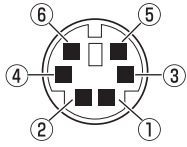


PACKET OPERATION

Connect this transceiver to your personal computer via a Terminal Node Controller (TNC). You can send messages or commands to far away stations, obtain a variety of information via your local bulletin boards, or enjoy other Packet applications. Reference material for starting Packet operation should be available at any store that handles Amateur Radio equipment.

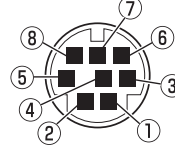
Note: When the distance between the radio antenna and your personal computer is too close, interference may occur.

DATA terminal pins



- When using the built-in TNC, the DATA terminal is not used.

PC/ COM terminal pins



- The PC terminal is on the rear of the TX/RX unit and the COM terminal is on the rear of the Operation panel. Connect these terminals to a personal computer.

No.	Name	I/O	Function
①	PKD	I	Audio signal for packet transmission
②	DE	—	PKD terminal ground
③	PKS	I	'L' is transmitted and the microphone is muted
④	PR9	O	Detected 9600 (bps) data
⑤	PR1	O	Detected 1200 (bps) data
⑥	SQC	O	Squelch control signal; Closed: 'L', Open: 'H' (The default settings can be changed in Menu 520)

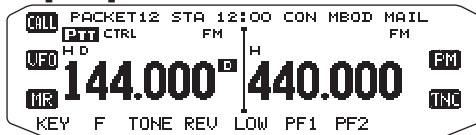
No.	Name	I/O	Function
①	RTS	O	Request to Send
②	CTS	I	Clear to Send
③	TXD	O	Transmit Data
④	GND	—	Ground
⑤	RXD	I	Receive Data
⑥	NC	—	Non Connect
⑦	NC	—	Non Connect
⑧	NC	—	Non Connect

PACKET MODE

This transceiver has a built-in TNC which conforms to the AX.25 protocol. This protocol is used for communications between TNCs.

For the commands supported by the built-in TNC, see "TNC COMMANDS LIST".

Press [TNC] 2 times to enter PACKET mode.



The following indicators appear on the transceiver display to show the current TNC status:

Indicator	Status
PACKET	The TNC is in Packet mode.
STA	Packets to be transmitted still remain in the buffer.
CON	The TNC is in connection with the target station.
MBOD	The mailbox in the TNC is being accessed or connected by the other station.
MAIL	The mailbox in the TNC holds mail addressed to you.
12	1200 bps transfer rate selected
96	9600 bps transfer rate selected

Note:

- Not all functions available via conventional TNC's are supported by the TNC built in this transceiver.
- The built-in TNC could be automatically reinitiated when its malfunction is detected; this does not designate that the transceiver is defective.
- To distinguish your various stations or nodes, you can have up to 15 Secondary Station Identifiers (SSIDs); ex. W6DJY-1 to W6DJY-15. You always have to put a dash between your call sign and SSID number.
- Packet operation, easily affected by transmit and receive conditions, requires a full-scale S-meter reading for reliable communication. When the S-meter reads less than maximum during 9600 bps operation, communication errors are frequent.

DATA BAND

Select how data will be transmitted and received on your transceiver.

- 1 Enter Menu mode and access Menu 529.



- 2 Set the data band to A-BAND (A band receives and transmits), B-BAND (B band receives and transmits), TX:A-BAND RX:B-BAND (A band transmits (T:R)) and B band receives (R:R)), or RX:A-BAND TX:B-BAND (A band receives (R:R)) and B band transmits (T:R)).

COM PORT SPEED

You can adjust the speed at which the computer and transceiver exchange information, when the transceiver is connected to your computer.

- 1 Enter Menu mode and access Menu 528.



- 2 Set the COM port speed to 9600, 19200, 38400, or 57600 bps.
 - Turning the power ON/OFF will change the port speed setting.

USING EXTERNAL TNC

External Data Band

- 1 Enter Menu mode and access Menu 517.



- 2 Set the data band to A-BAND (A band receives and transmits), B-BAND (B band receives and transmits), TX:A-BAND RX:B-BAND (A band transmits and B band receives), or RX:A-BAND TX:B-BAND (A band receives and B band transmits).

DATA Terminal Speed

Select 1200 or 9600 bps for the data transfer rate, depending on TNC.

1200 bps: Transmit data input (PKD) sensitivity is 40 mV_{p-p}, and input impedance is 10 kΩ.

9600 bps: Transmit data input (PKD) sensitivity is 2 V_{p-p}, and input impedance is 10 kΩ.

- 1 Enter Menu mode and access Menu 518.



- 2 Set the data speed to 1200 or 9600 bps.

PC Port Speed

- 1 Enter Menu mode and access Menu 519.

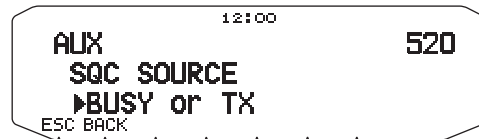


- 2 Set the PC port speed to 9600, 19200, 38400, or 57600 bps.
 - Turning the power ON/OFF will change the port speed setting.

SQC Output Setting

You can set the condition for which the SQC output terminal becomes active.

- 1 Enter Menu mode and access Menu 520.



- 2 Set the SQC output activation method to one of the following:
 - OFF: SQC output remains inactive.
 - BUSY: When a signal is received on the data band, the SQC output becomes active.
 - SQL: While CTCSS/DCS is ON and a matching signal is received, the SQC output becomes active. While CTCSS/DCS is OFF, the SQC output becomes active when a busy signal is received.
 - TX: While transmitting, the SQC output becomes active.
 - BUSY.TX: When the conditions of BUSY and TX (above) are met, the SQC output becomes active.
 - SQL.TX: When the conditions of SQL and TX (above) are met, the SQC output becomes active.

Note: The activation type (logic) can be changed using the MCP-2A software.

TNC COMMANDS LIST

The commands supported by the built-in TNC are listed below. You must enter a space between a command name (or short-form) and a parameter, or between two parameters; ex. AU OFF, BEACON EVERY 18.

Command Name	Short	Description	Parameter	Default
8BITCONV	8	When ON, handles one character using 8 bits in Converse mode. When OFF, handles one character using 7 bits.	ON/ OFF	ON
AFILTER	AF	Specifies up to 4 control codes to be removed from received packets when in Converse mode.	\$00 ~ \$80	\$00
AUTOLF	AU	When ON, sends a line feed (LF) to the computer after each carriage return (CR).	ON/ OFF	ON
AXDELAY	AXD	Specifies the delay time to be added to TXDELAY between PTT ON and start of transmission. The unit of the parameter is 10 milliseconds.	0 ~ 120	0
AXHANG	AXH	Specifies the voice repeater hang time. The unit of the parameter is 100 milliseconds.	0 ~ 250	0
BEACON	B	If set to EVERY, sends a beacon packet at intervals of the specified period (n). If set to AFTER, sends a beacon packet only once after the specified period (n). The unit of n is 10 seconds.	EVERY/ AFTER n (n = 0 ~ 250)	EVERY 0
BTEXT	BT	Specifies the content of the data portion of a beacon packet.	0 ~ 159 characters	-
CALIBRAT	CAL	Sends a space/mark square wave (50/50 ratio). Enter Q to exit Calibrate mode and restore the Command mode.	-	-
CHECK	CH	Specifies the interval from signal drop-out until execution of disconnection. The unit of the parameter is 10 seconds.	0 ~ 250	30
CONMODE	CONM	With NOMODE set to OFF, causes the TNC to automatically enter Converse or Transparent mode when connection is completed.	C/ T	C
CONNECT	C	Sends a connect request. Call1 is the call sign of the station to be connected to. Call2 to call9 are call signs of stations to be digipeated through.	Call1 (VIA call2, call3, ... call9)	-
CONOK	CONO	When ON, accepts a connect request and returns a UA packet. When OFF, rejects a connect request and returns a DM packet.	ON/ OFF	ON
CONSTAMP	CONS	When ON, displays the current date and time when connection is completed. The correct date and time must be set using DAYTIME.	ON/ OFF	OFF
CONVERSE	CONV or K	Causes the TNC to enter Converse mode. Press [Ctrl]+[C] to restore the Command mode.	-	-
CPACTIME	CP	When ON and in Converse mode, sends a packet at intervals of the period determined by PACTIME.	ON/ OFF	OFF
CR	CR	When ON, appends a carriage return (CR) to all packets to be sent.	ON/ OFF	ON
DAYSTAMP	DAYS	When ON, pressing [Ctrl]+[T] in Converse mode causes the TNC to send date data in addition to time data.	ON/ OFF	OFF
DAYTIME	DA	Sets the current date and time. Enter YYMMDDhhmmss. Sets 00 as the second if entry of the second is omitted.	-	-
DAYUSA	DAYU	When ON, displays the date like MM/DD/YY. When OFF, displays the date like DD-MM-YY.	ON/ OFF	ON
DIGIPEAT	DIG	When ON, allows the TNC to function as a digipeater.	ON/ OFF	ON
DISCONNE	D	Sends a disconnect request.	-	-

Command Name	Short	Description	Parameter	Default
DISPLAY	DISP	Causes the TNC to display the current status of all the commands. You can also specify a class identifier A, C, H, I, L, M, or T to display the status of only the desired command class. Enter a space between the command name and a class identifier; ex. DISPLAY H. A (ASYNC): RS-232C port parameters C (CHAR): Special TNC characters H (HEALTH): Counter parameters I (ID): ID parameters L (LINK): TNC-to-TNC link status M (MONITOR): Monitor parameters T (TIMING): Timing parameters	-	-
DWAIT	DW	Specifies the interval from no carrier detection until execution of transmission. The unit of the parameter is 10 milliseconds.	0 ~ 250	30
ECHO	E	When ON, causes the TNC to echo received characters to the computer.	ON/ OFF	ON
EPATH	EPATH	Specifies digipeater call signs to be added when the UISSID parameter in a received packet is 10 or 14.	Call1, ... call7	-
EXTCLR	EXTC	Clears the contents of the TNC mailbox.	-	-
FILE	FI	Displays the list of all messages in the TNC mailbox.	-	-
FIRMRNR	FIR	The other station sends a notice (packet) to you if it is not ready to receive data. When ON, receiving such a notice causes the TNC to suspend transmission until it receives a "ready" notice.	ON/ OFF	OFF
FLOVER	FL	Specifies the time delay from when the TNC buffer becomes full until the TNC buffer is cleared. The unit of the parameter is 1 minute.	0 ~ 120	0
FLOW	F	When ON, starting key entry causes the computer to stop displaying received packets.	ON/ OFF	ON
FRACK	FR	Specifies the interval from one transmission until retry of transmission. The unit of the parameter is 1 second.	0 ~ 15	3
FULLDUP	FU	When ON, allows the TNC to function in full duplex. When OFF, allows it to use data carrier detect signals to avoid packet collision.	ON/ OFF	OFF
GBAUD	GB	Selects 4800 or 9600 bps as the transfer rate between the TNC and the GPS receiver.	2400/ 4800/ 9600	4800
GPSEND	GPSS	Specifies the content of data to be output to the GPS receiver; this data is used to program the default settings on the receiver. The output data is not stored in memory.	0 ~ 159 characters	-
GPSTEXT	GPST	Specifies the type of a message to be determined by LTEXT.	0 ~ 6 characters	\$PNTS
HBAUD	HB	Selects 1200 or 9600 bps as the transfer rate between packet stations.	1200/ 9600	1200
HEALLED	HEAL	Determines whether or not normal operations of the ROM are checked. When ON and if normal operations are detected, "STA" and "CON" appear and blink alternately.	ON/ OFF	OFF
HID	HI	When ON, causes the TNC to send an ID packet every 9.5 minutes after digipeating.	ON/ OFF	ON
ID	I	Causes the TNC to send an ID packet.	-	-
KILL	KI	Deletes specific messages in the TNC mailbox.	-	-

Command Name	Short	Description	Parameter	Default
KISS	KISS	When ON, switching the power OFF then ON causes the TNC to enter (or exit) KISS mode.	ON/ OFF	OFF
LCSTREAM	LCS	When ON, changes a small letter (a through z) entered as a stream designator, to a capital letter (A through Z). A stream designator must be entered immediately after STREAMSW.	ON/ OFF	ON
LIST	LI	Displays the list of messages, in the TNC mailbox, other than those addressed to other stations.	-	-
LOCATION	LOC	If set to EVERY, sends GPS data at intervals of the specified period (n). If set to AFTER, sends GPS data only once after the specified period (n). The unit of n is 10 seconds.	EVERY/ AFTER n (n = 0 ~ 250)	EVERY 0
LOG	LOG	Displays the list of stations which have connected to the TNC mailbox.	-	-
LPATH	LPA	Specifies call signs to send GPS data. Call1 is the call sign of the destination. Call2 to call9 are call signs of stations to be digipeated through.	Call1 (VIA call2, call3, ... call9)	GPS
LTEXT	LT	Specifies the content of a message to be included in GPS data.	0 ~ 159 characters	-
LTMON	LTM	Specifies the interval for displaying a message determined by LTEXT on the screen; a message appears like a received beacon packet. The unit of the parameter is 1 second.	0 ~ 250	0
MAIL	MAI	When ON and the TNC mailbox holds a message addressed to you, outputs "Low" to the MAILED terminal.	ON/ OFF	OFF
MAXFRAME	MAX	Specifies the maximum number of packets to be transmitted at one time.	1 ~ 7	4
MBOD	MB	When ON, allows the TNC mailbox to be used.	ON/ OFF	OFF
MCOM	MCOM	When ON, causes the TNC to also monitor control packets. When OFF, causes it to monitor only information packets.	ON/ OFF	OFF
MCON	MC	When ON, causes the TNC to monitor other stations while in connection with the target station.	ON/ OFF	OFF
MINE	MI	Displays the list of messages, in the TNC mailbox, addressed to you and messages that you sent.	-	-
MONITOR	M	When ON, causes the TNC to monitor packets.	ON/ OFF	ON
MRPT	MR	When ON, causes the TNC to display the entire digipeat list for monitored packets.	ON/ OFF	ON
MSTAMP	MS	When ON, causes the TNC to display data and time information for monitored packets.	ON/ OFF	OFF
MYALIAS	MYA	Specifies a call sign for using your station as a digipeater.	6 characters + SSID	-
MYCALL	MY	Specifies your call sign.	6 characters + SSID	-
MYMCALL	MYM	Specifies a call sign to be assigned to your TNC mailbox.	6 characters + SSID	-
NEWMODE	NE	When ON, entering a CONNECT command causes the TNC to immediately enter the other mode.	ON/ OFF	OFF
NOMODE	NO	When ON, does not cause the TNC to automatically enter the other mode. When OFF, causes it to automatically enter the other mode as specified by NEWMODE.	ON/ OFF	OFF

Command Name	Short	Description	Parameter	Default
NPATH	NPATH	Specifies digipeater call signs to be added when the UISSID parameter in a received packet is 8 or 12.	Call1, ... call7	–
NTSGRP	NTSGRP	Specifies a group code to be used for making a \$PNTS sentence.	0 ~ 3 characters	–
NTSMRK	NTSMRK	Specifies a mark number to be used for making a \$PNTS sentence.	0 ~ 14	0
NTSMMSG	NTSMMSG	Specifies a message to be used for making a \$PNTS sentence.	0 ~ 20 characters	–
OVERKILL	OVE	Specifies the number of old messages to be deleted when the TNC mailbox does not accept a new message because the memory is full.	0 ~ 255	0
PACLEN	P	Specifies the maximum length of the data portion of a packet.	0 ~ 255	128
PACTIME	PACT	If set to EVERY, sends a packet at intervals of the specified period (n). If set to AFTER, sends a packet only once after the specified period (n). The unit of n is 100 milliseconds.	EVERY/ AFTER n (n = 0 ~ 250)	AFTER 10
PERSIST	PE	Specifies a parameter to calculate probability for the PERSIST/SLOTTIME method.	0 ~ 255	128
PPERSIST	PP	Causes the TNC to use the PERSIST/SLOTTIME method when ON, or the DWAIT method when OFF.	ON/ OFF	ON
RAMTEST	RAMTEST	Checks the RAM after clearing it.	–	–
READ	R	Specifies one or more message numbers to be read from the TNC mailbox.	–	–
RESET	RESET	Restores the default status for all the commands.	–	–
RESPTIME	RES	Specifies the acknowledgment packet transmission delay. The unit of the parameter is 100 milliseconds.	0 ~ 250	5
RESTART	RESTART	Causes the TNC to function as if it is switched OFF then ON.	–	–
RETRY	RE	Specifies the number of transmission retries.	0 ~ 15	10
ROUTE	ROU	When ON and receiving a packet forwarded by a PBBS, leaves the included route information.	ON/ OFF	ON
SENDPAC	SE	Specifies a character which forces a packet to be sent.	0 ~ \$7F	\$0D
SLOTTIME	SL	Specifies the period of random number generation intervals for the PERSIST/SLOTTIME method. The unit of the parameter is 10 milliseconds.	0 ~ 250	3
SPATH	SPATH	Specifies digipeater call signs to be added when the UISSID parameter in a received packet is 9 or 13.	Call1, ... call7	–
STREAMCA	STREAMC	When ON and multiple connections take place, receiving a packet causes the TNC to display the call sign.	ON/ OFF	ON
STREAMDB	STREAMD	When ON, causes the TNC to display a stream switch character included in a received packet.	ON/ OFF	OFF
STREAMSW	STR	Specifies a character to be used for switching streams.	0 ~ \$7F	\$01
TOUT	TOUT	Specifies the time-out time of the TNC mailbox. When no packet is received within the specified time, a disconnect takes place. The unit of the parameter is 10 seconds.	0 ~ 250	30
TRACE	TRAC	When ON, causes the TNC to display all received packets in their entirety.	ON/ OFF	OFF
TRANS	T	Causes the TNC to exit Command mode and enter Transparent mode. To restore Command mode, press and hold [Ctrl], then press [C] three times.	–	–

Command Name	Short	Description	Parameter	Default
TRFLOW	TRF	When ON, causes the TNC to respond to software flow control from the computer in Transparent mode.	ON/ OFF	OFF
TRIES	TRI	Specifies the number of transmission retries programmed in the retry counter.	0 ~ 15	0
TXDELAY	TX	Specifies the time delay between PTT ON and start of transmission. The unit of the parameter is 10 milliseconds.	0 ~ 120	50
TXFLOW	TXF	When ON, allows the TNC to send a software flow control (XON and XOFF) to the computer in Transparent mode.	ON/ OFF	OFF
UICHECK	UIC	Does not forward the same UI packet as one received within the time specified by this command. The unit of the parameter is 1 second.	0 ~ 250	28
UIDIGI	UI	When receiving a UI packet which includes the parameter specified by this command, replaces the parameter with the MYCALL parameter and forwards the packet.	OFF/ ON Call1, ... call14	OFF
UIDWAIT	UIDW	When ON and digipeating, causes the TNC to use the DWAIT and PERSIST settings.	ON/ OFF	OFF
UIFLOOD	UIF	Specifies how received UI packets, which include WIDEN-N or TRACEN-N parameters, are processed. Enter WIDE or TRACE before ID, NOID, or FIRST; ex. WIDE,FIRST. With ID selected, deletes the relayed digipeaters and adds the MYCALL parameter. With NOID, merely decrements N-N; ex. 4-3 to 4-2. With FIRST, adds the MYCALL parameter only when serving as the first digipeater.	ID/ NOID/ FIRST	NOID
UISSID	UIS	When ON, causes the TNC to process received UI packets depending on included destination SSIDs.	ON/ OFF	OFF
UITRACE	UIT	The command name must be followed by up to 5 alphanumeric characters; normally WIDE or TRACE. Causes the TNC to forward received UI packets which include WIDEN-N or TRACEN-N parameters.	-	-
UNPROTO	U	Specifies call signs to send a packet in Unprotocol mode. Call1 is the call sign of the destination. Call2 to call9 are call signs of stations to be digipeated through.	Call1 (VIA call2, call3)	CQ
USERS	US	Specifies the number of channels available to connect requests.	0 ~ 10	1
WRITE	W	Allows the TNC mailbox to store your message. In order to permit only a specific station to read your message, enter a call sign after the command name; ex. W JA1YKX. To complete message entry, press [Enter] (or [Return]), [Ctrl]+[C], then [Enter] (or [Return]). For a subject, you can enter up to 30 alphanumeric characters.	-	-
XFLOW	X	Causes the TNC to perform software flow control when ON, or hardware flow control when OFF.	ON/ OFF	ON