

# CAT SYSTEM PROGRAMMING

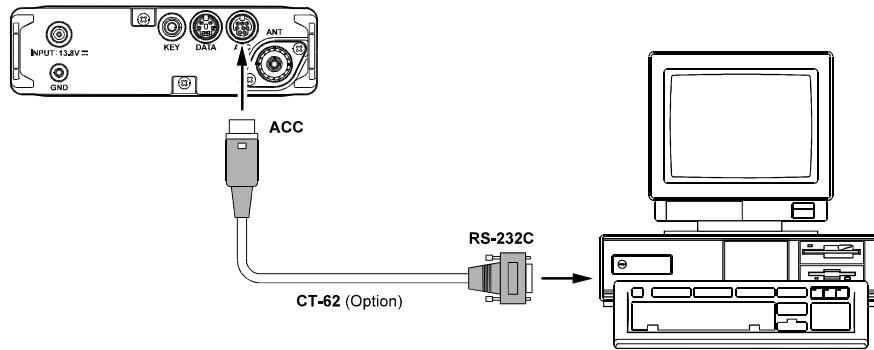
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The **FT-817ND**'s **CAT** System allows the transceiver to be controlled by a personal computer. This allows multiple control operations to be fully automated as a single mouse click, or it allows a third-party software package (such as contest logging software) to communicate with the **FT-817ND** without (redundant) operator intervention.

The Optional **CAT** Interface Cable **CT-62** is a connection cable for the **FT-817ND** and your computer. The **CT-62** has a built-in level converter, allowing direct connection from the rear panel **ACC** jack to the serial port of your computer, without the need for an external RS-232C level converter box.

Vertex Standard does not produce **CAT** System operating software, due to the wide variety of personal computers, operating systems, and applications in use today. However, the **FT-817ND** (and other Yaesu products) are widely supported by third-party software packages, and we recommend that you contact your dealer for advice, or check advertisements in amateur radio journals. Most software vendors also have Home Pages on the World Wide Web which contain a wealth of information on the features and radio support for their software packages.

The information presented in this section will allow the programmer to understand the command structure and opcodes used in the **FT-817ND**'s **CAT** System.



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## CAT Data Protocol

All commands sent from the computer to the transceiver consist of five-byte blocks, with up to 200 ms between each byte. The last byte in each block is the instruction opcode, while the first four bytes of each block are arguments (either parameters for that instruction, or dummy values required to pad the block out to five bytes). Each byte consists of 1 start bit, 8 data bits, no parity bit, and two stop bits.

Start Bit	0	1	2	3	4	5	6	7	Stop Bit	Stop Bit
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⇐ CAT DATA BYTE FORMAT

Command Data	L.S.D. Parameter 1	Parameter 2	Parameter 3	Parameter 4	M.S.D. Command
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⇐ CAT 5-BYTE COMMAND STRUCTURE

There are 17 instruction opcodes for the **FT-817ND**, listed in the chart on next page. Many of these opcodes are On/Off toggle commands for the same action (e.g. “PTT On” and “PTT Off.” Most of these commands require some parameter or parameters to be set. Irrespective of the number of parameters present, every Command Block sent must consist of five bytes.

Accordingly, any **CAT** control program must construct the five-byte block by selecting the appropriate instruction opcode, organizing the parameters as needed, and providing unused “dummy” Eargument bytes to pad the block to its required five-byte length (the dummy bytes can contain any value). The resulting five bytes are then sent, opcode last, from the computer to the **FT-817ND** CPU via the computer’s serial port and the transceiver’s **ACC** jack.

All **CAT** data values are hexadecimal.

## Constructing and Sending CAT Commands

**Example #1:** Set the VFO frequency to 439.70 MHz

- Per the **CAT** command table, the opcode for “Set Frequency” is **01**. Placing the opcode into the 5th data bit position, we then enter the frequency into the first four data bit positions:

DATA 1	DATA 2	DATA 3	DATA 4	DATA 5
43	97	00	00	01
Parameter				Command

Send these five bytes to the transceiver, in the order shown above.

**Example #2:** Turn the Split Mode “On”

- Per the **CAT** command table, the opcode for “Split On/off” is **02**. Placing the opcode into the 5th data bit position, we then enter dummy values into all other parameter locations:

DATA 1	DATA 2	DATA 3	DATA 4	DATA 5
00	00	00	00	02
Dummy Data				Command

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## OPCODE COMMAND CHART

Command Title	Parameter				Opcode	Notes
LOCK ON/OFF	※	※	※	※	<b>CMD</b>	CMD = 00: LOCK ON CMD = 80: LOCK OFF
PTT ON/OFF	※	※	※	※	<b>CMD</b>	CMD = 08: PTT ON CMD = 88: PTT OFF
Set Frequency	P1	P2	P3	P4	<b>01</b>	P1 ~ P4 :Frequency Digits 01, 42, 34, 56, [01] = 14.23456 MHz
Operating Mode	P1	※	※	※	<b>07</b>	P1 = 00: LSB, P1 = 01: USB, P1 = 02: CW, P1 = 03: CWR, P1 = 04: AM, P1 = 08: FM, P1 = 0A: DIG, P1 = 0C: PKT
CLAR ON/OFF	※	※	※	※	<b>CMD</b>	CMD = 05: CLAR ON CMD = 85: CLAR OFF
CLAR Frequency	P1	※	P3	P4	<b>F5</b>	P1 = 00: "+" OFFSET P1 ≠ 00: "-" OFFSET P3, P4: CLAR Frequency 12, 34 = 12,34 kHz
VFO-A/B	※	※	※	※	<b>81</b>	Toggle
SPLIT ON/OFF	※	※	※	※	<b>CMD</b>	CMD = 02: SPLIT ON CMD = 82: SPLIT OFF
Repeater Offset	P1	※	※	※	<b>09</b>	P1 = 09: "-" SHIFT P1 = 49: "+" SHIFT P1 = 89: SIMPLEX
Repeater Offset	P1	P2	P3	P4	<b>F9</b>	P1 ~ P4 :Frequency Digits 05, 43, 21, 00, [F9] = 5.4321 MHz
CTCSS/DCS Mode	P1	※	※	※	<b>0A</b>	P1 = 0A: DCS ON P1 = 2A: CTCSS ON P1 = 4A: ENCODER ON P1 = 8A: OFF
CTCSS Tone	P1	P2	※	※	<b>0B</b>	P1 ~ P2: CTCSS Tone Frequency (Note 1)
DCS Code	P1	P2	※	※	<b>0C</b>	P1 ~ P2: DCS Code (Note 2)
Read RX Status	※	※	※	※	<b>E7</b>	(Note 3)
Read TX Status	※	※	※	※	<b>F7</b>	(Note 4)
Read Frequency & Mode Status	※	※	※	※	<b>03</b>	(Note 5)
POWER ON/OFF	※	※	※	※	<b>CMD</b>	CMD = 0F: POWER ON (Note 6) CMD = 8F: POWER OFF

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## Note 1: CTCSS Tone

CTCSS TONE FREQUENCY (Hz)					
67.0	69.3	71.9	74.4	77.0	79.7
82.5	85.4	88.5	91.5	94.8	97.4
100.0	103.5	107.2	110.9	114.8	118.8
123.0	127.3	131.8	136.5	141.3	146.2
151.4	156.7	159.8	162.2	165.5	167.9
171.3	173.8	177.3	179.9	183.5	186.2
189.9	192.8	196.6	199.5	203.5	206.5
210.7	218.1	225.7	229.1	233.6	241.8
250.3	254.1	—	—	—	—

P1, P2: CTCSS Tone Frequency

P1 P2  
08 85 = 88.5 Hz

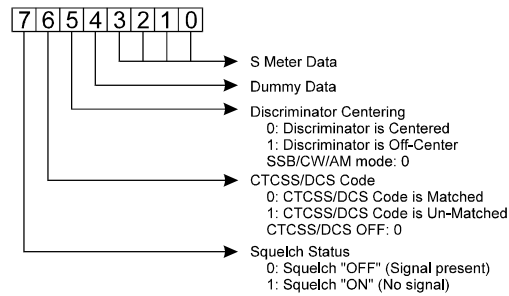
## Note 2: DCS Code

DCS CODE									
023	025	026	031	032	036	043	047	051	053
054	065	071	072	073	074	114	115	116	122
125	131	132	134	143	145	152	155	156	162
165	172	174	205	212	223	225	226	243	244
245	246	251	252	255	261	263	265	266	271
274	306	311	315	325	331	332	343	346	351
356	364	365	371	411	412	413	423	431	432
445	446	452	454	455	462	464	465	466	503
506	516	523	526	532	546	565	606	612	624
627	631	632	654	662	664	703	712	723	731
732	734	743	754	—	—	—	—	—	—

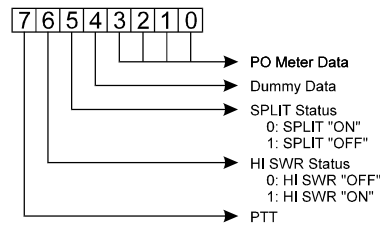
P1, P2: DCS Code

P1 P2  
00 23 = 023

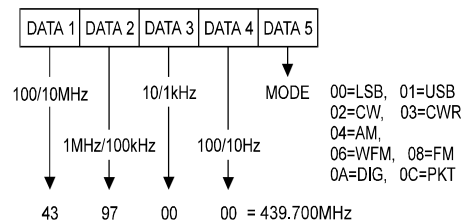
## Note 3: Read RX Status



## Note 4: Read TX Status



## Note 5: Read Frequency & Mode Status



## Note 6: POWER ON/OFF

- Do not use this command when using Alkaline batteries or the supplied **FNB-85** Ni-MH battery Pack.
- Send a 5-byte dummy data (such as "00, 00, 00, 00, 00") first, when send this command.