

OpenHpSDR CAT Commands

This document attempts to explain basic CAT command structure in OpenHPSDR PowerSDR, how to examine the individual commands available for your particular OpenHPSDR hardware implementation and how to test them using the OpenHPSDR PowerSDR CAT Command tester. This information may be helpful to users wishing to embed CAT macros in 3rd party applications or to simply explore your radio.

Please refer to Flex Radio Systems “PowerSDR_CAT_Command_Reference_guide.pdf” (Copyright © 2011-2013 FlexRadio Systems) freely available for download at <http://support.flexradio.com/Downloads.aspx?fr=1> for use with this document.

OpenHPSDR info available at <http://www.openhpsdr.org>

CAT Commands

• Introduction.....	2
• CAT Command Tester catstruct table.....	4
• Catstruct Header Definitions.....	6
• Flex Radio Systems “PowerSDR_CAT_Command_Reference_guide.pdf”.....	7
• CAT Command Examples and OpenHpSDR PowerSDR responses.....	9
• Sending CW with CAT commands.....	14

OpenHpSDR CAT Commands

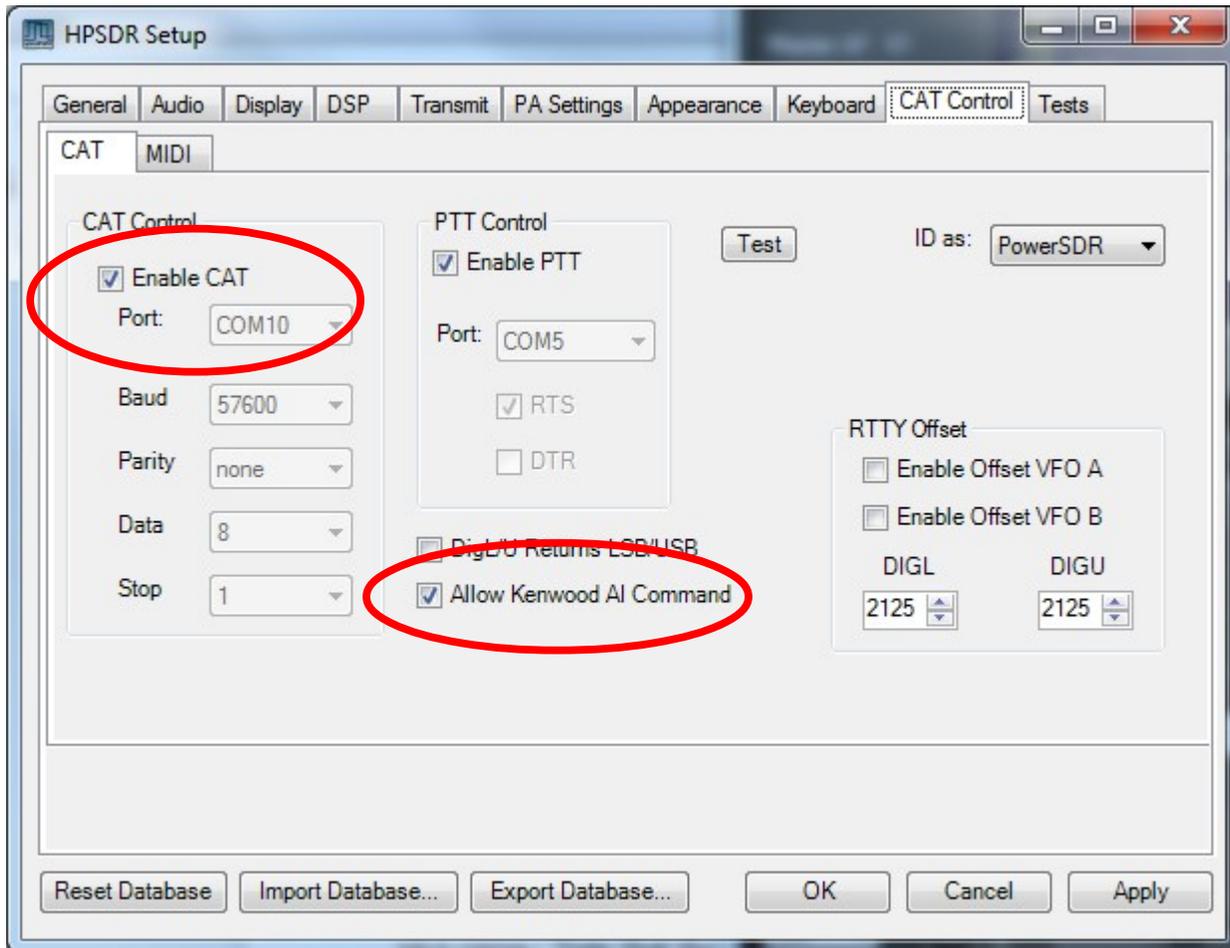
Introduction

OpenHPSDR PowerSDR supports CAT command strings and responses using a Kenwood like CAT command structure with “ZZxx” extensions. These CAT commands allow 3rd party applications (FLDigi, DM780, DDUTIL etc) to control/monitor PowerSDR, via actual (mostly legacy) or virtual serial or com ports.

The OpenHPSDR PowerSDR menu selection, Setup, CAT Control tab permits the user to setup the comports to work with 3rd party applications. The CAT Control comport on your PowerSDR computer is often accessible as a virtual comport via 3rd party utilities such as VSP Manager, com0com etc.

When using a virtual Com Port, the baud rate is immaterial, but setting it to the highest available value can't hurt.

Enable the “Allow Kenwood AI Command” check box to allow some automatic functions.



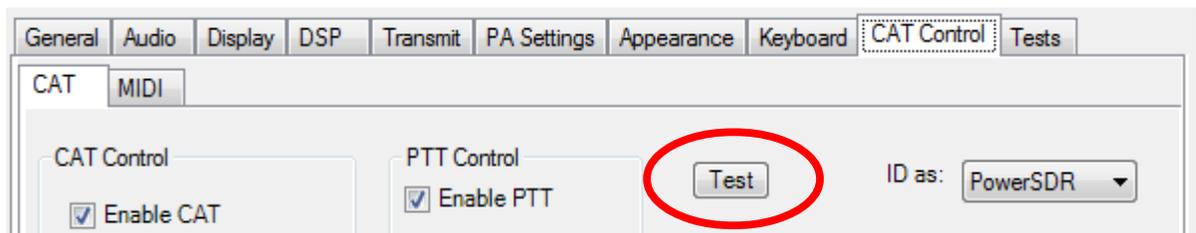
OpenHpSDR CAT Commands

OpenHPSDR PowerSDR CAT commands are largely compatible with the FLEX CAT command structure since Flex Radio Systems originally developed PowerSDR as an Open Source Project which was adopted and adapted by the OpenHpSDR developers.

There are some Flex hardware specific commands that do not work with OpenHPSDR PowerSDR and vice-versa. Note that the CAT commands and structure used in all implementations of PowerSDR are similar to the Kenwood CAT commands, with command extensions consisting of ZZxx style commands. Hardware implementations vary, and not all commands are supported on all installations.

Flex publishes PowerSDR CAT Command Reference guide dated 1/31/13 at <http://support.flexradio.com/Downloads.aspx?fr=1> . The .pdf file contains valuable info about cat commands. Do NOT download the SmartSDR CAT User Guide!

OpenHPSDR PowerSDR includes the ability to send CAT commands to OpenHPSDR radios and to examine the responses. The PowerSDR, Setup, CAT Control tab contains the "Test" button.

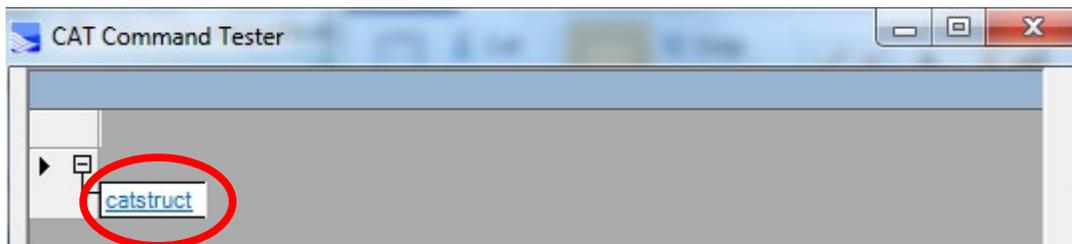
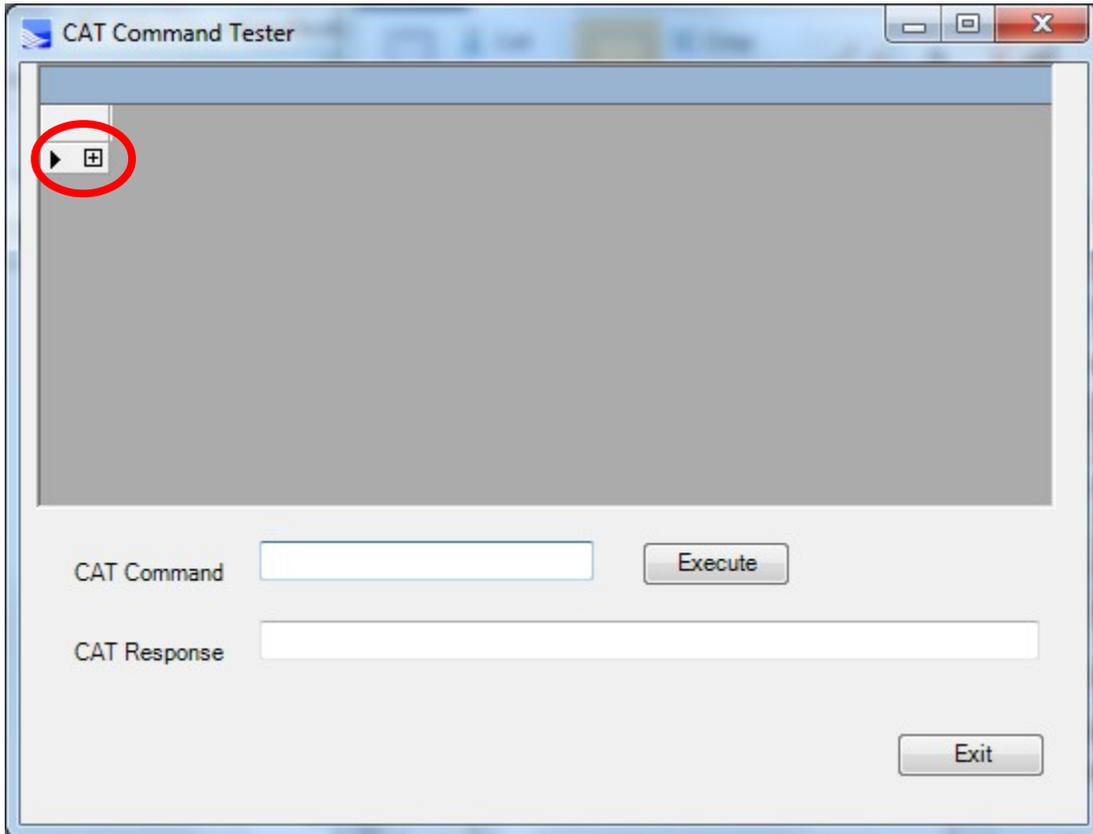


Pressing this button brings up the CAT Command Tester Dialog. You can use the Flex documentation and the CAT Command Tester to determine which commands work with OpenHPSDR PowerSDR and your OpenHPSDR radio.

OpenHpSDR CAT Commands

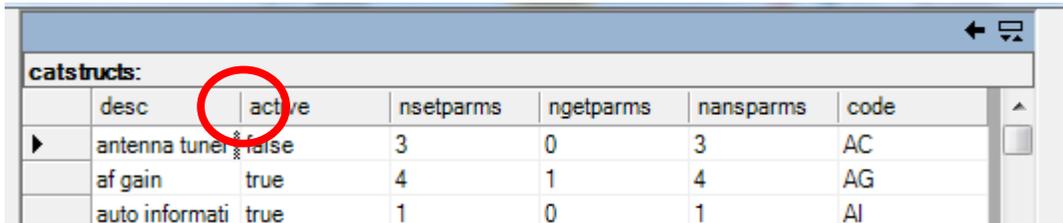
CAT Command Tester catstruct table

The CAT command tester includes a table to show CAT command structure and information. Click on the + sign (shown below at upper left), then click on catstruct to see the table.



OpenHpSDR CAT Commands

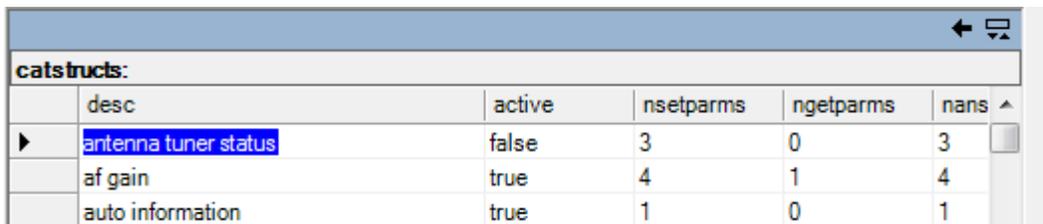
The catstructs table header width may need to be modified to expose all of the “desc” text. Place the mouse over the vertical line immediately to the left of the header word “active”, left click and drag the mouse to the right to expose all of the text under the desc header.



A screenshot of a software window titled "catstructs:" showing a table with the following columns: desc, active, nsetparms, ngetparms, nansparms, and code. The "active" header is circled in red. The table contains three rows of data:

	desc	active	nsetparms	ngetparms	nansparms	code
▶	antenna tuner	false	3	0	3	AC
	af gain	true	4	1	4	AG
	auto informati	true	1	0	1	AI

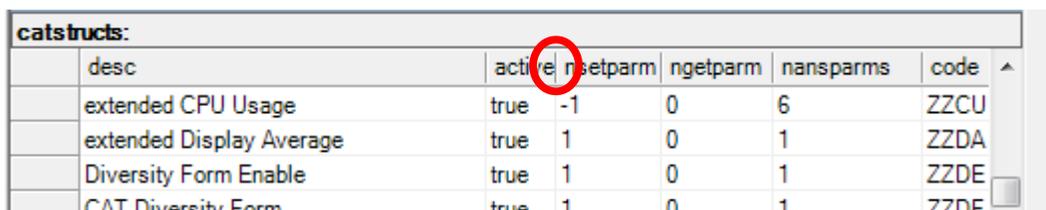
“desc” text expanded:



A screenshot of the "catstructs:" window where the "desc" header is expanded to show the full text of the first row. The "antenna tuner" text is highlighted in blue. The table structure is as follows:

	desc	active	nsetparms	ngetparms	nans
▶	antenna tuner status	false	3	0	3
	af gain	true	4	1	4
	auto information	true	1	0	1

The other headers need to be compressed somewhat, to re-expose all of the text. Place the mouse on the vertical line to the right of header text you want to compress and drag to left as needed.



A screenshot of the "catstructs:" window where the "active" header is circled in red and its width is compressed. The table contains four rows of data:

	desc	active	nsetparm	ngetparm	nansparms	code
	extended CPU Usage	true	-1	0	6	ZZCU
	extended Display Average	true	1	0	1	ZZDA
	Diversity Form Enable	true	1	0	1	ZZDE
	CAT Diversity Form	true	1	0	1	ZZDF

The table can be sorted by clicking on the desired header. Clicking on “code” header sorts the table on the CAT codes. Clicking on “desc” sorts the table on the CAT code desc etc.

OpenHpSDR CAT Commands

Catstruct Header Definitions

Catstruct header definitions:

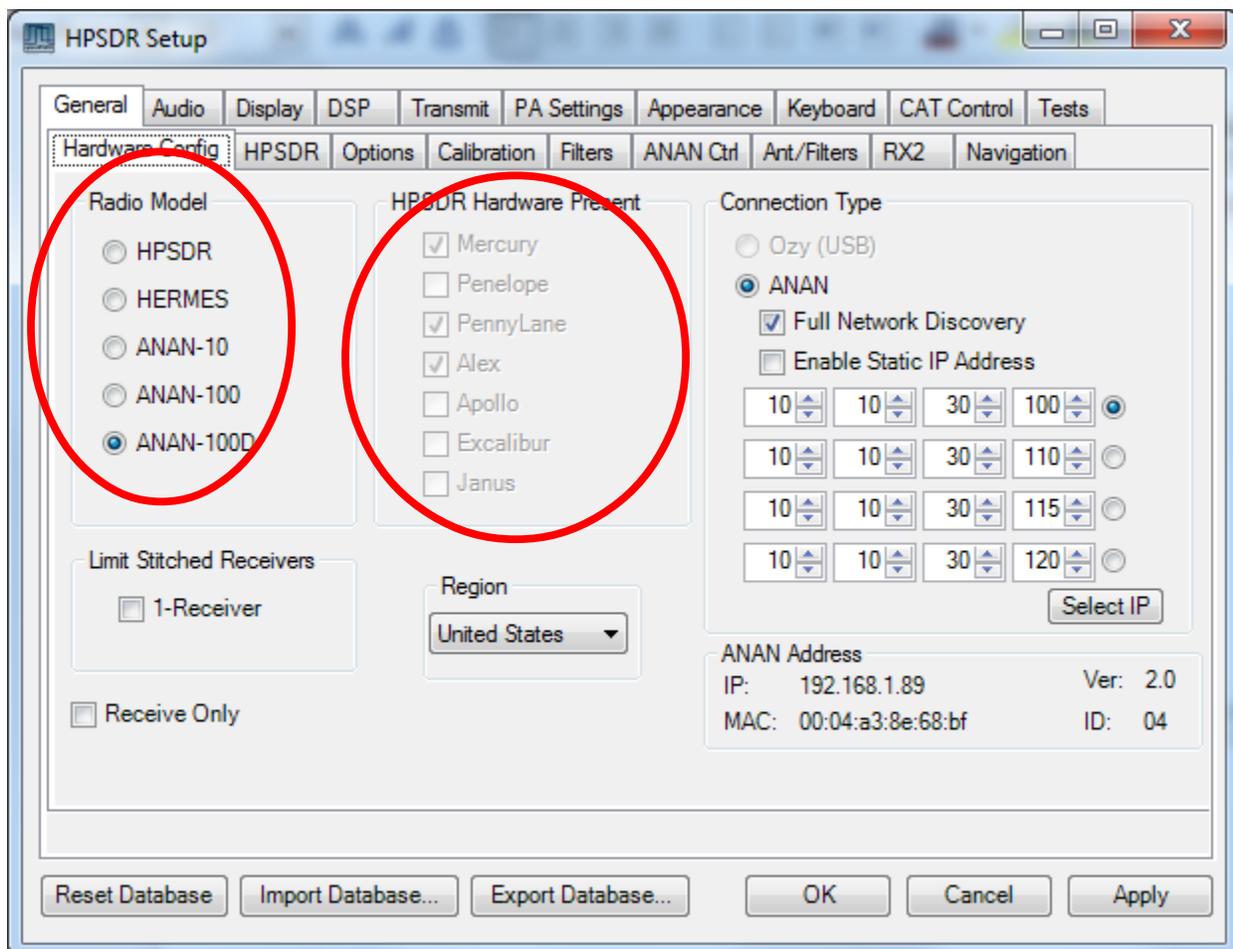
desc	Text describing command functions
active	Command available?
nsetparm	Number of "SET" parameters user must provide with set command.
ngetparm	Number of parameters user must provide with "GET" command
nansparms	Number of parameters returned in response to "GET" command.
Code	2 letter (Kenwood) or Flex Extended (ZZxx) CAT commands.

Notes:

-1 indicates a parameter does not apply/not applicable, not used etc.

Some commands indicated as active, may not be actually active in your implementation, YMMV.

The commands available in the catstruct table will vary according to the hardware being used, as shown on the PowerSDR setup, General tab.



OpenHPSDR CAT Commands

Flex Radio Systems “PowerSDR_CAT_Command_Reference_guide.pdf”

Please refer to Flex Radio Systems “PowerSDR_CAT_Command_Reference_guide.pdf” (Copyright © 2011-2013 FlexRadio Systems) available for download at <http://support.flexradio.com/Downloads.aspx?fr=1> for use with this chapter. Note: The Flex Radio Systems document does **NOT** include extensions implemented by OpenHPSDR developers to support OpenHPSDR hardware and software.

CAT commands require a 2 or 4 character command, optional parameter(s) and a terminating semi-colon. CC; CCP; ZZZZ; ZZZZP; The commands are NOT case sensitive.

GET or READ commands request information from the radio or OpenHPSDR PowerSDR.
SET or WRITE commands change radio or OpenHPSDR PowerSDR status and operation.
ANSWER responses return information from a GET command or an error response.

GET and SET commands can have no parameters, or a fixed number of parameters.

The parameters are listed in the Flex Radio Systems “PowerSDR_CAT_Command_Reference_guide.pdf” as P1 etc, where the number following the P indicates the parameter number.

P1 P1 P1 indicates parameter 1 is comprised of 3 characters.

P2 P2 P2 P2 indicates parameter 2 is comprised of 4 characters.

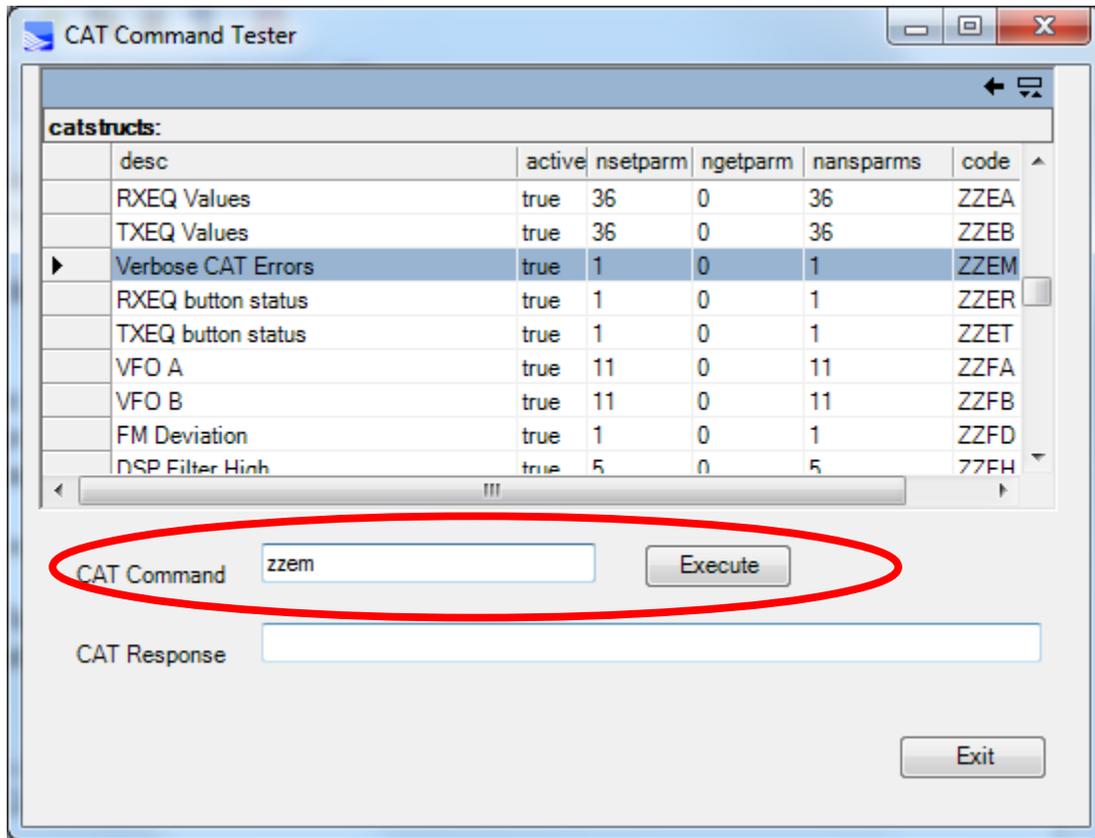
Notes:

PowerSDR returns the GET command received and appends the result to that command.

When PowerSDR receives an unknown or unsupported command it returns ?, unless the ZZEM1; command has been sent to enable verbose error responses.

OpenHpSDR CAT Commands

A CAT command can be sent by entering the command (and any required parameters) into the CAT Command text box and hitting the enter key or clicking on the “Execute” button. The entered text will be cleared from the CAT Command box and the response (if any) will appear in the CAT Response Text box.



Sending an Invalid or unsupported command such as XX will cause the command tester to return ?; unless the ZZEM1 command has been sent previously.

If the ZZEM1; command has been sent to invoke verbose error messages the response to the command XX; would be ZZEM:XX;:Unknown Command; If an inactive command is sent, such as AC (in the case of an ANAN-100) then ZZEM:AC;:Inactive Command; is returned.

OpenHpSDR CAT Commands

CAT Command Examples and OpenHpSDR PowerSDR responses.

ZZEM Command:

ZZEM Enables or disables CAT verbose error messages

Get	ZZEM	;	
Set	ZZEM	P1	;
Answer	ZZEM	See note	;
Notes		P1: 0 = OFF, 1 = ON. Not fixed length, varies with error message: Prefix Length Error Inactive Command Unknown Command Undefined Command Error Illegal Suffix Format Suffix Length Error Feature Not Available Form must be open	

Executing ZZEM1; Enables verbose error responses. Executing ZZEM0; disables verbose error responses.
Executing ZZEM; returns the CAT response ZZEM1; or ZZEM0; depending on current state of the ZZEM command.

ZZAI Command:

ZZAI Sets or reads the Auto Information function

Get	ZZAI	;	
Set	ZZAI	P1	;
Answer	ZZAI	P1	:
Notes		P1 = 0 for Off, 1 or more for On. When On, the radio will broadcast the VFO (A or B) frequency when changed. "Allow Kenwood AI Command" checkbox on the Setup/CAT tab must be checked to allow this command.	

The Set command is sent as ZZAI1; or ZZAI0; Where 0 or 1 is the P1 parameter. Nothing is returned.
The Get command is sent as ZZAI; PowerSDR should answer with ZZAI1; or ZZAI0;

AI Command:

AI Sets or reads the Auto Information function

Get	AI	;	
Set	AI	P1	;
Answer	AI	P1	:
Notes		P1 = 0 for Off, 1 or more for On. When On, the radio will broadcast the VFO (A or B) frequency when changed. Option checkbox on the Setup/CAT tab must be checked to allow this command.	

The Set command is sent as AI1; or AI0;
The Get command is sent as AI;. Response is AI1; or AI0;

OpenHPSDR CAT Commands

ZZAG Command:

ZZAG Sets or reads the Audio Gain control

Get ZZAG ;
Set ZZAG P1 P1 P1 ;
Answer ZZAG P1 P1 P1 ;
Notes P1 = 000 to 100.

The ZZAG; GET command returns the audio level setting for MASTER AF, ZZAG061; for example. Note that 3 numerals are returned, with leading zeros.

The ZZAG; SET command must contain 3 numerals. ZZAG050; changes audio gain to 50.

AG command:

AG Sets or reads the AF Gain thumbwheel control

Get AG P1 ;
Set AG P1 P2 P2 P2 ;
Answer AG P1 P2 P2 P2 ;
Notes

P1 = 0 for main transceiver, 1 for future sub receiver. P2 = 000 to 255 (scaled 0 to 100 in software). A Set value of 127 = 50 on the AF Gain thumbwheel. Also see ZZAG.

Gets or sets MASTER AF gain only in OpenHPSDR PowerSDR.

AG0255; Sets Master Gain Control to 100. AG0; Returns AG0255;

FA Sets or reads VFO A frequency

Get FA ;
Set FA P1
Answer FA P1
Notes

P1 = frequency in Hz (11 digits). Blank digits must be 0. Example: 14,320.150 = 00014320150.

FA; returns FA00014300000; or the VFO A frequency.

Set FA00014310000; changes VFO A to 14310khz.

FT Sets or reads the transceiver transmit VFO

Get FT ;
Set FT P1 ;
Answer FT P1 ;
Notes P1 = 0 for VFO A, 1 for VFO B.

FT; returns FT0; Sending FT1; selects secondary vfo as transmit vfo.

OpenHpSDR CAT Commands

ID Reads the transceiver ID number

Get ID ;

Set

Answer ID P1 P1 P1 ;

Notes P1 defaults to 019 (TS-2000).

The FlexRadio

ID; Returns ID900; for OpenHPSDR PowerSDR, when PowerSDR is selected as ID on CAT Control tab.

PS Sets or reads the Power Button status

Get PS ;

Set PS P1 ;

Answer PS P1 ;

Notes P1: 0 = Standby, 1 =
On.

PS0; does not power off radio, only controls the “Power” button of OpenHPSDR PowerSDR. Puts OpenHPSDR PowerSDR in the inactive state.

PS1; Reactivates, or returns from inactive state.

OpenHpSDR CAT Commands

ZZIF Reads the FlexRadio status

Get ZZIF ;

Set

Answer ZZIF P1
P1 P1 P2 P2 P2 P2 P3 P3 P3 P3
P3 P3 P4 P5 P6 P7 P7 P8 P9 P9
P10 P11 P12 P13 P14 P14 P15 ;

Notes

P1 (11 characters) VFO A frequency in Hz. Same as FA;
P2 (4 characters) Frequency step size expressed in powers of 10 (see ZZST).
P3 (6 characters) RIT/XIT frequency (+nnnnn or -nnnnn).
P4 (1 character) RIT status. 0 = off, 1 = on.
P5 (1 character) XIT status. 0 = off, 1 = on.
P6 (1 character) Channel bank number. Not used, defaulted to 0.
P7 (2 characters) Channel bank number. Not used, defaulted to 00.
P8 (1 character) MOX button status. 0 = off, 1 = on (transmitting).
P9 (2 character) Operating mode. See ZZMD for settings.
P10 (1 character) VFO Split status. Same as FR (always 0).
P11 (1 character) Scan status. Not implemented, defaulted to 0.
P12 (1 character) VFO Split status. Same as ZZSP.
P13 (1 character) CTCSS tone. Not used, defaulted to 0.
P14 (2 characters) More tone controls. Not used, defaulted to 00.
P15 (1 character) Shift status. Not used, defaulted to 0.

ZZIF; returns ZZIF000143000001000+00000000000010000000; from OpenHPSDR PowerSDR

OpenHpSDR CAT Commands

Sending CW with CAT commands

ZZKY command.

ZZKY Sends text to CWX for conversion to Morse

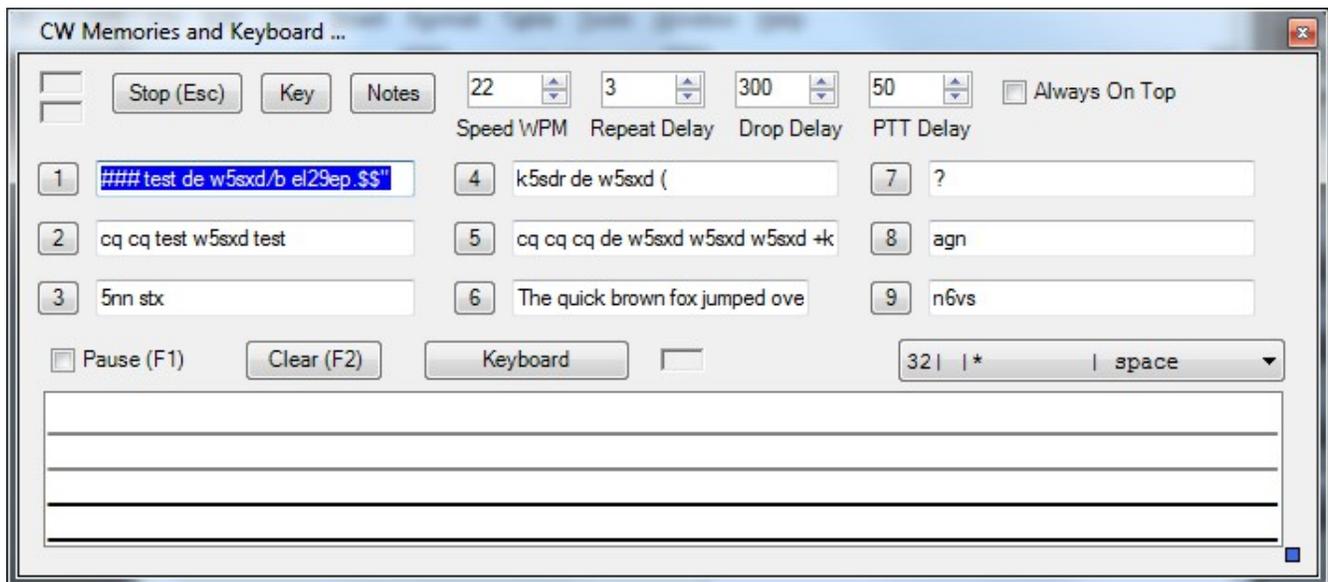
```

Get          ZZKY
Set  ZZKY P1  P2  P2  P2  P2  P2  P2  P2  P2  P2
P2      P2  P2  P2  P2  P2  P2  P2  P2  P2  P2
P2      P2  P2  P2  P2  P2  P2  P2  P2  P2  ;
Answer      ZZKY          P1          ;
Notes       Get: P1 0 = Character buffer available, 1 =
              Character buffer not available
              (>72 characters left in buffer), 2 = buffer is
              empty and all code has been sent.
              Set: P1 = space, P2 up to 24 ASCII printing
              characters. . Empty character positions in P2
              must contain a space.
    
```

Similar to Kenwood KY; command.

The above description (**Sends text to CWX for conversion to Morse**) may not be technically correct, since this command can be invoked without activating the PowerSDR CWX form. Note that most Kenwood radios support the KY command directly via CAT.

This command sends text which is converted to Morse code and then transmitted by the transceiver. This command is likely used by PowerSDR to convert text to Morse code via the CWX form, but can also be used by a 3rd party application to convert text to Morse code for transmission.



Example CW CAT commands:

ZZKY 24 char must be sent ; Note: each ZZKY command must contain a space plus 24 char. Pad with spaces where necessary.

OpenHpSDR CAT Commands

Sending ZZKY; Polls the CW buffer. Examine response. Wait til P1 = 0 (ZZKY0; buffer is empty) or P1=2 (ZZKY2; buffer empty, all code has been sent) before sending more characters.

ZZCS command

ZZCS Sets or reads the CW Speed

Get ZZCS ;
Set ZZCS P1 P1 ;
Answer ZZCS P1

ZZCS09; sets the front panel CW mode, CW speed to 9 wpm. ZZCS25; sets to 25WPM.

ZZCB command.

ZZCB Sets or reads the Break In Enable checkbox status

Get ZZCB ;
Set ZZCB P1 ;
Answer ZZCB P1 ;
Notes P1 = 0 for disabled, 1 for enabled.

ZZCD command

ZZCD Sets or reads the Break In Delay value

Get ZZCD ;
Set ZZCD P1 P1 P1 P1 ;
Answer ZZCD P1 P1

ZZCD; Returns ZZCD0300; or the value in the CW mode front panel Break In Delay(ms)
ZZCD0150; sets the break in delay to 150ms.