Kenwood D7 Protocol

TH-D7 Protocol Specification

This document has been produced by examining the data going into and coming out of the TH-D7 HT from Kenwood. There may be errors in this document – so the authors of this document take no responsability for it's accuracy or for any damages or losses as a result of using this document.

Want to see in the TH-D7? Click HERE

Serial Paramaters

9600, 8, N, 1

Return Values

Return Value	Description
N	Command Recognised but Invalid data entered.
?	Command Not Understood
[command]	Command Accepted

Often entering a text command by itself or followed by the first paramater will return the present value of the setting.

Generally paramters have

	0	1
State	Off	ON
Cannel (Band)	A	B

It may be able to tell if the unit attached has SkyCommand II by requesting the SkyCommand Call Sign. If the SkyCommand II is not available in the model, an error should be returned.

The most useful command is "AI 1". It sets the TH-D7 to transmoit out the serial port information about what the radio is doing. A 'Y' in the third column indicates that the radio will send this string out the serial port when it is varied.

Command	Description
ABC [0|1]	Automatic Band Change [D-700]

ABLG	APRS BLN Group	
AMGG	APRS MSG Group	
AMR [0|1]	APRS auto msg reply	
AD [0|1]	Auto Display Dim [D-700]	
AI [0|1]	Turns on output functions. Immediate functions output to the PC port.	
AIP [0|1]	Turns of Advanced Intercept Point – 1=On	
APO [0-2],n	Auto Power Off, 0=Off, 1 = 30 min, 2 = 60min APO *returns* two arguments, the first being the current APO setting and the second set to 1 if the unit is about to be powered off. I.e. if you adjust it, you'd send/receive "APO n,0" where n is the setting, but if you let it sit for 30 minutes or whatever, the D7 will start beeping and send "APO n,1" where n is the current setting. APO returns 0 if APO is disabled. Returns APO1,0 when enabled.	
ARL nnnn	Pos Limit (nnnn=km, 0000=off)	
AMSG [01-16]	Lets you view the corresponding APRS message with theresulting format AMSG a,KD6VYV-7,MESSAGE CONTENT HERE,b format of "a" a = number 1-5 then a= number of transmission left for message. a=* acknowledge received from receiving station (your message sent and received) a=M Mine – this makes me think that there might be B for bulletin, !,etc. format of "b" b is an unknown number and can be either one or three characters in length). AMSG [00] Lets you enter a new APRS message with the format: AMSG 00,KD6VYV-7,MESSAGE CONTENT HERE If no content, then at least one space is required after the comma.	
ARO [0|1]	Auto Repeater Offset 0=Off 1 = 0n	
ASC [A|B],[0|1]	Auto Simplex Check off and On?	
BAL [0-4]	Set the Balance – Band A Only = 0, Band B only = 4, Even levels from bands A and B = 2 [D-7 Only]	
BC [0|1]BC[0|1],[0|1]	Change Band to [A|B] Band. A= 0, B=1. [D700 two arguments. First is control band. Second is PTT]	Y

BCN [0|1]	Beacon mode [OFF|ON]	
BEL [0|1],[0|1]	Turns band [A|B] Tone Alert [OFF|ON] [D-7 Only]	
BEP [0-3]	BEEP. 0 = Off, 1 = Key, 2 = Key + New Data, 3 = All	
BEPT [0-3]	Beep on APRS messages, 0 = off, 1 = mine, 2 = all new, 3 = all [D700]	
BUF[0|1], Frequency, Step, Shift Direction, Reverse, Tone, CTCSS, DCS Enable, Tone Freq, DCS Tone, CTCSS Freq, Offset, Mode	Set the Frequency on the Radio0 = Band A, 1 = Band B To the Hz, leading 0 to 99 GHz!!! 0 = 5 HKz, 1=6.25, 2=10, 3=12.5, 4=15, 5=20, 6=25, 7=30, 8=50, 9=100 KHz 0=none 1=+ 2=-) i.e. repeaters , 1 = Reverse on 1 = Tone On 1 = CTCSS On 1 = DCS On, 1 = 67Hz, 3=71.5Hz …. 39=250.5 Hz Index 1 = 67Hz, 3=71.5Hz …. 39=250.5 Hz As frequency Above (i.e. 0.600/5.000) 0 = FM, 1 = AM	
BVOL [0-7]	Beep Volume 0 is off, 7 is loud [D-700]	
BY [0|1],[0|1]	Squelch on band [A|B] is now [CLOSED|OPEN]	
CIN	Copies current values (frequency, offset etc) to Call Channel.	
CTD a,n	CTD Carrier Tone Detecta=band 0/1 n;detected=1/not detected=0	
CH [0|1]	Channel Display Mode OFF|On.	
CP [0-3]	COM port bit rate. 0 = 9600, 1 = 19200, 2 = 38400, 3 = 57600 [D-700]	
CKEY [0|1]	CALL key function. 0 = call, 1 = 1750 Hz tone.	
CR [0|1],0	Call Channel Retrieve – Band [A|B]	

CW	Write Call channel Record… (as returned by CR)	
CT [0|1]	CTCSS Enable	Y
CNT [01-16]	LCD Contrast – 08 is the default	
CTN nn	CTCSS Tone – As abive	Y
DATP [0|1]	Data Speed – 0 = 1200, 1 = 9600. [D-700]	
DCSN	Set DCS Mode – codes map from 0010 = DCS code 023 thru 1040 = DCS code 754. [D-700]	
DIG [0|1]	APRS digipeater, 1 = enable	
DIM [0-4]	Backlight Control – 0 = off, 1 = bright, 4=dim [D-700]	
DL [0|1]	Dual Channel – 1 = Both A and B bands are used.	Y
DM cc,nn..nnn	DTMF Write. Writes Channel cc with nn..nnnnex. DM 01,12345 stores 123456 in DTMF memory 01	
DMN cc, NAME	DTMF Channel Name. Names the Channelex. DMN 01,HELLO names DTMF memory 01 HELLO	
DS [0|1]	DCD Sense – 0 = Data Band Only, 1 = Both Bands	
DTB [0|1]	Data Band A/B	
DTBA [0-3]	APRS data band, 0 = A, 1 = B, 2 = A:TX/B:RX, 3 = A:RX/B:TX [D700]	
DTM [0|1]	DTMF Monitor [D-700]	
DTX [0-2]	APRS Data TX mode (0=manual, 1=PTT, 2=auto)	
DUP [0|1]	Turns radio to Full Duplex (1) or Half Duplex (0) [D7]	
DW	Move Frequency Down	
ELK [0|1]	Tune Enable 0= Off, 1=On [D-7]	
FL	Comma Delimitered list of BAND extents	
FQ	Returns present Frequency	
FUNC [1-3]	Function menu mode 1-3 [D700]	
GU [0|1|2]	GPS Unit 1=NMEA GPS 2=NMEA9600 [2 is D700 only]	
ICO [0|1],i	Sets the APRS Iconfor [0] 0=Kenwood W, 1=Runner, 2=House, 3=Tent, 4=Boat – Sail, 5=SlowScan, 6=Plane, 7=Speedboat, 8=Car, 9=bicycle, Are there more? for [1], i = Hex	
ID	Returns the Radio ID – 'TH-D7' or 'TM-D700'	

KILO [0|1]	APRS 0 = Miles, 1 = Kilometers [D700]

LIST nn	LIST
	nn,<call>,<pos>,<icon>,<pos_comment>,<mess_type>,<icon_ext>,<comment>,
	<data>Where:<call> callsign
	
	<pos> position data in the form nnnnnnccmmmmmmmdd
	       where:
	
	nn nn.nn latitude
	
	mmm mm.mm longitude
	
	cc 00 North, 01 South
	
	dd 00 East, 01 West
	
	<icon> icon, 2 characters
	
	<pos_comment> 1 character
	
	    ? None
	
	    0 "Off Duty"
	
	    1 "En Route"
	
	    2 "In Service"
	    3 "Returning"
	
	    4 "Committed"
	
	    5 "Special"
	
	    6 "Priority"
	
	    7 "Emergency"
	
	<icon_ext> 1 character
	
	<mess_type> Determins data, below
	
	    0 CSESPD
	
	    1 WEATHER
	
	    2 CSESPD
	
	    3 OBJECT

```
     4      PHG

     5      CSESPD

     6      CSESPD



<data>    12 characters

  For:

    CSESPD:     cccsss
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where ccc is course and sss is speed

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    WEATHER:    dddsssttttrrr
where ddd is wind direction, sss is wind speed


ttt is temperature and rr.r is rainfall

    OBJECT:     fffffff
f... = "from" field

    PHG:
phgd          where: p
= POWER, h = HEIGHT, g = GAIN, d = DIR

  DIGITS   0  1  2   3
4   5   6   7    8
```

9 as used in the Pwr field

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-------------------------------------------------------------------------

  POWER    0, 1, 4,  9, 16, 25, 36,
```

49, 64, 81 watts SQR(P)

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  HEIGHT   10,20,40, 80,160,320,640,1280,2560,5120
```

feet   LOG2(H/10)

```
  GAIN     0, 1, 2,  3,  4,
5,  6,  7,   8,   9  dB

  DIR      0,45,90,135,180,225,270,
315, 360,   . deg    D/45  This offsets



*
the range circle in the
```

```
* 0 means
OMNI
indicated direction
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LK [0|1]	Radio Lock (1 = Locked)
LMP [0|1]	Radio Lamp (0 = OFF) [D7]
MAC [0-7]	SSTV My Call Color
MC [0|1],n	Switch to memory channel on band [A|B], n=channel number
MCNT [0|1]	Mic Control 1=Enable [D700]
MCL [0|1],[0|1	Lock memory channel [A|B],[UNLOCK|LOCK]
MD [0|1]	Set [FM|AM] on the 118 MHz Sub Band
MES HELLO	Power On Message – Message is up to 8 Characters
MIN 0,0	Copies the currently displayed frequency and other settings into channel 32. MIN copies current VFO settings into current memory (like F, M.IN)
MON [0|1]	Turns OFF|ON monitoring (Squelch)
MNA [0],nnn,Name	Names a memory. nnn of form 015 or L6. Name = max 8 characters
MNF [0|1]	Change between Name and frequency display on memories.
MP numbersMP x,numbers	My Position1234560N12345670W N 0=North, 1=South W 0=East 1=West North/South = 12 deg 34.56 minutes East/West = 123 deg 45.67 minutes D700 allows you to have multple "my position" stored (1-5): MP 1,33411001151070710
MPNA n,label	label a "my position" memory. [D700]
MR [0],[0],nnn	Reads memory nnn. nnn may be in the form 018, or L7Returns a MR string of the same form of BUF above, or form below. The absolute last parameter is a 0/1, 1 being memory lockoutThe second parameter is used to store a split frequency. For example, if you store a frequency of 145.00 rcv, 145.30 xmt in channel 20, you get the following:

MR 0,0,020,00145000000,0,0,0,0,0,,09,,09,,0,0

MR 0,1,020,00145300000,0

MR 0,0,nnn output from radio is:

first three fields from input,

freq,

step,

offset direction

reverse,

tone,

ctcss,

DCS on,

tone freq,

nnnn = dcs number, 0010 = 023 thru 1040 = 754

ctcss freq,

offset,

mode,

scan locked

MR 0,1,nnn output is:

first three fields from inout,

freq,

step (why?)

MSH	Copy Memory to VFO – Same as F-VFO
MW0, nnn, Frequency Step, Shift, Reverse,	MW Memory Write… Needs a lot more workThis essentially mirrors MR. nnn is the Channel for the memory

Tone, CTCSS, DCS Enabled Tone Freq, DCS Tone CTCSS Freq, Offset, Mode, 0	
MUTE [0|1]	Mute other side on PTT[D-700]
MYC VK2TDS	Sets the APRS CALLSIGN
NSFT [0|1]	Beat Shift – [OFF|ON]; [NORMAL|UPPER] [D7]
OS nnnn	Repeater Offset in Hz – 9 Digits 0 Padded
PAMB n	sets digits of ambiguity reported GPS position.
PC	Power ControlPC 0,0 'band A High power PC 0,1 'incorrect command no function PC 0,2 'band A Low power PC 0,3 'band A EL power PC 1,0 'band B High power On D700 First field is band, second is power with 0 = high, 1 = med, 2 = low
PF x,yy	PF x,yy – mic programmable function keys, x = key (1-4), yy = function00 = Power switch 13 = Rev26 = Visual 01 = A/B 14 = Low 27 = Dim 02 = Monitor 15 = Mute 28 = Sub-Band Sel 03 = Enter

	16 = Ctrl 29 = DX 04 = Voice 17 = PM.In 30 = TNC 05 = 1750 Hz tone 18 = A.B.C 31 = List 06 = PM 19 = M>V 32 = P.Mon 07 = Menu 20 = M.In 33 = BCon 08 = VFO 21 = C.In 34 = Msg 09 = MR 22 = Lock 35 = Pos 10 = CALL 23 = T.Sel 11 = MHz 24 = Shift 12 = Tone 25 = Step [D700]	
PIM n	Writes current "Programmable Memory" settings to memory N [D700]	
PKSA [0|1]	APRS packet speed, 0 = 1200, 1 = 9600	
PM n	selects "Programmable Memory" (aren't they all). [D700]	
PMM n	Auto "Programmable Memory" store, 0 = enable, 1 = disable! [D700]	
POSC n	Position Comment – 0=Off Duty, 1=Enroute, 2=In Service, 3=Returning, 4=Committed, 5=Special, 6=Priority, 7=Emergency	
PP path	APRS Packet Path	

PT [0-6]	Transmit Speed Pause of DTMF (100,200,500,750,1000,1500,2000 mSec)
PV [1-6],f1,f2	Set or return the VCO1=Air Band, 2 = VHF A, 3 = VHF B, 6 = UHF

f1, f2 = MHz only 5 digits 0 leading

f1 = lower VCO freq. f2 = Higher VCO Freq

PV first arg on D700 is 1-9 (weird pattern)

band

PV 1,00118,00135A (AM)

PV 2,00136,00199
A

PV 3,00136,00174
B

PV 4,00200,00299
A

PV 5,00300,00399
B

PV 6,00300,00399
A

PV 7,00400,00523
B

PV 8,00400,00469

A

PV 9,00800,01299
B |
| RBN [1|2|3|6] | Sets the VFO mode for the selected band. If you're onband A, 1 and 2 are valid settings and will switch between AIR and VHF_A.

If you're on band B, 3 and 6 are valid settings for VHF_B and UHF |
RC [0	1]	remote control, 1 = enable [D700]
RCA [0	1]	remote control answer back, 1 = enable [D700]
RCC nnn	remote control code, default 000 [D700]
REP [0-2]	repeater, 0 = off, 1 = locked band, 2 = cross band
[D700]
REPH [0	1]	Repeater Hold [D700]

REV [0|1]	Sets the REVERSE mode – 1 = On	
RSV text	An RSV message – usually Signal report	
RSC [0-7]	RSV Text Color	
RX	Stop transmitting and go into recieve mode, or the radio has stopped transmitting	
SC [0|1]	Stop/Start Scanning	
SCR [0-2]	Scan Resume – 0=Time, 1 = Carrier, 2 = Seek	
SCC callsign	Sky Command Callsign	
SCT callsign	Sky Command To Callsign	
SFT n	Repeater Shift. 0=None, 1=minue, 2=Plus	
SKTN nn	Sky Command Access Tone – As CTCSS	
SHT n	squelch hang time, 0 = off, 1 = 125 ms, 2 = 250 ms, 3 = 500 ms [D700]	
SM [0|1],nn	Recieved signal strength on band [A|B] – 05 is the highest I have seen	
SMSG text	SSTV Message	
SMY mycall	SkyCommand or SSTV (check) callsign	
SMC [0-7]	SSTV Message Color0=Black, 1=Blue, 2=Red, 3=Magenta, 4=Green, 5=Cyan, 6=Yellow	
SQ [0|1],[00-1F]	Set the Squelch setting for the [A|B] band. The valid range is 00-05 (00=open)D700 range is 00-1F	
SSEL n	set speaker mode 1-2 [D700]	
SSL b,l	S-meter squelch level, b = band, l = bars to open [D700]	
SSQ b,n	set S-meter squelch, b = band, n = 1 enable [D700]	
ST n	Set Step Size0 = 5 HKz, 1=6.25, 2=10, 3=12.5, 4=15, 5=20, 6=25, 7=30, 8=50, 9=100 KHz	
STAT text	Sets the APRS Status Text	
STC call,n	SSTV Superimpose Call – n=???	
STS	SSTV Transmit Mode – VC involved?	
STP	Stop Scanning – No RETURN !!! This may be a side effect and really be related to the SSTV VC.	

STXR n	Status TX Rate, 0 = off, 1-8. [D700]
SV [0-9]	Battery Save, 0=Off, 1=0.2Sec 2=0.4, 3=0.6, 4=0.8, 5=1.0, 6=2, 7=3, 8=4, 9=5 [D7]
TC [0|1]	Turns FULL TNC ON/OFF – TC 0 turns full TNC on. TC 1 turns TNC off in TNC comamnd mode. Returns TS 1 !!!! Note the wrong return value.[D7]
TNC [0|1]	Turns the TNC [OFF|ON]. Turning it on is only for APRS mode.D700 1 = APRS, 2 = Packet
TO [0|1]	Pl Tone Enable
TOT	PTT timeout, 0 = 3 minutes, 1 = 5 min, 2 = 10 min [D700]
TEMP [0|1]	APRS 0 = degrees F, 1 = degrees C
TN nn	PL Tone – As above
TSP [0|1]	DTMF Transmission Speed – 0 = Fast, 1 = Slow
TT [0|1]	Turn OFF/On 1750 Mhz tone (D7E)
TX [0|1]	Start transmitting on the [A|B] band.
TXH [0|1]	Turns TXHold [OFF|ON]
TXI [0-7]	APRS TX interval(0=0.5,1=1,2=2,3=3,4=5,5=10,6=20,7=30)
TXN	Transmit Narrow (TH-D7E)
TXS [0|1]	TX Inhibit 0=Off, 1=On [D7]
TDY	it's thought these are related to the diode matrix – for example,TH-G71 radios with the extended receive mod report different values. Handy if you could set them via the serial port!
UIDIG nnn	UIDIGI path [D700]
UNIT [0|1]	APRS Display Unit0 = Miles/F, 1=Km and Celcius (1 Should be the default 🙂 [D7]
UPR string	Unproto String – APK001 = Default [APK101 for D700]
UP	UP Moves the Memory Channel up (similar to DW) – Similar to DW
VCS [0|1]	SSTV VC Shutter 1=on
VMC [0|1][0-3]	Mode of band [A|B] 0=VFO, 2=Memory, 3=call
VSC [0|1]	Visual Scan [D700]
VSL xxx,y	Visual scan output, I guess XXX is the "channel"number and "y" is the signal strength (ranges between 0 and 7 like

	the main signal strength) [D700]
VSM n	visual scan mode, 1 = 31 channel, 2 = 61 ch, 3 = 91 ch, 4 = 181 ch. [D700]
VW	VFO Write ???
WAY n	waypoint reporting format -0 = off 1 = 6 digits NMEA 2 = 7 digits NMEA 3 = 8 digits NMEA 4 = 9 digits NMEA 5 = 6 digits Magellan 6 = DGPS

UNKNOWN COMMANDS

Command	Comment
GC	
GM	
SR	
TH	
LAN	
NMSG	
OPTH	No Return – VC?
STM	No Return – VC?
STR	No Return – VC?
STS	No Return – VC?
STT	No Return – VC
TXN	

TYD	
ULC 0,0	

Format of the D7 Kenwood File

COMMENT	Coments?
MEMORY	Contents of radio memories
CALL	Contents of Call Channels
VCO	Contents of the VCO's
DTMF	???
RADIO MENU	
APRS MENU	APRS Setting
SSTV MENU	Slow Scan TV Settings

MEMORY

TAB Delimitered

CHANNEL|FREQ|STEPflag|SHIFTflag|REV|TONEflag|CTSSflag

|Blank|TONEcode|Blank|CTSScode|Offset|LOCKflag|FM/Amflag|Blank|Blank|Blank|
NAME

1	Memory Number – 3 Digits
2	Frequency – 9 Digits
3	VCO Number (1=118 MHz, 2=VHF, 3=SubVHF, 6=UHF
4	Frequency Step (0 = 5 HKz, 1=6.25, 2=10, 3=12.5, 4=15,5=20, 6=25, 7=30, 8=50, 9=100 KHz)
5	Reverse On
6	Tone On (1=On)
7	CTCSS On (1=On)

8	
9	Tone Frequency
10	
11	CTCSS Frequency
12	Repeater Offset – 9 Digits
13	

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For a PERL module that can be used to operate the TH-D7 click
HERE

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The following table is from Jim Gill

TNC/Serial Port is in THIS MODE	TO GO TOTHIS MODE	SEND THISIN UPPERCASE	Is there a delayfor the TNC to re-initialize
OFF	APRS	TNC 1	YES
OFF	PACKET	TNC 2 then TC 0	YES
OFF	RC	(not necessary)*	
APRS	OFF	TNC 0	
APRS	RC	(not necessary)*	
APRS	PACKET	TNC 2 then TC 0	YES
RC	OFF	TNC 0	

RC	APRS	TNC 1	YES
PACKET ★	OFF	TC 1 then TNC 0	
PACKET ★	RC	TC 1	NO
PACKET ★	APRS	TC 1 then TNC 1	YES

★

Don't forget to send a Ctrl-C (alt-3 on keypad, hex $03, etc) to get out of

converse mode on the TNC if necessary!

★ You

can enter any Radio Control (RC) commands while in the OFF or APRS modes.

↑