

# ELECRAFT P3 PROGRAMMER'S REFERENCE

Rev. A7 (See Appendix A for change history)

## Command Set Overview

The P3 provides a set of remote-control commands to control the most important instrument functions (Table 1). Details on individual commands start on page 2.

**Table 1.** P3 Control Commands.

Name	Description	Name	Description	Name	Description
=	Product ID	#LD	Internal use only	#RVS	SVGA firmware rev.
#AVG	Averaging time	#MFA	Marker A frequency	#SCL	Scale
#BMP	Bitmap upload	#MFB	Marker B frequency	#SPM	Span mode
BR	Baud rate set	#MKA	Marker A on/off	#SPN	Span
#BR	Baud rate set	#MKB	Marker B on/off	#SVDT	SVGA data on/off
#CTF	Center frequency	#NB	Noise blanker on/off	#SVEN	SVGA enable
#DSM	Display mode	#NBL	Noise blanker Level	#SVFL	SVGA fill on/off
#ER	Internal use only	#PKM	Peak mode on/off	#SVFN	SVGA font
#EW	Internal use only	#PS	Power status/control	#SVRS	SVGA resolution
#FNL	Function key label	#PT	Pass-Through mode	#SVWB	SVGA waterfall bias
#FNX	Function key execute	#QSY	QSY to current marker	#TP	Internal use only
#FON	Display font size	#RCF	Relative Center Freq	#VFB	VFO B cursor on/off
#FXA	Fixed auto-adjust mode	#REF	Reference Level	#WFA	Waterfall average on/off
#FXT	Fixed or Tracking select	#RST	Reset the P3	#WFC	Waterfall color
#LBL	Labels on/off	#RVF	SVGA FPGA revision	#WFM	Waterfall markers on/off
		#RVM	Main firmware revision	#XCV	Transceiver select

The **Command Tester** screen of the *P3 Utility* computer program is a convenient way to try individual control commands. You can also define macros, which allow sending strings of P3 and/or K3 commands with a single mouse click. The **Capture Image** screen uses the **#BMP** command to upload the current P3 screen to a standard bitmap graphics file. See the *P3 Utility* help facility for details.

When a K3 is connected to the RS232 XCVR port, both K3 and P3 commands can be sent from the same computer program. For example, **#RVM;** returns the revision number of P3 firmware and **RVM;** returns the revision number of main firmware in the K3. Sending those two commands is a handy way to check the connectivity of the two RS232 ports on the P3. If you get a response to **#RVM;** then the PC port is connected; if you get a response to **RVM;** then the XCVR port is connected as well.

### Command Format

Commands sent from the computer to the P3 are considered either GETs or SETs. GET commands are used by the computer to get information from the P3; the P3 will then provide an appropriate response message (RSP). SET commands are sent by the computer to change the instrument's configuration or initiate an event. Commands with an incorrect format or an out-of-range parameter are ignored. A SET can be followed by a GET to verify the new settings.

SET commands use 2-4 characters, optional data fields, and a terminating semicolon (;). Examples:

**#AVG05;**      Computer turns on averaging with a time constant of 5.  
**#DSM1;**      Computer selects spectrum+waterfall display mode.

Many SET commands have a corresponding GET command, which is just the command letters with no data, plus the semicolon. The data format of the response message from the P3 (RSP) is usually identical to the format of the SET data. Exceptions are noted in the command descriptions.

Characters sent to the P3 can be in either upper or lower case. The P3 always responds with upper case.

## Command Reference

This section describes all P3 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 otherwise noted. All commands must be followed by a semicolon except where noted.

= (*Product identification; GET only*)

RSP format: **P3** (main firmware executing) or **p3** (boot loader ready to download new firmware). There is no "#" or semicolon in either the query or the response.

**#AVG** (*Averaging Time, GET/SET*)

SET/RSP format: **#AVGnn**; where **nn** is 00 (average mode off) or the averaging time constant, 02-20 (average mode on).

**#BMP** (*Bitmap upload, GET only*)

RSP format: **[bmp]cc** where **[bmp]** is 131,638 bytes of binary image data in standard .BMP file format and **cc** is a two-byte checksum. Note that the response does not include the command name and has no terminating semicolon. The checksum is the modulo-65,536 sum of all 131,638 bytes, sent least-significant byte first.

**BR and #BR** (*Baud Rate of the PC RS232 port, SET only*)

SET format: **BRn**; or **#BRn**; where **n** is **0** (4800 b), **1** (9600 b), **2** (19200 b), or **3** (38400 b). The *P3 Utility* program automatically sets the P3 to 38400 baud for downloads, then restores the baud rate to the user's selection (that was made using either this command or the P3's *RS232* menu entry). Note that the RS232 port that connects to the K3 always runs at 38400 baud. Any **BR** command that is received from a host computer affects the baud rate of the P3 (on the RS232 port that connects to the PC), not the K3.

**#CTF** (*Center Frequency, GET/SET*)

SET/RSP format: **#CTF***s***xxxxxxxxxxxx**; where *s* is +/- and **xxxxxxxxxxxx** is the center frequency in Hz. *s* can also be a space in lieu of +. Example: **#CTF+00014060000**; sets the center frequency to 14060 kHz. If the specified frequency is in a different band than the K3 is tuned to, the action is undefined. A value of zero sets the center frequency to the main VFO frequency of the transceiver. For transceivers other than the K3, the center frequency is interpreted relative to the frequency the transceiver is tuned to and may be positive or negative.

**#DSM (Display Mode, GET/SET)**

SET/RSP format: **#DSM***n*; where *n* is **0** (spectrum only), **1** (spectrum + waterfall), **2** (spectrum + power meters) or **3** (spectrum + waterfall + power meters).

**#FNL (Function Key Label, GET only)**

GET format: **#FNL***n*; where *n* = 1-8, for keys FN1-FN8.

RSP format: **#FNL***n***ccccccccc**; where *n* = 1-8 and **ccccccccc** are the 9 ASCII characters in the key label for FN*n*.

**#FON (Font Size, GET/SET)**

SET/RSP format: **#FON***n*; where *n* is **0** (5 x 7 pixels), **1** (7 x 11 pixels) or **2** (9 x 14 pixels).

**#FNX (Function Key Execute, SET only)**

SET format: **#FNX***n*; where *n* = 1-8, for keys FN1-FN8. Executes the function assigned to the key, if any.

**#FXA (Fixed-tune Auto-adjust Mode, GET/SET)**

SET/RSP format: **#FXA***n*; where *n* is **0** (Full screen), **1** (Half screen), **2** (Slide) or **3** (Static) to specify how far the P3 center frequency moves when the K3 VFO A is tuned off screen in fixed-tune mode.

**#FXT (Fixed or Tracking Select, GET/SET)**

SET/RSP format: **#FXT***n*; where *n* is **0** (Tracking mode), or **1** (Fixed-tune mode).

**#LBL (Labels on/off, GET/SET)**

SET/RSP format: **#LBL***n*; where *n* is **0** (FN key labels off) or **1** (FN key labels on).

**#MFA, #MFB (Marker A/B Frequency, GET/SET)**

SET/RSP format: **#MFA***s***xxxxxxxxxxxx**; or **#MFB***s***xxxxxxxxxxxx**; where *s* is +/- and **xxxxxxxxxxxx** is the marker frequency in Hz. *s* can also be a space in lieu of +. Example: **#MFA+00014060000**; sets the marker A frequency to 14060 kHz. If the specified frequency is in a different band than the K3 is tuned to, the action is undefined. A value of zero sets the marker to the main VFO frequency of the transceiver. For transceivers other than the K3, the marker frequency is interpreted relative to the frequency the transceiver is tuned to and may be positive or negative.

**#MKA, MKB (Marker A/B on/off, GET/SET)**

SET/RSP format: **#MKAn**; or **#MKBn**; where **n** is **0** (marker off) or **1** (marker on). The last marker to be turned on automatically becomes the active marker, meaning it can be adjusted with the knob and is the one that responds to the QSY command. If the marker was off-screen before executing a marker-on command, it will default to the center frequency.

**#NB (Noise blanker on/off, GET/SET)**

SET/RSP format: **#NBn**; where **n** is **0** (noise blanker off) or **1** (noise blanker on).

**#NBL (Noise blanker level, GET/SET)**

SET/RSP format: **#NBLnn**; where **nn** sets the aggressiveness of the noise blanker algorithm, 1 = least aggressive, 15 = most aggressive.

**#PKM (Peak Mode on/off, GET/SET)**

SET/RSP format: **#PKMn**; where **n** is **0** (peak mode off) or **1** (peak mode on).

**#PS (Power Status, GET/SET)**

SET/RSP format: **#PSn**; where **n = 1** indicates the P3 is on. **#PS0** turns the P3 off, but this removes power so **#PS1** cannot be used to turn it on. Note that if the power-on jumper on the rear-panel I/O board is in the "always on" position, then the **#PS0** command has no effect.

**#PT (Pass Through, SET only)**

SET format: **#PT**; Sets the P3 to pass-through mode, that is, the panadapter operation ceases and all data received on either RS232 port is passed through immediately to the other RS232 port without delay or modification. This command is used by *P3 Utility* when downloading new firmware to the K3 transceiver. Pass-through mode ends automatically 8 seconds after the last RS232 activity.

**#QSY (QSY to current marker, SET only)**

SET format: **#QSYn**; where **n** is **1** (QSY) or **0** (undo QSY). "QSY" means the currently-active marker frequency is transferred to the associated VFO on the K3. MKR A controls VFO A and MKR B controls VFO B. "Undo QSY" means to return the VFO to the frequency it was on before the last QSY, a one-level undo command.

**#RCF (Relative Center Frequency, GET/SET)**

SET format: **#RCFsnnnnnn**; where **s** is +/- and **nnnnnn** is the offset in Hz which when added to the VFO A frequency becomes the new center frequency. This command is used to position the VFO A cursor on the screen. For example, if the current span is set to 50 kHz, **#RCF+025000** will move the VFO A cursor to the left edge of the screen. (the center frequency moves up 25 kHz, which shifts the VFO A cursor to the left)

RSP format: **#RCFsnnnnnn**; where **s** is +/- and **nnnnnn** is the difference between the current center frequency and the VFO A frequency.

***#REF (Reference Level, GET/SET)***

SET/RSP format: **#REFsnnn**; where **s** is +/- and **nnn** is the reference level in dBm, between -170 and +010 dBm. **s** can also be a space in lieu of +. For example, **#REF-120**; sets the reference level (at the bottom of the P3 spectrum screen) to -120 dBm.

***#RST (Reset the P3, SET only)***

Forces a power-on reset.

***#RVFnn (SVGA board's FPGA Image Revision, GET only)***

RSP format: **#RVFnnNN.NN**; where **nn** is the FPGA image number from 00 to 05 and **NN.NN** is the image revision, e.g. **01.23**. Returns 99.99 if no FPGA image is installed.

***#RVM (Main Firmware Revision, GET only)***

RSP format: **#RVMNN.NN**; where **NN.NN** is the firmware revision, e.g. **01.23**.

***#RVS (SVGA board Firmware Revision, GET only)***

RSP format: **#RVSNN.NN**; where **NN.NN** is the firmware revision, e.g. **01.23**. Returns 99.99 if no SVGA firmware is installed and 00.00 if only the SVGA boot loader is installed.

***#SCL (Scale, GET/SET)***

SET/RSP format: **#SCLnnn**; where **nnn** is the scale (the difference in dB between the top and bottom of the spectrum screen), between 010 and 080 dB. Example: **#SCL080**; sets the scale to 80 dB.

***SPM (Span mode, GET/SET)***

SET/RSP format: **#SPMn**; where **n** is **0** (continuous span mode) or **1** (stepped span mode). In stepped span mode, the span steps between 2, 5, 10, 20, 50, 100 and 200 kHz.

***#SPN (Span; GET/SET)***

SET/RSP format: **#SPNxxxxxx**; where **xxxxxx** is 000020-002000, the span in 100-Hz units. Example: **#SPN000500**; sets the span to 50 kHz.

***#SVDT (SVGA decoded data display on/off; GET/SET)***

SET/RSP format: **#SVDTn**; where **n** is **0** (data display off) or **1** (data display on).

***#SVEN (SVGA display on/off; GET/SET)***

SET/RSP format: **#SVENn**; where **n** is **0** (SVGA display off) or **1** (SVGA display on).

***#SVFL (SVGA spectrum fill on/off; GET/SET)***

SET/RSP format: **#SVFLn**; where **n** is **0** (fill off) or **1** (fill on). When on, the area below the spectrum trace on the external SVGA display is filled in for easier visibility.

***#SVFN (SVGA font select; GET/SET)***

SET/RSP format: **#SVFNn**; where **n** is the font number from 0 to 3. The larger the number, the larger the font.

***#SVRS (SVGA display resolution; GET/SET)***

SET/RSP format: **#SVRSn**; where **n** is the external display resolution, from 0 to 4. See the manual for the SVGA option for more details.

***#SVWB (SVGA waterfall bias, GET/SET)***

SET/RSP format: **#SVWBnn**; where **nn** is 1 to 99, corresponding to 0.1 to 9.9 in the P3's "SVGA bias" menu entry. The higher the number, the greater the color contrast in the external display waterfall. A value of 1.0 makes it look similar to the P3 screen on a typical monitor screen.

***#VFB (VFO B cursor on/off; GET/SET)***

SET/RSP format: **#VFBn**; where **n** is **0** (VFO B cursor off) or **1** (VFO B cursor on).

***#WFA (Waterfall averaging on/off; GET/SET)***

SET/RSP format: **#WFAn**; where **n** is **0** (waterfall averaging off) or **1** (waterfall averaging on).

***#WFC (Waterfall color; GET/SET)***

SET/RSP format: **#WFCn**; where **n** is **0** (gray scale waterfall) or **1** (colored waterfall).

***#WFM (Waterfall markers on/off; GET/SET)***

SET/RSP format: **#WFMn**; where **n** is **0** (waterfall markers off) or **1** (waterfall markers on).

***#XCV (Transceiver select; GET/SET)***

SET/RSP format: **#XCVnn**; where **nn** is **00** (K3), **01** (User-defined transceiver), **02** (455 kHz IF) etc. to the last "transceiver" in the "Xcvr Sel" menu selection.

## **Appendix A: Change History** [Applicable firmware revision shown in brackets]

A1, 10-20-10 [00.41] Added commands #AVG, #CTF, #DPM, #FNL, #FNX, #LBL, #MFA/B, #MKA/B, #PKM, #PS, #QSY, #REF, #SCL and #SPN.

A2, 11-05-10 [00.41] Added "Internal use only" commands to the table. Changed #DPM command name to #DSM. Changed #SPN format. Added #PT and #VFB commands.

A3, 2-16-11 [01.05] Added commands #FXA, #FXT and #TP.

A4, 3-19-12 [01.11] Added commands #RST, #RVF and #RVS.

A5, 1-23-15 [01.35] Added commands #NB, #NBL, #SPM, #SVWB, #SVDT, #SVEN, #SVFN, #SVFL, #SVRS, #WFA, #WFC, and #WFM.

A6, 2-2-16 [01.57] Changed #DSM command. Added #FON and #XCV commands.

A7, 3-8-16 [01.59] Added #RCF command