ELECRAFT K3 PROGRAMMER'S REFERENCE

Rev. C14 (See Appendix A for change history)

Command Set Overview

The K3 firmware provides a large set of remote control commands (**Table 1**). See the **Command Examples** section (page 4) to get a feel for how they're used. Details on individual commands start on page 6.

Table 1 K3 Control Commands. Note: ($) = Add '$' to target sub receiver. (*) = Not available on the K2.

Name	Description	Name	Description	Name	Description
! , @ *	Direct DSP control	FT	Transmit VFO select	PS *	Power-on/off control
AG $ *	AF gain	FW $	Filter bandwidth and #	RA $	RX attenuator on/off
AI	Auto-info mode	GT	AGC speed and on/off	RC	RIT/XIT offset clear
AN	Antenna selection	IC *	Icon and misc. status	RD	RIT down
BG	Bargraph level	ID	Radio identification	RG $ *	RF gain
BN $ *	Band number	IF	General information	RO *	RIT/XIT offset (abs)
BR *	Baud rate set	IS *	IF shift	RT	RIT on/off
BW $ *	Filter bandwidth	K2	K2 command mode	RU	RIT up
CP *	Speech compression	K3 *	K3 command mode	RV *	Firmware revisions
CW *	CW sidetone pitch	KS	Keyer speed	RX	Enter RX mode
DB *	VFO B text	KY	Keyboard CW/DATA	SB *	Sub RX on/off
DL *	Internal use only	LD *	Internal use only	SD *	QSK delay
DM *	DSP RAM read	LK $	VFO lock (A or B)	SM $	S-meter
DN/DNB	VFO (or menu) down	LN *	Link VFOs	SP *	Internal use only
DS	VFO A text,basic icons	MC *	Memory channel	SQ $	Squelch level
DT *	Data sub-mode	MD $	Operating mode	SWT/H *	Switch emulation
DV *	Diversity mode	MG *	Mic gain	TB *	Buffered text
ER *	Internal use only	ML *	Monitor Level	TE *	Transmit EQ
ES *	ESSB mode	MN *	Menu entry number	TQ	Transmit query
EW *	Internal use only	MP *	Menu param read/set	TT *	Text-to-terminal
FA	VFO A frequency	NB $	Noise blanker on/off	TX	Exter TX mode
FB	VFO B frequency	NL $ *	Noise blanker level	UP/UPB *	VFO (or menu) up
FI *	I.F. center frequency	OM *	Option modules	VX *	VOX state
FN *	Func. encoder control	PA $	RX preamp on/off	XF $ *	Crystal filter number
FR	Receive VFO select	PC	Power output level	XT	XIT on/off

Some commands emulate front-panel controls. For example, the **SWT/SWH** commands emulate switch TAP or HOLD, **MN** directly accesses menu functions, **DS** reads the contents of the VFO A display, and **DB** reads VFO B.

Other commands directly read or modify radio parameters, such as the VFO A and B frequencies (**FA** and **FB**), operating mode (**MD**), keyer speed (**KS**), power level (**PC**), and filter bandwidth (**BW** or **FW**).

There is some overlap between emulation and parametric commands. For example, you can select the *next* operating mode using an **SWT** command to virtually "tap" the $\boxed{\textbf{MODE}}$ switch, or set a *specific* mode using **MD**.

Using K3 Utility to Test Commands and Create K3 Switch Macros

The **Command Tester** screen of the *K3 Utility* PC application can be used to try individual control commands. You can even save useful commands (or strings of commands) as named *macros* for later use. A subset of these macros can be stored in the K3's EEPROM memory, where they can be assigned to programmable function switches (PFx/Mx). See the **Command Examples** section (page 4).

Command Format

Commands sent from the computer to the K3 are considered either GETs or SETs. GET commands are used by the computer to get information from the K3; the K3 will then provide an appropriate response message (RSP). SET commands are sent by the computer to change the radio's configuration or initiate an event. A SET can be followed by a GET to verify the new settings, or the *auto-info* mechanism can be used for confirmation that something has changed (see **AI** in the Meta-commands section).

SET commands use 2 or 3 characters, optional data fields, and a terminating semicolon (**;**). Examples:

KS020;	Computer sets CW speed to 20 WPM (data = 020)
MD1;	Computer selects LSB mode (data = 1)

Many SET commands have a corresponding GET command, which is just the command letters with no data. The data format of the response message from the K3 (RSP) is usually identical to the format of the SET data. Exceptions are noted in the command descriptions.

Characters sent to the K3 can use either upper or lower case. The K3 will always respond with upper case, except when a lower-case character is a place-holder for a special symbol (e.g., the VFO B display command, **DB**).

Sub Receiver/VFO B Commands ($), Linked VFOs, and Diversity Mode

Some commands target the sub receiver and VFO B if a dollar sign (**$**) is added after the command prefix. Examples include **AG$**, **RG$**, **MD$**, **BW$, FW$, LK$**. This is indicated in the reference section by a $ in the command title. (Some commands target VFO B itself and do not need the '$', including **FB**, **UPB**, **DNB**, and **DB**.)

If the VFOs are linked (see **LN**), commands that affect the VFO A frequency also change VFO B. This includes **FA**, **UP**, **DN**, **RU**, **RD**, and **RC**. In Diversity mode, **BW**, **FW** and **MD** match the VFO B/sub receiver filter and mode settings, respectively, to the main receiver.

Extended Commands

Some commands have an **extended** data format which provides enhanced functionality or backward compatibility with older software applications. Such commands should be avoided in switch macros because of the need to use a *meta-command* to enable extended functionality (see **Meta-commands** section). Alternatives are available. For example, the **BW** (bandwidth) command should be used in macros rather of the legacy **FW** command, which depends on meta-command settings.

Response Time

The K3 will typically respond in less than 10 milliseconds. General worst-case latency is around 100 ms, except for commands that change bands, which can take up to 500 ms.

Since the K3 provides a full-duplex interface, the computer can send the K3 commands at any time. Continuous, fast polling (< 100 ms per poll for bar graph data in transmit mode, for example) should be carefully tested to ensure that it isn't affecting radio operation. Polling during transmit not be used unless necessary.

Busy/Limited Access Indication (?;)

Some commands cannot be safely handled when the K3 is in a *busy* state, such as transmit, or in a *limited-access* state, such as BSET or VFO A/B reverse (REV switch). If a command cannot respond due to such a condition, the K3 will return "**?;**". Future firmware releases will gradually become less restrictive in this regard.

You can use the **TQ** command to see if the K3 is in transmit mode, and the icon/status command (**IC**) to check for BSET mode (byte **a**, bit **6**).

Meta-commands: *AI*, *K2* and *K3*

Meta-commands change the behavior of other commands, in some cases to provide backward compatibility with older application software. In general they should not be embedded in K3 front-panel switch macros, as they may adversely affect software applications that control meta-command modes. The **Command Reference** section explains when to use them with specific commands.

AI (Auto-info mode): The **AI** meta-command can be used to enable *automatic responses* from the K3 to a computer in response to K3 front panel control changes by the operator. Application software may use **AI1** or **AI2** mode as an alternative to continuous polling. (Not appropriate for switch macros.)

> **AI0,** *No Auto-info:* This is the default. The PC must poll for all radio information using GET commands; the K3 will not send any information automatically.

> **AI1,** *Auto-Info Mode 1:* The K3 sends an **IF** (info) response within 1 second when any frequency or mode-related event occurs, either manually (at the radio itself) or when the PC sends commands. These events include: band change, mode change, VFO movement, RIT/XIT offset change or clear, and several additional switches (e.g., A/B, REV, A=B, SPLIT, CW REV, RIT, XIT). **IF** responses are suppressed during VFO movement. **Notes:** (1) putting the K3 into auto-info mode 1 (by sending **AI1;**) causes an initial **IF** response. (2) The K3 can be placed into **AI1** mode without a PC by setting *CONFIG:AUTOINF* to **AUTO 1**. The user may do this to support non-PC devices that make use of auto-info, such as a SteppIR antenna controller. Application software can check for unexpected **IF** responses and turn **AI** off if required.

> **AI2,** *Auto-Info Mode 2:* The K3 sends an appropriate response (**FA**, **FB**, **IF**, **GT**, **MD**, **RA**, **PC**, etc.) whenever any front-panel event occurs. This applies to all of the events mentioned for mode **AI1**, and ultimately to all rotary control changes and switch presses. At present only a subset of controls generate responses.

> **AI3,** *Combination*: This is similar to mode **AI2** and is provided only for compatibility with existing programs.

K2 (K2 command mode): The **K2** meta-command modifies the set/response format of some commands. Avoid using this command in switch macros.

> **K20,** *K2 Normal mode:* This is the default; K2 command extensions are disabled.

> **K21,** *K2 Normal/rtty_off:* Same as **K20**, except that **MD** and **IF** report RTTY and RTTY-reverse modes as LSB and USB, respectively. This may be useful with programs that don't support a separate RTTY mode.

> **K22,** *K2 Extended mode:* Enables all K2 command extensions.

> **K23,** *K2 Extended mode/rtty_off:* Enables all K2 extensions, but like **K21**, alters the **MD** and **IF** commands.

K3 (K3 command mode): The **K3** meta-command modifies the set/response format of some commands. Avoid using this command in switch macros.

> **K30,** *K3 Normal mode:* This is the default; K3 command extensions are disabled.

> **K31,** *K3 Extended Mode:* Enables all K3 command extensions (see, for example, **FW**). Typically, K3 applications will place the K3 in **K31** mode except when **K30** mode is needed due to the use of certain commands.

Command Examples

Macros

Macros – strings containing one or more control commands – can be used to automate K3 front panel switch sequences. **Table 2** lists some examples. See *Creating and Using Macros* (page 5) for complete instructions.

Table 2 Sample Macros. These can be altered or combined as needed (see the **Command Reference** section).

Label	Description	Command string
SPLIT+2	CW DX split starting point: A>B twice, enter SPLIT, move VFO B up 2 kHz, RIT/XIT off	SWT13;SWT13;FT1;UPB5;RT0;XT0;[1]
EQ MIC1	Boost 100-Hz TX EQ band by 8 dB; others "flat"	TE+00+08+00+00+00+00+00+00;
WEAKSIG	Diversity mode, main/sub preamps on, 200-Hz bandwidth, no IF shift	DV1;PA1;PA$1;BW0020;IS 9999;
CLEANUP	Turn off split/RIT/XIT; unlink VFOs; open squelch	FT0;RT0;XT0;LN0;SQ000;
WWV 10	30 m, AM mode, VFO A to 10.0 MHz, 3 kHz AF bandwidth (requires 6 kHz IF crystal filter)	FA00010000000;MD5;FA00010000000; BW0300;[2]
OLDIES	Switch to N6KR's favorite late-night AM music station (1550 kHz); 4 kHz BW, attn. on, preamp off	FA00001550000;MD5;FA00001550000; BW0400;IS 9999;RA01;PA0;
LCD BRT	Set the MAIN:LCD BRT menu parameter to 6	MN003;MP005;MN255;[3]
MEM32	Load frequency memory #32	MC032;
LOCKA&B	Lock both VFOs	LK1;LK$1;
PWRTEST	Send "BT" at 100 W, 10 W, and 1 W, then restore power to 100 W ("=" embeds a BT prosign)	PC100;KYW =;PC010;KYW =; PC001;KYW =;PC100;
TUN 10W	Set power to 10 W and enter TUNE mode	PC010;SWH16;
AMP ON	Turn on an external amplifier and set K3 drive to 65 W (see CONFIG:DIGOUT1, Owner's Manual)	MN019;MP001;MN255;PC065;
599FAST	Send "5NN" at 40 WPM, "TEST " at 30 WPM	KS040;KYW5NN ;KS025;KYWTEST ;
MUTE AF	Set main and sub AF GAIN to zero	AG000;AG$000;
MON OFF	Set monitor volume to zero (present mode)	ML000;
SCANNOW	Stores VFO A & B in per-band quick-memory M4 and starts scan (> 2 second hold starts "live" scan); VFO B frequency must be > VFO A	SWT15;SWT39;SWT23;SWT39;SWH41;[4]
STEPPIR	Send frequency info to a device attached to the serial port, such as an antenna controller or ATU	IF;[5]

---

[1] **SWT13** is a switch-emulation command that has the same effect as tapping A>B. **FT1** enters split mode. The number **5** in **UPB5** is not a value in kHz, but an index into the table of step sizes (in this case 2 kHz); see the **DN** command in the command reference for full details. **RT0** and **XT0** turn off RIT and XIT.

[2] The first **FA** command in this macro may cause a band change. **MD** (mode) is sent after it, so the mode change will apply to the new band. The second **FA** command is only required if auto-offset-on-mode-change is in effect. (In *CONFIG: CW WGHT*, tapping 5 alternates between **VFO NOR** and **VFO OFS**. In the latter case, the VFO frequency is adjusted when switching between CW and any other mode.)

[3] **MN** accesses menu entries. **MP** can then be used (in some cases) to read or set the parameter value. In the LCD BRT macro, **MP005** sets **LCD BRT** to **6**. You can determine a menu entry's parameter range by manually setting the parameter to the lowest/highest values, typing "**MP;**" each time in the command test box at the top of the **Command Tester** screen.

[4] This example uses per-band memory M4 (SWT39), but any of M1-M4 could be used, or quick memories 0-9 (see SWT/SWH command). If scanning is started with a macro, the last switch emulation command in the macro must be **SWH41** (SCAN).

[5] **IF** is a GET command (general transceiver info, including VFO A's frequency and mode). When the K3 encounters a GET command in a macro, it sends the response to any device attached to the serial port, just as if a computer had requested it. Multiple GET commands could be placed in a macro if necessary; examples include **FA** and **FB** (VFO A and B frequencies).

Creating and Using Macros

K3 Utility is used to create and test macros. The first eight of these can be sent to the K3, where they can be assigned to any of the K3's ten programmable function switches (PF1, PF2, M1-M4 tap, M1-M4 hold). Macros can have a length of up to 120 characters, along with a label of up to 7 characters.

Example ("SPLIT+2"):   ***A>B, A>B, SPLIT, VFO B up 2 kHz, RIT/XIT off,*** assigned to **PF1**

To create this macro and assign it to a K3 front panel switch, you'll need to complete all of steps 1-8 below. Once you've been through the process one time, you'll find creating or modifying macros very easy.

1. Run ***K3 Utility***.
2. Click on the **Command Tester/K3 Macros** tab.
3. Click on the **Edit Macros** button at the top of the screen. This brings up the macro edit window.
4. In MACRO 1's **Macro Label** field, enter the label "SPLIT+2".
5. In the **Macro Commands** field, enter:

   SWT13;SWT13;FT1;UPB5;RT0;XT0;

Note: The number **5** in the "**UPB5**" command is not a value in kHz; it is an index into a table of step sizes. **UPB5** moves VFO B up 2 kHz, **DNB5** moves it down 2 kHz, etc. (there are similar commands for VFO A). For the full list of **UP**/**DN** command variations, see the **DN** (down) command (page 7).

6. Click on **Send Macros 1-8 to K3**. Exit the edit window by clicking **Save**. The macro can now be tested from within the Command Tester by clicking on its associated button. (The label won't flash on VFO B when this is done from *K3 Utility* – only when using the assigned switch at the K3.)
7. At the K3, locate *CONFIG:MACRO x* menu entry. Tap '1' if the menu entry label is not already "MACRO 1".
8. Hold **PF1** to assign **PF1** to *MACRO 1*. Exit the menu.

From then on, using **PF1** will flash **SPLIT+2** and execute the above sequence.

Important Restrictions: (1) Macros normally only use *SET* commands, since they can't make use of the response from a *GET*. For a very useful exception to this rule, see the last sample in **Table 2**. (2) Macros should not use *meta-commands* (like **K31;**) as this can interfere with software applications that control meta-modes. (3) Macros can be used to send direct DSP commands (see **!** and **@**, page 6), but at present this only works from *K3 Utility*, not from K3 front-panel switches.

Simple Application Program

The pseudo-code program below displays the VFO A frequency (8 digits) while watching for the user to request a frequency change via the PC keyboard. For details on individual commands, see the **Command Reference** section.

```
VfoControlLoop
{
        SendCommand( "FA;" )                          // GET frequency of VFO A
        StringF = GetResponse( TIMEOUT_100MS )        // wait for response; include a timeout, just in case
        Display( StringSubset( StringF, 5, 12 ) )     // show MHz through Hz digits on PC screen
        If( KeyboardInput = "+" )                     // up/down control could be a mouse click instead
                SendCommand( "UP;" )                  // this is a SET command that moves VFO A up
        If( KeyboardInput = "-" )
                SendCommand( "DN;" )
}
```

Command Reference

Note: Commands marked with a dollar sign ($) can be used with the sub receiver. Commands marked with an asterisk (*) are not available on the Elecraft K2.

This section describes all K3 GET, SET and RSP (response) command formats. Unless otherwise noted, the GET format is just the 2 or 3 letters of the command followed by a semicolon. The SET and RSP data formats are identical unless noted otherwise. When **K2** or **K3** extended modes are in effect (typically **K22** or **K31**), some commands have an **extended** format (see **Meta-commands**). Both **Basic** and **Extended** formats are described here.

*! and @ * (Direct Main/Auxiliary DSP control)*

Elecraft releases documentation on specific DSP commands as user needs for them arise [TBD]. DSP command can cause side effects and should be used with caution. **NOTE: At present, DSP commands can <u>not</u> be used in combination with regular commands in *K3 Utility* macros. Also, they will not work as K3 switch macros.**

*AG $ * (AF Gain; GET/SET)*

SET/RSP format: **AGnnn;** or **AG$nnn;** where **nnn** is 000-255.

AI (Auto-Information; GET/SET)

SET/RSP format: **AIn;** where **n** is 0-3. See Meta-commands for details. **Note:** The **AI** power-up default is normally **AI0**, corresponding to K3 menu setting *CONFIG:AUTOINF* = **NOR**. *AUTOINF* can also be set to **AUTO 1**, which makes the default **AI1** on power-up. This is useful for K3s controlling a StepIR antenna, etc.

AN (Antenna Selection; GET/SET)

SET/RSP format: **ANn;** where **n** is **1** for antenna 1, and **2** for antenna 2.

BG (Bargraph Read; GET only)

RSP format: **BGnn;** where **nn** is **00** (no bars) through **10** (bar 10) if the bargraph is in **DOT** mode, and **12** (no bars) through **22** (all 10 bars) if the bargraph is in **BAR** mode. Reads the S-meter level on receive. Reads the power output level or ALC level on transmit, depending on the **RF/ALC** selection. Also see **SM/SM$** command, which can read either main or sub RX S-meter level.

*BN $ * (Band Number; GET/SET)*

SET/RSP format: **BNnn;** where **nn** is 00-24, the present "logical" band for VFO A (use **BN$nn** for VFO B). **Note:** **BN** SET command applies only to VFO A at present. **BN** GET works with either VFO A or B.

nn is defined as follows: **0**=160 m, **1**=80 m, **2**=60 m, **3**=40 m, **4**=30 m, **5**=20 m, **6**=17 m, **7**=15 m, **8**=12 m, **9**=10 m, **10**=6 m, **11-15** reserved for future expansion, **16**=Xvtr band #1, **17**=Xvtr band #2… **24**=Xvtr band #9.

Also see **MC** command (memory channel set).

*BR * (Serial I/O Baud Rate; SET only)*

SET format: **BRn;** where **n** is **0** (4800 b), **1** (9600 b), **2** (19200 b), or **3** (38400 b). **Note:** The K3 firmware download utility automatically sets the K3 to 38400 baud for downloads, then restores the baud rate to the user's selection (made using the K3's *CONFIG:RS232* menu entry).

BW $ * (Filter Bandwidth; GET/SET)

SET/RSP format: **BWxxxx;** where **xxxx** is 0-9999, the bandwidth in 10-Hz units. May be quantized and/or range limited based on the present operating mode.

Notes: (1) **BW** is a dervative of the legacy **FW** command. **BW** is safer to use in switch macros, because it makes no assumptions about meta-command settings (**K2x** and **K3x**). **FW** may be preferred in applications. (2) In diversity mode, **BW** matches the sub receiver's filter bandwidth to the main receiver's. (3) Both **BW** and **BW$** can be used in BSET mode (one exception: at present, **BW/BW$** SET can't be used in BSET mode with diversity receive in effect).

CP * (Speech Compression; GET/SET)

SET/RSP format: **CPxxx;** where **xxx** is 000-040 (speech compression level).

CW * (CW Sidetone Pitch; GET only)

RSP format: **CWxx;** where **xx** is 30-80 (sidetone pitch in 10 Hz units).

DB * (VFO B Display Read/Write; GET/SET)

GET format: **DB;** (no data). Returns text displayed on VFO B. If there are no decimal points or colons in the display, 7 characters are returned. Up to two decimal points OR two colons may be used, so up to 9 ASCII characters may be returned. VFO B normally displays only uppercase alphabetic characters. **DB** returns the following lower-case characters that represent symbols: **a** (antenna), **b** (mu), **c** (slashed 0), **d** (itself), **e** (sigma), **f** (<-), **g** (->), **h** (II), **i** (left-justified "1"), **j** (delta, large), **k** (delta, small), **l** (right-justified "1").

There are two SET formats with different functions:

DBnn; where **nn** is one of the available VFO B alternate display mode (**00**=normal, **01**=time, **02**=date, **03**=RIT/XIT offset, **04**=supply voltage, **05**=supply current, **06**=PA heatsink temp, **07**=front panel temp, **08**=PLL1 voltage, **09**=PLL2 voltage, **10**=AFV, **11**=dBV). Modes 08 and higher require *CONFIG:TECH MD* = **ON**.

DBn; where **n** is an ASCII character to send to VFO B, entering at the right end of the display and scrolling left as additional characters are entered. This can be used to create scrolling messages to alert the operator to something regarding the computer, send extended help text, insert a newsfeed, report a DX spot, test special characters, etc.

DL * (DSP Command Debug On/Off; SET only)

SET format: **DLx;** where **x** = 2 to turn DSP command debugging OFF, **3** to turn it ON. When it's ON, all commands sent from the MCU to the DSP are echoed to the K3's serial port, with a few exceptions such as during program loading. The DVR recording icon will turn on as a reminder.

DM * (DSP RAM Read; GET only)

GET format: **DMxxxxy;** where **xxxx** is a 16-bit hex address offset from the DSP RAM base address and y is a byte count from 0-9. RSP format: **DMxxxx.aa.bb.cc**, where **xxxx** is the GET address and **aa** (etc.) are data bytes (hex).

DN/DNB (Move VFO A or B, or Menu Entry/Parameter Down; SET only)

SET format: **DN;** or **DNB;** or **DNn;** or **DNBn;** where **n** is an optional VFO change specification. **DN;** and **DNn;** move VFO A (or the menu parameter) down. **DNB;** and **DNBn;** move VFO B (or the menu entry) down. VFO displacement, **n**: **0**=1 Hz; **1** or **not used**=10 Hz; **2**=20 Hz; **3**=50 Hz; **4**=1 kHz; **5**=2 kHz; **6**=3 kHz; **7**=5 kHz; **8**=100 Hz; **9**=200 Hz.
Note: If the VFOs are linked (non-SPLIT), **DN;** and **DNn;** set VFO B to the same frequency as VFO A.

DS (VFO A and Basic Icon Read; GET only)

GET format: **DS;** (no data). Returns everything needed to reproduce the contents of the VFO A display, as well as a basic subset of the LCDs icons (also see **IC** command, which provides many more status indicators and does not require that **K31** be in effect). The format of the response message is: **DStttttttttaf;** where **tttttttt** is the LCD text and decimal point data, **a** is icon data, and **f** is icon flash data (all 0 for the K3), or additional K3 icon data. These fields are detailed below.

TEXT and decimal point data: This field contains 8 bytes, with values 0x30 - 0xFF (hex). The first byte is the left-most displayed character. Bit 7 (MSB) of each byte indicates whether the decimal point to the *left* of each character is on (1) or off (0)[6]. The other bits contain an ASCII character that corresponds to the displayed character.

Some ASCII characters (e.g., 'X', 'M') cannot be shown on VFO A, which uses a 7-segment display. The K3 uses such characters as placeholders for special characters that *can* be displayed – in some cases lowercase versions of uppercase letters – to enhance display readability. For this reason, the characters returned by the **DS** command must sometimes be converted to other characters by the software application. **Table 3** shows all possible conversions, some not used. The table assumes the decimal-point flag (bit 7) is 0.

The menu parameters for *MAIN:RX EQ / TX EQ* consist of 8 "mini bar-graphs" with 5 possible "levels." These show up as the following characters in the **DS** response string (level 1 through 5): '_', '=', '>', ']', and '^'. To see how these should appear in a graphical application, go into RX EQ and vary one of the EQ bands over its full range.

Table 3   DS response character conversions (bit 7 cleared).

DS chr.	Converts to	DS chr.	Converts to	DS chr.	Converts to
<	small-caps L	M	N	Z	lowercase c
>	dash	Q	O	[	r-bar
@	space (blank)	V	U	\	lambda
K	H	W	I	]	RX/TX EQ level 4
		X	c-bar	^	RX/TX EQ level 5

Icon data: This field is a single byte whose value is between 0x80 and 0xFF. Bit 7 is always 1. The other 7 bits indicate the on/off states of 8 icons common to the K2 and K3. The bits are defined as follows (B7 = 0x80).

B7: Always 1   B3: 1=ATT on
B6: 1=NB on*   B2: 0=VFO A selected (always 0 for K3)
B5: 1=ANT2 selected   B1: 1=RIT on
B4: 1=PREAMP on   B0: 1=XIT on

Icon flash data or additional K3 icons: This field is a single byte whose value is between 0x80 and 0xFF. Bit 7 is always 1. In K3 normal mode (K30, or K2 emulation), the other 7 bits are all 0, since in general the K3 doesn't use flashing icons to indicate state. In **K3 Extended** mode (**K31**), the bits are defined as follows (B7 = 0x80):

B7: Always 1   B3: 1=CWT on
B6: 1=SUB on*   B2: 1=NR on*
B5: 1=RX ANT on   B1: 1=NTCH on
B4: 1=ATU on (in-line)   B0: 1=MAN NOTCH on

* The **IC** command provides extended info about the sub receiver (SUB on/off state, linked VFOs, band independence, diversity, sub antenna selection, sub AUX antenna source, sub NB, and sub NR). **IC** does not require the use of **K31**, which may be an advantage for some applications.

---

[6] K2 decimal point flash status can be obtained directly; use **LK** for VFO lock, **IF** for scan on/off, and **GT** for AGC on/off.

DT * (DATA Sub-Mode; GET/SET)

SET/RSP format: **DTn;** where **n** is the data sub-mode last used with VFO A, whether or not DATA mode is in effect: 0 (DATA A), 1 (AFSK A), 2 (FSK D), or 3 (PSK D). See **MD** for data normal/reverse considerations. In *Diversity Mode* (accessed by sending **DV1;** or via a long hold of **SUB**), sending **DTn;** matches the sub receiver's mode to the main receiver's. **Notes:** *(1) Use DT only when the K3 is in DATA mode; otherwise, the returned value may not be valid.* (2) In AI2/3 modes, changing the data sub-mode results in both **FW** and **IS** responses. (3) The present data sub-mode is also reported as part of the **IF** command, although this requires that **K31** be in effect. Refer to the **IF** command for details.

DV * (Diversity Mode; GET/SET)

SET/RSP format: **DVn;** where **n** is 0 to turn diversity mode OFF, 1 to turn it ON. Requires subreceiver. **Note:** The **SUB** switch has two other functions besides diversity on/off (long hold): sub on/off (tap) and link/unlink VFOs (normal hold). These can be accomplished remotely; see **LN** (link) and **SB** (sub on/off). Turning the sub off cancels diversity mode.

ES * (ESSB Mode; GET/SET)

SET/RSP format: **ESn;** where **n** is 0 to turn ESSB mode OFF, and 1 to turn it ON. **Note: The application must place the K3 in either LSB or USB mode for the ESSB ON condition to be relevant.**

FA and FB (VFO A/B Frequency; GET/SET)

SET/RSP format: **FAxxxxxxxxxxx;** or **FBxxxxxxxxxxx;** where **xxxxxxxxxxx** is the frequency in Hz. Example: **FA00014060000;** sets VFO A to 14060 kHz. The Hz digit is ignored if the K3 is not in FINE mode (1-Hz tuning; use **SWT49**). If the specified frequency is in a different amateur band than the present one, the K3 will change to the new band, and will automatically report the new values of parameters that may have changed[7]. **Notes:** (1) **Band changes typically take 0.5 seconds; all command handling is deferred until this process is complete.** (2) If the specified frequency is over 30 MHz and is within a valid transverter band (as specified by the operator using the K3's **XVTR** menu entries), the K3 will switch to that transverter band. If the specified frequency is outside the range of 500 kHz-30 MHz and 48-54 MHz, the K3 will switch to the amateur band closest to the requested one, and the last-used VFO A and VFO B values for that band will be retrieved.

If the VFOs are linked (non-SPLIT), **FA** also sets VFO B to the same frequency as VFO A.

FI * (I.F. Center Frequency; GET only)

RSP format: **FInnnn;** where **nnnn** represents the last 4 digits of the K3's present I.F. center frequency in Hz. Example: If nnnn = 5000, the I.F. center frequency is 8215000 Hz. Intended for use with panadapters, which need to keep track of the exact I.F. center frequency as filter bandwidths and shifts are changed by the operator.

FN * (Function Encoder control; GET/SET)

Note: This command has not yet been implemented. It will allow read/set of the four multifunction controls.

FR (RX VFO Assignment [K2 only] and SPLIT Cancel; GET/SET)

SET/RSP format: **FRn;** where **n** is ignored in the K3 case because VFO A is always active for receive mode (the K3 cannot emulate the K2's VFO A/B behavior). Any **FR** SET cancels SPLIT mode.

FT (TX VFO Assignment and optional SPLIT Enable; GET/SET)

SET/RSP format: **FTn;** where **n** specifies the transmit-mode VFO assignment: 0 for VFO A, 1 for VFO B. If B (1) is selected for transmit, the K3 will enter SPLIT (except when split is N/A). Use **FR0;** to cancel SPLIT.

---

[7] The parameters sent on band change include **IF** (includes new mode), **FA**, **FB**, **FR**, **FT**, **PA**, **RA**, **AN**, **GT**, **FW**, and **NB**.

FW $ (Filter Bandwidth and Number; GET/SET)

NOTE: Use BW rather than FW in switch macros (see BW).

K3 Extended SET/RSP format (**K31**): **FWxxxx;** where **xxxx** is 0-9999, the bandwidth in 10-Hz units. May be quantized and/or range limited based on the present operating mode.

Basic and K2 Extended formats: See KIO2 Programmer's Reference (K2). In **K22** mode, direct selection of crystal filters is possible by adding a 5th digit. However, **K31** must not be in effect, or it will override the legacy K2 behavior and only allow direct bandwidth selection. For example, you could send **K30;K22;FW00003;K20;K31;** to select filter #3 and then restore the original **K2x** and **K3x** command modes (yours may be different).

Notes: (1) In **AI2**/**3** modes, moving the physical WIDTH control results in both **FW** and **IS** responses (width and shift). (2) In diversity mode, **FW** matches the sub receiver's filter bandwidth to the main receiver's, which may result in the generation of **FA**/**FB**/**FR**/**FT** responses. (3) Both **FW** and **FW$** can be used in BSET mode (one exception: at present, **FW**/**FW$** SET can't be used in BSET mode with diversity receive in effect). (4) In **K22** mode, a legacy 6th digit is added to the response. It is always 0. In the K2, it indicated audio filter on/off status.

GT (AGC Time Constant; GET/SET)

Basic SET/RSP format: **GTnnn;** where **n** is 002 for fast AGC and 004 for slow AGC.
K2 Extended SET/RSP format (K22): **GTnnnx;** where **x** is 0 (AGC off) or 1 (AGC on).
Note: AGC time constant is stored per-mode in the K3, as is AGC on/off and VFO tuning rate.

IC * (Misc. Icons and Status; GET only)

RSP format: **ICabcde;** where **abcde** are 8-bit ASCII characters (**Byte** in **Table 4** below) used as collections of flags (**Bit** in table). Each flag represents the status of an LCD icon and/or a specific transceiver function.

Some functions whose status is indicated by **IC** command flags can be controlled using other commands. For example, the K3 can be put into TX TEST by sending **SWH18**. The condition can be verified at any time using the **IC** command (byte **a**, bit **5**). Another example: ESSB (extended SSB) can be turned on/off using an **MN** (menu) command, followed by **SWT11**, simulating a tap of 1 on the keypad. Again, **IC** can be used to verify the present state (byte **d**, bit **5**).

The 8th bit (B7) of each byte is always 1 to ensure that control characters are not sent to the computer. The other bits are defined as shown in **Table 4**.

Table 4 **IC** response fields. See notes below.

Bit	**Byte**				
	a (Misc)	**b** (Sub RX)	**c** (CW/DATA)	**d** (Voice Modes)	**e** (Misc)
B7	Always 1	Always 1	Always 1	Always 1	Always 1
B6	1=BSET ** 0=Normal	1=VFOs linked (VFO A tunes both)	1=Full QSK 0=Semi QSK	1=VOX on in voice, DATA A, AFSK A	1= 10 Hz SHIFT 0= 50 Hz SHIFT
B5	1=TX TEST 0=Normal	1=VFO A/B bands are independent	1=Dual-passband CW in use	1=ESSB 0=Normal	1= AM Sync USB 0= AM Sync LSB
B4	1=mW power level (xvtr or KXV3 test) 0=normal power out	1=Diversity mode (requires sub RX)	1=VOX on for CW, FSK-D, or PSK-D	1=Noise gate on 0=Off	1= Main RX is squelched
B3	0=MSG bank 1 1=MSG bank 2 §	1=Sub ant. = MAIN 0=Sub ant. = AUX	1=Dual-tone FSK filter in use	1=AM Sync RX 0=Normal	1= Sub RX is squelched
B2	1=MSG is playing 0=no MSG playing	Sub RX aux source: 1=BNC (AUX RF) 0=non-TX ATU ant	1=Normal FSK TX polarity 0=inverted	1=FM PL tone on 0=Off	1=Sub RX NR is on 0=Off
B1	1 =*CONFIG:MEM0-9* = **BAND SEL**	1=Sub RX NB is on 0=Off	1=Sync DATA 0=Normal	1=(+) Rptr TX ofs	0 *
B0	Preset #: 0=I, 1=II§	1=Sub RX is on	1=Text-to-terminal is in effect (see **TT**)	1=(-) Rptr TX ofs	0 *

* These bits are reserved for future use.

** If BSET is in effect (byte **a**, bit **6**=1), the values of some other flags may change or may be invalid. The application should examine this bit first.

§ Per-mode, or per mode-group (e.g., MSG bank # is stored separately for CW/FSK-D/PSK-D and voice/DATA-A/AFSK-A).

ID (Transceiver Identifier; GET only)

RSP format: **IDnnn;** where **nnn** is 017. This command is provided only for compatibility with existing software, which may use **ID** in order to distinguish between transceivers. New or modified software should send the **K3** command to the transceiver; if a **K3n;** response is received, the computer must be connected to a K3.

IF (Transceiver Information; GET only)

RSP format: **IF[f]*****+yyyyrx*00tmvspbd1*;** where the fields are defined as follows:

[f]	Operating frequency, excluding any RIT/XIT offset (11 digits; see **FA** command format)
*	represents a space (BLANK, or ASCII 0x20)
+	either "+" or "-" (sign of RIT/XIT offset)
yyyy	RIT/XIT offset in Hz (range is -9999 to +9999 Hz when computer-controlled)
r	1 if RIT is on, 0 if off
x	1 if XIT is on, 0 if off
t	1 if the K3 is in transmit mode, 0 if receive
m	operating mode (see **MD** command)
v	receive-mode VFO selection, 0 for VFO A, 1 for VFO B
s	1 if scan is in progress, 0 otherwise
p	1 if the transceiver is in split mode, 0 otherwise
b	**Basic** RSP format: always 0; **K2 Extended** RSP format (**K22**): 1 if present IF response is due to a band change; 0 otherwise
d	**Basic** RSP format: always 0; **K3 Extended** RSP format (**K31**): DATA sub-mode, if applicable (0=DATA A, 1=AFSK A, 2= FSK D, 3=PSK D)

The fixed-value fields (space, 0, and 1) are provided for syntactic compatibility with existing software.

IS * (I.F. Shift; GET/SET)

SET/RSP format: **IS*nnnn;** where * is a space, and **nnnn** is the AF center frequency (Fc) in Hz. The SET value may be altered based on the present mode; a subsequent **IS** GET reports the value used. The nominal Fc (i.e., with no SHIFT) varies with mode, and in CW or DATA modes will also vary with PITCH. To center the passband, send **IS 9xxx;** (**xxx** must be digits, but are ignored). A subsequent **IS** read will then return the center frequency.

Notes: In AM-Sync mode, send **IS 1400** / **IS 1600** to shift to LSB / USB. This doesn't actually shift the AF passband; an IS get will return **IS 1500** in AM-Sync because AF Fc remains at 1500 Hz. To determine which sideband is in use for AM sync, see the **IC** command. In AI2/3 modes, moving the physical SHIFT control results in both **IS** and **FW** responses (shift and width). In diversity mode, an **IS** command also shifts the sub receiver, and FA/FB/FR/FT commands may be generated. **IS** is not applicable to FM mode or QRQ CW mode.

K2 (K2 Command Mode; GET/SET)

SET/RSP format: **K2n;** where **n** is 0-3. If non-zero, enables K2 command extensions to legacy "2-letter" commands. (These apply to the K3 as well.) In most cases the effects of the **K2** command are independent from those of the **K3** command (see below), and the two can both be non-zero at the same time. The **FW** command is an exception; see meta-commands and **FW** for details. **BW** is a non-modal version of **FW** that is preferred in switch macros and when **AI** modes aren't used.

K3 * (Command Mode; GET/SET)

SET/RSP format: **K3n;** where **n** is 0-1. If n is 1, enables K3-specific command extensions to legacy "2-letter" commands. Not needed for new commands that are unique to the K3. In most cases the effects of the **K3** command are independent from those of the **K2** command (see above), and the two can both be non-zero at the same time. The **FW** command is an exception; see meta-commands and **FW** for details. **BW** is a non-modal version of **FW** that is preferred in switch macros and when **AI** modes aren't used.

KS (Keyer Speed; GET/SET)

SET/RSP format: **KSnnn;** where **nnn** is 008-050 (8-50 WPM).

KY (CW or CW-to-DATA Keying from Text; GET/SET)

SET format: **KY*[text];** where ***** is normally a BLANK and **[text]** is 0 to 24 characters. If ***** is a **W** (for "wait"), processing of any following host commands will be delayed until the current message has been sent. This is useful when a **KY** command is followed by other commands that may have side-effects, e.g., **KS** (keyer speed). **Basic** RSP format: **KYn;** where **n** is 0 (CW text buffer not full) or 1 (buffer full). Also see **TB** command. **K2 Extended** RSP format (K22): **KYn;** where **n** is 0 (buffer < 75% full), 1 (buffer > 75% full), or 2 (buffer completely empty AND transmit of previous string is complete.

The following keyboard characters are mapped to CW "prosigns":

    (KN   **+** AR   **=** BT   **%** AS   ***** SK   **!** VE

In addition to these prosigns, these special characters can be inserted anywhere in the **KY** command text:

    <   Puts the K3 into TX TEST mode, until a '>' character is received
    >   Returns the K3 to TX NORM mode
    @   In CW mode, this character normally terminates any CW message (via KY or manual send), emulating the K2. However, tapping **2** in *CONFIG:CW WGHT* changes '@' to a prosign: the 'at' sign as used in e-mail addresses. This is the newest Morse Code character; it can be remembered as the prosign 'AC' (as in "the At Character").
    ^D (EOT, ASCII 04) Quickly terminates transmission; use with CW-to-DATA.

LK $ (VFO Lock; GET/SET)

SET/RSP format**: LKn;** where **n** is 0 (VFO unlocked) or 1 (locked).

LN * (Link VFOs; GET/SET)

SET/RSP format**: LNn;** where **n** is 0 (VFOs unlinked) or 1 (linked).

MC * (Memory Channel; GET/SET)

SET/RSP format: **MCnnn;** where **nnn** is the memory # (or channel). Regular memories are 0**00-099**. Per-band quick memories: nnn = 100 + bandNum * 4 + Mn – 1. For bandNum, see **BN**. Mn is 1 - 4, i.e. **M1**-**M4** tap.
Notes: (1) A SET is ignored if the target memory is invalid. (2) If *CONFIG:MEM0-9* = **BAND SEL**, then memories 00**0-009** only ("Quick memories") will recall the last-used VFO frequencies in the target band, not fixed frequencies. (3) Switching to any regular memory (000-099) updates the K3's default **V>M**/**M>V** memory number; this is not the case when switching to Per-Band Quick memories (**M1**-**M4**). (4) Switching to any memory tagged with '*' as the first character in its label enables channel-hop scanning (see K3 owner's manual).

MD $ (Operating Mode; GET/SET)

SET/RSP format: **MDn;** or **MD$n;** where **n** is 1 (LSB), 2 (USB), 3 (CW), 4 (FM), 5 (AM), 6 (DATA), 7 (CW-REV), or 9 (DATA-REV). **Notes:** (1) In *Diversity Mode* (accessed by holding **SUB**), sending **MDn;** sets both main and sub mode to **n**. (2) DATA and DATA-REV select the data sub-mode that was last in effect on the present band. (To read/set data sub-mode, use **DT**.) The norm/rev conditions for the K3's data sub-modes are handled in two pairs at present: DATA A/PSK D, and AFSK A/FSK D. E.g., if the radio is set up for DATA A mode, alternating between **MD6** and **MD9** will cause both DATA A and PSK D to be set to the same normal/reverse condition. In K2 command modes 1 and 3 (**K21** and **K23**), the RSP message converts modes 6 and 7 (DATA and DATA-REV) to modes 1 and 2 (LSB and USB). This may be useful with existing software applications that don't handle DATA modes correctly.

MG * (Mic Gain; GET/SET)

SET/RSP format: **MGxxx;** where **xxx** is 000-060.

ML * (Monitor Level; GET/SET)

SET/RSP format: **MLxxx;** where **xxx** is 000-060. Applies to current mode (CW sidetone, voice, or data). In voice modes, applies to MON or DVR level, whichever is presently selected (see *MAIN:TX DVR*).

MN * (Menu Selection; GET/SET)

SET/RSP format: **MNnnn;** where **nnn** is shown in **Table 5**. **MN255** is returned if the menu is not in use. **MN** commands can be sent in any order. To exit the menu, send **MN255**. To change the parameter, use **UP** / **DN** (or **MP**—see table notes). **IMPORTANT:** TECH MD must be in effect to access tech-mode menu entries; otherwise **MN** will skip these entries. Use **MN072** to access the tech mode menu entry.

Table 5 MN values. ‡ = parameters can be read/set using **MP**. **nnn** is permanently associated with a menu entry, even if entries are added or moved later. **md** is the data mode pertaining to a menu entry: CW, SB (LSB/USB), DT (DATA), AM, or FM. **pwr** is LP (QRP), HP (QRO), or MW (0 to 2 mW, using the KXV3 transverter I/O jacks).

Entry	nnn	Entry	nnn	Entry	nnn	Entry	nnn
ALARM	000	DATE MD	030	SMTR MD	060	XVx RF	090
IAMBIC	001	DDS FRQ	031	AGC-F	061	XVx IF	091
LCD ADJ ‡	002	LIN OUT ‡	032	REF CAL	062	XVx PWR	092
LCD BRT ‡	003	KIO3	033	SQ MAIN	063	XVx OFS	093
LED BRT ‡	004	ADC REF	034	SQ SUB	064	XVx ADR	094
MSG RPT ‡	005	RFI DET	035	SMTR OF	065	AF GAIN	095
PADDLE	006	KDVR3	036	SMTR SC	066	TX ESSB	096
RPT OFS ‡	007	AGC-S	037	SMTR PK	067	SPKR+PH	097
RX EQ	008	FLx BW	038	SPLT SV	068	VFO B->A	098
TX EQ	009	FLx FRQ	039	SPKRS	069	AGC PLS	099
VOX GN	010	FLx GN	040	SW TEST	070	RIT CLR	100
ANTIVOX	011	FLx ON	041	SW TONE	071	TX GATE	101
WEIGHT	012	FLTX **md**	042	TECH MD	072	MEM 0-9	102
2 TONE	013	FP TEMP	043	TIME	073	PTT KEY	103
AFV TIM	014	FSK POL	044	AGC THR ‡	074	VFO CRS	104
MIC+LIN	015	AUTOINF	045	PTT RLS	075	AFX MD ‡	105
TX DLY	016	KBPF3	046	BND MAP	076	SIG RMV	106
AGC SLP	017	AF LIM	047	TTY LTR	077	AFSK TX	107
FM MODE	018	KNB3	048	TX ALC	078	AGC DCY	108
DIGOUT1 ‡	019	KRC2 AC	049	TXGN **pwr**	079	PB CTRL	109
AGC HLD	020	KRX3	050	SUB AF	080	MACRO x	110
FM DEV	021	KXV3	051	PWR SET	081	L-MIX-R ‡	111
EXT ALC	022	LCD TST	052	MIC BTN	082	CW QRQ	112
KAT3 ‡	023	MIC SEL	053	VCO MD ‡	083	TX DVR	113
BAT MIN	024	NB SAVE	054	VFO CTS	084		114
TX INH	025	KPA3 ‡	055	VFO FST	085		115
SER NUM	026	PA TEMP	056	VFO IND	086		116
TXG VCE	027	RS232	057	VFO OFS	087		117
FW REVS	028	TUN PWR ‡	058	WMTR **pwr**	088		118
DATE	029	SYNC DT	059	XVx ON	089	**Exit Menu**	255

MP * (Direct Menu Parameter Access; GET/SET)

SET/RSP format**: MPnnn;** where the useful range of **nnn** is determined by the present menu entry.
MN accesses menu entries. **MP** can then be used (in some cases) to read or set the parameter value. You can determine a menu entry's parameter range (**nnn**) by manually setting the parameter to its lowest/highest values, typing "**MP;**" each time in the command test box at the top of the **Command Tester** screen. Only menu entries marked with ‡ in **Table 5** can be accessed with **MP**, while others will return "**?;**" (use **UP** / **DN**, **DS**, and **SWT/SWH** in such cases). There is also no range checking with **MP** in most cases, so the user's macro or application must verify the correct range.

NB $ (Noise Blanker On/Off; GET/SET)
SET/RSP format: **NBn;** or **NB$n;** where **n** is 0 (**OFF**) or 1 (**ON**).
Notes: NB0 overrides non-zero **NL** settings for either the DSP or IF noise blanker (see **NL**). In K2 extended mode, an additional '0' is appended to the **NB** response to provide legacy (K2) format compatibility.

NL $ * (DSP and IF Noise Blanker Level; GET/SET)
SET/RSP format: **NBddii;** or **NB$ddii;** where **dd** is DSP NB level (**00-21**), and **ii** is IF NB level (**00-21**).
For either the DSP or IF blanker, **00** effectively turns that blanker off, even if **NB1** is in effect (see above).
For the DSP blanker, **01** = setting **t1-1**, **02** = **t1-2**, etc. For the IF blanker, **01** = **NAR1**, **02** = **NAR2**, etc.

OM * (Option Module Query; GET Only)

RSP format: **OM APXSDFf-----;** where any of the characters **APXSDFf**, if present, indicate installed and detected option modules (see list below). The positions of the letters are fixed. If a module is not present, its letter is replaced by a dash (**-**). For example, if only a PA and sub receiver were installed, "**OM;**" would return "**OM -P-S-- ------;**". The five dashes at the end are reserved for future module letters.

Option List: The letters (and associated positions) in the **OM** string refer to the following option modules:
A = ATU (KAT3), **P** = PA (KPA3), **X** = XVTR and RX I/O (KXV3), **S** = Sub Receiver (KRX3), **D** = DVR (KDVR3), **F** = Band-Pass Filter module, main (KBPF3), and **f** = Band-Pass Filter module, sub (KBPF3).

PA $ (Receive Preamp Control; GET/SET)

SET/RSP format: **PAn;** or **PA$n;** where **n** is 0 (preamp OFF) or 1 (preamp ON). **Note:** Unlike the main receiver, the sub receiver's preamp setting is *not* per-RX ANT state.

PC (Power Output Level; GET/SET)

Basic SET/RSP format: **PCnnn;** where **nnn** is 000-012 or 000-120 watts depending on the POWER range. (If *CONFIG:KXV3* is set to TEST or if a transverter band with low-level I/O is selected, then the unit is hundreds of a milliwatt, and the available range is 0.00-1.50 mW. This can be checked using the **IC** command, byte **a**, bit **4**.)
K2 Extended SET format (K22): **PCnnnx;** where **nnn** is 000-120 (0.1-watt units) or 000-120 (1-watt units) and **x** is a range selector: **0** selects the low power range, **1** selects the high-power range.
K2 Extended RSP format (K22): **PCnnnx;** where **nnn** is power, and **x** is 0 (low range) or 1 (high range).
Notes: (1) High power range applies only to K3/100, and only if the KPA3 menu entry is set to **PA NOR** or higher. (2) A lower power limit may be in effect on trasnsverter bands (menu entries **XVTR1-9**). 3. Use **MN** and **DS** commands to turn PA on/off in menu.

PS (Transceiver Power Status; GET/SET)

SET/RSP format: **PSn;** where n = **1** indicates transceiver on. Note: **PS0** turns the transceiver off, but this removes power, so **PS1** *cannot* be used to turn it on. To turn power on, the K3's POWER_ON line (aux I/O jack) must be pulled low by an external device, or it can be turned on manually using the power switch.

RA $ (Receive Attenuator Control; GET/SET)

SET/RSP format: **RAnn;** or **RA$nn;** where **nn** is 00 (attenuator OFF) or 01 (attenuator ON). **Note:** Unlike the main receiver, the sub receiver's attenuator setting is *not* per-RX ANT state.

RC (RIT Clear; SET only)

SET format: **RC;** (no data). Sets RIT/XIT offset to zero, even if RIT and XIT are both turned off (the change will be reflected when either RIT or XIT is turned on). **Note:** This command behaves differently in FINE RIT mode in the case of the K2. Refer to the KIO2 Programmer's Reference.

RD (RIT Offset Down One Unit; SET only)

SET format: **RD;** (no data). Moves the RIT/XIT offset down one step, which can be 1, 10, 20, or 50 Hz, depending the present VFO tuning rate. If the user has selected COARSE VFO tuning, **RD** moves either 20 or 50 Hz, as specified by *CONFIG:VFO FST*. The offset change occurs even if RIT and XIT are both turned off (the change will be reflected when either RIT or XIT is turned on). RIT/XIT offset range under computer control is -9.999 to +9.999 kHz. VFO step size is stored per-mode. Use the **IF** command to check the present RIT/XIT offset amount. **Note:** Both the **RD** and **RU** commands behave differently in the case of the K2 when FINE RIT mode is in effect. Refer to the KIO2 Programmer's Reference.

RG $ * (RF Gain; GET/SET)

SET/RSP format: **RGnnn;** or **RG$nnn;** where **nnn** is 000-250.

RO * (RIT/XIT Offset, Absolute; GET/SET)

SET/RSP format: **ROsnnnn;** where **s** is +/- and **nnnn** is 0000-9999. **s** can also be a space in lieu of +.

RT (RIT Control; GET/SET)

SET/RSP format: **RTn;** where **n** is 0 (RIT OFF) or 1 (RIT ON). RIT is disabled in QRQ CW mode.

RU (RIT Offset Up One Unit; SET only)

See **RD** command.

RV * (Firmware Revisions; GET only)

GET format: **RVx;** where **x** is M (MCU), D (Main DSP), A (Aux DSP), R (DVR), or F (Front Panel flash). RSP format: **RVxNN.NN** where **NN.NN** is the firmware revision, e.g. **02.37**. If a module isn't present, or an unknown module ID is requested, the revision is normally reported as **99.99**. A module that is present but malfunctioning may return revision **00.00**.

RX (Receive Mode; SET only)

SET format: **RX;** (no data). Terminates transmit in all modes, including message play and repeating messages. RX/TX status is available via the **TQ** command and is also included in the **IF** response. Note: **RX** is not usable in CW mode in the K2.

SB * (Sub Receiver On/Off)

SET/RSP format: **SBn;** where **n** is **0** (sub receiver off) or **1** (on).

SD * (QSK Delay, GET only)

SET/RSP format: **SDnnnn;** where **nnnn** is the semi-break-in delay in 50-ms increments. Provided for backwards compatibility with older applications. If the K3 is in full QSK mode, SD will still read the same value even though the actual break-in delay is set to as close to 0 as possible.

SM $ (S-meter Read; GET only)

Basic RSP format: **SMnnnn;** where **nnnn** is 0000-0015. S9=6; S9+20=9; S9+40=12; S9+60=15.
K3 Extended RSP format (**K31**): **nnnn** is 0000-0021. S9=9; S9+20=13; S9+40=17; S9+60=21.
This command can be used to obtain either the main (**SM**) or sub (**SM$**) S-meter readings. Returns 0000 in transmit mode. **BG** can be used to simply emulate the bar graph level, and applies to either RX or TX mode.

SQ $ (Squelch Level; GET/SET)

SET/RSP format: **SQnnn;** or **SQ$nnn;** where **nnn** is 000-029. If the K3's *CONFIG:SQ MAIN* menu entry is set to a numeric value (**0-29**), then **SQ** and **SQ$** apply to main and sub receivers, respectively, and the SUB RF/SQL pot on the K3 controls SUB RF GAIN. However, if *SQ MAIN* is set to **=SUB POT**, then **SQ** and **SQ$** are linked (either applies to *both* receivers), and the SUB RF/SQL pot controls squelch for both receivers as well. (Also in this case, the MAIN RF gain pot controls RF gain for both main and sub.)
Note: The **SQ** command in the K2 used the same format but different units.

SWT/SWH * (Switch Emulation; SET only)

SET format: **SWTnn;** (TAP functions) or **SWHnn;** (HOLD functions). **nn** is determined from **Table 6**. Switch emulation commands must sometimes be followed by a delay if successive commands expect the switch function to have been executed (example: **SWT16;** [XMIT], delay, **TQ;** [transmit status check]). Activating some switch functions results in icon or status changes that can be checked using the **IC** or **DS** commands. **Note:** The K2's **SW** command format is not supported by the K3.

Table 6 Switch identifiers (**nn**) for the SWT/SWH command. Table entries are organized similarly to the K3's front panel (e.g. BAND is upper left). Numeric keypad switches (0-9, '.', '<-') are shown in parentheses.

TAP	HOLD	nn	TAP	HOLD	nn	TAP	HOLD	nn
BAND-	VOX	09	FREQ Ent	SCAN	41	CWT (0)	TEXT Dec	40
BAND+	QSK	10	FINE	COARSE	49	AFX (<-)	DATA Md	43
MODE-	ALT	17	RATE	LOCK	50	V->M	AF REC	15
MODE+	TEST	18	*SUB	Link/Unlink	48	M->V	AF PLAY	23
MENU	CONFIG	14	A/B (1)	BSET	11	M1	M1-RPT	21
XMIT	TUNE	16	REV (2)	n/a	12	M2	M2-RPT	31
RX ANT	n/a	25	A->B (3)	SPLIT	13	M3	M3-RPT	35
DISP	METER	08	PRE (4)	ATT	24	M4	M4-RPT	39
ATU Tune	ATU	19	AGC (5)	OFF	27	REC	MSG Bank	37
ANT	ANT Name	26	XFIL (6)	DUAL PB	29	RIT	PF1	45
SHIFT/LO	NORM	58	NB (7)	LEVEL	33	XIT	PF2	47
WIDTH/HI	I/II	59	NR (8)	ADJ	34	CLR	n/a	53
SPD/MIC	DELAY	57	NTCH (9)	MANUAL	32			
CMP/PWR	MON	56	SPOT ('.')	PITCH	42			

TB * (Received Text Read/Transmit Text Count; GET only)

RSP format: **TBtrrs;** where **t** is the count of buffered CW/data characters remaining to be sent (from **KY** packets); **rr** is the count of received CW/data characters available (00-40), and **s** is the corresponding variable-length text string. If no received text is available, and no transmit text to be sent, the response is **TB000;** . **t** can be 0-9; if there are more than 9 characters remaining to be sent, then **t** will be 9.
Notes: (1) Since an RX count is provided, semicolons—which are legal for text decode in somedata modes—can appear in the text string. A terminating semicolon is still provided as a check and to retain compatibility with other commands. (2) After the K3 responds to a TB command, it clears the RX count to zero and the text just read is no longer available. (3) Application software must poll with **TB;** often enough to prevent loss of incoming text.

TE * (Transmit EQ; SET only)

SET format: **TEabcdefgh;** where **a** through **h** are 3-character values, each with a range of **–16** to **+16** dB. Values **a** through **h** correspond to EQ bands as follows: a = 50 Hz, b = 100 Hz, c = 200 Hz, d = 400 Hz, e = 800 Hz, f = 1600 Hz, g = 2400 Hz, h = 3200 Hz. **Important:** If the current transmit mode (VFO B mode in SPLIT) is SSB, CW or DATA, **TE** applies to SSB. If the transmit mode is ESSB, AM, or FM, **TE** affects ESSB/AM/FM. The two setups are saved separately because SSB EQ is typically optimized for communications effectiveness, while ESSB/AM/FM is often optimized for fidelity. (ESSB mode is selected using the CONFIG:TX ESSB menu entry.)
Note: If the TX EQ menu entry is displayed at the time **TE** is sent, the display will be updated accordingly.

TQ (Transmit Query; GET only)

RSP format: **TQ0;** (receive mode) or **TQ1;** (transmit mode). This is the preferred way to check RX/TX status since it requires far fewer bytes than an **IF** response. **Note: TQ1** will be returned even during pseudo-transmit conditions such as TX TEST or when the radio is "pre-armed" for CW transmit via XMIT or PTT. This is because such states may turn on the K3's KEY OUT line, activating down-stream relays (on amplifiers, transverters, etc.).

TT * (Text to Terminal; SET only)

Note: TB (text buffer read) provides a more reliable means of implementing a CW/data terminal. **TB** *must* be used rather than **TT** if a P3 panadapter is attached between the computer and K3.

SET format: **TTn;** where **n** is 1 to enable decoded text to be routed to a PC (ASCII). **n**=0 disables this. (There's no GET command for **TT**, but its status can be checked using the **IC** command: byte **c**, bit **0**.) When the application has to send a SET command of another type, it can do without interrupting the TT stream. If it has to send a GET command, it must either suspend the text stream temporarily by sending TT0, or parse the response stream to look for the desired return data. (Returned strings are never interspersed with text data, so this can easily be done.)

TX (Transmit Mode; SET only)

SET format: **TX;** (no data). Used to initiate transmit in all modes (same as activating PTT or using the XMIT switch on the K3). Use the **RX** command to cancel **TX** (some special considerations apply; see RX). RX/TX status is available via **TQ** and is also included in the **IF** response.

UP/UPB (Move VFO A or B, or Menu Entry/Parameter Up; SET only)

See **DN/DNB**.

VX * (VOX State; GET only)

RSP format: **VXn;** where **n** is **0** (VOX on) or **1** (VOX off). Applies only to present mode only. In CW mode, VOX refers to "hit-the-key transmit," i.e. the user doesn't have to assert the **XMIT** switch or the PTT input first. In voice modes, VOX refers to voice-operated-relay, again not requiring **XMIT** or PTT.
Note: A SET version of the command is planned.

*XF $ * (Crystal Filter Number; GET only)*

RSP format: **XFn;** where **n** is the present crystal filter selection (1-5) for the target receiver.

XT (XIT Control; GET/SET)

SET/RSP format: **XTn;** where **n** is **0** (XIT OFF) or **1** (XIT ON). XIT is disabled in QRQ CW mode.

Appendix A: Change History   [Applicable MCU revision shown in brackets]

A2, 10-23-07 [1.30]:   Added various functions to **MN** table.

A3, 11-13-07 [1.36]:   Changes to **KS**, **NB**, **SM**, **DS**, and **FR**. **K2** and **K3** meta-commands further explained.

A4, 11-17-07 [1.38]:   1. **RG** command implemented. **PC** ranges now 0-12 and 0-120 W.

2. **PS** description changed. **FA/FB** now ignore 1-Hz digit if K3 isn't in FINE mode.

B1, 05-15-08 [1.96]:   1. Added the following menu entries to **MN** command table: FM MODE, FM DEV, TX DLY, MIC+LIN, SMTR MD, TX INH, AUTOINF, TUN PWR, and SYNC DT. See **AI** for AUTOINF discussion.

2. Expanded **DN** description to explain the use of this command (and **UP**) in changing operating parameters, e.g. PITCH, as well as the **DNB/UPB** variants for use with VFO B parameter displays.

3. **KY** command now handles the *VE* prosign, as well as '@' (for e-mail addresses).

4. Added RIT/XIT offset display mode [index = 3] to **DB** command.

B2, 06-13-2008 [2.03]   1. Added the following menu entries to **MN** table: EXT ALC, RFI DET.

2. **DS** now sends status for seven K3-specific icons in the last byte of the response.

3. **FW** command allow get/set of filter bandwidth in 10-Hz units in K3 extended mode.

4. **FA** and **FB** commands that cause a band change take about 0.5 seconds; all other host commands are deferred until these complete (e.g., filter or mode set/get). Earlier firmware had a timing window where commands might affect the old band rather than the new.

5. Added PWR SET and MIC BTN menu entries to **MN** command table.

6. **MD** command now explained in full detail for the K3.

B3, 07-3-2008 [2.13]   1. Described sub receiver commands. These add '$' after the 2-letter prefix.

2. **AG** command works with the sub receiver (e.g. **AG$;** or **AG$050;).**

3. Added PTT RLS menu entry to **MN** command table.

4. Added **FI** command (I.F. center frequency).

5. Added **SP** command (K3 special functions).

B4, 07-31-2008 [2.23]   Added TX DLY menu entry to **MN** command table.

B5, 08-12-2008 [2.24]   Clarified **K2** vs. **K3** command modes in meta-command section as well as individual commands.

B6, 08-24-2008 [2.29]   1. **FA**, **UP**, **DN**, **RU**, **RD**, and **RC** update both VFO A and B when the VFOs are linked (but not in SPLIT mode). **MD** and **FW** update both main and sub RX filtering in Diversity Mode.

2. **RG** command works with the sub receiver (e.g. **RG$;** or **RG$050;**).

B7, 08-26-2008 [2.31]   Added RIT CLR menu entry to **MN** command table.

B8, 09-03-2008 [2.37]   1. Revised **DB** and **DS** to show all available character-to-symbol conversions.

2. Added information on some commands previously flagged as "development-only," including **DL** (DSP command debug mode), **DM** (DSP RAM read) and **RV** (firmware revision query).

B9, 09-10-2008 [2.41]   1. Added **IS** command (IF shift). Explained behavior of **FW** and **IS** in **AI2** and diversity modes.

2. Further clarification of the **K2** and **K3** meta-commands, in the command reference section.

B10, 09-10-2008 [2.41]   1. Described how BSET mode causes a busy indication ("**?;**") in response to some commands. See **Busy Indication**.

2. Added **MG** command (mic gain).

3. Added **MD$** command.

B11, 10-03-2008 [2.48]   1. Added TX GATE menu entry to **MN** command table.

2. Added **OM** command (option modules).

3. Added **MP** command (menu parameter read/set).

4. **KY** now accepts an EOT (ASCII 04). This is used to terminate CW-to-DATA quickly.

B12, 10-14-2008 [2.50]   1. The **DS** return string may contain multiple semicolons (;) if used to read the RX EQ or TX EQ menu parameter (bar graph levels). See **DS** for details.

2. *Busy* and *Limited Access* states: information updated.

3. The following menu parameters are directly accessible via **MP**: MSG RPT, LIN OUT, TUN PWR, AFX MD, RPT OFS, ATU MD, VCO MD, AGC THR. The menu entry must first be selected using **MN**. All MP-accessible parameters are noted with ‡ in the **MN** table.

B13, 10-16-2008 [2.51] 1. The **IF** response now includes DATA sub-mode information if **K31** is in effect.

2. Added **DT** command (data sub-mode get/set). Clarified use of **MD** in data modes.

3. Added **IC** command (icon and misc. status).

4. Added **LK$** command (direct read/set of VFO B lock).

B14, 10-17-2008 [2.54] 1. Semicolons in VFO A part of **DS** response are translated to underscores (semicolons can appear in the response due to a character conversion for the RX EQ/TX EQ menu entry mini-bar graphs—see **DS**). This allows semicolons to be reserved strictly as command terminators.

2. Sending a sub receiver command (**xx$**) that isn't recognized no longer results in a "**?;**" response. This response is sent only when a *legal* command is received while the K3 is busy or in the wrong context.

B15, 11-2-2008 [2.61] 1. Added MEM 0-9, SW TONE, and BND MAP menu entries to **MN** list.

2. Removed references to non-existent **SFT/SFH** commands in **SWT/SWH** table.

3. **RX** command applicability to K2 and K3 clarified. Also, RX will now exit the TUNE condition.

4. In **AI1** and **AI2** modes, rapid manual band changes by the user (with BAND UP/DN) no longer generate extra response packets from the intermediate bands. This should prevent buffer overflow conditions seen with some applications.

5. **IF**, **FA**, **FB**, **MD**, **MD$** and **DT** can now be used during BSET (GET ONLY in all cases).

6. Added **DV** (diversity mode on/off).

7. **SM$** added (direct sub receiver S-meter level read). **SM** and **SM$** both work in BSET. **BG** can also be used in BSET; see BG command description.

8. **FW$** added. Both **FW** and **FW$** can be used in BSET mode (one exception: at present, **FW/FW$** SET can't be used in BSET mode with diversity receive in effect).

B16, 11-19-2008 [2.67] AF LIM and SUB AF menu entries added to **MN** list.

B17, 12-11-2008 [2.76] 1. VOX status added to **IC** command (CW/direct data, byte **c**, bit **4**; voice/AF data, byte **d**, bit **6**).

2. Added ADC REF menu entry to **MN** list.

3. Added **RA$** and **PA$** (sub receiver attenuator and preamp). **Note:** Unlike the main receiver, the sub receiver's preamp and attenuator settings are *not* per-RX ANT state.

4. Added **MP** command access for KPA3 menu entry.

B18, 01-17-2009 [2.78] 1. Added **CP** command (speech compression).

2. **TT** (text-to-terminal) status can be checked using the IC command (byte **c**, bit **0**).

B19, 03-08-2009 [2.99] 1. Added **BN** command (band number, GET only). This returns the "logical" band number for VFO A (or VFO B, if **BN$** is used).

2. SUB NB state added to **IC** (byte **b**, bit **1**). Note: **DS** continues to show the icon state, which will normally be the MAIN NB but is SUB NB in BSET mode with the sub on.

3. SUB ON/OFF state added to **IC** (byte **b**, bit **0**). Note: **DS** continues to show SUB icon state, but **IC** doesn't require that **K31** be in effect, and it includes all of the other sub-RX related status flags (diversity, band independence, sub antenna selection, etc.).

3. SIG RMV added to **MN** list (VFO spurious signal removal).

4. AFSK TX added to **MN** list (AFSK narrow transmit data filter on/off).

5. Some commands will respond with *busy* (**?;**) if the operator is holding down the REV (VFO A/B reverse) switch.

6. The following note was added to **TQ**: **TQ1** will be returned even during pseudo-transmit conditions such as TX TEST or when the radio is "pre-armed" for CW transmit via XMIT or PTT. This is because such states may turn on the K3's KEY OUT line, activating downstream relays (on amplifiers, transverters, etc.).

7. The **FB** command now works correctly when VFO B is set to a different band (see *CONFIG:VFO IND* in the owner's manual)

B20, 04-13-2009 [3.09] 1. Added AGC DCY to **MN** list.

2. **IC** command byte **b** bit **3** corrected (1=sub ant. is MAIN, 0=sub ant. is AUX).

3. Note added to **FW** command: In **K22** mode, a legacy 6th digit is added to the response. It is always 0. In the K2, this digit indicated audio filter on/off status.

B21, 07-27-2009 [3.23] 1. In **DS** command, noted that the "ATU on" status flag means "ATU is in-line". This bit would be 0 if the ATU were bypassed. **Note:** ATU status is per-band/per-antenna.

2. Added **ML** command (monitor level; applies to current mode).

3. **IC** command byte **a** bit **2** is 1 if message play is in effect in current mode, 0 otherwise.

4. **RC** and **RD**/**RU**: Removed information about VFO B being set equal to VFO A when VFOs are linked and these commands are executed, which was not correct. Also noted that **RC**/**RD**/**RU** behave differently in the case of the K2 when FINE RIT is in effect (see KIO2 Programmer's Reference).

5. Added **PB CTRL** (passband control) menu entry to **MN** list.

6. Added **RO** command (RIT/XIT offset read/set, absolute).

7. **DT** command should only be used when the K3 is in DATA mode.

B22, 09-01-2009 [3.30] 1. **IC** command byte **e** bit **6** is 1 if FINE SHIFT (10 Hz) is in effect in the present mode.

2. **MN** command can now be used to GET the present menu entry's ID number.

3. **NB$** command added (NB on/off for sub receiver). Also added **AI2** response for **NB$**.

C3, 10-22-2009 [3.46] 1. MACRO x menu entry added to **MN** list. (This menu entry is used to assign up to four K3 Utility "Command Tester" macros to K3 programmable switch functions.)

2. General rewrite of introductory sections to improve readability, especially for those who may try their hand at creating switch macros. **Note: At present, direct DSP commands can not be used in combination with regular commands in K3 Utility macros, and they will not work as K3 switch macros.**

3. **DN**/**DNB** and **UP**/**UPB** commands no longer require **K22** mode (they are unaffected by the **K2x** setting). Also added more VFO displacement values to these commands (example: **UP7** and **UPB7** move VFO A or VFO B up 5 kHz).

4. Added **BW** command (non-modal alternative to **FW**). **BW** should be used in switch macros.

5. A "**W**" (for "wait") appearing in the third position of a **KY** packet (i.e., **KYW**…) suspends further processing of host commands until the current message has been sent. This is useful in switch macros that follow the **KY** command with other commands, such as **KS**, or for pacing commands in software applications.

6. **SWT**/**SWH** commands no longer require **K31** mode (they are unaffected by the **K3x** setting).

7. Added **Command Examples** section, which includes sample macros that are "safe" (using only non-modal SET commands).

8. Added **LN** command (link VFOs, GET/SET).

9. Added **SB** command (sub receiver on/off, GET/SET).

10. **VX** command (VOX state, GET only, applies to present mode) has been in the firmware all along but was not documented. A SET version will be added later.

11. **SD** command (semi-QSK delay in 50-ms units, GET only) has been in the firmware all along but was not documented. A SET version will be added later, and the units may be changed to 10 ms if no present applications were using it. (This would match the K3's semi-QSK-delay granularity.)

C4, 10-24-2009 [3.48] 1. Improved and extended the **Command Examples** section, including the addition of complete instructions for creating and using macros.

C6, 10-27-2009 [3.51] 1. Added *CONFIG:L-MIX-R* menu entry to **MN** list. Parameter is accessible via **MP**.

2. **MP** parameter access added for *LCD BRT*, *LCD ADJ*, and *LED BRT* menu entries.

3. Added caution regarding use of the **MP** command, which has few semantic checks.

4. Change in notch switch behavior; in SSB modes, **SWT32** (or $\boxed{\textsf{NTCH}}$) now turns auto-notch on/off rather than cycling through auto/manual/off. Use **SWH32** for manual notch.

C7, 11-10-2009 [3.57]   1. Improved **MP** command description.
2. **UP0/DN0/UP$0/DN$0** commands move target VFO in 1-Hz steps. **UP8** and **UP9** (and other **UP/DN** derivatives) move target VFO in 100- and 200-Hz steps.
3. **IS 1400** / **IS 1600** , respectively, can be used to select AM-Sync LSB or USB. This doesn't actually shift the AF passband; in fact, an IS get will always return **IS 1500** in AM-Sync mode because the center of the AF passband remains at 1500 Hz. To determine which sideband is in use for AM sync, see the **IC** command.
4. **IC** command reports AM Sync sideband in byte **e**, bit **5**.

C8, 11-20-2009 [3.63]   1. Added **MP** access to DIGOUT1 menu entry.
2. **RX** command can now be used to cleanly terminate message play/repeat (DVR as well as CW/DATA).

C9, 12-18-2009 [3.71]   1. **IC** command reports squelch status (open or closed) for both main and sub receivers in byte **e**, bits **4** and **3**.
2. **XF/XF$** command added: Returns crystal filter number presently in use (1-5).

C10, 1-21-2010 [3.76]   1. **IC** command reports sub receiver NR status in byte **e**, bit **2**. Note: **DS** continues to reflect the NR icon state, which will normally be the MAIN NR but is SUB NR in BSET mode with the sub on.
2. The **FA** and **FB** commands have been able to recognize GHz digits since MCU revision 3.13. The command description has been corrected.

C11, 3-20-2010 [3.84]   1. Added **NL/NL$** command (noise blanker level). **Not** format-compatible with the Kenwood **NL** command (TS-480/TS-2000).
2. Note: **UP/DN/UPB/DNB** commands are applicable only to VFO and menu, not switch parameters. Direct control of all switch parameters is being phased in (e.g., **NL/NL$**, above).

C12, 3-30-2010 [3.89] 1. Added **TB** command (text buffer read/status). Provides a more reliable means of implementing a CW/DATA terminal application than the **TT1** method.
2. Added **MC** command (read/set memory channel, or number. Can be used to switch to a K3 regular or quick memory, and can be used in macros.
3. Added *CONFIG:MEM0-9* status to the **IC** command (byte **a**, bit **1**).
4. Added **TE** command (TX EQ), to allow quick voice-mode optimization for different mics or users. This command takes 27 characters, far fewer than the series of switch emulation commands formerly required, and is thus better suited to use in a K3 switch macro. If the user is viewing the TX EQ menu entry at the time **TE** is sent, the parameter display will be updated accordingly. Note: TX EQ is stored separately for regular SSB vs. wideband modes (AM/FM/ESSB).

C13, 5-22-2010 [3.98]   1. Added **ES** command to turn ESSB mode flag on/off. **Note:** The application must place the K3 in either LSB or USB mode for the ESSB ON condition to be relevant.
2. Added SET to **BN** command, but only for VFO A at present. Intended for use by KPA500 amplifier for changing K3 band using the amplifier's band switches.
3. New QRQ CW mode disables SPLIT/RIT/XIT; noted this in **FT**, **RT**, and **XT** commands. Added *CONFIG:CW QRQ* to **MN** list.

C14, 8-28-2010 [4.08]   1. Added **CW** command (CW sidetone pitch x10 Hz; GET only).
2. Added *MAIN:TX DVR* to **MN** list (transmit DVR playback normal/independent).