Instruction Manual

EJ-41U Terminal Node Controller Unit

Thank you for purchasing this fine Alinco product. This unit enables data communication when it is properly installed in designated Alinco transceivers. Please read this manual, print the contents if necessary, and keep this disk for future reference.

Since this device is capable of being used in commercial applications, some of the pages in this manual are intentionally left blank to accommodate those uses in other regions.

Although we attempt to explain the features of this unit in a simple and comprehensive manner, unless you have some knowledge about packet communications and APRS, you may have difficulty understanding the contents of this manual. We apologize, but Alinco cannot provide basic information of how packet and/or APRS works in general. Please consult your favorite Ham radio stores for books on the subject and/or web-sites that support your area of interest regarding those communication modes. You can explore the exciting world of data communication by yourself, and we believe that this is a most interesting part of the king of hobbies, Amateur Radio.

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Notice
• This unit should be used with ALINCO transceiver DR-135T/E.
• The memory of all settings of the unit are retained by the built-in lithium battery. If they go back to the
 default, the battery might be consumed. In that case consult the dealer.

Accessories
 The accessories listed below are included. Check that all of them are found before using.
• EJ-41U   • 3.5ø stereo plug (for GPS input terminal)   • Velcro for installation
• Instruction Manual   • Instruction Manual DISK version

Installation
 1) Remove the bottom case of DR-135.
 2) Attach Velcro on the VCO case.
 3) Unplug W1 of DSUB-9 connector from CN107 and plug it into
     CN1 connector of EJ-41U.
 4) Plug W2 of EJ-41U to the transceiver connector CN107.
 5) Attach Velcro on EJ-41U so that it matches to the other Velcro on the
     VCO case. (Be careful that the lithium battery doesn't mount
     on the electric part.)
 6) Install the bottom case after putting W1 neatly not to be caught in. (*1)
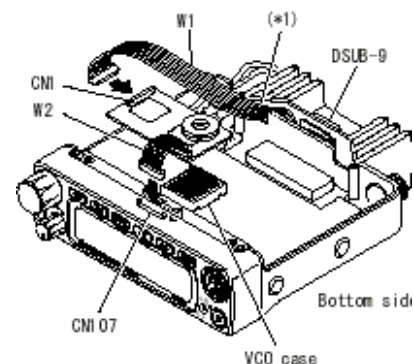
Functions

(1) CN1 (for PC data input/output): Connect W1 to DSUB-9 connector
on the rear side.(Connect DSUB-9 with the RS-232C serial port of
a personal computer.)

(2) W2 (for transceiver data input/output): Plug into CN107 of transceiver.

(3) VR1: For the modulation level adjustment of 9600bps TX data

(4) VR2: For the modulation level adjustment of 1200bps TX data

(5) CON LED (orange): lights while connecting with the other station
in packet communication.

(6) STA LED (green): lights when the transmitting data is remained.

(7) PTT LED (green): lights while transmitting data.

(8) GPS LED (green): flashes when data reaches from GPS receiver during positioning.

(9) Clock Shift: In case that harmonics of 7.9872MHz clock should interfere the RX circuit of the
transceiver while turning ON the power of EJ-41U, short the clock shift by soldering to shift the
oscillating frequency about 200ppm.
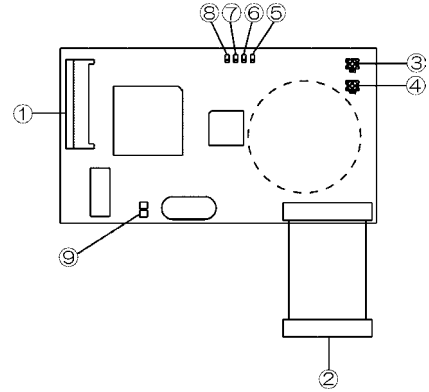
Connecting to a personal computer

Connect DSUB-9 connector on the rear side of the transceiver to the
RS-232C COM terminal of a personal computer with the straight-type
DSUB-9 cable that is commercially available

Connecting to GPS receiver

Install the optional 3.5ø stereo plug to the data output line from GPS
receiver. Insert the modified 3.5ø stereo plug to the DATA terminal
on the front of transceiver.
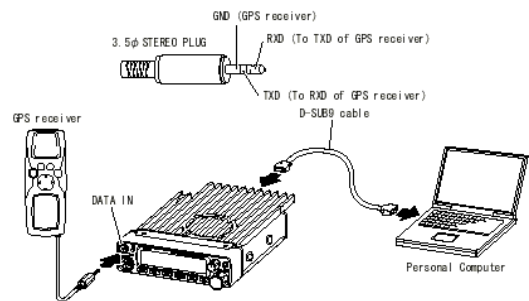
1. Description

A CPU with 4 KB of built-in RAM is used to run the EJ-41U. This allows a very compact and
affordable data communications board. Some of the features of a conventional external TNC
(such as a mailbox) are not found in the EJ-41U. The communication protocol is compatible to
AX.25 version 2 Level 2. This enables a reliable connection with CRC check and the re-try
function. It is also capable of transmitting without being connected to a node (unproto mode or
beacon mode). This protocol is identical to the one conventionally used in a TNC for Amateur
Radio. The 9600 bps non-synthesized serial mode is used to connect to a host (computer or
terminal). The unit is enhanced with a GPS connection capability. The EJ-41U processes and
converts data from a GPS receiver and re-transmits it as a beacon at predetermined intervals.
This advanced feature allows the easy setup of mobile units for GPS position-reporting systems
such as APRS.

Please refer the Alinco transceivers' instruction manual for the installation of this unit.

2. Commands

In this manual, unless otherwise specified, any "key" stands for the ones on the PC keyboard. The screen referred to is the PC monitor screen.

2-1 Command mode and Converse mode

The typical operating modes of this unit are the Command mode and the Converse mode.
It is necessary to use the command mode to set internal parameters in the EJ-41U. When the unit is in the command mode, the "cmd:" prompt will appear on the screen. If "cmd:" does not show up, press enter (or carriage return [CR]).
The converse mode enables the EJ-41U to transmit text as data. Use this mode for sending files and/or text. Press the Ctrl and C keys together to return to the command mode.

2-2 General description of the commands

2-2-1: Direct commands
The commands without specific definitions or parameter settings are Direct Commands. These are mainly used to change modes. These commands are immediate, such as D for Disconnect.

2-2-2: To set parameters
Type the command parameter name. Enter a space after the parameter name and type the new value. Press [CR] to enter. The screen will show "XXX was YYY"(XXX stands for the parameter, YYY for the previous value). If the parameter setting is ON/OFF, use the Y key for ON, N key to select OFF.

2-2-3: To check current parameter settings
Type the command name only and press [CR] key. The monitor will show "XXX is ZZZ" (ZZZ stands for current value).

2-3: Error indications

2-3-1 [?EH]
This prompt will be displayed when the command does not exist or an invalid string is entered.

2-3-2 [?BAD][?RANGE][?TOO LONG]
If the entered command does not specify the parameter [?BAD] appears. If the command exceeds the parameter range [?RANGE] appears. If the length of a column is too long, [?TOO LONG] appears.

2-3-3 [?TOO MANY][?NOT ENOUGH]
If the parameter value is too long [?TOO MANY] will be displayed.
If the parameter value is too short [?NOT ENOUGH] will be displayed.

2-4 Common commands for Amateur Radio Communication

The following is a chart for the commands commonly used in Amateur Radio communications.

Command	Description	reference
AUTOLF	Adds a line-feed [LF] after [CR]	3-3-6
AWLEN	Specifies the data bits, 7 or 8, between the host and TNC	3-3-1
BEACON	The transmission interval of the beacon signal in increments of 10 seconds	4-5-3
BBSMSGS	A hidden command. Changes the message that identifies the TNC unit.	9-3-1
BTEXT	The message sent out as a beacon at specified intervals set in BEACON	4-5-4
CALBRA	Calibrate mode. In this mode, the TNC sends the mark and space at 50% duty. Press Q to exit this mode.	4-1-5
CHECK	Checks if the destination station is still connected and time in seconds until disconnected after the last message is received.	4-4-11
CMSG	A hidden command. Activates the automatic transmission of a message (in CTEXT parameter) when a station connects to the EJ-41U	4-4-4
CMSGDISC	A hidden command. Sends message in CTEXT and then disconnects..	4-4-6
CONNECT	Request a connection (after "VIA" if using digi-peaters) eg: C KW1KW or C KW1KW VIA K6ANC	4-4-1
CONOK	Allows acceptance of a connection request from another station (or not).	4-4-3
CONVERSE	Puts TNC in the converse mode. Simply press K to abbreviate.	6-2-1 6-2-2
CPACTIME	Validates PACTIME feature in converse mode.	4-6-4
CR	Adds a Carriage Return [CR] to outgoing packets.	4-6-2
CTEXT	A hidden command. Sets the message that will be sent out when a station connects to you. Be advised, the memory is shared with the LTXT.	4-4-5
DISCONE	Sends the disconnection command.	4-4-2
DISPLAY	Displays all the current settings of the TNC.	9-2-1
DWAIT	The interval period (in 10 mS units) the TNC waits to send a packet after the frequency is clear of traffic.	4-2-4
ECHO	Activates echo back of your keystrokes on the computer screen	3-3-3
FIRMRNR	In RNR frame reception, TNC waits to transmit until next frame reception.	4-4-12
FLOW	When on, when you start keyboard activity, TNC output to the terminal stops.	3-3-4
FRACK	The re-try waiting period in units of 1 second.	4-4-8
GBAUD	Sets the data communication rate with the GPS receiver	5-6-1
GPSSEND	Use to output up to 159 characteristics to initialize the GPS. This data cannot be memorized.	5-6-13
GPSTEXT	Sets the date string to be sent into LTEXT from the GPS.	5-6-9
HBAUD	Changes the data rate of communication over the radio (1200 or 9600bps)	4-1-1
HEALLED	Tests LED on TNC	7-5-1
KISS	TNC will enter the KISS mode from the next boot-up.	6-3-1

LOCATION	Sets the transmission time of GPS data in 10 second increments.	5-6-4
LPATH	Sets the outgoing path of GPS data. (Including DIGI-peater(s) used).	5-6-3
LTEXT	The GPS data buffer.	5-6-6
LTMON	Displays the LTEXT message as if it were received as a beacon signal in preset intervals.	5-6-7
MCOM	TNC monitors all I frames.	4-7-2
MCON	Monitor (or not monitor) other stations while you are connected.	4-7-3
MONITOR	Monitor (or not monitor) packet communications.	4-7-1
MRPT	Allows monitoring the DIGI-peat route in a packet header (or not).	4-7-5
MYCALL	Sets your callsign in the TNC	4-1-2
NTSGRP	Adds group-codes into the GPS data.	5-6-10
NTSMRK	Adds MARK# in the GPS data.	5-6-11
NTSMSG	Add NTS message into the GPS data.	5-6-12
PACLEN	Sets the maximum length of the data part of the packet	4-6-3
PACTIME	The interval time until automatic packet transmission after keyboard input stops, in 100ms units.	4-6-4
PERSIST	Sets the CSMA P-persistent probability	4-2-2
PPERSIST	Selects P-Persistent CSMA	4-2-1
PORTOUT	Sets expanded output port	8-1-1
RESET	Returns TNC to its default parameters. This command also resets the back-up memories.	9-1-2
RESPTIME	Sets the transmission delay time of the confirmed packet.	4-4-7
RESTART	Re-starts the TNC.	9-1-1
RETRY	Set the number of packet retries before disconnecting.	4-4-9
SENDPAC	Sets the characters that command a packet to be sent.	4-6-1
SLOTTIME	Sets the interval of generating random numbers in P-persistent CSMA.	4-2-3
TRACE	Displays the contents of all received frames.	4-7-6
TRIES	Sets the number of attempts to re-send a packet that has not been acknowledged as received.	4-4-10
TXDELAY	Designates the time delay between PTT and the start of data transmission.	4-2-6
UNPROTO	Sets the destination of packet and the DIGI-PEAT route while communicating unconnected.	4-5-2
XFLOW	Software flow / Hardware flow controls	3-3-5

3. Connecting to the host PC
3-1 Communication conditions

Set the PC parameters as follows
* Bit rate   9600Bps fixed
* data length   8 bit / 7 bit   AWLEN command
* Parity   None/Even/Odd   Parity command
* Stop bit   1 bit fixed
The following parameters must meet the terminal software's requirements.
* wireless modem to the host: echo back setting   Echo command
* wireless modem to the host: put [LF] after [CR]   AUTOLF command

3-2 Caution on the communication buffer size

3-2-1 host to EJ-41U

The temporary FIFO buffer, which pools serially received data, can only store 64 bites. Accordingly, when the software flow control is activated, if the host does not respond, the FIFO buffer will overflow. To analyze commands, the temporary memory buffer of the packet data has 256 bytes available. They are transferred from the FIFO buffer to the stand-by buffer spontaneously. This does not mean that 1 line ends with only 64 characters!

3-2-2 EJ-41U to host

The FIFO buffer for the data that is to be transferred to the host, such as the received packet data or echo back, has 720 bites available. If such data exceeds 720 bites, the received packet will be discarded. In such cases, it communicates to the destination asking to wait for the transfer of data. Or the retry can be used to request the data be sent again. AX.25 protocol makes it possible to receive complete data but it may take time. However, data such as beacons may not be re-captured. Please take note of the following to avoid over-flow:

(1) Do not send XOFF (Ctrl+S) from the host and leave in that state it for a long time.
Process the display pause in the shortest possible time.

(2) Do not key input while FLOW command is on (without hitting the ENTER key).
Hit enter key and start the display immediately. Or set FLOW off to avoid a pause.
If the echo command is on, both echo and received data will be displayed which can cause confusion. This is avoidable if the host application can be activated with echo command off.

(3) Do not transmit to the host large data such as monitor related output.
Do not send uncommon data for normal communications, such as debug data. It eliminates a line of overflow monitor output.

3-3   Commands

3-3-1 AWLEN command

Abbrev. AW   default 8   parameter 7/8 example AW 8

This is used to set the data length for serial communication with the host.
7 stands for 7 bites, 8 for 8 bites. Restart is required using RESTART command, or restart when the back-up is made.

3-3-2 Parity command

Abbrev. PAR default 0   Parameter 0 to 3   example PAR 0

This is used to set the parity between the host and serial communication.
[0],[2]   No parity
[1]   odd parity
[2]   even parity
Restart is required using RESTART command, or restart when the back-up is made.

3-3-3 Echo command
Abbrev. E   default ON range ON/OFF   example ECHO OFF

This is used to set the echo-back of characters input from the host. ON for echo-back, OFF for none. This is compatible to terminal software's "local echo" setting. If this is not matched properly, the characters may be displayed twice or the characters may not be seen at all.

3-3-4 Flow command
Abbrev. F default ON range ON/OFF example F ON

When ON is selected, as you start input with the keyboard, the received packet display will be paused. When the input is complete, send ([CR] in command mode or when transmitting the packet in converse mode). It separates the TX and RX messages for easier reading of the messages on the screen. Note that during the pause, if the serial transmitting buffer to the host is filled, the received packet will be lost.

3-3-5 XFLOW command
Abbrev. X   default ON   range ON/OFF example XFLOW OFF

This is used to select software flow control ON/OFF. ON to enable flow control. Use XOFF(Ctrl+S) to pause the display, XON(Ctrl+Q) to resume. In OFF position, the hardware flow control is ON always.

3-3-6 AUTOLF command
Abbrev. AU default ON range ON/OFF example AU ON

When on, it puts a line-feed [LF] code after the carriage return [CR]. This is to match the parameters of the terminal software such as [CR] RX, [CR]/[CR]+[LF]. The incorrect setting may result in overwriting of the new message onto the displayed message or if excessive line feeds occur.

4. Communication related commands (as a wireless modem)

The following will explain communication-related commands, pertaining to the following categories.

- The basic TX/RX commands
- TX related commands
- RX related commands
- The commands used when you are connected
- The commands used when you are not connected
- Control commands in converse mode
- Monitor related commands

4-1 The basic TX/RX commands

Check these commands if the unit does not transmit.

4-1-1 HBAUD command
abbrev HB default 1200 parameter 1200/9600
example HBAUD 9600, HB1200

This is to determine the speed of transmitted data. If 1200 is set, it enables AFSK at 1200bps. At this position the modulated signal is output from the T1200(29th pin) on the gate-array but no output from the T9600 (35th pin). When 9600 is set, GMSK 9600 bps is enabled. T9600 (35th pin) outputs the modulated signal, but NO output from the T1200(29th pin).

4-2-2 MYCALL command
abbrev,. MY   default NOCALL parameter : up to 6 alphanumeric characters and SSID
example MY K6ANC-15

This is to set your callsign. Usually callsigns are less than 6 characters. You may add a SSID (sub-station ID) to identify up to 16 different callsigns. To add a SSID, chose 0 to 15 preceded by a "dash" [-]. If a SSID is not added, the callsign is processed as SSID [0]. Note that the EJ-41U can transmit a signal without a callsign being entered (NO CALL). It is illegal to transmit a signal without your identification, which is a callsign. PLEASE BE SURE TO SET YOUR CALLSIGN FIRST. Also, if the same callsign is used by different stations (club-station callsign, home and mobile set-up etc) you will encounter problems. Please use a SSID to differentiate the stations and avoid problems.

4-1-3   XMITOK command
Abbrev. XM   default ON parameter ON/OFF
Example XMITOK ON

This command enables PTT on/off. It should usually be set ON so that the packet will be transmitted by the radio. If OFF is selected, the data would not be transmitted from the radio even though data is output. Note that some difference may be found between conventional TNCs and the EJ-41U on this setting.

Conventional TNC	EJ-41U
* default is OFF.	* default is ON.
* This parameter may be set automatically When MYCALL data is input.	* Does not effect the MYCALL setting.

4-1-4   Loop command
Abbrev. LOOP   default: OFF   parameter: ON/OFF
Example: LOOP ON

This command determines the Loop Back test status. When ON is selected, you may be able to monitor your transmitted messages on the screen, as it is processed in the gate-array. PTT signal is always off, so the signal won't be transmitted. While the parameter is ON, you cannot monitor a received message, either. Set OFF for normal communication.

4-1-5   CALIBRA command
Abbrev. CAL   default: none   parameter: none
Example: CAL

By using this command, the TNC enters the calibrate mode and outputs mark and space characters alternately. This is useful for checking the transmitter or for setting transmit deviation. Type [Q] key to exit.
In the 1200 bps mode, 1200 and 2200Hz signals are output alternately.
In the 9600 bps mode, the signals are not really alternated High/Low, but can be monitored by observing the eye-pattern of the modulated signals on an oscilloscope.

4-2 TX related commands

To avoid conflicts with other packets, these commands are used to determine how to start transmission. They are PPERSIST, PERSIST, SLOTTIME, DWAIT, SOFTDCD and TXDELAY.

Please cross-refer relative commands' description, as they are closely related each other.

(A)PPERSIST is OFF

[Others transmit]   [Others transmit]   [Start transmit]

DWAIT   DWAIT
(1)   (2)
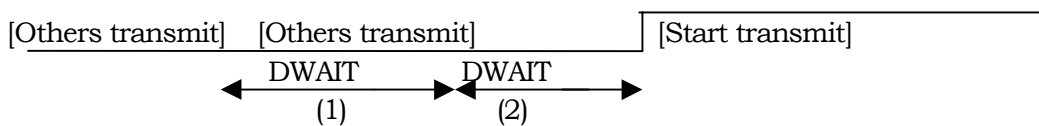
DWAIT: As another station stops transmission, DWAIT starts counting. While it is counting, another station starts transmitting, it stops counting. When this occurs, you cannot transmit.
(1)DWAIT: If no signal is received during the entire DWAIT period, The TNC starts to transmit.

(B)PPERSIST command is ON

[Others transmit]   [Start transmit]

Slot time   Slot time
(1)   (2)   (3)   (4)   (5)
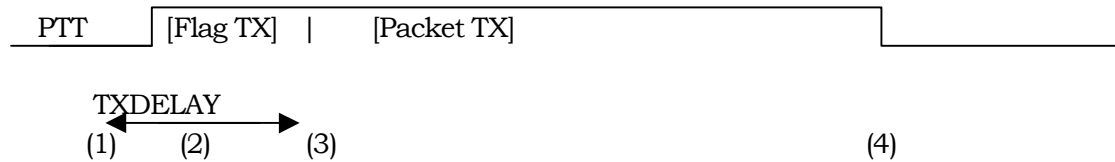blank   blank   hit
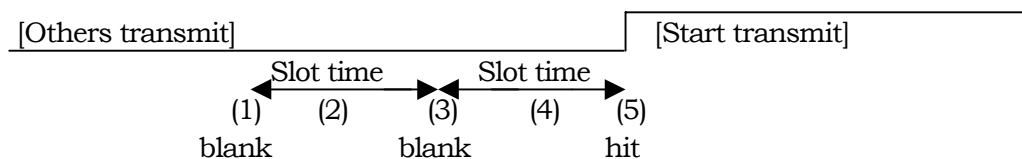
It's like a slot-machine.
(1) As others stop transmitting, it generates a random number between 0 and 255. If this number is higher than the number set in the parameter, it is considered a "blank" and does not transmit.

(2) In this status, it waits until the slot time elapses, and generates a new random code again.

(3) If the number is higher, it's "blank" again.

(4) Again, it's waiting for another slot time.

(5) This time the number is lower than the parameter. It's a HIT and goes to transmit.

If the other stations start transmitting, it stops counting the slot time, and generates code when the incoming signal is gone.

(C) Transmission for Ham radio use

```
  PTT        [Flag TX]   |      [Packet TX]
  _____|_____|_____

        TXDELAY
       <──────────>
       (1)   (2)     (3)                           (4)
```

(1) As it goes to transmission, PTT turns ON and starts transmitting the Flag signal. The Flag signal is to show the partition of the packet and to synthesize the data clock.

(2) The data transmission is held until the TXDELAY time elapses. The TXDELAY must be calculated including the physical timing of the RX/TX change of the radio, and the Flag period of the reception side of the packet. The Sleep feature is not recommended, but if it is activated at the reception side, it must be considered to determine the delay period.

(3) When the TXDELAY period is elapsed, the packet data will start transmitting.

(4) PTT is released when the packet is sent.

4-2-1 PPERSIST command
abbrev. PP   default: ON   parameter: ON/OFF
example: PP ON

This command selects whether the P-PERSIST CSMA system is enabled or not. If it's ON, it enters the PP CSMA mode. It detects the carrier, and when the channel is empty, it starts generating the code for a slot. This is to avoid all waiting stations starting their transmissions at the same time causing a conflict. In the OFF position, the system remains Persistent CSMA. The unit transmits after the DWAIT period is elapsed.

4-2-2 PERSIST command
abbrev. PE   default: 128   parameter 0 to 255
example: PERSIST 63

This will select the parameter of the P-Persistent CSMA random code "hit" probability as previously described. If the higher number is set, the chance to "hit" increases but the potential conflict with others also may increase. If you set the value lower, the risk of conflict decreases but you cannot transmit a sequence of packets rapidly.

4-2-3 SLOTTIME command
abbrev. SL   default:3 parameter: 0 to 255
example: SL 5

This sets the time to generate a new random code for the P-Persistent CSMA system as previously described. It is set in 10 microsecond units.

4-2-4 DWAIT command
abbrev. DW   default: 30   parameter: 0 to 255
example: DWAIT 10

Sets the time delay between the end of others' transmission and your initiating a transmission. It is recommended that this be set slightly different at each station in order to avoid conflicts.
SOFTCD
Abbrev. Not available default: OFF   parameter ON/OFF
Example: SOFTDCD ON

This selects the method of carrier detection. If this is ON, it detects a carrier using internal software. If the incoming signal is digital data, it is considered "the channel is in use". If it is OFF, it detects signals using the status of SQUELCH (SQ) terminal (the 3rd pin) on the CPU. If SQ is in LOW position it is considered "the channel is in use".
In 9600 bps mode, the EJ-41U always considers "the SOFTDCD command channel is in use". If this is the case, change this parameter to ON position. When ON, the transceiver can be run with an "open" or no squelch setting.

4-2-5 TXDELAY command
Abbrev. TX   default 50   parameter: 0 to 255
Example: TX 80

This is to determine the waiting time between PTT on and the transmission of the packet, in units of 10 microseconds. During the TXDELAY period, the Flag signal is transmitted. This Flag signal is used to divide frames and to allow the radio to synthesize. Please calculate enough time for the Flag signal based on the physical TX/RX change on the transceiver, and synthesizing timing. If the "sleep" or "battery save" mode is used at the receiving end, you must calculate it also, or do not use sleep mode. When using digital modes, it is recommended that "sleep" or "battery save" modes be deactivated.

4-3 Reception related commands

4-3-1 PASSALL command
abbrev. PASSA   default: OFF   parameter: ON/OFF
example: PASSALL ON

In AX. 25 protocol, it detects the error on frames using CRC code. PASSALL command determines how to process such errors, if found. If it's ON, the error frame is accepted. If OFF is selected only correct frames are accepted. Please leave this parameter OFF for error-free communication.

4-4 Connected communication command

In the connected communication mode, in accordance with AX.25 protocol, the data is exchanged with "Yes, I got it" or "I didn't get it, please retransmit" kind of information. If the reconfirmation ("I got it") is not received after transmission, it retransmits the data.
In this chapter the following commands will be explained.
● Connect, Disconnect commands: CONNECT, DISCONE
● When the request of connection is received: CONOK, CMSG, CTEXT, CMSGDISC
● Retransmission related: RESPTIME, FRACK, RETRY, TRIES, CHECK, FIRMRNR

4-4-1 CONNECT command
abbrev. C   default: not available   parameter: destinations callsign VIA repeaters 1 to 8
example: C K6ANC-1
        C K6ANC-1 VIA K6ANC-2
        C K6ANC-1 V K6ANC-2, K6ANC-3

This will send a connect request frame (SABM). If the confirmation (UA frame) is received, "*** CONNECTED TO" followed by destination callsign and its repeater ID (if any) will appear on the screen and a connection is established. Once connected, AX.25 protocol enables error-free communications. If a UA frame is not received, it transmits a SABM frame up to a predetermined number of times. If a UA frame is still not received, the TNC automatically disconnects.

Enter the destination callsign as shown in the example. The first example shows that you wish to connect to K6ANC-1. As shown, you should add the SSID, as needed. You may also include a relay stations' callsign in case you cannot connect directly to the other station. In this case, you can add VIA or V followed by the relay stations' callsigns. Up to 8 stations can be specified for the relay(s).

The last example shows that you are going to connect K6ANC-1 using K6ANC-2 and K6ANC-3 as relay stations. Remember that the EJ-41U does not have a relay function so if you may need to be a relay station yourself, please use an external TNC for that operation.

4-4-2 DISCONNE command
abbrev. D   default: none   parameter: none
example: D

This command sends a disconnect-request frame (DISC). When the reconfirmation frame(UA frame) is received, the screen displays "****** DISCONNECTED" and goes to the disconnected mode.

4-4-3 to 4-4-6 intentionally blanked (for commercial use only)

4-4-7 RESPTIME command
abbrev: RES   default: 5   parameter: 0-250
example: RES 5

In the connected packet mode, your TNC must reply to the destination by saying "Yes, I got your packet"(RR frame) after the information (I frame) is correctly received. Up to 7 RR frames can be sent together at one time. For example, you can reduce the RR frame transmission during a file transaction when different I frames are received frequently. This command sets the waiting time between the reception of an I frame and transmission of a RR frame in units of 100 ms. The communication efficiency may become poor if a higher number is set as the time delay to send RR becomes longer. If an even higher number is set, an I frame may be sent before an RR frame is sent.

4-4-8 FRACK command
abbrev. FR   default: 3   parameter: 0-250
example: FR 5

When you are "on-line" (connected) and the transmitted information frame (I frame) is received at its destination correctly, you receive a "Yes, I got it" (RR frame). If a certain time has elapsed but you still don't get a reply, the I frame will be transmitted again (retry feature). Beside I frames, and a connection request frame (SABM frame), there are frames that require a reconfirmation from the destination. The retry will take place if a reply is not received. This command sets the time duration between the end of transmission of the reply-required signal and the start time of a retry transmission in 1 second.
When a relay station is involved, it automatically waits for a [(number of relay stations X 2 + 1) X parameter] period. The relay stations only pass the messages, and they do not acknowledge each packet. Accordingly, the transmitted packet takes some time until it gets to the destination and a reply comes back.
This unit automatically changes the retry fraction time in accordance with the number of relay stations. In case the packet traffic is very high, set this parameter a little higher than the default. It eliminates unnecessary retries when traffic is reduced.

4-4-9 RETRY command
abbrev. RE   default 10   parameter: 0-15
example: RE 15

This command is used to set the maximum number of retries. When the maximum number of retries exceeds the parameter, [****** retry count exceeded],[***** DISCONNECTED] appears on the screen, and the TNC returns to the disconnected state. The conventional TNC AX.25 protocol may transmit a SABM frame at this point, and the RELINK command (default OFF) is available to set this option. The EJ-41U does not have this parameter (fixed at OFF position).

4-4-10 TRIES command
abbrev. TRI   default: 0   parameter: 0-15
example: TRI 0

This is to display and adjust the current retry counter. If the command TRIES is entered, it might report back TRIES 9. You can enter TRIES 2 and in doing so, you reset the number of TRIES before reaching the cutoff figure set under RETRY.

4-4-11 CHECK command
abbrev. CH   default 30   parameter: 0-250
example CH12
When connected, even without sending data, this command sends a message to the effect of "Are you still there?" to check if the link is still present. This parameter sets the time between the sending of the check-packet ("Are you still there?") after the destination's signal is received, in 10 ms unit.

4-4-12 FIRMRNR command
abbrev.: FIR   default: OFF   parameter: ON/OFF
example: FIR ON

When the "Wait a moment!" message (RNR frame= not available for reception) is received from the destination, this parameter determines how your station will proceed with sending your packet.

When the setting is in the ON position and you receive RNR frame, it does not transmit the packet until you receive another frame from the destination. In the OFF position, it will transmit the packet regardless of the RNR status. This may result in poor communications efficiency by sending packets that will not be received.

4-5 Unconnected messages or "UNPROTO" commands

These commands are used when sending packets without being connected to another station. Some examples of unconnected messages might be a "CQ" message, an informational beacon, a chat session with many stations or APRS location beacons.
In this mode, the receiving station(s) will discard incomplete data without requesting a retry and the transmitting station does not re-transmit. Accordingly there is no guarantee of error-free transmission in this mode. In this chapter we explain:

● UNPROTO to set the destination and relay stations without being connected
● BEACON, BTEXT for the beacon related commands

To broadcast the GPS data there are LPATH, LOCATION, and LTEXT commands. These will be explained in the GPS chapter, but they are similar to UNPROTO, BEACON and BTEXT so that they may be used as the secondary beacons.

4-5-1 intentionally blanked (engineers' use only)

4-5-2 UNPROTO commands
abbrev. U default: CQ   parameter: destination's callsign (with up to 8 with using VIA)
example: U CQ
         U APRS V RELAY,WIDE

This is used to determine destination's callsign and relay stations.

4-5-3 BEACON command
Abbrev.: B default: EVERY 0 parameter: EVERY/AFTER 0-250
Exapmle: B E 6

This is to set the timing of the transmission of beacons. The prefix E allows that the beacon will be sent at every interval specified by the following number. The prefix A allows that a beacon will be sent only once when nothing is received during the time period specified by the following number. No beacon will be sent when the number "0" is set. The unit is 10 seconds.

4-5-4 BTEXT command
Abbrev. BT   default: none parameter: up to 159 small characters. If this parameter is left blank, no message will be sent. Use % character to intentionally leave it blank. This text will be beaconed at intervals identified under the BEACON command

4-6   Commands to used while connected

In the converse mode, characters entered from the terminal will be sent as a packet, or sequence of packets, to the receiving station. These commands are used by the TNC to make those packets. When one of the following conditions is satisfied, the input characters will be considered as an information frame (I frame) and sent.
● The specific characters are input : SENDPAC
● Relative command: CR
● When they reach pre-determined length: PACLEN
● When the pre-set time is elapsed: PACTIME and relative CPACTIME
You may transmit different frames as one packet. The maximum number of these frames can be determined with MAXFRAME command.

4-6-1 SENDPAC command
abbrev.: SE   default: $0D   parameter: 0-$7F
example: SENDPAC $0D

In the converse mode, when the letter code specified with this parameter is entered, the letters followed by the code is considered a complete packet (information frame=I frame) and will be sent out. Default is CR. The codes set at this parameter won't be included in the frame.

4-6-2 CR command
abbrev. CR   default: ON   parameter: ON/OFF
example: CR ON

This command determines if the [CR] code is added (or not) at the end of the I-frame transmission. [CR] is added if ON is chosen. [CR] won't be added if OFF is chosen. Normally, the SENDPAC command does not include [CR] when it makes an I frame, as it is already "$0D"=[CR]. In this case, when this parameter is ON, [CR] is added after the I frame. As a result, [CR] code will be left.

4-6-3   PACLEN command
Abbrev. P   default: 128   parameter: 0-255
Example: P 78

When the number of input characters (bites to be exact) reach this parameter, the data will be considered as a packet (I frame) and sent.

4-6-4   PACTIME command
Abbrev. PACT default: AFTER 10 parameter: EVERY/AFTER 0-250
Example: PACT A 10

This command was originally for the transparent mode, which is not supported by this unit. When the CPACTIME command, which will be explained later is set ON, this command becomes effective in the converse mode.
The prefix EVERY (abbrev.E) is selected, the input characters will be considered as an I frame at every interval identified in the parameter setting. The parameter is set in units of 100ms. Nothing will be sent if nothing is input during the identified interval.
If the prefix AFTER (abbrev. A) is selected, the packet(I frame) is sent after the time set when the time identified by the number has elapsed.

4-6-5   CPACTIME command
Abbrev. CP   default: OFF   parameter: ON/OFF
Example: CP OFF

This is to determine if the PACTIME command becomes effective (or not) while in the converse mode. The PACTIME command becomes effective when ON is selected. The PACTIME command is not automatically effective on the EJ-41U.

4-6-6   MAXFRAME command
Abbrev. : MAX   default: 4   parameter: 1-7
Example: MAX 7

This command sets a limit on the number of packets that have not been acknowledged by the receiving station. Since the size of the EJ-41U's transmission buffer is limited, the number of outstanding frames and the size of those frames must be considered. The maximum size and the

total of the frames should be less than 330 bites. This buffer size is the minimum required to send one maximum frame. The information field maximum length is 256 bites, but it becomes this size when other information such as destination callsign and relative relay station data is included.

4-7 Monitor related commands

There are MONITOR, MCOM, MCON, MALL, MRPT, and TRACE commands available to control the condition and display on the screen.

4-7-1 Monitor command
Abbrev: M   default: ON   parameter: ON/OFF
Example: M ON

This is used to monitor the packet communications (or not). If ON is selected, you will see your messages and other traffic on the monitored frequency, including unproto traffic. If OFF is selected, you will only see packets addressed to your station.

4-7-2 MCOM command
Abbrev.: MCOM default: OFF   parameter: ON/OFF
Example: MCOM ON

This sets the TNC to monitor certain frames.
If set ON, and MONITOR is set ON, all frames, including control frames, are monitored. If set OFF, it monitors only I frames (information frames). When ON is selected the frame status is shown between[< >]. The details are available from books on packet or on the internet. Frames used in packet communication are listed below:

- Types of frames
[I] information frames(I)
[RR] Available for reception frame(RR)
[RNR] Not available for reception frame(RNR)
[REJ] deny frame(REJ)
[C] connection request frame(SABM)
[D] disconnection frame (DISC)
[DM] disconnection notice frame(DM)
[UA] Non numeric system confirmation notice frame (UA)
[FRMR] frame refusal notice frame (FRMR)
[UI] Non numeric system information frame (UI)

- Pall / final-bite

[P] pall bite ON

[F] final-bite ON

- Command/Response

[C] command

[R] Response

- Sequences

[Rn] Receiving sequences. n=0-7

[Sn] Transmitting sequence n=0-7

4-7-3　MCON command

Abbrev. MC　default OFF　parameters: ON/OFF

Example: MC ON

This allows you to monitor frequency activity even when connected to another station.

ON allows you to monitor while you are connected. OFF does not.

4-7-4　MALL commands

Abbrev. MA　default: ON　parameter: ON/OFF

Example: MA ON

When ON, all stations will be monitored, connected and unconnected. When OFF, it does not monitor stations that have sent unproto data such as a CQ call.

4-7-5　MRPT command

Abbrev. MR　default: ON　parameter: ON/OFF

Example: MR ON

This is to determine if you wish to display relay station (digipeater) information in the header or not.

If ON is selected, the relay list will be shown with [*]. OFF excludes such information.

4-7-6　TRACE command

Abbrev. TRAC　default: OFF　parameter: ON/OFF

Example: TRACE ON

When ON, it will display all the details of the frame. The left side block shows frames in 16-digit codes. The right side block shows them in ASCII codes. The display system may differ from that of a conventional TNC when the EJ-41U is used.

5. GPS CONNECTION

5-1 Using a GPS Receiver with the EJ-41U

GPS, the Global Positioning System, transmits signals from a constellation of GPS satellites orbiting the earth. A GPS receiver uses data from these satellites to determine the current geographical position of the receiver. This system is widely used in navigation today. The EJ-41U can transmit the position data taken from the GPS receiver at pre-determined intervals. This feature allows you to set up a mobile location system, such as a car-navigation system and/or APRS operations.

5-2 Compatible GPS receivers

The following GPS receivers are compatible with the EJ-41U:
(1) SONY's IPS-5000 series, IPS-3000 series, PACY-CNV10 and other GPS receivers that output the data starting with [SONY xxxxxx]. The Sony Car-Navigation system receiver that generates a data string starting with [SMATC xxxx] may work, but we do not guarantee its function, as the format of this string is not officially published.
(2) NMEA-0183 compatible output GPS receivers.

The output data from the Sony system is 9600 bps, while most other GPS receivers commonly operate at 4800 bps but some are capable of 9600. The EJ-41U can accept either output rate but you must make the appropriate GBAUD setting.

5-3 Data Communication between GPS and EJ-41U:

- Bit-rate: 4800/9600 bps, selected with GBAUD command
- Data length: 8 bit fixed
- Parity: None fixed
- Stop-bit: 1 bit fixed

Flow control is not available. If the PC is connected as a dummy GPS, please loop PC's CTS and RTC.

5-3-1 Bit-rate default setting

The bit-rate can be selected as 4800 or 9600 bps. When the RESET command is used, or the RAM's back-up data is deleted, the default settings are done by the hardware.
The CPU's GPS SEL terminal (80th pin) determines the default.
When GPS SEL terminal is in [H] position, 9600 bps becomes the default.
GPS SEL terminal is in [L] position, 4800 bps becomes the default.
The status of this pin will be checked when the RESET command is executed or RAM back up is not present. It does not effect the speed when the system is working properly, or when the RAM back-up is done with the correct bit-rate setting.

5-4 The meaning of GPS information (The data that can be analyzed and re-structured)

The EJ-41U analyzes data received from the GPS receiver. Then, based on that data, it converts from one format to another. When the initial part of the input data and the GPSTEXT command matches, it re-transmits that data as a LTEXT beacon. It also allows the transmission of a non-compatible format string without the data being converted.

5-4-1 SONY

The following is a format that is output by the Sony IPS-5000 series. The EJ-41U is able to analyze it, but cannot re-structure it. It is a 110 bite fixed data string starting with [SONY] and ending with [CR][LF]. It contains date, time, latitude, longitude, altitude, speed and direction of the GPS receiver and telemetry from the satellite(s).

Example:
SONY80950716090346N3546569E13918458+02180040139507016090345D4BDHIFGXHbCI
RDFFFPEiFHSCKCQGBRFFeBEDDcCOCHdDH10<CR><LF>

Description:

SONY80 : GPS firmware's version
950701 : current date
6   : day
090346 : Current time in UTC
N   : N for North, S for South to indicate the latitude
            3546569: the latitude in degree. This number can be shown in DMD (NEMA) or DMS
            that is selectable with a command. The identifier will appear on the later part of the
            data. In the DMD (NEMA) system it means 35'46.569", in DMS it means 35'46"56.9"'.
E   : E for East, W for west to indicate the longitude.
13918458: The longitude in degrees. In DMD 139'18.458", in DMS 139'18",45.8"'.
+0218   : Altitude, It indicates the altitude in meters. Same as Geoid for NEMA format.
004   : GPS receiver's speed in km/h.
013   : The direction of the GPS receiver in degrees. 000 stands for 0 degrees north, up to 360
            degrees clockwise.
950701, 6, 090345: The date, day and time when the receiver detected latitude, longitude,
            altitude, speed and direction. Time is usually indicated 1 second before the
            actual time.
D   : DOP value. Uses characters [A] to [Q] to indicates relative values.
4   : The dimension process mode. [3] stands for the 2-dimension measurements, [4] for
            3-dimension measurements.
B   : Location ID. B stands for Japan, Korea
            DHIFG to CCOCH: the status of satellites being received on each channel. This
            example shows the status of the satellites received in channels 1 to 8 to receive data.
            Each 5 letters defines 1 channel. The first letter shows the satellite number, 2nd shows
            the elevation angle, the 3rd shows direction angle, 4th shows channel status and 5th
            shows the signal-level of each satellite.

D   : The status of the internal oscillator of the GPS receiver.

DH   : not related to the user.

1   : DMS/DMD identifier. Letters for DMS, numbers for DMD.

0   : Parity. [0] for o, [E] for 1.

<CR><LF> end of the data

5-4-2 SMATC

This format is used for SONY's car-navigation system "Columbus". The GPS receiver by itself is not yet available. Accordingly no further information is available, and NO DATA IS AVAILABLE FROM SONY TO THE PUBLIC. DO NOT CONTACT SONY FOR DETAILS. The string with SMATC and ends with <CR><LF>, fixed 130 bite fixed data. Similar information to "SONY" format would likely be contained.

5-4-3 $GPGGA

This is one of NMEA-0183 compatible formats. The EJ-41U can analyze and re-structure this format.

It starts with $GPGGA followed by the numbers. They indicate:

GPGGA - Global Positioning System Fix Data

String: $GPGGA,123519,4807.038,N,01131.324,E,1,08,0.9,545.4,M,46.9,M, , *42

        123519   Fix taken at 12:35:19 UTC

        4807.038,N   Latitude 48 deg 07.038' N

        01131.324,E Longitude 11 deg 31.324' E

        1   Fix quality: 0 = invalid

                            1 = GPS fix

                            2 = DGPS fix

        08   Number of satellites being tracked

        0.9   Horizontal dilution of position

        545.4,M   Altitude, Meters, above mean sea level

        46.9,M   Height of geoid (mean sea level) above WGS84

            ellipsoid

        (empty field) time in seconds since last DGPS update

        (empty field) DGPS station ID number

5-4-4 $GPVTG

One of the NMEA-0183 formats. Only the speed and direction can be detected. The EJ-41U can analyze and re-structure this format.

The data contains the following information:

*$GPVTG: starts GPVTG sentence

- True course direction in degree related to the North.
- T fixed, means True Course
- Magnetic course direction in degree.
- M fixed, means Magnetic course
- Speed in knots=1.852Km/h.
- N fixed, means Knots.
- Ground speed in Km/h
- K fixed, means ground speed unit in Km
- *hh<CR><LF> check-sum and end of message

5-4-5 $GPZDA

One of NMEA-0183 formats. It contains date and time information only. EJ-41U can analyze and re-structure this format.

The data contains the following information:

- $GPZDA starts GPZDA sentence
- Time/minutes/seconds in UTC.
- Date 01 – 31
- Month: 01-12
- Year in 4 digit. These are also shown in UTC
- Time zone: -13 to 00 to 13
- Time zone: 00 to 59 minutes
- *hh<cr><LF> check-sum and end of message

5-4-6 $GPRMC

One of NMEA-0183 formats. Date , time, latitude, longitude, moving speed and direction can be detected. EJ-41U can analyze and re-structure this format.

The data contains the following information:

- Starts $GPRMC sentence.
- Hour/minutes/seconds in UTC
- The data status. [A] for valid data, [V] for invalid.
- Latitude in numbers
- N for north, S for South
- Longitude in numbers
- E for East, W for West
- Ground speed in knots.
- Direction in degrees
- Date in dd/mm/yy format.
- The difference of magnetic direction from true north.
- To which direction the magnetic direction differs. E toward east, W toward west.

- Hh<CR><LF> the check-sum and the end of the message.

5-4-7 $PNTS

This is a private-sentence based on NMEA-0183. The data contains date, time, latitude, longitude, moving speed, direction, altitude plus a short message, group codes, and icon numbers. The EJ-41U does not analyze this format but can re-structure it.

The data contains the following information:

- $PNTS Starts the $PNTS sentence
- version
- the registered information. [0]=normal geographical location data. This is the only data EJ-41U can re-structure. [s]=Initial position for the course setting [E]=ending position for the course setting [1]=the course data between initial and ending [P]=the check point registration [A]=check data when the automatic position transmission is set OFF [R]=check data when the course data or check point data is received.
- Dd/mm/yyyy/hh/mm/ss: Date and time indication.
- Latitude in DMD followed by N or S
- Longitude in DMD followed by E or W
- Direction: Shown with the number 360 degrees divided by 64. 00 stands for true north, 16 for east.
   Speed in Km/h
- One of 15 characters [0] to [9], [A] to [E]. NTSMRK command determines this character when EJ-41U is used.
- A short message up to 20 bites. Use NTSMSG command to determine this message.
- A group code: 3 letters with a combination of [0] to [9], [A] to [Z]. Use NTSGRP command to determine.
- Status: [1] for usable information, [0] for non-usable information.
- *hh<CR><LF> the check-sum and end of PNTS sentence.

5-4-8 Caution for NMEA-0183 formats

The format of NMEA-0183 data depends on each devices' own codes. The following formats are not against NMEA-0183 rules. The software used to process the received beacons must be programmed to receive and process the data, such as:

- The partition of the data field is a comma[,]. The null-field format is used when particular data is intentionally left blank. In this case, nothing is written, but used a comma to go to the next field.
- If all the data afterwards are not necessary, the data may be ended at once followed by <CR><LF>
- The numeric digits usually vary its length, sometimes without the decimal numbers.
- In order to keep a fixed length of data, 0 is added before a number like 001 to indicate 1.
- The check-sum may be eliminated. Numbers followed by * , or even * itself is sometimes eliminated.

5-5 GPS information processing detail

In the EJ-41U, data in the LTXT buffer will be sent out as a beacon. Other than user entered data placed in the buffer by using the LTXT command, LTXT can be updated automatically with new data received from the GPS receiver. The following flowchart explains how the LTXT is automatically updated when a line of GPS data is received.

```
┌─────────────────────────┐
│ GPS inputs a line of data │
└─────────────────────────┘
            │
            ▼
┌──────────────────────────────────┐
│ The data is one of SONY/SMAIC/$GPGGA/ │ YES ──────────────┐
│ $GPVTG/$GPZDA/$GORMC             │                   ▼
└──────────────────────────────────┘          ┌──────────────┐
         No │         ◄─────────── No │ check-sum OK │
            │                          └──────────────┘
            │                                   │
            │                                   ▼
            │              ┌───────────────────────────────────┐
            │   ◄──────────│ Analyze GPS data such as date, time, │
            │              │ long, lat. Etc.                    │
            │              └───────────────────────────────────┘
            ▼
┌──────────────────────────────┐     ┌──────────────────────────────┐
│ Matches GPSTEXT and the initial │ YES │ Renews automatically to LTEXT │
│ Data sentence from the GPS?    │────▶│                              │
└──────────────────────────────┘     └──────────────────────────────┘
            │                                                      │
            ▼                                                      │
┌──────────────────────────────┐     ┌───────────────────────────────┐
│ GPSTEXT is one of $PNTS/$GPGGA  │ YES │ GPSTEXT sentence is restructured │
│ /$GPVTG/$GOZDA/$GPRMC?         │────▶│ and automatically up-dated in LTEXT │
└──────────────────────────────┘     └───────────────────────────────┘
         NO │        ◄──────────────────────────────────┘
            ▼
      ┌───────────────┐
      │ End of process │
      └───────────────┘
```

5-6 GPS related commands

5-6-1: GBAUD commands
abbrev.: GB   default: variable   parameter: 4800/9600
example: GBAUD 4800

Determines the GPS port bit-rate.
4800 for 4800 bps. 9600 for 9600 bps.
Refer also to chapter 5-3-1. 4800 is recommended for NMEA compatible GPS units, 9600 for SONY GPS. Remember that this command sets bit-rate only, and is not related to the firmware of the device. The firmware checks SONY/NMEA GPS data by processing the contents of the receiving data.

5-6-2 Intentionally left blank

5-6-3: LPATH command
abbrev: LPATH   default: GPS   parameter: destination's callsign (may be combined with V for relay up to 8 stations)
example: LPA GPS VIA RELAY,WIDE

This is an UNPROTO compatible command used for GPS beacon transmissions. Set the receiving stations' (or digipeater's) callsign(s). See APRS software documentation for more information on the path of your beacons.

5-6-4: LOCATION command
abbrev. LOC   default: EVERY 0   parameter: EVERY/AFTER 0-250
example: LOC E 1
This command determines the interval at which the LTEXT contents will be sent out as a beacon. This is a similar command to BEACON in the conventional packet command set.

5-6-5 Intentionally left blank

5-6-6 LTEXT command

abbrev. LT   default: none   parameter: up to 160 letters.
Example: LTEXT text of LT
       LT% (to empty the content)
LTEXT buffer contents will be transmitted as a beacon at the interval set with the location command. Nothing will be transmitted if the LTEXT buffer is empty. Use % to empty the buffer. By using the LTEXT command, you can manually insert text to be beaconed. The LTEXT buffer can also be filled automatically by specifying a GPS output string using the GPSTEXT command and connecting a GPS unit.

5-6-7 LTMON command
abbrev.: LTM   default:0   parameter: 0-250
example: LTMON 5

The LTEXT contents can be sent to the computer and seen on the monitor as if it were received over the air. The LTMON command specifies the output interval in units of 1 second. The output won't occur when the "0" is set as a parameter. Viewing the content of the LTEXT buffer is possible by using the LTEXT command but it could be difficult depending on which terminal software is being used and may cause the wireless modem to function.

5-6-8 LTMHEAD command << IMPORTANT
abbrev. LTMH   default: ON   parameter: ON/OFF
example: LTMHEAD OFF

This command specifies if a header (such as a call sign) is added with the LTMON command.

With this parameter ON, it outputs all information just as other beacons are received however SET THIS PARAMETER OFF FOR APRS use; otherwise the position of your station may not be read.

5-6-9   GPSTEXT command
Abbrev. GPST   default: $PNTS   parameter: up to 6 letters
Example: GPST $GPRMC

When the initial part of the input data received by GPS port and the GPSTEXT command match, the GPS input data contained in the string will be automatically placed in the LTEXT buffer. If the GPSTEXT content is one of those below and does not match with the initial part of the data, it restructures the sentence and automatically updates the LTEXT content based on previously received GPS data. In other words, the feature offers the conversion of the GPS data.

Understandable sentence	Restructurable sentence
$GPGGA	$GPGGA
$GPRMC	$GPRMC
$GPVTG	$GPVTG
$GPZDA	$GPZDA
SONY	$PNTS
SMATC	

5-6-10 NTSGRP command
Abbrev. NTSGRP   default: none   parameter: alphanumeric characters up to 3
Example: NTSGRP ABC

This is to set the "group-code" in order to make $PNTS sentence. 0-9, A-Z can be used. The PC software can select and plot only the beacon with the matching code.

5-6-11 NTSMRK command
Abbrev. NTSMRK   default: 0   parameter: 0-14
Example: NTSMRK 13

This is to set the marking code for the $PNTS sentence.

5-6-12 NTSMSG command
Abbrev. NTSMSG   default: none   parameter: small character up to 20 letters.
Example: NTSMSG this is a test

This is to set the message used in $PNTS sentence.

5-6-13 GPSSEND command
Abbrev. GPSS default: none   parameter: up to approx. 240 characters
Example: GPSSEND@SKB (SKB is used to set IPS-5000's measurement zone as Tokyo. See your GPS manual for details).

This command transmits the entered characters to the GPS port. This command is used to send initializing command(s) to the GPS. The content cannot be stored in memory but some GPS units will have a memory feature (This is mainly to conserve space in the RAM which is very limited in this unit). The main-loop process is stopped while the data is transmitted to the GPS. Too long or too frequent transmission of the data may cause problems with the function of the TNC.

5-7
Intentionally left blank.

6   Operational mode

This firmware contains the following operational modes:
- command mode
- converse mode
- KISS mode

6-1 Command mode
As mentioned in 2-1, the operational mode is usually "connect mode". The "cmd:" prompt appears when it is in the command mode. If it does not appear, use CR or return or Enter key to display it on the screen.

6-2 Converse mode
As briefly mentioned in 2-1, this is the mode to send typed data as a packet. By using the CONVERSE or K command from the command mode, it switches to the Converse mode. The TNC also enters the converse mode when you connect from your station to another station. To return to command mode from the converse mode, use Ctrl+C.

6-2-1 Converse command
abbrev. CONV default: none   parameter: none
example: CONV
This is to change the mode to CONVERSE mode. The typed data in converse mode will be sent out as a packet. To return to command mode from the converse mode, use Ctrl+C keys.

6-2-2 K command
Abbrev. K   default: none   parameter: none
Example: K
This is same as the Converse command. Since this change is required very often, the K is made available as a shortcut.

6-3   KISS mode
This is a special mode to enable protocol control from the PC. Specific KISS mode software is necessary. The EJ-41U is compatible with KISS but in very limited manner. We do not recommend the use of this mode.

Chapter 7/8
Intentionally left blank.

Chapter 9   Miscellaneous commands

The followings are miscellaneous commands:
● Restart and Reset commands
● Display commands
● Display setting according to the terminal software

9-1 Restart and Reset
9-1-1 RESTART command
Abbrev. RESTART   default : none   parameter: none
Example: RESTART

This will restart the TNC. If memories are stored, it initializes according to the stored data. This is used mainly to set parameters such as AWLEN and PARITY which is available only when the TNC is initialized.

9-1-2 RESET command
Abbrev. RESET   default: none   parameter: none
Example: RESET

This is used to set all parameters to their default values. Use this command if the TNC is operating in an erratic manner or if a return to default settings is desired. After using RESET, all user settings must be re-entered.

9-2 Display the parameter status
9-2-1 Display command
Abbrev. DISP   default; none   parameter: character as shown below
Example: DISP   (display all)

This is used to display the parameter settings in full or in part.

DISP=   displays all parameter settings.
DISP A= displays COM port related parameters.
DISP C=   displays special characters related parameters.
DISP H=   displays hellscounter related parameters.
DISP I=   displays ID related parameters.
DISP L= displays link related parameters.
DISP M=   displays monitor related parameters.
DISP T= displays timing related parameters.

9-3 Display setting according to the terminal software
9-3-1 BBSMSGS command
Abbrev. BBS   default: OFF   parameter: ON/OFF
Example: BBS OFF

This is to select how to output messages from the TNC. If ON is selected, the CR code is added before the message such as "*** disconnected" is output. These messages must begin at the start of a line, so it is easy for the terminal software to detect it. The connect request message such as "*** connect request:--" does not appear. By selecting BBSMSGS "ON" and CONOK "OFF", the unwanted message won't interfere while receiving a file. "OFF" position was commonly used in older generation TNCs, which did not include the CR before a message.

9-3-2 RXBLOCK command
Abbrev. RX default: OFF   parameter: ON/OFF
Example: RX OFF

If "ON" is selected, the ID block with $FF is structured on the data from the connected station in converse mode ONLY. It is handy when necessary to identify the data connected through the terminal software. OFF is default.

Identified blocks are $FF,LH,LL,PID,DATA-UNIT in order.
$FF= 1bite. To identify the beginning of the block.
LH= Block length High bite (1 bite. 1111 is fixed for the higher 4 bits)
LL= Block length Low bite (1bite)
PID= Protocol Identifier. The value of reception control field.
DATA-UNIT= The content of the receiving packe

Information, functions and features subject to change without notice or obligation.

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