX and SSTV data in **16 gray levels**. As in **8L**evels, **16L**evels is effective only when the **MULTIFAX** is turned **ON**. If **MULTIFAX** is turned **OFF**, the MFJ-1278 is set to transmit and receive **2L**evel **FAX** and **4L**evel **SSTV** regardless of the setting of **16L**evels, **ON** or **OFF**. **16L**evels is not supported by the built-in printer port of the MFJ-1278. Special terminal program must be used to decode and display multi-level FAX and SSTV. Note that turning 16Levels ON will not turned 8Levels OFF, you must turned 8Levels OFF when setting the MFJ-1278 to operate 16 gray levels.

Command Default Update

The following command default settings have been changed since the printing of the MFJ-1278 main manual:

Command	New Default Value	Old Default Value
ASPECT	Default: 3	Default: 2
8BITCONV	Default: OFF	Default: ON