

Pactor Option Addendum

KAM Eprom Version 6.1

Thank you for purchasing the Pactor Option for your KAM. We believe you'll find many hours of enjoyment and many new friends as you explore this new digital mode.

The enclosed Eprom for your KAM contains some minor changes since the original release, version 6.0. The manual indicates (on pages 3 and 10) that you must use the PTLISTEN mode to monitor Pactor transmissions. By popular demand, this has been changed in version 6.1 to allow monitoring in Standby mode too.

To monitor Pactor in Standby mode, set the MONITOR command to ON/XXX and the ARQBBS command to OFF. In Pactor Standby mode, you can also transmit FEC by typing <CTRL-C>T and return to receive by typing <CTRL-C>E.

We've also added the NAVLOG command, an immediate command, to display a list of NAVTEX messages that have been properly received in the NAVTEX mode.

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Pactor Mode

A special KAM Pactor EPROM is required to use Pactor.

Pactor is a protocol that provides error-free communications even during adverse conditions. The full ASCII character set can be transmitted, including all 8-bit character combinations. There are two modes of Pactor: connected and unconnected. In both modes, information is transmitted in small packets that include a CRC for error detection. In the connected mode, these small packets are acknowledged by the remote station (which you have previously connected to). When using the unconnected mode, there are no acknowledgments.

When two stations connect with each other, they "own" the frequency. There is no channel sharing with other stations. Pactor operates on a cycle-time basis (when connected). Each cycle time the Information Sending Station (ISS) transmits a packet and waits for an acknowledgment. The Information Receiving Station (IRS) listens a specified amount of time for a packet and then transmits a response. As long as the connection exists, each station will transmit once per cycle. The protocol sets the cycle time to 1.25 seconds. A long-path option can be used to increase the cycle time to 1.4 seconds.

Pactor is somewhat of a cross between Packet and Amtor. This has caused the terminology to also get mixed up. The Pactor connected mode may also be referred to as linked or ARQ. The Pactor unconnected mode is sometimes referred to as FEC or unproto. The packets of information that are transmitted may be called: packets, blocks or frames.

Host Master has two menu selections for the Pactor mode: Pactor Listen and Pactor Standby. Pactor Listen is used to monitor unconnected packets and connected packets (from two other connected stations, not when you are connected). You cannot transmit from Pactor Listen, however, you can initiate a connect. The Pactor Standby selection is used to transmit unconnected data (such as CQ), to initiate connect attempts and to respond to incoming connect requests. You cannot monitor any packets from the Standby mode. Only packets exchanged after a connection has been established are displayed.

Pactor Listen Menu Selection

Selecting "Pactor Listen" from the 2 menu will put Host Master and the KAM in Listen Pactor mode. This mode allows you to copy all Pactor signals (connected and unconnected). When Pactor Listen is entered the status line will change to read:

P2:PT-LSTN

Keyb:P

The keyboard is not placed in the HF mode. Listen Pactor is a listen only mode, however, you may initiate a Pactor connect. When the connect is finished, Host Master will be in the Pactor Standby mode.

TUNING UNCONNECTED PACTOR: Unconnected Pactor, used for calling CQ, is tuned by adjusting the transceiver tuning until the two end LEDs of the KAM's bargraph are lit. In reality the LEDs will alternately light as marks and spaces are received. However, they alternate with such speed that they both appear lit at the same time. The KAM's CON LED will light when packets are being received. The STA LED will be lit when the packets are sent at a baud rate of 200; the STA LED will not be lit if the packets are sent at 100 baud.

TUNING TO MONITOR CONNECTED FACTOR: The KAM's bargraph display will vary depending on whether you are hearing both stations. If you are hearing only one station the bargraph display will change depending on whether that station is the ISS or IRS. While the station is the ISS, the two end LEDs will be lit for almost 1 second, then for about 3/10s of a second the center LED will be lit. Other LEDs, close to the center, may be lit if noise is being received. While the station you are hearing is the IRS, the center LED will be lit for most of the time and the two end LEDs will flash on briefly while you receive the acknowledgment. Acknowledgments do not contain user data, so nothing will be displayed on your screen when you are receiving an IRS station. If you are able to hear both stations, the bargraph's two end LEDs will be lit most of the time.

The KAM's CON LED will light when packets are being monitored from an ISS station. If you can only hear the IRS station, the CON LED will not light. The STA LED will be lit when the packets are sent at a baud rate of 200; the STA LED will not be lit if the packets are sent at 100 baud.

TO INITIATE A FACTOR CONNECT, press <F2>. A pop-up box will ask you for the callsign of the station you wish to connect to. Enter the callsign (up to 8 characters, plus optional ! for long path, see below.) and press <Return>. The status line will change to PT-ISS and the KAM will begin attempting to connect to the desired station. When the connect is successful, you will be the Information Sending Station (ISS) as described below. (If the attempt is not succeeding, use <F3> to abort the attempt. The status line will change to PT-STBY and you will be in the Pactor Standby mode as described below.)

TO RETURN TO PACKET select "Return to Packet" from the 2 menu.

Pactor Standby Menu Selection

Selecting "Pactor Standby" from the 2 menu places you in the Pactor Standby mode. From this mode you can send unconnected packets (e.g. call CQ), receive a connection from a remote station, or initiate a Pactor connect. You will not monitor any data in the Standby mode. Only data received from the station you connect to will be displayed.

When Pactor standby is entered, the status line will read:

P2:PT-STBY

Keyb:HFV

TRANSMITTING UNCONNECTED (Calling CQ):

- To transmit, press <Home>.

- Type your message (or send a buffer or file). To call CQ use the callsign in your KAM's MYPTCALL parameter. For example:

```
CQ CQ CQ DE KEØSM KEØSM KEØSM
CQ CQ CQ DE KEØSM KEØSM KEØSM
CQ CQ CQ DE KEØSM KEØSM KEØSM
K K K
```

- To return to receive, press <End>.

NOTE: If the KAM's ARQBBS parameter is ON, you will not be able to transmit unconnected messages.

When you press <Home>, the word "Transmit" will be added to the status line. Your radio will begin to transmit and continue transmitting until you instruct it to return to receive. When there are no characters to send, the KAM sends a fill character. You may type-ahead (before pressing <Home> to transmit). What you type-ahead will be stored in the KAM's buffer and sent after <Home> is pressed. If the KAM's XMITECHO command is ON, what the KAM transmits will be displayed (as it is sent) in the Xmit Echo window.

When you press <End>, the words "Finish Sending Buffer..." will be displayed in the status line. When the KAM has finished transmitting its buffer, the status line will return to the original Standby display.

If you wish to return to receive immediately, press <Ctrl-End>. As soon as the KAM finishes transmitting the current packet, the status line will change to the original Standby display. The data remaining in the KAM's buffer is deleted.

Unconnected data is normally transmitted at 100 baud (depending on the setting of the KAM's PTFECSPD parameter). By default, each packet is sent twice (may be changed with the KAM's PTRPT parameter). This gives the receiving station multiple chances to receive the packet correctly and improves reception. The receiving controller does not send the extra packets to the terminal.

WHEN SOMEONE CONNECTS TO YOU: If you have called CQ, someone may attempt to establish a connect with you. When your KAM receives a connect packet, it begins transmitting acknowledgments. Every 1.25 (or with long path option 1.4) seconds your KAM will key your transmitter and send an acknowledgment. When the connect is established, you are the IRS (Information Receiving Station). The bottom status line will read:

P2:PT-IRS <LINKED TO callsign> Keyb:HFW

where callsign is the callsign of the station that has connected (or linked) to you. You may type on the keyboard at this time, but what you type will be held in the KAM's buffer until you are the ISS (Information Sending Station).

NOTE: If the KAM's ARQBBS parameter is ON, incoming connects will be responded to by the KAM's PBBS (mailbox). See your KAM Pactor Manual for details on using the mailbox on Pactor.

When the remote ISS station finishes what he has to say, he will turn the link over to you by transmitting a changeover packet. Then you will become the ISS station. The status line will change to read:

P2:PT-ISS <LINKED TO callsign> Keyb:HFW

The only change is from IRS to ISS. If the remote station does not indicate in his conversation that he is turning the link over to you, the only way you can tell is by looking at the status line for this small change. Your transmitter will also start keying for longer periods of time. Now what you typed ahead in the buffer and what you continue to type will be transmitted. If the KAM's XMITECHO command is ON, what you type will be displayed (as it is transmitted) in the Xmit Echo window.

To turn the link back to the remote station, press <Ins>. This sends a changeover packet to the remote station. When the changeover packet is acknowledged you will become the IRS, and the status line will change to IRS.

This cycle continues until the end of the conversation: Type what you have to say (or send a buffer or file). Then press <Ins> to turn the link over to the remote station. He says what he has to say, then turns the link back to you. Both stations alternate between being the ISS and IRS.

When you are the IRS it is possible for you to seize the link and become the ISS. This is done by pressing <Ins> while you are the IRS. If the remote station seizes the link while you are the ISS, the status line will change to IRS and your transmitter will start transmitting short acknowledgment packets.

REMEMBER to identify your station according to FCC rules. Your callsign is sent only in the connect packet. You must manually identify your station throughout the rest of the link.

CAUTION: If you are the receiving station (IRS) and are typing ahead, DO NOT press the insert key until the KAM has actually started sending your typed-ahead text or you will seize the link immediately.

To break the link, press <F3>. The word "Disconnecting" will be added to the status line. A QRT (disconnect) packet will be sent to the remote station. When your KAM receives an acknowledgment, the status line will return to PT-STBY (Pactor Standby), your transceiver will stop keying and you will no longer be connected. If you are the IRS, pressing <F3> will first seize the link and then send a QRT packet.

INITIATING A PACTOR CONNECTION: Press <F2>. A pop-up box will appear asking you for the callsign of the station you wish to connect to. Enter the callsign (up to 8 characters, plus optional ! for long path, see below.) When you press <Return>, the KAM will begin transmitting a connect packet. Every 1.25 seconds your KAM will key your transmitter and send a packet. When the KAM receives an acknowledgment from the remote station, the status line will change to read:

P2:PT-ISS <LINKED TO callsign> Keyb:HFW

where callsign is the callsign of the station you have linked to.

You are the ISS (Information Sending Station). What you type will be transmitted. If the KAM's XMITECHO command is ON, what you type will be displayed (as it is transmitted) in the Xmit Echo window.

To turn the link back to the remote station, press <Ins>. This sends a changeover packet to the remote station. When the changeover packet is acknowledged you will become the Information Receiving Station (IRS). The status line will read:

P2:PT-IRS <LINKED TO callsign> Keyb:HFW

This cycle continues until the end of the conversation: Type what you have to say (or send a buffer or file). Then press <Ins> to turn the link over to the remote station. He says what he has to say, then turns the link back to you. Both stations alternate between being the ISS and IRS.

When you are the IRS it is possible for you to seize the link and become the ISS. This is done by pressing <Ins> while you are the IRS. If the remote station seizes the link while you are the ISS, the status line will change to IRS and your transmitter will start transmitting short acknowledgment packets.

REMEMBER to identify your station according to FCC rules. Your callsign is sent only in the connect packet. You must manually identify your station throughout the rest of the link.

CAUTION: If you are the receiving station (IRS) and are typing ahead, DO NOT press the insert key until the KAM has actually started sending your typed-ahead text or you will seize the link immediately.

To break the link, press <F3>. The word "Disconnecting" will be added to the status line. A QRT (disconnect) packet will be sent to the remote station. When your KAM receives an acknowledgment, the status line will return to PT-STBY (Pactor Standby), your transceiver will stop keying and you will no longer be connected. If you are the IRS, pressing <F3> will first seize the link and then send a QRT packet.

TUNING CONNECTED PACTOR: When you are the ISS, the bargraph will be unlit while you are transmitting and the two end LEDs will light while you receive the acknowledgment transmitted by the remote station. The acknowledgment is very short (about 1/10 of a second) so the LEDs will light for a very brief time. When you are the IRS, the two end LEDs will light while you are receiving packets and the bargraph will be unlit while you are transmitting the acknowledgment. It takes almost a second for a packet to be sent; so the bargraph will be lit most of the time and appear to only flash off when you transmit the acknowledgment.

The KAM's CON LED will be lit whenever a connect exists. The STA LED will light when the link is at 200 baud and will be unlit when the link is 100 baud.

LONG PATH: The normal cycle time of a Pactor link is 1.25 seconds. This allows you to link with stations up to approximately 4500 miles away (when using the KAM's default timing parameters). The Pactor cycle time can be increased to 1.4 seconds to allow you to communicate with stations that are further away. When you want to make a long-path connect, press <F2>. A pop-up box will ask you for the callsign of the station you want to connect to. Precede the callsign with an explanation mark (!). For example:

!ZL2AB

The connect packet will contain special status information, which will tell the remote station that you will be using the 1.4 second cycle time.

SPEED CHANGE <Shift-F1>: This function is only available when you are connected and when you are the IRS (receiving station). Pressing <Shift-F1> brings up a box where you can choose Auto, 100 Baud, or 200 Baud.

Pactor normally operates at Auto speed. When poor conditions affect the throughput of the link, the speed is automatically changed to 100 baud. If 100 baud works well for a few packets, the speed is automatically changed to 200 baud. The amount of good or bad packets needed to cause a change is controlled by the KAM's PTDOWN, PTUP, and PTTRIES commands.

You may use <Shift-F1> to manually force a speed change. This change will remain in effect until you become the sending station. Each time the link changes directions the speed will be reset to Auto. Only the receiving station can change the speed of the link.

TO ABORT A LINK Press <Ctrl-Home>. The KAM will begin sending QRT packets. If an invalid acknowledgment (or noise) is received, the KAM will immediately abort the link and return to Standby. You will not have to wait for the normal timeout, which is set with the KAM's PTERRS command. This is useful if the remote station can no longer be heard because of band conditions or other problems.

WARNING: When linked, do not go to the Command Channel and change the TXDAMTOR, PREKEY, or POSTKEY parameters. Changing these parameters while linked, will affect the timing and make communications unsuccessful.