# ELECRAFT P3 PROGRAMMER'S REFERENCE

Rev. A4  (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 | #FNX | Function key execute | #PT | Pass-Through mode |
| #AVG | Averaging time | #FXA | Fixed auto-adjust mode | #QSY | QSY to current marker |
| #BMP | Bitmap upload | #FXT | Fixed or Tracking select | #REF | Reference Level |
| BR | Baud rate set | #LBL | Labels on/off | #RST | Reset the P3 |
| #BR | Baud rate set | #LD | Internal use only | #RVF | SVGA FPGA revision |
| #CTF | Center frequency | #MFA | Marker A frequency | #RVM | Main firmware revision |
| #DSM | Display mode | #MFB | Marker B frequency | #RVS | SVGA firmware revision |
| #ER | Internal use only | #MKA | Marker A on/off | #SCL | Scale |
| #EW | Internal use only | #MKB | Marker B on/off | #SPN | Span |
| #FNL | Function key label | #PKM | Peak mode on/off | #TP | Internal use only |
| | | #PS | Power status/control | #VFB | VFO B cursor on/off |

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 or 3 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: **#CTFsxxxxxxxxxxx;** where **s** is +/- and **xxxxxxxxxxx** 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:  **#DSMn;** where **n** is **0** (spectrum only) or **1** (spectrum + waterfall).

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

GET format: **#FNLn;** where **n** = 1-8, for keys FN1-FN8.
RSP format: **#FNLnccccccccc;** where **n** = 1-8 and **ccccccccc** are the 9 ASCII characters in the key label for FNn.

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

SET format: **#FNXn;** 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:  **#FXAn;** 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:  **#FXTn;** where **n** is **0** (Tracking mode), or **1** (Fixed-tune mode).

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

SET/RSP format:  **#LBLn;** 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:  **#MFAsxxxxxxxxxxx;** or **#MFBsxxxxxxxxxxx;** where **s** is +/- and  **xxxxxxxxxxx** 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 actiion 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.

*#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.

*#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.

*#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.

*#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).

**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