

Table of Contents

MFJ-56 A/B/C.....	2
Expansion Board Installation	2
RAM Expansion	7
Firmware EPROM Upgrade	7
MFJ Pactor	8
Online modes	8
FEC/ UNPROTO	8
Monitoring	8
Speedup/Speeddown	9
Automatic online compression.....	9
Flow Control	10
AMTOR while in PACTOR mode	10
Changeover - Type ahead	10
Digital Memory ARQ.....	11
LEDs	11
CW Identifier	12
MFJ PACTOR Commands.....	13
Firmware Upgrade.....	18
Upgrade without Grey-Level modem	18
Upgrade with the Grey-Level modem	20
Multi-Level Operation without Using Special Terminal Program	20
Multi-Level Operation with Special Terminal Program.....	20
Special Terminal Programs.....	20
Terminal Parameters Changes	21
Optional Items Available for your MFJ-1278	22
Firmware Installation.....	23
Documantation Upgrade.....	23
Firmware Release 4.1 Documentaion	24
Automatic Signal Analysis (ASA).....	24
ASA Operation	24
MARS Operation	27
Mars Operation	27
Operation Hints for Multicom.....	28
The MARsmode Command	29
SSTV Operation Update	29
FAX Operation Update	31
Host Mode	31
MODEM Calibration Procedure Update	32
Calset Values Update.....	35

PACKET Mailbox Update	35
Set Up your Easy-Mail Mailbox	36
Mailbox Operation	43
Additional Mailbox Features.....	47
Forwarding.....	47
Eliciting Reverse Forwards.....	48
Remote Heard Log.....	49
Chat Mode	49
Page SYSOP	49
Remote SYSOP.....	50
Mailbox CText.....	50
Idle Timeout.....	50
Abort.....	50
Mailbox Commands Update.....	51
Additional Commands Update	57
Command Default Update	62

MFJ-56 A/B/C

Thank You for purchasing the MFJ-56A/B/C mailbox memory/Pactor expansion board for your MFJ multimode. The MFJ-56 is for MFJ-1278 and MFJ-1278T. The MFJ-56 memory/Pactor expansion board is supplied with the most recent EPROM firmware upgrade. Documentation for the firmware is also supplied.

You will notice that some sockets on the memory expansion are not populated (U413, U422 & U425) when received. These sockets will be populated with ICs to be transferred from the motherboard.

The various memory expansion boards for the MFJ-1278/T are as follows:

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

Note that the above models use the same memory expansion board but are packed with a different RAM IC.

The extra memory provided by the expansion boards are dedicated solely for the use of the packet mailbox. The firmware of the multimode does not allocate this additional memory to other operations. Battery back up for the memory board is supplied from the mother board.

EXPANSION BOARD INSTALLATION

In this installation you will be required to remove three ICs from the mother board and transfer them to the expansion board. Please handle these ICs carefully and make note of the IC numbers and their orientation.

Throughout this installation instruction we will use "TNC" to refer to the MFJ-1278 and MFJ-1278T multimodes.

Please perform the following procedure very carefully:

1. Disconnect all cables from the TNC, including power, radio and computer.
2. Remove the top cover of the TNC by removing the four (4) screws on the sides the unit. Then lift the cover off.
3. Remove the jumper off of JMP5. This takes the lithium battery out of the circuit. If your TNC has a MFJ-2400 modem installed, remove it. Set it aside, it will be re-installed later.

NOTE: When removing ICs from your TNC, ensure that you do not bend or break any of the pins.

4. Using a small flat tip screwdriver remove the following ICs from your TNC:

U13--74HC4066	U25--NEC 43256-10L or Equiv.
U22--Z0840004PSC Z80 CPU	U23--SYSTEM EPROM

5. Install the ICs which were removed from your TNC in the above step. Take note as to the orientation of the IC. Match up the NOTCH on the IC to the NOTCH on the IC socket on the expansion board. Refer to Figure 2 parts layout diagram for proper installation of the ICs.

Install the ICs removed from the mother board to the memory board as follows:

74HC4066	(U13)	in	socket	IC-413
43256	(U25)	in	socket	IC-425
Z80 CPU	(U22)	in	socket	IC-422

A new EPROM with the new firmware is already installed on the expansion board. There will be no EPROM installed on the TNC motherboard.

NOTE: The old EPROM removed from the mother board will not be used.

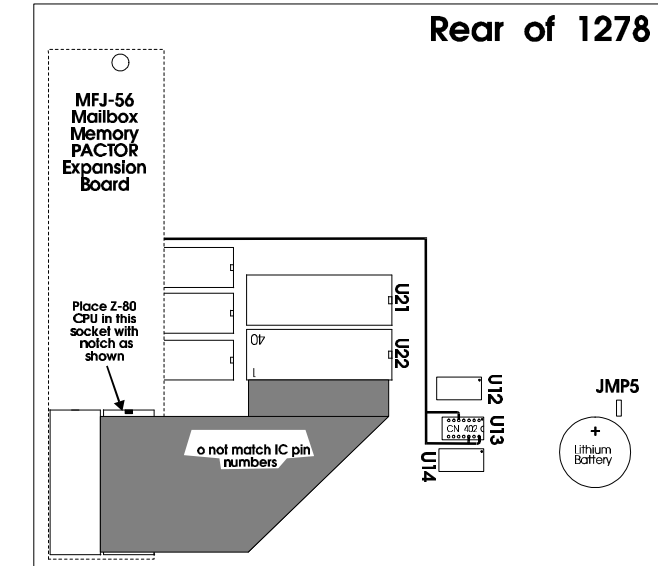


Figure 1 Front of TNC 2 / 1278

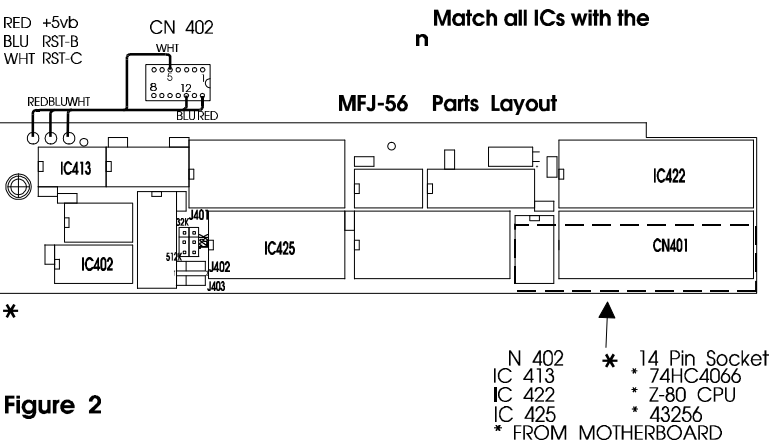


Figure 2

NOTE: *When installing ICs onto the memory board, ensure that you do not bend or break any pins. Ensure all pins are in the IC socket.*

6. Check and make sure that there no IC pins are bent under the IC itself. Check and make sure that no IC pins are broken off. Do this before proceeding beyond this point.
7. Set the expansion board aside for now.
8. Please refer to Figure 1 when performing this step. Using a small phillips screwdriver remove the PC hold-down screw in the left rear corner of the TNC mother board, this is referred to as HOLE "A". Do not let this screw out of your sight, you'll be using it here shortly.
9. Take the 1/2" hex spacer supplied and install it in HOLE A, as noted in Figure 1 in this instruction. This is the same place where you removed the screw in Step #8. This is an aluminum spacer DO NOT OVER TIGHTEN it, you will STRIP the THREADS.
10. Now with the memory board in one hand, plug the free end of the 40-pin ribbon cable into the IC socket labeled U22 (please refer to Figure 1; this is the same one which you removed the Z80 CPU from earlier in this procedure) on the mother board. Be sure to orient the blue connector so that pin 40 and 1 on the blue connector are oriented to the right side of the IC socket, (with the front panel of the TNC facing toward you). You will need to twist the cable slightly. Ensure that you leave the CN402 pigtail free and clear, do not let it become pinched or caught up underneath anything.

NOTE: *If you do not have an MFJ-2400 board installed in the TNC, skip to step 14.*

11. If you have an MFJ-2400 modem installed position the 40-pin cable, so the cable is not going to be pinched by the mounting stud for the MFJ-2400 modem.
12. Now you can re-install your MFJ-2400 modem. Be sure that you do not pinch any of the wires of the 40-pin ribbon cable or the CN402 pigtail when you tighten the MFJ-2400 down. This will cause problems with both the MFJ-2400 and the memory board.

13. Find the original hold-down screw which you removed from the TNC motherboard earlier. Secure the expansion board to the 1/2" spacer which you installed earlier. Again this an aluminum spacer, DO NOT OVER-TIGHTEN it! You will STRIP the THREADS.
14. Take note of the location of the NOTCH on CN402. Now plug CN402 into the IC socket labeled U13 (socket which the 74HC4066 was removed earlier) on the TNC mother board. Please refer to either Figure 1. Plug it in so the NOTCH is pointing toward the lithium battery. Make sure it is firmly in place!
15. Remove the paint (if any) from around the mounting holes on the outside of the chassis and the inside of the cover. This can be done with either light sandpaper or a knife blade. This will eliminate any EMI from the TNC caused by the additional large ribbon cable. This concludes the installation of the mailbox memory expansion board. However, before you start putting things back to together double check everything you have already done.

Final Inspection

Before closing up the TNC do a final inspection. Please check all of the following:

1. Check all connections to ensure that they are all secure.
2. Make sure that there are no pins bent or broken on any of the IC's or connectors installed in this procedure.
3. Make sure that there are no wires pinched or caught up under any of the screws, circuit boards or connectors.
4. Lastly, give your TNC one last look over for any debris or foreign matter on the main PC.

If all of the above checks out then you can re-install the battery jumper JMP5. Connect the computer cable to the TNC, apply power and see if you can obtain the TNC's sign-on message. If not go back and double check the entire installation procedure. If the TNC signed on properly, install the cover. Reconnect your TNC or multimode to your radio and computer. Follow the instructions given by the rest of this documentation to operate your mail box.

RAM EXPANSION

The RAM on the 32K board can be increased to 128K or to 512K. For the 128K board you can increase the RAM to 512K. This can be done simply by replacing IC424 on the memory board and relocate the jumper at J401 header. Refer to Figure 2 and the following chart. RAM chips can be ordered from MFJ Enterprises, Inc.

ITEM No.	RAM TYPE	J401 POSITION
MFJ-45A	43256LP-10 (32K)	The (2) inside most pins
MFJ-45B	431000LP-10 (128K)	The (2) middle pins
MFJ-45C	8512LP-10 (512K)	The (2) outside most pins

FIRMWARE EPROM UPGRADE

There are two versions of firmware EPROM upgrade for both the MFJ-1278 and MFJ-1278T Multimodes. One version, the MFJ-48, supports standard TNCs without the RAM Expansion Board. The other version, the MFJ-48B, supports the MFJ-1278/T with a memory expansion board and MFJ-1278B/BTs. Since you have already installed the RAM Expansion Board, remember to request the MFJ-48B version when ordering EPROM upgrades for you TNC in the future.

MFJ PACTOR

This section of this instruction pertains strictly to the PACTOR upgrade feature. It will explain the functions and then go through the PACTOR commands.

Online modes

As in packet, pactor also contains command and converse modes. Please note that switching between them is modelled on the "NEWMODE ON" procedures in packet. To manually switch between modes, ^C (the default CMDCHR) or a 'Break' signal takes you to cmd mode, and the letter "K" (**not CONVerse**) takes you to converse mode.

Once connected, the link acts much like AMTOR. The station originating the connection is deemed to be the master and he remains in transmit mode until he or the slave initiates a changeover. Either station may reverse the direction of the link by issuing a control-Y changeover (^Y) in converse mode.

FEC/ UNPROTO

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

MONITORING

Monitoring unproto: Unlike the German pactor controller, our controller is always in listen mode (if MONITOR is ON) except when connected and in one other situation. This other situation occurs when

- a) we've just terminated a 2-way pactor contact and
- b) the other side initiated the disconnect.

To prevent Uncontrolled Disconnects <the capitalized term is defined in the ptc docs>, we are unable to listen to all kinds (unproto, connected, and connect request) of third party pactor transmissions for (WAIT x Cycle_Time) seconds after receiving the other side's last disconnect. {Cycle time is 1.25 or 1.4 seconds}

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

Speedup/Speeddown

Speedup and speeddown: When the TNC is the receiving station (IRS), after MAXDOWN consecutive failures to receive a 200 baud packet the TNC requests a speeddown to 100 baud. Speedup occurs when MAXUP consecutive error-free 100 baud packets are received provided speedup is not inhibited by NO200 set to ON.

Bad band conditions: Faster links may sometimes be achieved during unusually poor conditions by avoiding 200 baud operations. Setting NO200 to ON instructs the TNC to avoid 200 baud operation in a compatible way. When forced 100 baud operation is combined with digital memory ARQ (always on by default), the TNC is capable of operation during extremely poor (fading, distortion, QRN) conditions such as are found on 160, 80 and 40 meters.

Automatic online compression

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

Flow Control

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

AMTOR while in PACTOR mode

AMTOR calls (1278 rev 10 only): MFJ's Pactor implementation is downward compatible with AMTOR-only stations. That is, even if the TNC is in pactor "p_cmd:" mode it will automatically detect and respond to incoming AMTOR ARQ connection attempts. This allows your buddies with AMTOR-only controllers to call you even though you are in the pactor mode. To enable the AMTOR call detection feature, you must have previously entered your AMTOR selective callsign in the "a_cmd:" MYSELCAL parameter. Furthermore, you must have the appropriate sideband (usually, LSB) selected because unlike PACTOR, AMTOR is polarity-dependant.

How AMTOR-while-in-PACTOR mode detection works: Pactor continuously monitors the channel for pactor packets and for AMTOR call packets that match your AMTOR SELCALL. When PACTOR hears your AMTOR SELCALL, the TNC enters the "a_cmd:" AMTOR mode in an attempt to complete the link. If the link is not established within 30 seconds of entry to AMTOR then the TNC automatically returns to PACTOR mode. If the link is established, the TNC remains in AMTOR mode for the duration of the connection and for an additional 30 seconds after the link terminates. Upon expiration of the 30 seconds, the return to PACTOR is accomplished automatically.

Changeover - Type ahead

One of the many ways PACTOR resembles AMTOR is the protocol's one way nature. Data are transmitted in one direction at a time. The calling TNC is, initially, the Information Sending Station (ISS), i.e. the sender. The other station is, initially, the Information Receiving Station (IRS). To reverse data direction, either the sender or the receiver must send the changeover character (default: ^Y -- changeable).

The changeover character has an affect dependant upon the current state (sending or receiving) of the TNC. If the TNC is currently the ISS, the

changeover takes effect when all pending characters are acknowledged by the remote. When the TNC is the IRS, the changeover takes effect immediately and any characters typed prior to the changeover are queued for immediate transmission (type-ahead).

Digital Memory ARQ

MFJ's pactor incorporates Digital memory ARQ. Memory ARQ enables the reconstruction of a good packet when a retried packet is repetitively received with one or more bit errors. Memory ARQ is accomplished by accumulating the bit value (1 or 0) derived from the RF input port during successive receptions of the same error-laden packet, and then passing the series of accumulations to the receiver shift register. Thus a correct packet may be reconstructed from 2 or more "bad" packets.

The number of accumulations performed for each bit are controlled by the MAXSUM parameter. Larger values tend to increase the effectiveness of the memory ARQ scheme, but only up to a point. A too large value, in the presence of excessive QRM, QRN, or QSB, tends to accumulate so many bit errors that the subsequent reception of an almost perfect packet will be inadequate to overcome the accumulated noise. On the other hand, a too small value will accumulate too few samples to correct for moderate error rates. The default value represents a compromise; feel free to play around with the setting.

LEDs

The STA and CON leds on the front of the TNC will help in determining the TNC status while in the PACTOR mode. Please refer to Table 2-1 on the following page for information on what is happening during the four (4) led conditions:

STA	CON	ACTION
0	0	MON: The TNC is idling and has not monitored any information packets in the past second RX: n/a TX: n/a
0	1	RX: Sending ack control sig TX: Last packet acknowledged MON: Received new packet
1	0	RX: Dupe rcvd; sending Request control sig TX: Received request control MON: Received dupe packet
1	1	RX: Info packet missing; sending request TX: Control sign missing; retransmitting MON: n/a

Table 2-1
Led Conditions in PACTOR

CW Identifier

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

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

The eighth mode is manual cwid. Invoke manual CWID by issuing the "ID" command.

MFJ PACTOR COMMANDS

Generally, the following commands are only valid when issued at the p_cmd prompt. Note that a few of the parameters use the same names as packet commands but the parameters themselves are NOT shared between the different modes.

- Connect [call]-** Attempts to connect with [call] using regular timing
- Autolf ON/OFF-** default ON - Works same as packet
- CBell ON/OFF-** default OFF- Same as packet
- CHObell ON/OFF-** default ON- When ON, an ASCII bell (0x07) character is sent when the pactor link changes directions.
- CHOChar nnn-** 0 <=nn<=255, default 25 (^Y) - 0 disables - This is the character the TNC initiates a pactor changeover action with. See above.
- CMDCHR nnn-** 0<=nn<=255, default 3 (^C)- Same as COMMAND in 1278
- CWidmode nn-** 0<=nn<=255, default 0--This bitmapped parameter selects various pactor CW ID features.

Bit 1 Selects	Bit 0 Selects
1 selects initial cwid on locally initiated calls and disconnects (outgoing)	1 enables idtimer for cw id on Remotely automatic timed cw ident calls and disconnects (incoming)

Also see IDTIME

- DISPLAY-** Immediate command; displays all displayable parameters.
- Disconne-** Cleanly terminates the current ARQ or FEC connection.

DDisc-	"Dirty" immediate termination of current connection.
EAa ON/OFF-	default ON - "Echo as ACKd". When ON the TNC echos transmitted data to the terminal upon receipt of the remote's acknowledgement of the same data.
EEcho ON/OFF-	default ON - Same as 1278, except that echoing is deferred when EAA is ON as described above.
ERrstrin cccc-	default '[...]' - ccc is 1-5 chars long. Selects the string to display when an unconnected packet is monitored out of sequence. Set first character to '%' or '&' to clear.
EXactcal ON/OFF-	default ON - When ON, the TNC responds to connect packets that match all the letters in your callsign and no more. When OFF, the looser "buggy" pactor specification comes into play and your TNC responds to any connect packet containing at a minimum the contents of MYCALL. EXACTCAL matching will not always work to filter out improper callsigns when the offending unit is the pacomm pactor version 1.0 unit because of its use of regular ascii 0x55 ("U") characters to fill and terminate callsigns. MFJ uses ascii 0x0f as specified in pactor documents, instead of 0x55 to fill, and thus fixes the bug.
FLow ON/OFF-	default ON - same as 1278 but operates only in p_cmd mode. This limitation is due to rapidly changing transmit<>receive status of a pactor link. Applying FLOW to data would improperly hold off the important changeover signal and is therefore disallowed.
ID-	Immediate command - Generates an immediate CW ID
IDTime nn-	6<=nn<=255, default 59 (590 seconds) - This parameter specifies the time interval/10 between automatically generated cw id events. The actual time yielded equals IDTIME * 10 seconds. IDTIME is only relevant when bit 0 of the CWIDMODE parameter is set to 1.

- K** Puts you in converse mode
- LC [callsign]-** Initiates an ARQ link to callsign using extended (longpath) timing to support long txdelays or long skip paths
- LEdmode 0/1** - default: 1 - Controls whether the 1278 flashes its LEDs rapidly for each cycle a 200 baud packet is sent, received, or expected. The user may find the flashing of benefit in evaluating link quality, and as an indication that the high-throughput 200 baud mode is active. Also see "NO200" parameter.
- LFADD ON/OFF-** default OFF - same as 1278
- MAXDown nnn-** $2 \leq nnn \leq 48$, default 4 - Controls the number of 200 baud information-packet receive errors the TNC tolerates prior to requested speed down to 100 baud.
- MAXSum nnn-** $5 \leq nnn \leq 120$, default 30 - Specifies the number of cycles of error-laden information packets received that are accumulated in the digital memory arq sum buffer for reconstruction. When MAXSUM consecutive information receive errors occur, on the next receive cycle the sum buffers are re-initialized to inhibit the corruption of real-time reception by historical receive errors.
- MAXUp nnn-** $2 \leq nnn \leq 48$, default 10 - MAXUP specifies how many consecutive good receptions of 100 baud information packets are required prior to the TNC's requesting a speeding-up to 200 baud. Note that a NO200 ON setting preempts the value in MAXUP, and if on, the TNC will never request a speedup regardless of the MAXUP setting. The MAXUP value should be small enough to enable timely speed up in relatively good conditions while being large enough to avoid pointless speedups during bad conditions.

- Monitor ON/OFF-** default ON - same as a 1278 with MCON off. I.e., When not connected and MONITOR is ON, the TNC displays monitored data and connect attempts.
- MYcall [callsign]-** Your callsign, up to 8 chars (default: MFJPACTR)
- MYSelcall [4 char amtor selcall]-** default MFJJ - This is used temporarily to debug the amtor call detection. When integrated with the 1278 this command will go away and PACTOR will find the selcall in ZAMTOR's memory. In standalone pactor, a message "[AMTOR call received]" is displayed.
- NO200 ON/OFF-** default OFF. Controls whether 200 baud links are to be discouraged. The TNC accomplishes this in two ways: (1) Speedups are inhibited, and (2) Incoming connect requests are acknowledged for 100 baud. NO200 works most effectively when both units are capable of NO200 operation. Regardless of the setting of NO200, the TNC complies. This ensures connectivity with non-MFJ units.
- PASS nn-** $0 \leq nn \leq 255$ default ^V - Same as 1278. (Doesnt work for ^Y Changeover)
- PTOver-** > see CHOCHAR command
- PTSend-** > see U1 command
- REtries nn-** ($0 \leq nn \leq 255$) The number of error cycles tolerated before unilaterally terminating the link. (Also see WAITDISC)
- STatus-** Displays debug information. See appendix.
- TRace ON/OFF-** Continuous debug info display
- TXdelay nn-** $25 \leq nn \leq 255$ default: 2 (20ms) Similar to AMTOR's DELAY and packet's TXDELAY. The actual delay yielded is (TXDELAY * 10 ms). NB If the combined TXDELAYS of both stations involved in the link exceeds about 180ms, then shortpath connections may

not work, particularly at longer distances. If difficulty is experienced, try using the longcall command to connect ("LC").

U1- Initiate 100 baud FEC.

U2- Initiate 200 baud FEC.

URepeats nn- $1 \leq nn \leq 7$, default 1. The UREPEATS parameter specifies how many retransmissions to perform for each FEC data packet sent. Ex: UREPEATS 1 causes each FEC packet to be sent two times.

Waitdisc nn- ($10 \leq nn \leq 255$) default: 20 The number of cycles our TNC waits to reply to the other TNC, that having requested a disconnect, fails to hear our disconnect acknowledgement.

XOFF nn- $0 \leq nn \leq 255$ default: ^S Same as 1278

XON nn- $0 \leq nn \leq 255$ default: ^Q Same as 1278

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

FIRMWARE UPGRADE

The MFJ-48B is the latest firmware upgrade for the MFJ-1278 and the MFJ-1278T multi-mode data controller. This firmware is **Release 4.1**. Any MFJ-1278 or MFJ-1278T with the mailbox memory/PACTOR expansion board installed must use firmware Release 4.1 which is supplied with the memory board.

Firmware Release 4.1 features as follows:

1. Supports 16 gray level FAX and SSTV.
2. Supports transmit and receive color SSTV in real time.
3. Supports PACTOR operation. Includes Digital Memory ARQ, Automatic On-Line Compression and a CW Identifier.
4. Supports packet mailbox memory expansion to 32K, 128K or 512K.
5. Enhanced mailbox that allows separate callsign for the mailbox. Mailbox now stays ON during packet connects.
6. Other mailbox features are: Auto and manual mail forwarding, auto and manual reverse mail forwarding, remote sysop access, sysop paging, chat mode, mailbox Ctext and much more mailbox features.
7. Dedicated Mars mode.
8. Improved Automatic Signal Analysis (ASA).
9. Host mode.
10. 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.

This firmware can be installed in an MFJ-1278/1278T with the MFJ-56A/B/C expansion board installed, or an MFJ-1278B/BT. The firmware can also be installed in the same units with or without the multi-gray level FAX/SSTV modem installed.

It is **very important** that you read this instruction booklet concerning Release 4.1 before you install the firmware.

UPGRADE WITHOUT MULTI-GRAY LEVEL MODEM

If you have purchased the MFJ-48B and installed it in an MFJ-1278/56A/B/C combination which does not have a multi-gray level modem, 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 multi-gray level modem board mounts vertically on the right side and it is connected to the mother board by a 20-line ribbon cable.

If your MFJ-1278 does not have the multi-gray level modem board and you wish to install it, contact MFJ Enterprises, Inc. for information concerning this modem board. Multi- gray level modem board requires factory installation.

Without the multi-gray level modem board installed in your MFJ-1278, operation of multi-gray level SSTV and FAX will not be possible even if you have installed the 4.1 firmware. However, without the multi-gray level board you can still operate 2-level FAX and use other features which are not related to SSTV and multi-gray level FAX when firmware 4.1 is installed.

The following features and commands installed in firmware Release 4.1 are not related to multi-gray level FAX and SSTV operation and will function without the multi-gray level modem board.

1. **MAILED:** This is the mail waiting indicator (using the STA) LED to show that you have mail present in your Easy-mail mailbox, depending on the flag conditions of the existing messages. Also if your mail box is turned on.
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** (Automatic Signal Analysis): Automatically identifies HF packet, RTTY, ASCII and AMTOR signals. ASA works with the OK command to accept the mode.
5. **PROFMARS** a command which sets the MFJ-1278 to Mars operation automatically.
6. **ANSWRQRA** a command which pools all the packet stations within range.
7. All Easy-mail mailbox functions with or without mailbox memory expansion board.

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

UPGRADE WITH THE MULTI-GRAY LEVEL MODEM

If your MFJ-1278 is equipped with the multi-gray level modem, you will have all of the features and commands described in the above section. In addition you will be able to transmit and receive up to 16 gray levels in FAX and SSTV modes. Note that operation of multi-gray level FAX and SSTV requires also an appropriate terminal program such as the MFJ-1289 MULTICOM for IBM and compatible computers or 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 4.1 upgrade for MFJ-1278 with multi-gray level modem board.

Multi-Level Operation without Using Special Terminal Program

If you are NOT using a special terminal software which allows printing of multi-gray level pictures to the computer screen you may attach an Epson or IBM graphic compatible printer to the MFJ-1278 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.

Multi-Level Operation with Special Terminal Program

If you are using a 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.

Special Terminal Programs

IBM AND COMPATIBLES Computers

The MFJ Advanced Starter Pack, MFJ-1289 MULTICOM (version 3.1) 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 2.2) you can upgrade it to the new MULTICOM (version 3.1) terminal program by ordering the MFJ-49B for 5 1/4" disks or MFJ-49BM for 3 1/2" disks for \$29.95 by sending in the old disk 1 or proof-of-purchase.

COMMODORE C64/C128 COMPUTERS

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) which does not support multi-gray level operation, you may contact MFJ for upgrade information.

MACINTOSH COMPUTERS

The MFJ-1287B Starter Pack for the Macintosh computer has the MFJ MULTICOMMAC terminal program that supports multi- gray level FAX and color SSTV operation. If you have an earlier version of Macintosh terminal program, MFJ-1287, please contact MFJ for upgrade information.

AMIGA COMPUTERS

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.

TERMINAL PARAMETER CHANGES

The MFJ-1278 parameters, **AWLEN** and **PARITY** default values were changed since firmware release 3.3. These changes will affect the upgrade with or without the multi-gray level modem. **Please read carefully.**

AWLEN	8
STOPBITS	1
PARITY	NONE

In **previous** MFJ-1278 firmware releases (Releases 2.3 and earlier, AWLEN is defaulted to 7 and PARITY is defaulted to EVEN.

If your computer 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 terminal parameters to the MFJ-1278 terminal parameters will cause the MFJ-1278 to print "garbage" on the screen or it may cause the computer to lock-up.

MFJ Enterprises has several optional items for the MFJ-1278/1278T. These items are listed below:

OPTIONAL ITEMS AVAILABLE FOR YOUR MFJ-1278

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-56A	32K RAM Packet mailbox/PACTOR expansion board
MFJ-56B	128K RAM Packet mailbox/PACTOR expansion board
MFJ-56C	512K RAM Packet mailbox/PACTOR expansion board
MFJ-48BE	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 commercial 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

1. Remove all power from the MFJ-1278.
2. Remove the cover by removing the mounting screws on the sides of the cabinet.
3. Remove JMP5 jumper to disconnect the Lithium battery.
4. Using a small flat-tip screwdriver carefully remove the EPROM (U23, 27C512) 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.
5. Install the new EPROM with firmware on the MFJ-1278 board at U23. Make sure that no IC pins are bent under the IC, or that no IC pins are became 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. If the IC is installed wrong damage to the IC, the MFJ-1278 or both can result!
6. Install JMP5 jumper.
7. Replace the cover of the cabinet.
8. Apply power to the MFJ-1278. Ensure the MFJ-1278 signs on. If not, go back and check for IC pins bent under the IC, or IC pins which are broken off.

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 from MFJ Enterprises, Inc. for \$9.95 shipping included.

FIRMWARE RELEASE 4.1 DOCUMENTATION

The MFJ-1278 is designed to keep pace with the ever changing field of digital communication technology. By simply changing the firmware of the MFJ-1278, existing features of the MFJ-1278 can be improved and new features can be easily added.

The following section of this manual documents the improved features as well as new the features which were added since the printing of the main manual supplied with your MFJ-1278. If you do not have the latest MFJ-1278 manual (4th Edition) you may purchase it from MFJ for \$9.95 shipping included.

AUTOMATIC SIGNAL ANALYSIS (ASA)

The ASA (Automatic Signal Analysis) feature has been greatly improved in the firmware release. 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 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 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 copy the signal correctly. This may be 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 **RBitmask** 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 **<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 be displayed.

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.

MARS OPERATION

Firmware Release 4.1 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 than ever. We have made operating MARS with the MFJ-1278 more fun and enjoyable. The following section should be very useful to the MARS operator.

Mars Operation

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 Multicom

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** 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

The MFJ-1278 now supports color SSTV and 16 gray level black and white SSTV. The following SSTV formats are supported:

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

Note that to support 16 gray level SSTV and color SSTV operations a special terminal program such as the MFJ-1289 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 its 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 instruction 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.

TVBreak is arranged in the format:

Sync | White Area | Gray Area | Black Area |

\$ss, \$saa, \$bb, \$cc, \$dd, \$ee, \$ff, \$gg, \$hh, \$ii, \$jj, \$kk, \$ll, \$mm, \$nn

The default TVBreak value is:

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,\$51,\$53,\$55,\$57,\$59,\$5B,\$5D,\$5F,\$61,\$63,\$65,\$67,\$69,\$6B

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. The MFJ-1278 will automatically select 8 TVBreak values.

In SSTV transmitting, the **PIXtones** command have been update to 16 levels. The default Pixtones values are as follows:

The default PIXtones values are as follows:

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

The pixtones command serves the same function as in RXBright but in the transmitting of SSTV and FAX pictures.

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 PIXTones and 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 4.1. 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 103 to 110.

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 65 to 75.

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 indicates completion of 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

PACKET MAILBOX UPDATE

In firmware Release 4.1 major improvement is made in the Easy-mail mailbox. The improved mailbox features can be used MFJ-1278 with or without the expansion mailbox memory. However, in order for you to fully benefit from this mailbox, we recommend that you install the memory expansion board. Mailbox memory on your MFJ-1278 can be increased by 32K, 128K or 512K. This additional memory is also backed-up by the lithium battery on the MFJ-1278 mother board. The memory expansion board can be purchased separately and it can be easily installed by the user inside the MFJ-1278. The MFJ-1278 equipped with the expanded memory must use the firmware MFJ-48B which is supplied when you purchase the memory expansion board. However, you must remember to request the "B" version of firmware upgrade whenever a new upgrade becomes available in the future. The different versions of the mailbox memory boards are listed below:

MFJ-1278/1278T Multimode Data Controller Mailbox Memory/PACTOR Expansion

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

Above mailbox memory expansion boards are available from MFJ dealers or from MFJ Enterprises, Inc.

This procedure for mailbox operation replaces the procedure given in the main MFJ-1278 manual (Chapter 5, page 21-25).

Set Up your Easy-Mail Mailbox

The MFJ Easy-Mail Mailbox is now a **Single-user** device. The Mailbox can now be operated independently from the standard packet operation. There are certain commands which need to be set. These will be explained later in this instruction.

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

1. Under the cmd: prompt, type:

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

2. Type:

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 Page 42 in your 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 continues to

keep time even with the MFJ-1278 turned off. You will not have to set your MFJ-1278s "DAYTIME" every time your MFJ-1278 is powered up.

4. Type:

MAILBOX ON <CR>

Now your MFJ-1278 is ready for simultaneous Mailbox/Packet operations. You as the SYSOP can access your Mailbox by typing:

SYSOP <CR>

Your MFJ-1278 will respond with:

|K[MFJ-2.0-M\$]
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 all users will always know how much space is left in your Mailbox. The Mailbox will update the "Bytes Free" whenever messages are forwarded, added or deleted.

NOTE: The M command will not be in Release 4.1. This is due to the fact that there is no Mailbox expansion in the Release 4.1.

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 functions are as follows:

- B** Logout: This initiates a disconnect sequence from the Mailbox.
- E** 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 MYcall or MYMcall.

@: 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.

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 a flag in the first flag box. There are a few message types, and here are a couple listed below:

1. "T" messages -- These are NTS (National Traffic System) type messages. This message system was developed by the ARRL. 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.
2. "P" messages-- These types of messages are still private to the sender, recipient, and the SYSOP.

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

Flag:The message Flag is now very important. All of flags can be set via the S (send) or E (edit) commands. This flag will either be an N or a Y. This will appear in the flag block closest to To: block in the message header. There are different types of flags are as follows:

- N** Messages with this flag set are all able to forwarded, providing all other criteria is met for a message to be forwardable). Only messages with the N flag set, trigger the "You have new mail!" message.
- T** The T flag indicates that the message is an NTS message.
- 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.

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 BBS Bulletin

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.

H(elp) This command displays the Mailbox command list. A brief description of the commands available to user is given.

J This command replies with the TNC's MHeard list. The eleven most recently heard callsigns will be displayed. The "J" command only applies to remote users.

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 callsign, originator callsign, subject field. 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 NUMBER
32K	0
128K	0THRU1
512K	0THRU7

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. 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 which have the MFJ-56A, B, or C expansion board installed and Release 4.1x is used.

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 Y flag during a read is that the person who the message is addressed to needs to read it. The flag will not change for any other person who 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 cal 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.

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 memory bank being used for the Mailbox. Please refer to the explanation of the M command for the Mailbox, in this section.

Now at this point all of the Mailbox 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 or the SP commands must be used. It must be used in conjunction with a callsign as in the examples below:

SKB5JNZ <CR>,

this will send an ordinary message to the callsign KB5JNZ.

or

SP KB5JNZ <CR>,

this will send a private message to the callsign KB5JNZ.

The Mailbox will respond with:

Title:

—

The user will enter the message subject (title) at 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 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 also. 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 memory expansion board is 30. For an MFJ-1278 with the memory expansion installed the maximum slots per memory bank is 99.

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 or which are addressed to him/her. Also a message which is 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:
 - 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:

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 to 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## 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

Other MFJ-1278 mailbox features are as follows:

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 is can be done too, thus allowing you to forward mail through NETROM, THENET, and KA- NODE switches. Please refer to the **NODE**forw 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 header of the message to be forwarded. The message header can be altered through the Mailbox Edit 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.

Eliciting Reverse Forwards

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 others 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 SID) then the MFJ-1278 will attempt to elicit a reverse forward.

Remote Heard Log

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.

Chat Mode

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.

Page SYSOP

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 MCText 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 the MFJ-46B and MFJ-46C (128K and 512K respectively) it keeps up with the available RAM in multiple memory banks.

Mailbox Commands Update

MYMcall [callsign]

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.

FForward (dest bbs,[optional via]) Mode: Packet

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:

1. Have flags of 'N'ot read
2. 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.

MCText Mode: Mailbox Default: " "

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

This command works like CTEXT except that MCTEXT 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 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, but feel free to use the system...Enjoy!

MTTimeout 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 disconnect 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"

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.

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 forwarder 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.

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.

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.

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.

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.

ADDITIONAL COMMANDS UPDATE

The following commands have been added or updated in firmware Release 4.1/.

ASA 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 appropriate 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.

OK Mode: ASA

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.

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	

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 are translated as follows:

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

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

CR	*
LF	=
BELL	@
NULL	\

RXBRIGHT n Mode: FAX/SSTV Default: n = 4

Parameter:

when n = 0, RXBRight assumes the current values of TVBreak.

when n=1 to 9, RXBRight 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 16Levels is ON and 8Levels is OFF, MFJ-1278 will receive and transmit FAX and SSTV data in 16 gray levels. As in 8 levels, 16 levels is effective only when the MULTIFAX is turned ON. If MULTIFAX is turned OFF, MFJ-1278 is set to transmit and receive in 2 levels FAX and 4 levels SSTV regardless of the setting of 16Levels (ON or OFF). 16 levels 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 turn 8Levels OFF, you must turn 8Levels OFF when setting the MFJ-1278 to operate 16 gray levels.

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 4.1 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 "CTRL-C". The MFJ-1278 will respond with the cmd: prompt.

MNONPrin ON|OFF

default: ON

Parameter:

ON Enables printing Non-Printable Characters

OFF Discards all Packets containing Non-Printable Characters

The setting of the MNONPRINT parameter determines whether monitored packets containing non-printable characters (i.e., characters other than ASCII CR, LF, BEL, and not between \$20 and \$7e) are monitored or simply discarded. The default setting permits monitoring all information packets (subject to LCALLS, MONITOR, MNONAX25, etc). 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.

EAS ON|OFF 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-AS SENT 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.

COMMAND DEFAULT UPDATE

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

<u>Command</u>	<u>New Default Value</u>	<u>Old Default Value</u>
<u>ASPECT</u>	Default: 3	Default: 2
<u>8BITCONV</u>	Default: ON	Default: OFF