

FLEX-6000 SIGNATURE SERIES

SMARTSDR CAT SOFTWARE USER'S GUIDE

SmartSDR CAT version 2.3.9

9 July 2018

TABLE OF CONTENTS

| | |
|---|-----------|
| 1 INTRODUCTION..... | 3 |
| 1.1 Description of the SmartSDR CAT Interface | 3 |
| 1.2 Operational Notes..... | 3 |
| 2 SMARTSDR CAT INSTALLATION MANAGEMENT..... | 4 |
| 2.1 SmartSDR CAT Installation Procedure | 4 |
| 2.2 Upgrading SmartSDR CAT | 4 |
| 2.3 Removing SmartSDR CAT..... | 4 |
| 3 USING SMARTSDR CAT INTERFACE..... | 7 |
| 3.1 Starting the SmartSDR CAT Interface..... | 7 |
| 3.1.1 Auto Start Up..... | 7 |
| 3.1.2 Manual Start Up..... | 7 |
| 3.2 Configuring SmartSDR CAT | 7 |
| 3.2.1 Main Window | 8 |
| 3.2.2 Port Edit Window | 15 |
| 3.2.3 Log Window | 23 |
| 4 CAT COMMANDS..... | 24 |
| 4.1 Supported CAT Commands | 24 |
| 4.2 Supported Kenwood CAT Commands..... | 25 |
| 4.3 FlexRadio CAT Command Syntax Detail..... | 26 |
| 4.4 Kenwood CAT Command Syntax Detail..... | 37 |
| 5 OTRSP COMMANDS..... | 45 |
| 5.1 Supported OTRSP Commands..... | 45 |
| 6 WINKEYER COMMANDS..... | 45 |
| 6.1 Supported Winkeyer Commands | 45 |
| APPENDIX A: UNINSTALLING SMARTSDR CAT VERSIONS PRIOR TO V1.2.11..... | 46 |
| APPENDIX B: KEY TERMS | 47 |

1 INTRODUCTION

1.1 DESCRIPTION OF THE SMARTSDR CAT INTERFACE

The SmartSDR CAT interface bridges the legacy COM port interface used by many amateur radio systems to that of the FlexRadio Systems Signature Series radios. This allows third party programs such as loggers and digital mode clients that don't communicate directly with the radio using our Ethernet API to communicate without changes.

The FlexRadio CAT command set is based upon the Kenwood format. Therefore, any program that supports Kenwood models should work with our radio. In addition to the CAT protocol SmartSDR CAT also supports the Open Two Radio Switching Protocol (OTRSP) for SO2R automation, Winkeyer emulation, and PTT Port capabilities.

Because of the limitations in a legacy system like CAT, the SmartSDR CAT feature set is limited. Common features like tuning a VFO, transmitting, etc., are included. However, this means that many advanced features in a Signature Series radio will not be available via the CAT interface. Developers seeking additional access to such features should explore the API resources available at the [Flex Application Developer Program \(ADP\) web page](#).

The Signature Series are a radio "server" platform that multiple "clients" can communicate with. SmartSDR for Windows is one such client and the SmartSDR CAT interface is a separate client, both of which can communicate concurrently with Signature Series radios.

1.2 OPERATIONAL NOTES

Most third-party CAT enabled programs are designed to control VFO A and possibly VFO B based on a 1 or 2 VFO legacy radio architecture.

With the Signature Series, the concept of a VFO maps very closely to a Slice Receiver. For this reason, a Slice Receiver Index (e.g. Slice A) is a required setup parameter for any protocol that utilizes the concept of a VFO. The selected Slice is *logically* mapped to the third-party CAT program's VFO A.

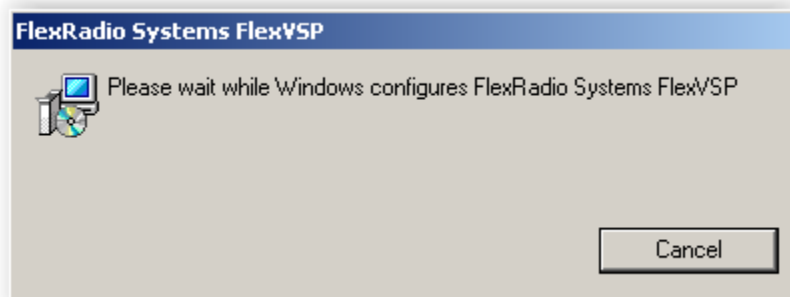
In the CAT protocol, the first time a split command such as 'FT1;' or 'ZZSW1;' is encountered, the SmartSDR CAT application will create a new "Split Slice" and set that Slice's Transmit flag (the typical Split configuration with a Signature Series Radio). This allows listening to either the receive and transmit frequencies or both. From that point forward, that Slice will be *logically* mapped to the third-party CAT program's VFO B. Commands that access VFO B information before one of the commands mentioned above is issued or after the Split Slice is manually closed will receive a '?' response.

2 SmartSDR CAT INSTALLATION MANAGEMENT

The following sections describe how install, upgrade or remove SmartSDR CAT from your PC.

2.1 SMARTSDR CAT INSTALLATION PROCEDURE

During the installation of SmartSDR for Windows you may see the following informational dialog box as the FlexRadio Systems FlexVSP virtual serial port driver is installed. It may take a few minutes for the FlexVSP drivers to completely install. Please do not press the Cancel button if it appears that the installation has stopped as this will prevent SmartSDR CAT from operating properly.



When SmartSDR for Windows finishes installing and configuring the FlexRadio Systems FlexVSP software component, the new version of SmartSDR CAT will be started and an icon will be placed on the Desktop for easy subsequent starts.

2.2 UPGRADING SMARTSDR CAT

The SmartSDR CAT upgrade process is as simple as installing a newer version of SmartSDR for Windows. The installer will optionally include SmartSDR CAT and the virtual serial port driver (FlexRadio Systems FlexVSP), only upgrading required components when necessary.

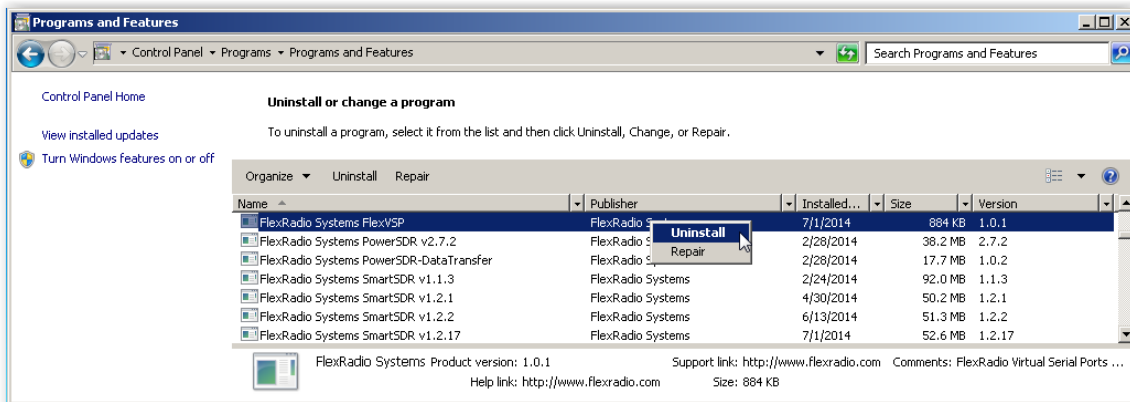
2.3 REMOVING SMARTSDR CAT

Note: If you have SmartSDR CAT v1.2.10 or earlier installed on your PC, see Appendix A.

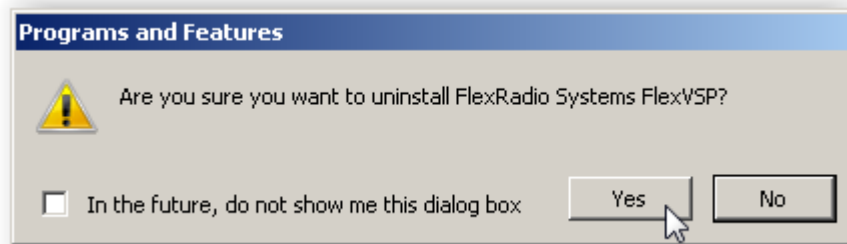
The SmartSDR CAT application component is uninstalled automatically when you run the SmartSDR for Windows uninstaller. However, the virtual serial port driver, **FlexRadio Systems FlexVSP** must be uninstalled manually using the procedure described below. Note that it is not necessary to uninstall FlexVSP when upgrading SmartSDR and/or SmartSDR CAT.

CAUTION: UNINSTALLING THE FLEXRADIO SYSTEMS FLEXVSP DRIVER WITHOUT UNINSTALLING THE SMARTSDR CAT APPLICATION WILL RESULT IN AN ERROR WHEN THE SMARTSDR CAT APPLICATION IS STARTED. YOU SHOULD ONLY UNINSTALL THE FLEXRADIO SYSTEMS FLEXVSP DRIVER WHEN INSTRUCTED TO DO SO BY UPGRADE INSTRUCTIONS OR BY A FLEXRADIO SYSTEM TECHNICAL SUPPORT ENGINEER.

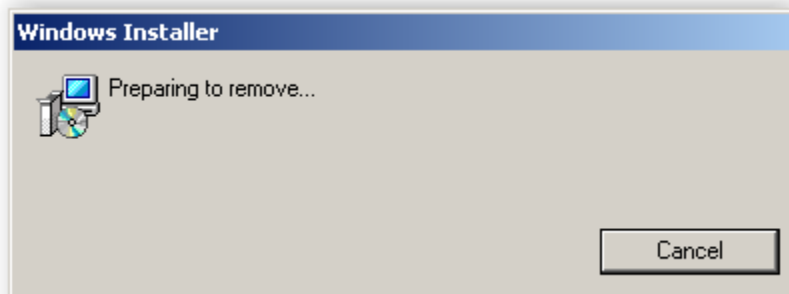
1. Close the **SmartSDR CAT** application.
2. Open the **Windows Control Panel** and select **Uninstall a Program**
3. Click on the **FlexRadio Systems FlexVSP** program entry.



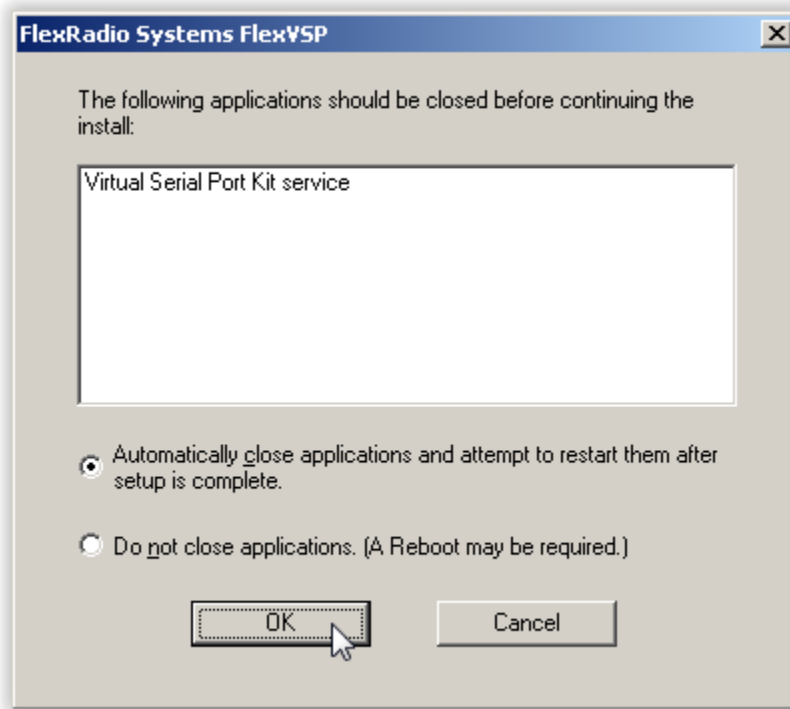
4. Click the **Uninstall** option above the list (or right click on the entry and select the **Uninstall** option).
5. Answer **Yes** to the prompt “*Are you sure you want to uninstall FlexRadio Systems FlexVSP*” as shown below.



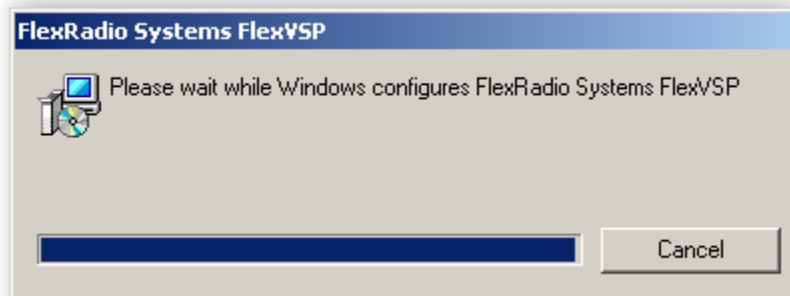
6. The Windows Installer *Preparing to Remove* dialog box is displayed as shown below.



7. If you receive a prompt to “*Automatically close applications and attempt to restart them after setup is complete*”, click on **OK** to continue. See image below.



8. A progress dialog box will be displayed as shown below as the FlexRadio Systems FlexVSP driver is being uninstalled.



9. After FlexVSP has finished uninstalling, manually reboot your PC if not prompted to do so.

3 USING SmartSDR CAT INTERFACE

3.1 STARTING THE SMARTSDR CAT INTERFACE

SmartSDR CAT is started by two methods described below. Usually SmartSDR CAT is started by the Auto Start Up method and is never closed, so it is always communicating with the configured FlexRadio Signature Series radio.

Note: SmartSDR CAT must be able to connect to a Signature Series radio to work properly.

3.1.1 Auto Start Up

SmartSDR CAT will start automatically when SmartSDR starts, if the **Autostart CAT with SmartSDR** option is selected in SmartSDR. When selected, SmartSDR CAT starts and stops with SmartSDR. If the SmartSDR CAT application window was minimized that last time it ran, it will start minimized when SmartSDR is restarted. It will remain running unless closed by the user. Clicking on the SmartSDR CAT icon will open the SmartSDR CAT User Interface for configuration.

3.1.2 Manual Start Up

You can manually start SmartSDR CAT by double clicking on the **SmartSDR CAT** program icon located on your Desktop or in the Windows Start Menu under the FlexRadio Systems program folder. If the application is already running, its window will appear.

3.2 CONFIGURING SMARTSDR CAT

When SmartSDR CAT starts the first time, it will create a Serial CAT port automatically at the lowest open port (COM4 or above) and a TCP CAT Port on port 5002 primarily for DDUtil compatibility.

If the FlexVSP driver is not loaded or has not fully started at the time the SmartSDR CAT user interface starts, an error message will be displayed. This condition in which the VSP driver has not fully started can exist on systems that utilize a solid state hard drive allowing Windows to run the Startup applications before the FlexVSP service has started. If this occurs, wait 15-30 seconds and then manually restart SmartSDR CAT.

3.2.1 Main Window

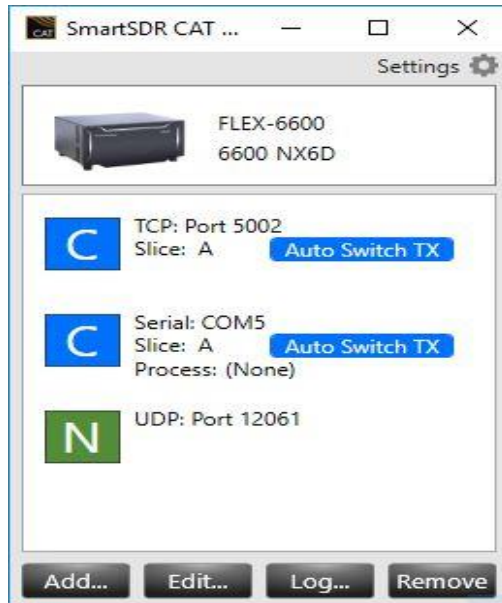


Figure 1 SmartSDR CAT Main Window

Near the top of the Main Window, an indicator shows whether SmartSDR CAT has connected to a radio and if it is using a SmartLink connection to a radio. Once a connection has been made, hovering the mouse cursor over this indicator will show the Model and Nickname (or Serial Number) of the connected radio. When no connection is present, this indicator will be shown as follows:

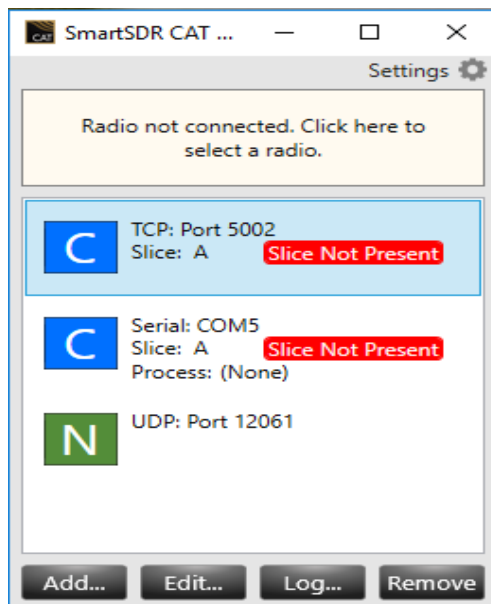


Figure 2 Main Window - Radio Not Connected

To select which radio to connect, click on the connection status box at the top of the window. It may also show a blue SmartLink indicator. This will bring up the radio chooser.

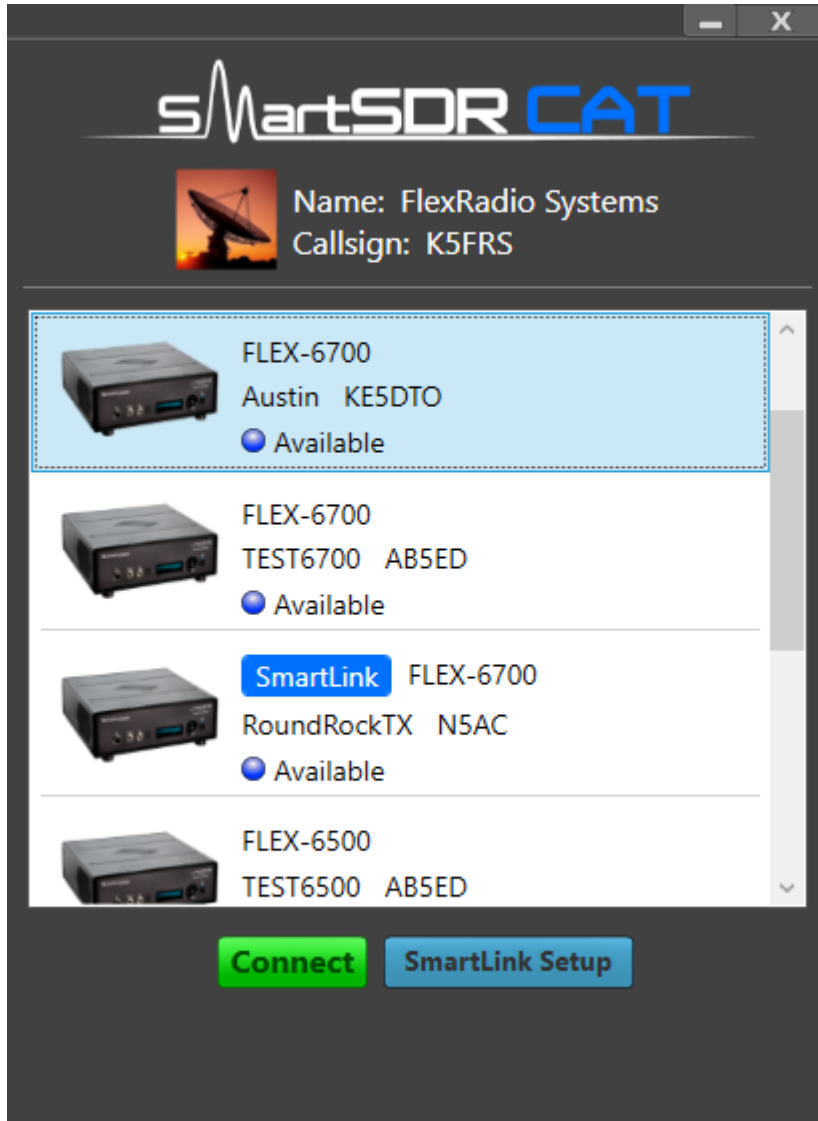
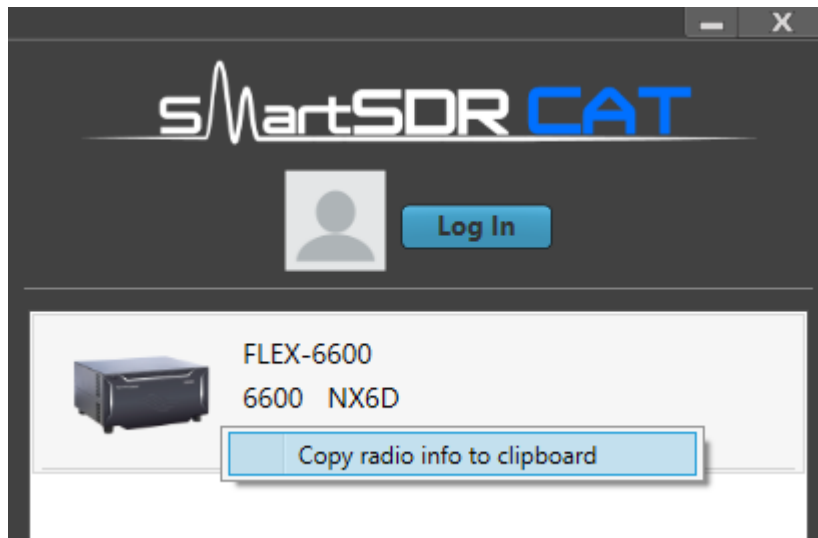


Figure 3 Radio Chooser

From this screen, the SmartLink Setup allows the user to verify the SmartLink settings and select a radio from the list. Once a radio is chosen, auto-connect settings are applied when starting up. These settings can be accessed by clicking on the settings icon in the SmartSDR CAT main window. Unchecking the **Auto Connect SmartLink** option will prevent automatically connecting to a remote radio which could cause unintended network bandwidth to be used.

Right clicking a radio in the radio chooser opens a menu selection that allows you to copy the detailed information about the selected radio to the clipboard, as shown below:



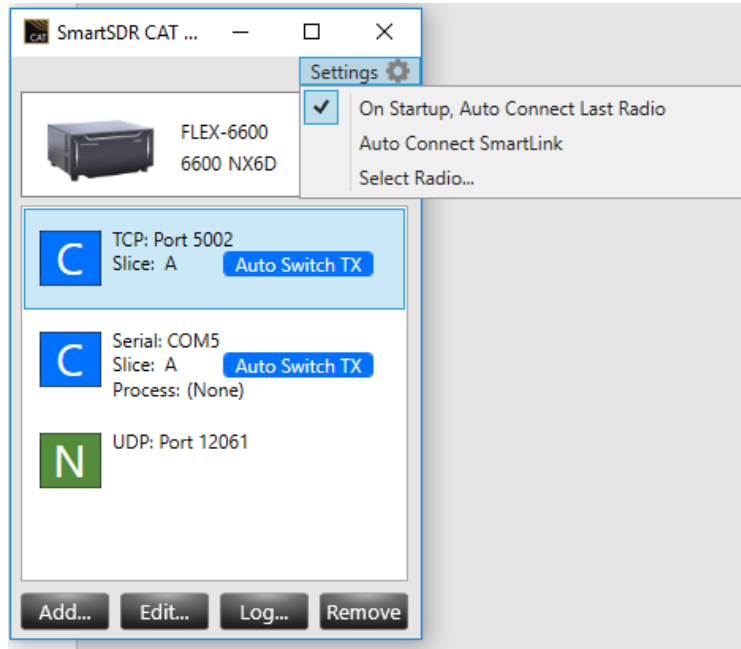


Figure 4 Auto Connect options

The Port list is the primary component of the Main Window. Each item in the list represents a single Port showing the relevant details of the port including the Protocol (CAT, OTRSP, PTT, or Winkeyer), the Port type (e.g. COM1 or TCP port 60000), and the associated Slice (A-H). The colored icon on the left side denotes the first letter of the protocol (C for CAT, O for OTRSP, etc.) Hover the mouse cursor over the indicator to display the Port Protocol.

Note that for Virtual Serial Port (VSP) pairs, only the Client side (the side to be used by the third-party application) of the VSP is shown in the Main Window.

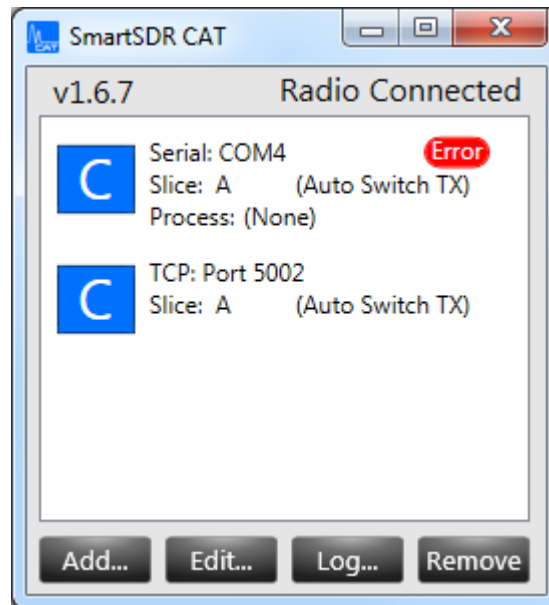


Figure 5 Main Window - Port Error

If there is a problem opening the Port (Serial or TCP), a red Error indicator will appear to the right of the Serial/TCP line. Hovering the mouse cursor over the error will produce a message that should help to shed some light on the source of the problem. If the Port is in conflict as a result of another program using it or if it is a hardware Serial port (perhaps a USB to Serial adapter) that is powered down or unplugged, simply closing the program, powering up the device and/or plugging the device in should resolve the problem. When the problem is resolved, the red Error indicator will disappear.

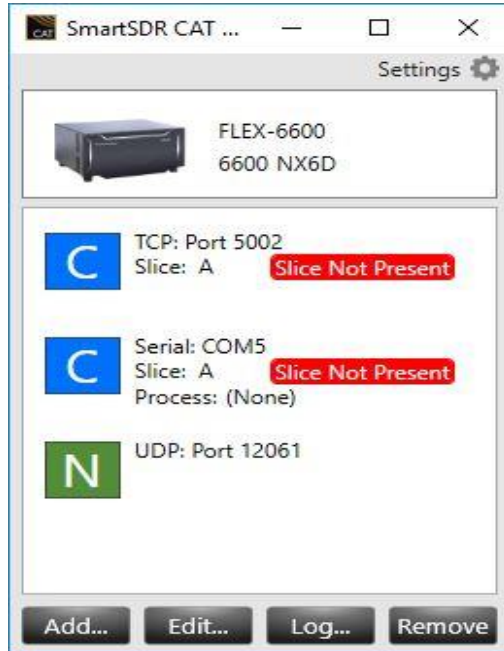


Figure 6 Main Window - Slice Not Present

If a Port's selected Slice is not found in the radio, a red indicator reading "Slice Not Present" will be shown. Creating a Slice using a Radio Client like SmartSDR for Windows will resolve this issue and cause the indicator to disappear.

The **Add** button allows the user to add an additional Port to the list. See the Port Edit Window description below for more information.

The **Edit** button allows the user to change Port settings. See the Port Edit Window description below for more information.

The **Log** button allows the user to open a diagnostic window. See the Log Window description below for more information.

The **Remove** button allows the user to remove a Port. Ctrl and Shift keys may be used to select multiple Ports for faster removal. Multiple selection does not apply to the Edit or Log buttons. Note that removing a FlexVSP Serial Port will result in those ports being removed from the system and may take several seconds to complete the device removal process. Right-clicking on the Remove button reveals a **Reset FlexVSP Port** option. Clicking this option will cause the system to remove all FlexVSP ports and then add back the pairs as defined in the Port list. This can help to recover a situation where the FlexVSP ports have been disassociated from the defined Ports.

To close the SmartSDR CAT application, click the red X in the upper right corner of the Main Window. A prompt to confirm avoids accidental disconnecting of all of the Ports with the radio.

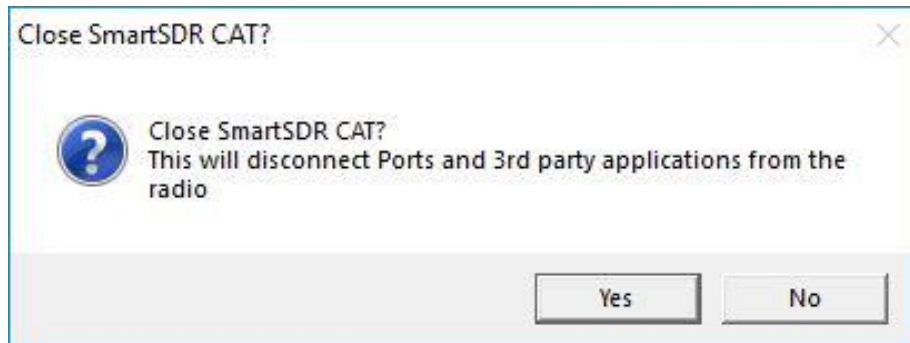


Figure 7 Close Dialog

3.2.2 Port Edit Window

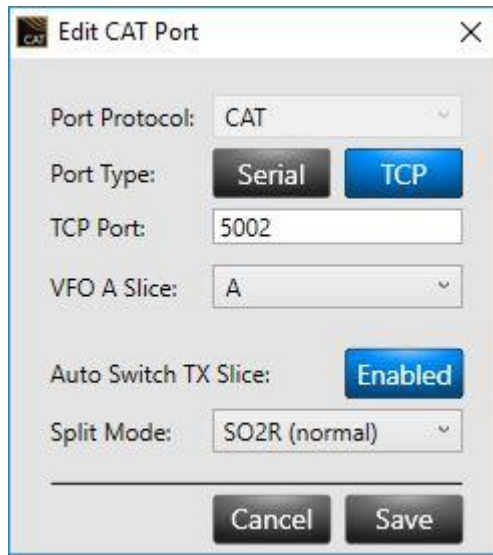


Figure 8 Port Edit Window

The Port Edit Window allows the user to set Port details when adding or editing a Port.

Before describing the various controls on this Window, it is appropriate to explain that the screenshots shown in the manual were taken in **Advanced mode**. To enable Advanced Mode, right click anywhere on the Port Edit Window and click the Advanced menu option.

Note: The screen image examples shown below are in Advanced Mode in order to display all of the possible options.

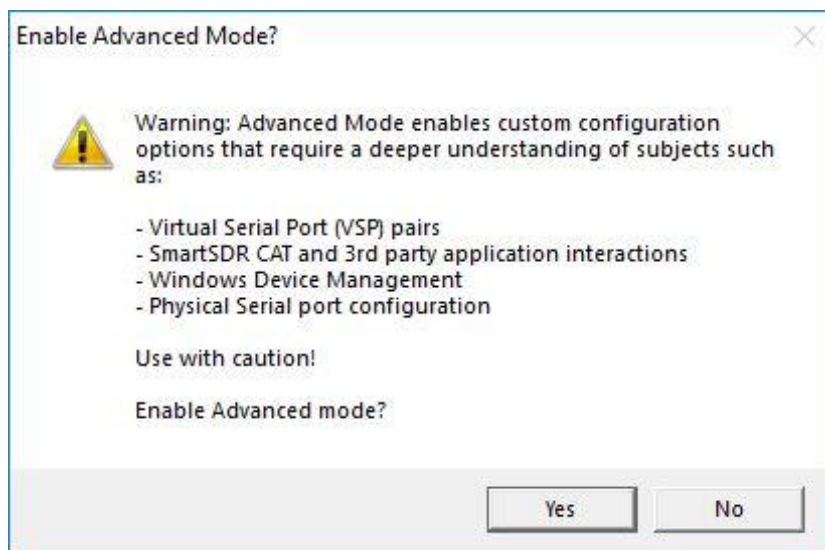


Figure 9 Advanced Mode Warning

A warning dialog as shown above will require confirmation that the user wants to use this mode. Using the Advanced Mode is not necessary for operation of SmartSDR CAT, but simply provides another degree of freedom in configuration for the Advanced user. In particular, when Advanced Mode is off, the CAT sides of VSP ports are not shown and the Serial Port to use for the Client side is chosen for the User. If any of this is confusing, leave Advanced Mode off.

The **Port Protocol** is the selected language of the Port. This can be CAT, OTRSP, PTT or Winkeyer. Note that while editing a Port, this field cannot be changed. To change the protocol on a Port, it is necessary to Remove the port from the Main Window and then set the new protocol when Adding the Port.

Protocol Descriptions:

CAT: Computer Aided Transceiver (CAT) was developed as a way to communicate with a radio through a serial interface. Commands are sent in text and are terminated with a semicolon. The command set varies depending on the transceiver make and model. The SmartSDR CAT implementation is based on the Kenwood command set including compatibility commands (2-character commands) and specialized FlexRadio specific commands (4-character commands beginning with ZZ).

Note: While the CAT protocol exposes many common radio operations, it is a dated interface and thus does not implement the entire set of features possible on a FlexRadio Signature Series radio. For more functionality and control, see the [Flex Application Developer Program \(ADP\) web page](#).

OTRSP: The Open Two Radio Switching Protocol (OTRSP) was developed in order to facilitate and simplify Single Operator, 2 Radio (SO2R) configurations. Details on the protocol can be found here: <http://www.k1xm.org/OTRSP/>.

PTT: The Push-To-Talk (PTT) protocol to enables serial port control of the Transmit mode. This allows for easy hardware configurations for triggering transmit.

Winkeyer: The Winkeyer port type emulates a subset of the Winkeyer functionality for easy integration with logging applications such as N1MM. The Winkeyer spec can be found here: <http://k1el.tripod.com/files/Winkey10.pdf>.

The **Port Type** allows the Port to be setup for Serial or TCP connections. Note that PTT ports can only be setup in Serial mode.

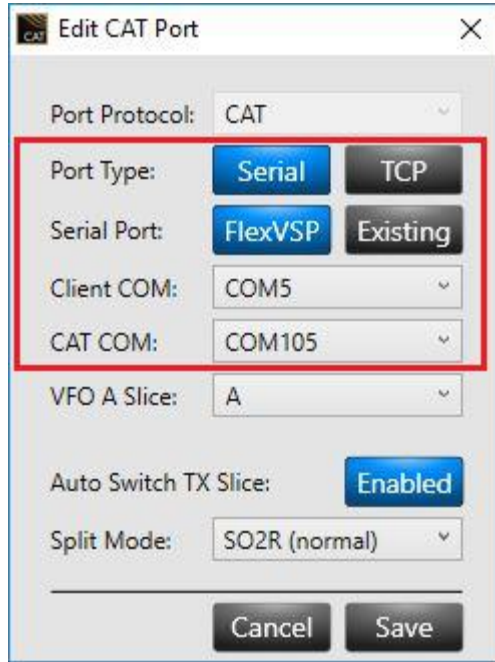


Figure 10 Serial FlexVSP Port Configuration

When **Serial** is selected, the Serial Port can be one of two types: FlexVSP or Existing.

A **FlexVSP** port will create a pair of Virtual Serial Ports (VSP) using the FlexVSP driver. One end of this pair is opened by the SmartSDR CAT application (the **CAT COM**) and the other end is opened by the 3rd party application (the **Client COM**). When creating or editing a FlexVSP Serial Port, note that it will take several seconds for the changes to take place due to delays in the driver.

When in Advanced Mode, when selecting a FlexVSP com port, all available or free com ports will be shown. This list is extensive since Windows can define up to 265 com ports.

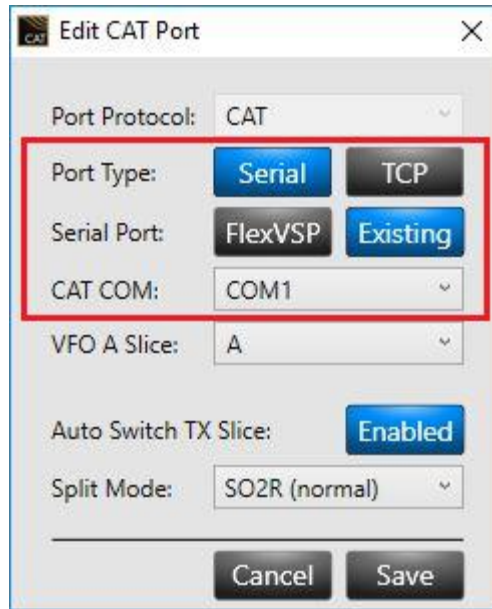


Figure 11 Serial Existing Port Configuration

When choosing an **Existing** Serial Port, the **CAT COM** specifies an existing COM port already present on the system. This is ideal for interfacing to hardware ports that speak the CAT language natively.

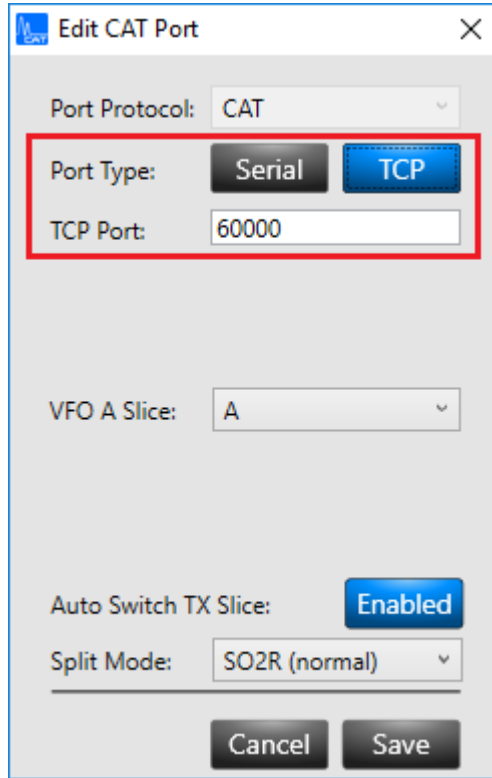


Figure 12 TCP Port Configuration

A **TCP** port requires only the TCP Port number to be specified. Connecting to this port will allow an application to communicate using the specified protocol (CAT, OTRSP, etc.) to the radio. Note that TCP is not available with the PTT protocol.

The **VFO A Slice** specifies which Slice will be used for the logical VFO A in the protocol. (not used with Winkeyer)

When enabled **Auto Switch TX Slice** automatically switches the Transmit Slice to the VFO A Slice selected above when a CAT TX command is sent on the com port. This feature allows multiple digital mode applications to operate at the same time on different VFO A Slice assigned slices by dynamically making the slice the transmit slice when the digital mode application is transmitting. If this option is not enabled, the operator will have to manually designate the Transmit Slice.

Note that PTT type ports will not show a VFO A Slice selection if this feature is disabled and the Main Window will show “TX” for the Slice.

The **Split Mode** determines whether a split Slice will be removed when coming out of Split mode (FT0; or ZZSW0; commands). In SO2R (normal) mode, the split Slice will be closed. In SO2V mode, the split Slice will be left open, allowing the user to continue using it in the typical VFO A/VFO B configuration. Note that going into Split mode (FT1;

or ZZSW1; commands) in either setting will still create a split Slice in the event that one is not already in place.

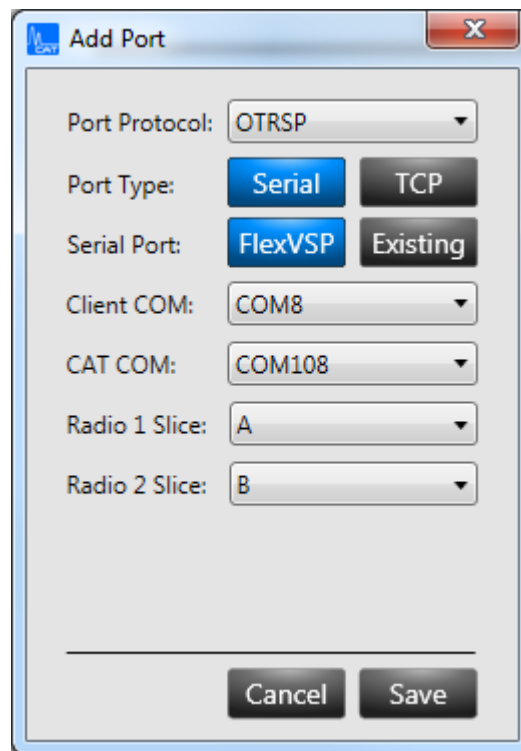


Figure 13 OTRSP Port Configuration

The OTRSP protocol has several unique fields.

The **Radio 1 Slice** is the Slice to be used when OTRSP commands reference the Radio 1 object. Similarly, **Radio 2 Slice** is the Slice to be used when OTRSP commands reference the Radio 2 object.

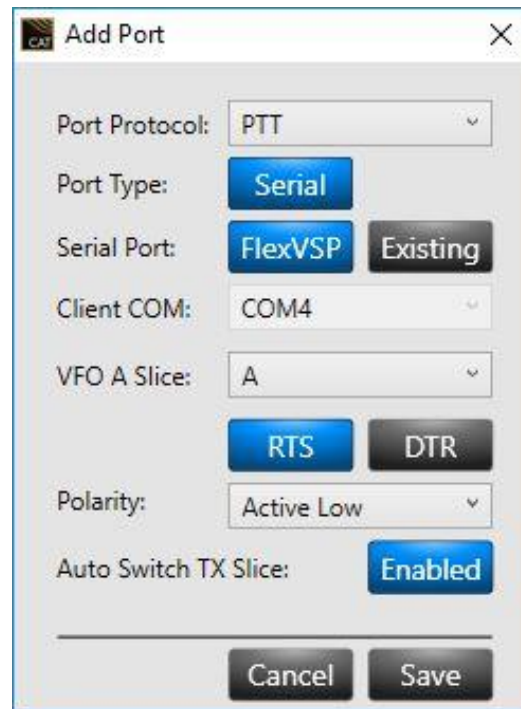


Figure 14 PTT Port Configuration

The PTT Protocol has several unique fields.

The **RTS** and **DTR** controls indicate whether to use the RTS or DTR Pins to signal PTT changes on the radio. Note that either or both of these can be used in a wired OR configuration (i.e. if both are enabled, then if either signal is asserted, PTT is signaled).

The **Polarity** indicates whether Transmit (PTT) should be active on a pin transition to Ground (Active Low) or when the pin is pulled up (Active High).

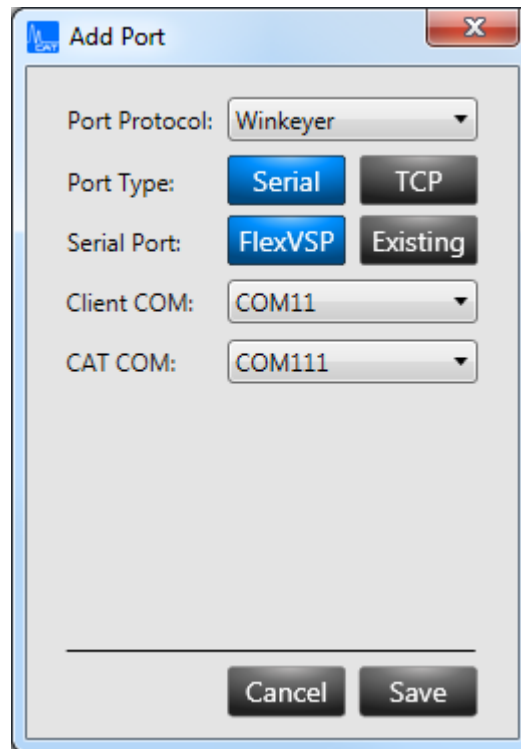


Figure 15 Winkeyer Port Configuration

The **Winkeyer** protocol has no unique fields.

The **Cancel** button will close the Window and cancel any changes on an Edit, or simply not execute an Add depending on how the Window was opened.

The **Save** button will execute any necessary changes to the Port on an Edit and will create the Port on an Add. Note that changes to the FlexVSP Serial Ports can take several seconds to complete.

3.2.3 Log Window

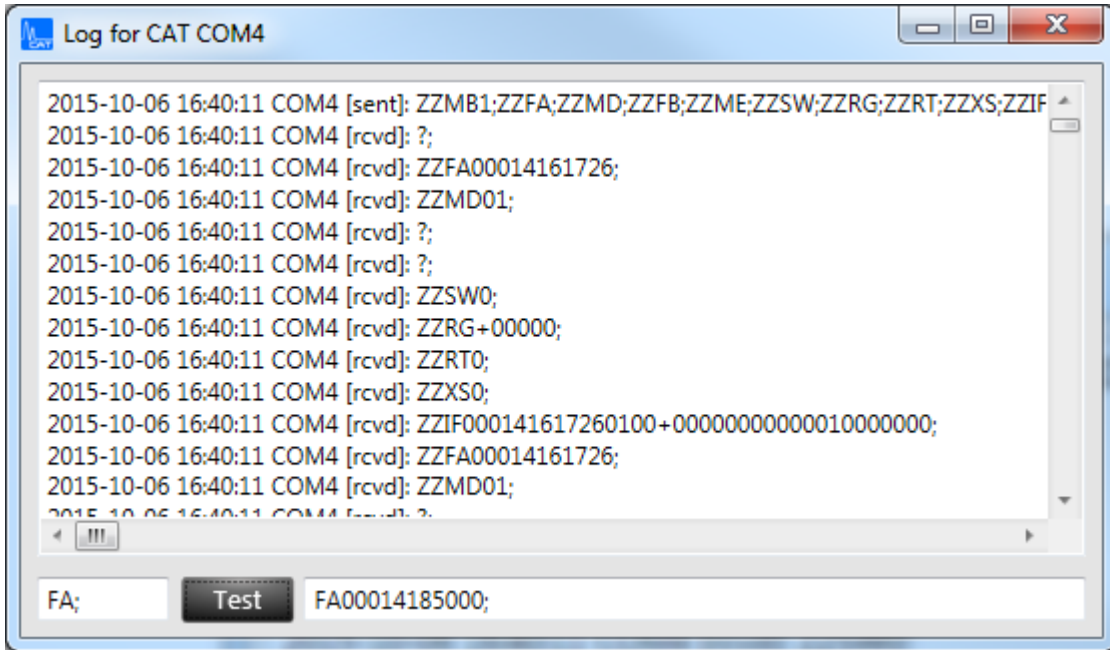


Figure 16 Log Window

The **Log Window** is primarily a diagnostic interface. It shows the stream of data being transferred across the Port in real time with date and timestamps to facilitate debugging of commands or connections. A test interface is also included that allows commands to be entered in the lower left Text Box. Commands can be executed by pressing Enter or by clicking on the Test button. The reply will be shown in the Text Box in the lower right corner.

Multiple Log Windows may be opened to view traffic on more than one port.

The traffic from all Ports is also logged to:

%appdata%\FlexRadio Systems\LogFiles\CAT.log for further debugging. Once a file grows larger than 5 Megabytes (MB), the file will be renamed CAT.log.1, then CAT.log.2, etc. and a new CAT.log will be created. A maximum of 5 log files are kept.

4 CAT COMMANDS

The following are the CAT commands supported in SmartSDR CAT. There are FlexRadio (ZZ) CAT commands and a subset of the Kenwood TS-2000 CAT command set for compatibility with older third-party CAT-enabled programs that do not support the FlexRadio CAT command set.

If a third-party CAT-enabled program does not have a FLEX-6000 or FlexRadio CAT option, then use the Kenwood TS-2000 configuration.

4.1 SUPPORTED CAT COMMANDS

| | |
|------|--|
| ZZAG | Reads / Sets VFO A Audio Gain (0-100) |
| ZZAI | Auto Information State (on/off) |
| ZZAR | Reads / Sets VFO A AGC Threshold (0-100) |
| ZZAS | Reads / Sets VFO B AGC Threshold (0-100) |
| ZZBI | Reads / Sets Binaural RX State (On / Off) |
| ZZDE | Reads / Sets VFO A Diversity (DIV) state (On / Off) [FLEX-6700 only] |
| ZZFA | Reads / Sets VFO A Frequency (11 digit Hz) |
| ZZFB | Reads / Sets VFO B Frequency (11 digit Hz) |
| ZZFI | Reads / Sets VFO A DSP Filter Index |
| ZZFJ | Reads / Sets VFO B DSP Filter Index |
| ZZFR | Toggle VFO A/B Active |
| ZZFT | Toggle VFO A/B Transmit |
| ZZGT | Reads / Sets VFO A AGC Mode |
| ZZIF | Reads Transceiver Status |
| ZZLB | Reads / Sets VFO A Audio Pan (0-100, Left to Right) |
| ZZLE | Reads / Sets VFO B Audio Gain (0-100) |
| ZZLF | Reads / Sets VFO B Audio Pan (0-100, Left to Right) |
| ZZMA | Reads / Sets VFO A Mute (On / Off) |
| ZZMD | Reads / Sets VFO A DSP Mode |
| ZZME | Reads / Sets VFO B DSP Mode |
| ZZMG | Reads / Sets Transmitter Mic Gain (0-100) |
| ZZNL | Reads / Sets VFO A Wide Noise Blanker (WNB) Threshold (0-100) |
| ZZNR | Reads / Sets VFO A Noise Reduction (NR) State (On / Off) |
| ZZPC | Reads / Sets the RF Power Drive Level (0-100) |
| ZZRC | Clears RIT |
| ZZRD | Decrements RIT frequency |
| ZZRG | Reads / Sets VFO A RIT Frequency (+/- 5 digit Hz) |
| ZZRT | Reads / Sets VFO A RIT State (On / Off) |
| ZZRU | Increments the RIT frequency |
| ZZRW | Reads / Sets VFO B RIT Frequency (+/- 5 digit Hz) |

ZZRX Reads Receive State (On / Off) [inverse of MOX]
ZZRY Reads / Sets VFO B RIT Frequency (+/- 5 digit Hz)
ZZSM Read the S-Meter
ZZSW Set Transmit VFO (0=A, 1=B)
ZZTX Set MOX State (On / Off)
ZZXC Clear XIT Frequency
ZZXG Read / Set VFO A XIT Frequency (+/- 5 digit Hz)
ZZXS Reads / Sets XIT State (On / Off)

4.2 SUPPORTED KENWOOD CAT COMMANDS

AI Auto Information State (On / Off)
FA Reads / Sets VFO A Frequency (11 digit Hz)
FB Reads / Sets VFO B Frequency (11 digit Hz)
FR Reads / Sets Active VFO (0=A, 1=B)
FT Reads / Sets Transmit VFO (0=A, 1=B)
GT Reads / Sets VFO A AGC Mode (0-Off, 2-Slow, 3-Medium, 4-Fast)
ID Reads the transceiver ID number
IF Reads Transceiver Status
KS Reads / Sets CW Keyer Speed (5-100 WPM)
KY Sends Text Morse Code
MD Reads / Sets VFO A DSP Mode
NB Reads / Sets VFO A Wide Noise Blanker State (On / Off)
PC Reads / Sets RF Power Level (0-100)
PT Reads / Sets CW Pitch Frequency (3 digit Hz)
RC Clears RIT
RD Decrements RIT frequency
RT Reads / Sets VFO A RIT State (On / Off)
RU Increments VFO A RIT Frequency
RX Sets Receive State (TX Off)
SH Reads / Sets VFO A Filter High Cut Frequency Index
SL Reads / Sets VFO A Filter Low Cut Frequency Index
SM Reads the S-Meter
TX Sets Transmit State (On / Off)
XT Reads / Sets VFO A XIT State (On / Off)

4.3 FLEXRADIO CAT COMMAND SYNTAX DETAIL

The following tables describe the FlexRadio CAT Command Syntax used with SmartSDR CAT.

| | | | | | | | | | |
|--------------------------------------|------|----|----|----|---|--|--|--|--|
| ZZAG Sets or reads VFO A Audio Gain | | | | | | | | | |
| Get | ZZAG | ; | | | | | | | |
| Set | ZZAG | P1 | P1 | P1 | ; | | | | |
| Answer | ZZAG | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZAI Sets or reads the Auto Information mode for a Slice | | | | | | | | | |
| Get | ZZAI | ; | | | | | | | |
| Set | ZZAI | P1 | ; | | | | | | |
| Answer | ZZAI | P1 | ; | | | | | | |
| Notes: P1 = 0 Auto Information disabled, P1 = 1 Auto Information enabled. When enabled, CAT will actively send any frequency change (VFO A or B) formatted as an 'FA;' or 'FB;' response. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|---|--|--|--|--|
| ZZAR Sets or reads VFO A AGC Threshold | | | | | | | | | |
| Get | ZZAR | ; | | | | | | | |
| Set | ZZAR | P1 | P1 | P1 | ; | | | | |
| Answer | ZZAR | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|---|--|--|--|--|
| ZZAS Sets or reads VFO B AGC Threshold | | | | | | | | | |
| Get | ZZAS | ; | | | | | | | |
| Set | ZZAS | P1 | P1 | P1 | ; | | | | |
| Answer | ZZAS | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| ZZBI Sets or reads Binaural Receive | | | | | | | | | |
| Get | ZZBI | ; | | | | | | | |
| Set | ZZBI | P1 | ; | | | | | | |
| Answer | ZZBI | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZDE Sets or reads Diversity (DIV) Button [FLEX-6700 ONLY] | | | | | | | | | |
| Get | ZZDE | ; | | | | | | | |
| Set | ZZDE | P1 | ; | | | | | | |
| Answer | ZZDE | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|----|----|----|----|----|
| ZZFA Sets or reads VFO A Frequency | | | | | | | | | |
| Get | ZZFA | ; | | | | | | | |
| Set | ZZFA | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Answer | ZZFA | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Notes: P1 = frequency in Hz (11 digits). Blank digits must be filled with 0. Example: 14.150.000 = 00014150000. May switch to 8 digit mode by doing an 8 digit set. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|----|----|----|----|----|
| ZZFB Sets or reads VFO B Frequency | | | | | | | | | |
| Get | ZZFB | ; | | | | | | | |
| Set | ZZFB | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Answer | ZZFB | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Notes: P1 = frequency in Hz (11 digits). Blank digits must be filled with 0. Example: 14,150.000 = 00014150000. May switch to 8 digit mode by doing an 8 digit set. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|---|--|--|--|--|--|
| ZZFI Sets or reads VFO A DSP Filter | | | | | | | | | |
| Get | ZZFI | ; | | | | | | | |
| Set | ZZFI | P1 | P1 | ; | | | | | |
| Answer | ZZFI | P1 | P1 | ; | | | | | |
| Notes: P1 value represents a Filter index from 0 to 7 for decreasing bandwidth. Example: If you are in LSB mode and your filter bandwidth is greater than 2.7K but less than or equal to 2.9K, ZZFI; will return 'ZZFI02;'. If your bandwidth were 2.901K, it would return 'ZZFI01;'. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|---|--|--|--|--|--|
| ZZFJ Sets or reads VFO B DSP Filter | | | | | | | | | |
| Get | ZZFJ | ; | | | | | | | |
| Set | ZZFJ | P1 | P1 | ; | | | | | |
| Answer | ZZFJ | P1 | P1 | ; | | | | | |
| Notes: Similar to ZZFI for VFO B | | | | | | | | | |

| | | | | | | | | | |
|---|------|---|--|--|--|--|--|--|--|
| ZZFR Toggle VFO A/B Active | | | | | | | | | |
| Set | ZZFR | ; | | | | | | | |
| Notes: If VFO B is not defined, this command just toggles VFO A Active on/off. Otherwise, if the radio is in "split mode" (ZZSW1) it will toggle between VFO A Active and VFO B Active. | | | | | | | | | |

| | | | | | | | | | |
|--|------|---|--|--|--|--|--|--|--|
| ZZFT Toggle VFO A/B Transmit | | | | | | | | | |
| Set | ZZFT | ; | | | | | | | |
| Notes: If VFO B is not defined, will just toggle VFO A Transmit on/off. Otherwise will toggle between VFO A Transmit and VFO B Transmit. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| ZZGT Sets or reads VFO A AGC Mode | | | | | | | | | |
| Get | ZZGT | ; | | | | | | | |
| Set | ZZGT | P1 | ; | | | | | | |
| Answer | ZZGT | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 2 = Slow, 3 = Med, 4 = Fast | | | | | | | | | |

| ZZIF Transceiver status query | | | | | | | | | | |
|-------------------------------|---|-----|-----|-----|-----|----|-----|-----|-----|--|
| Get | ZZIF | ; | | | | | | | | |
| Answer | ZZIF | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 | |
| | | 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 | <p>P1 (11 characters) VFO A frequency in Hz. Same as ZZFA; P2 (4 characters) Frequency step size (0001 = 10 Hz/1000 = 50 Hz) 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. P11 (1 character) Scan status. Not used, defaulted to 0. P12 (1 character) VFO Split status. Same as FT. 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.</p> <p>* Feature not available currently, defaulted to zeros.</p> | | | | | | | | | |

| ZZLB Sets or reads VFO A Audio Pan | | | | | | | | | |
|---|------|----|----|----|---|--|--|--|--|
| Get | ZZLB | ; | | | | | | | |
| Set | ZZLB | P1 | P1 | P1 | ; | | | | |
| Answer | ZZLB | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 (full left) to 100 (full right). | | | | | | | | | |

| | | | | | | | | | |
|--------------------------------------|------|----|----|----|---|--|--|--|--|
| ZZLE Sets or reads VFO B Audio Gain | | | | | | | | | |
| Get | ZZLE | ; | | | | | | | |
| Set | ZZLE | P1 | P1 | P1 | ; | | | | |
| Answer | ZZLE | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|---|--|--|--|--|
| ZZLF Sets or reads VFO B Audio Pan | | | | | | | | | |
| Get | ZZLF | ; | | | | | | | |
| Set | ZZLF | P1 | P1 | P1 | ; | | | | |
| Answer | ZZLF | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 (full left) to 100 (full right). | | | | | | | | | |

| | | | | | | | | | |
|-----------------------------------|------|----|---|--|--|--|--|--|--|
| ZZMA Sets or reads VFO A Mute | | | | | | | | | |
| Get | ZZMA | ; | | | | | | | |
| Set | ZZMA | P1 | ; | | | | | | |
| Answer | ZZMA | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | |
|-----------------------------------|------|----|---|--|--|--|--|--|--|
| ZZMB Sets or reads VFO B Mute | | | | | | | | | |
| Get | ZZMB | ; | | | | | | | |
| Set | ZZMB | P1 | ; | | | | | | |
| Answer | ZZMB | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--|--|----|----|---|--|--|--|--|--|----|-----|----|-----|----|---|----|---|----|----|----|----|----|------|----|------|----|-----|----|-----|----|-----|----|-----|----|--|----|--|
| ZZMD Sets or reads VFO A DSP Mode | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Get | ZZMD | ; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Set | ZZMD | P1 | P1 | ; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Answer | ZZMD | P1 | P1 | ; | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <p>P1 Values:</p> <table> <tr><td>00</td><td>LSB</td></tr> <tr><td>01</td><td>USB</td></tr> <tr><td>03</td><td>CWL (Mode is CW, Lower Sideband style tuning)</td></tr> <tr><td>04</td><td>CWU (Mode is CW, Upper Sideband style tuning)</td></tr> <tr><td>05</td><td>FM</td></tr> <tr><td>06</td><td>AM</td></tr> <tr><td>07</td><td>DIGU</td></tr> <tr><td>09</td><td>DIGL</td></tr> <tr><td>10</td><td>SAM</td></tr> <tr><td>11</td><td>NFM</td></tr> <tr><td>12</td><td>DFM</td></tr> <tr><td>20</td><td>FDV</td></tr> <tr><td>30</td><td>RTTY (ASKF – requires third-party RTTY software)</td></tr> <tr><td>40</td><td>DSTR (D-STAR requires ThumbDV waveform and dongle)</td></tr> </table> | | | | | | | | | | 00 | LSB | 01 | USB | 03 | CWL (Mode is CW, Lower Sideband style tuning) | 04 | CWU (Mode is CW, Upper Sideband style tuning) | 05 | FM | 06 | AM | 07 | DIGU | 09 | DIGL | 10 | SAM | 11 | NFM | 12 | DFM | 20 | FDV | 30 | RTTY (ASKF – requires third-party RTTY software) | 40 | DSTR (D-STAR requires ThumbDV waveform and dongle) |
| 00 | LSB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 01 | USB | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 03 | CWL (Mode is CW, Lower Sideband style tuning) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 04 | CWU (Mode is CW, Upper Sideband style tuning) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 05 | FM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 06 | AM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 07 | DIGU | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 09 | DIGL | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | SAM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | NFM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | DFM | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 20 | FDV | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 30 | RTTY (ASKF – requires third-party RTTY software) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 40 | DSTR (D-STAR requires ThumbDV waveform and dongle) | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|---|--|--|--|--|--|
| ZZME Sets or reads VFO B DSP Mode | | | | | | | | | |
| Get | ZZME | ; | | | | | | | |
| Set | ZZME | P1 | P1 | ; | | | | | |
| Answer | ZZME | P1 | P1 | ; | | | | | |
| Notes: See ZZMD for values. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|---|--|--|--|--|
| ZZMG Sets or reads the Transmitter Mic Gain Level | | | | | | | | | |
| Get | ZZMG | ; | | | | | | | |
| Set | ZZMG | P1 | P1 | P1 | ; | | | | |
| Answer | ZZMG | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|---|--|--|--|--|
| ZZNL Sets or reads VFO A Wide Noise Blanker (WNB) Level | | | | | | | | | |
| Get | ZZNL | ; | | | | | | | |
| Set | ZZNL | P1 | P1 | P1 | ; | | | | |
| Answer | ZZNL | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: Values 000 to 100. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZNR Sets or reads Slice Noise Reduction (NR) State | | | | | | | | | |
| Get | ZZNR | ; | | | | | | | |
| Set | ZZNR | P1 | ; | | | | | | |
| Answer | ZZNR | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | |
|---|------|------|---|--------|--|--|--|--|--|
| ZZPA Sets the Panadapter data IP Address:Port | | | | | | | | | |
| Set | ZZPC | <IP> | : | <Port> | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|---|--|--|--|--|
| ZZPC Sets or reads RF Power Drive Level | | | | | | | | | |
| Get | ZZPC | ; | | | | | | | |
| Set | ZZPC | P1 | P1 | P1 | ; | | | | |
| Answer | ZZPC | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: 000 to 100 | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| ZZPE Sets whether the Panadapter data is Enabled | | | | | | | | | |
| Set | ZZPE | P1 | ; | | | | | | |
| Notes: P1 Values: 0 = Disabled, 1 = Enabled | | | | | | | | | |

| | | | | | | | | | |
|--|------|---|--|--|--|--|--|--|--|
| ZZRC Clear Slice A RIT Frequency | | | | | | | | | |
| Set | ZZRC | ; | | | | | | | |
| Notes: Sets the RIT Frequency to zero. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|----|----|---|--|--|
| ZZRD Decrement the RIT frequency | | | | | | | | | |
| Set | ZZRD | P1 | P1 | P1 | P1 | P1 | ; | | |
| Set | ZZRD | ; | | | | | | | |
| Notes: ZZRD without parameter P1 will decrement the RIT frequency 10 Hz in CW, DIGU, and DIGL modes; 50 Hz in USB, LSB, and AM modes. P1 (00000 to 99999) will decrement the VFO A RIT Frequency by the amount entered. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|----|----|----|---|--|
| ZZRG Sets or reads VFO A RIT Frequency | | | | | | | | | |
| Get | ZZRG | ; | | | | | | | |
| Set | ZZRG | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Answer | ZZRG | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Notes: P1 = Polarity (+ or -) P2 = 00000 to 99999 | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZRT Sets or reads VFO A RIT State | | | | | | | | | |
| Get | ZZRT | ; | | | | | | | |
| Set | ZZRT | P1 | ; | | | | | | |
| Answer | ZZRT | P1 | ; | | | | | | |
| Notes: P1: 1 = On, 0 = Off. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|----|----|---|--|--|
| ZZRU Increment VFO A RIT frequency | | | | | | | | | |
| Set | ZZRU | P1 | P1 | P1 | P1 | P1 | ; | | |
| Set | ZZRU | ; | | | | | | | |
| Notes: ZZRU without parameter P1 will increment the RIT frequency 10 Hz in CW, DIGU, and DIGL modes; 50 Hz in USB, LSB, and AM modes. P1 (00000 to 99999) will increment the VFO A RIT Frequency by the amount entered. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|----|----|----|---|--|
| ZZRW Sets or reads VFO B RIT Frequency | | | | | | | | | |
| Get | ZZRW | ; | | | | | | | |
| Set | ZZRW | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Answer | ZZRW | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Notes: P1 = Polarity (+ or -) P2 = 00000 to 99999 | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| ZZRX Sets or reads the Receive state (can only set to RX) | | | | | | | | | |
| Get | ZZRX | ; | | | | | | | |
| Set | ZZRX | 1 | ; | | | | | | |
| Answer | ZZRX | P1 | ; | | | | | | |
| Notes: P1 Answer Values: 0 = Off, 1 = On. 'ZZRX0;' is not supported. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZRY Sets or reads VFO B RIT State | | | | | | | | | |
| Get | ZZRY | ; | | | | | | | |
| Set | ZZRY | P1 | ; | | | | | | |
| Answer | ZZRY | P1 | ; | | | | | | |
| Notes: P1: 1 = On, 0 = Off. | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|----|----|---|--|--|--|--|
| ZZSM Read the S-Meter | | | | | | | | | |
| Get | ZZSM | ; | | | | | | | |
| Answer | ZZSM | P1 | P1 | P1 | ; | | | | |
| <p>This command will read the S-Meter value for the slice that is assigned to the CAT port P1 = 000 to 260</p> <p>ZZSM reads the received signal strength in dBm where S9 = -73 dBm. The range is -140 dBm to -10 dBm with a scale factor of 2 (P2 max = 260). The actual signal strength, in dBm, is the value of ZZSM divided by 2 minus 140.</p> | | | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| ZZSW Sets or reads the Transmit Flag (VFO A or B) | | | | | | | | | |
| Get | ZZSW | ; | | | | | | | |
| Set | ZZSW | P1 | ; | | | | | | |
| Answer | ZZSW | P1 | ; | | | | | | |
| <p>Notes: P1 = 0 VFO A Transmit flag is set, P1 = 1 VFO B Transmit flag is set. If VFO B has not been created, and ZZSW1; is sent, VFO B will be created near VFO A. Note that logical VFO B is not necessarily Slice B, and could be any Slice depending on which Slices already exist. The Split Slice will be shown on the Main Window on the Slice line for the Port when one is defined. The Split Slice will be removed (if it exists) when processing the ZZSW0; command.</p> | | | | | | | | | |

| | | | | | | | | | |
|--|------|---|--|--|--|--|--|--|--|
| ZZTX Sets or reads Transmit State (MOX) | | | | | | | | | |
| Get | ZZTX | ; | | | | | | | |

| | | | | | | | | | |
|--|------|----|---|--|--|--|--|--|--|
| Set | ZZTX | P1 | ; | | | | | | |
| Answer | ZZTX | P1 | ; | | | | | | |
| Notes: P1 = 0 Radio is in receive mode, P1 = 1 Radio is in transmit mode | | | | | | | | | |

| | | | | | | | | | |
|--|------|---|--|--|--|--|--|--|--|
| ZZXC Clear VFO A XIT Frequency | | | | | | | | | |
| Set | ZZXC | ; | | | | | | | |
| Notes: Sets the XIT frequency to zero. | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|----|----|----|----|----|---|--|
| ZZXG Sets or reads VFO A XIT Frequency | | | | | | | | | |
| Get | ZZXG | ; | | | | | | | |
| Set | ZZXG | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Answer | ZZXG | P1 | P2 | P2 | P2 | P2 | P2 | ; | |
| Notes: P1 = Polarity (+ or -) P2 = 00000 to 99999 | | | | | | | | | |

| | | | | | | | | | |
|---|------|----|---|--|--|--|--|--|--|
| ZZXS Sets or reads VFO A XIT State | | | | | | | | | |
| Get | ZZXS | ; | | | | | | | |
| Set | ZZXS | P1 | ; | | | | | | |
| Answer | ZZXS | P1 | ; | | | | | | |
| Notes: P1: 0 = Off, 1 = On. | | | | | | | | | |

4.4 KENWOOD CAT COMMAND SYNTAX DETAIL

The following tables describe the Kenwood CAT Command Syntax used with SmartSDR CAT

| | | | | | | | | | |
|---|----|----|---|--|--|--|--|--|--|
| AI Sets or reads the Auto Information mode | | | | | | | | | |
| Get | AI | ; | | | | | | | |
| Set | AI | P1 | ; | | | | | | |
| Answer | AI | P1 | ; | | | | | | |
| Notes: P1 = 0 Auto Information disabled, P1 = 1 Auto Information enabled. When enabled, CAT will actively send any frequency change (VFO A or B) formatted as an 'FA;' or 'FB;' response. | | | | | | | | | |

| | | | | | | | | | |
|-----------------------------------|------------------|----|----|----|---|--|--|--|--|
| AG Sets or reads VFO A Audio Gain | | | | | | | | | |
| Get | AG | ; | | | | | | | |
| Set | AG | P1 | P1 | P1 | ; | | | | |
| Answer | AG | P1 | P1 | P1 | ; | | | | |
| Notes | P1 = 000 to 100. | | | | | | | | |

| | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|
| FA Sets or reads Slice A frequency | | | | | | | | | |
| Get | FA | ; | | | | | | | |
| Set | FA | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | : | | | | |
| Answer | FA | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Notes: P1 = frequency in Hz (11 digits). Blank digits must be filled with 0. Example: 14,150.000 = 00014150000. May switch to 8 digit mode by doing an 8 digit set. | | | | | | | | | |

| | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|
| FB Sets or reads Slice B frequency | | | | | | | | | |
| Get | FB | ; | | | | | | | |
| Set | FB | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Answer | FB | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | ; | | | | |
| Notes: P1 = frequency in Hz (11 digits). Blank digits must be filled with 0. Example: 14,150.000 = 00014150000. May switch to 8 digit mode by doing an 8 digit set. | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|---|--|--|--|--|--|--|
| FR Sets or reads VFO A/B Active flags | | | | | | | | | |
| Get | FR | ; | | | | | | | |
| Set | FR | P1 | ; | | | | | | |
| Answer | FR | P1 | ; | | | | | | |
| Notes: P1 will be "0" when VFO A Active flag is set. P1 will be "1" when VFO B Active flag is set. Setting 'FR1;' without VFO B will result in ';'. | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|---|--|--|--|--|--|--|
| FT Sets or reads VFO A/B Transmit flags | | | | | | | | | |
| Get | FT | ; | | | | | | | |
| Set | FT | P1 | ; | | | | | | |
| Answer | FT | P1 | ; | | | | | | |
| Notes: P1 = "0" sets VFO A Transmit flag. P1 = "1" sets VFO B Transmit flag. If VFO B has not been created, and FT1; is sent, VFO B will be created near VFO A. Note that logical VFO B is not necessarily Slice B, and could be any Slice depending on which Slices already exist. The Split Slice will be shown on the Main Window on the Slice line for the Port when one is defined. The Split Slice will be removed (if it exists) when processing the FT0; command. | | | | | | | | | |

| | | | | | | | | | |
|--|----|----|----|----|---|--|--|--|--|
| GT Sets or reads VFO A AGC Mode | | | | | | | | | |
| Get | GT | ; | | | | | | | |
| Set | GT | P1 | P1 | P1 | ; | | | | |
| Answer | GT | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: 000 = Off, 002 = Slow, 003 = Med, 004 = Fast | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|---|--|--|--|--|
| ID Reads the transceiver ID number | | | | | | | | | |
| Get | ID | ; | | | | | | | |
| Answer | ID | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: 904 = Flex-6700, 905 = Flex-6500, 906 = Flex-6700R, 907=Flex-6300 | | | | | | | | | |

| | | | | | | | | | |
|------------------------------------|---|-----|-----|-----|----|-----|-----|-----|-----|
| IF Transceiver status query | | | | | | | | | |
| Get | IF | ; | | | | | | | |
| Answer | IF | P1 | P1 | P1 | P1 | P1 | P1 | P1 | P1 |
| | | P1 | P1 | P1 | P2 | P2 | P2 | P2 | P3 |
| | | P3 | P3 | P3 | P3 | P3 | P4 | P5 | P6 |
| | | P7 | P7 | P8 | P9 | P10 | P11 | P12 | P13 |
| | | P14 | P14 | P15 | ; | | | | |
| Notes | <p>P1 (11 characters) VFO A frequency in Hz. Same as FA; P2 (4 characters) Frequency step size (0001 = 10 Hz/1000 = 50 Hz) 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 (1 character) Operating mode. See MD for settings. P10 (1 character) VFO Split status. Same as FR. P11 (1 character) Scan status. Not used, defaulted to 0. P12 (1 character) VFO Split status. Same as FT. 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.</p> | | | | | | | | |

| | | | | | | | | | |
|---|------------------|----|----|----|---|--|--|--|--|
| KS Sets or reads the CW keying speed | | | | | | | | | |
| Get | KS | ; | | | | | | | |
| Set | KS | P1 | P1 | P1 | ; | | | | |
| Answer | KS | P1 | P1 | P1 | ; | | | | |
| Notes | P1 = 005 to 100. | | | | | | | | |

| | | | | | | | | | |
|--|----|----|----|----|----|----|----|----|----|
| KY Sends text to CWX for conversion to Morse | | | | | | | | | |
| Get | KY | ; | | | | | | | |
| Set | KY | 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 | ; | | | | | | |
| Answer | KY | P1 | ; | | | | | | |
| Notes: P1 = character buffer available; 0=YES/1=NO (SmartSDR is not buffer limited so P1 will always return a "0". P2 = Any of the 56 printable ASCII characters. Empty character positions in P2 must contain a space. SmartSDR CAT will accept the Kenwood protocol as shown above but it is not limited to the same strict formatting. The number of P2 characters is limited to 256. | | | | | | | | | |

| | | | | | | | | | |
|---------------------------------|--|----|---|--|--|--|--|--|--|
| MD Sets or reads VFO A DSP mode | | | | | | | | | |
| Get | MD | ; | | | | | | | |
| Set | MD | P1 | ; | | | | | | |
| Answer | MD | P1 | ; | | | | | | |
| Notes | P1 = 1 LSB 2 USB 3 CW 4 FM (NFM, DFM, FDV) 5 AM (SAM) 6 DIGL (RTTY) 9 DIGU | | | | | | | | |

| | | | | | | | | | |
|---|----|----|---|--|--|--|--|--|--|
| NB Sets or reads VFO A Wide Noise Blanker (WNB) | | | | | | | | | |
| Get | NB | ; | | | | | | | |
| Set | NB | P1 | ; | | | | | | |
| Answer | NB | P1 | ; | | | | | | |
| Notes: P1 0 = Off, 1 = On | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|---|--|--|--|--|
| PC Sets or reads the RF Power Drive Level | | | | | | | | | |
| Get | PC | ; | | | | | | | |
| Set | PC | P1 | P1 | P1 | ; | | | | |
| Answer | PC | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: 000 to 100 | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|---|--|--|--|--|
| PT Sets or reads the CW Pitch Frequency | | | | | | | | | |
| Get | PT | ; | | | | | | | |
| Set | PT | P1 | P1 | P1 | ; | | | | |
| Answer | PT | P1 | P1 | P1 | ; | | | | |
| Notes: P1 Values: 000 to 999 | | | | | | | | | |

| | | | | | | | | | |
|--|----|---|--|--|--|--|--|--|--|
| RC Clear VFO A RIT Frequency | | | | | | | | | |
| Set | RC | ; | | | | | | | |
| Notes: Sets the RIT frequency to zero. | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|----|----|---|--|--|
| RD Decrement VFO A RIT Frequency | | | | | | | | | |
| Set | RD | P1 | P1 | P1 | P1 | P1 | ; | | |
| Notes: RD without parameter P1 will decrement the RIT frequency 10 Hz in CW, DIGU, and DIGL modes; 50 Hz in USB, LSB, and AM modes. P1 (00000 to 99999) will decrement the VFO A RIT Frequency by the amount entered. | | | | | | | | | |

| | | | | | | | | | |
|----------------------------------|----|----|---|--|--|--|--|--|--|
| RT Sets or reads VFO A XIT State | | | | | | | | | |
| Get | RT | ; | | | | | | | |
| Set | RT | P1 | ; | | | | | | |
| Answer | RT | P1 | ; | | | | | | |
| Notes: P1: 0 = Off, 1 = On. | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|----|----|---|--|--|
| RU Increment VFO A RIT frequency | | | | | | | | | |
| Set | RU | P1 | P1 | P1 | P1 | P1 | ; | | |
| Notes: RU without parameter P1 will increment the RIT frequency 10 Hz in CW, DIGU, and DIGL modes; 50 Hz in USB, LSB, and AM modes. P1 (00000 to 99999) will increment the VFO A RIT Frequency by the amount entered. | | | | | | | | | |

| | | | | | | | | | |
|------------------------------------|----|---|--|--|--|--|--|--|--|
| RX Sets Receive mode | | | | | | | | | |
| Set | RX | ; | | | | | | | |
| Notes: RX is a write only command. | | | | | | | | | |

| | | | | | | | | | |
|--|----------------------|-----------|----|------|--|--|--|--|--|
| SH Sets or reads VFO A DSP Filter High Cut Index | | | | | | | | | |
| Get | SH | ; | | | | | | | |
| Set | SH | P1 | P1 | ; | | | | | |
| Answer | SH | P1 | P1 | ; | | | | | |
| Notes | LSB/USB/CW/DIGU/DIGL | | AM | | | | | | |
| | | 00 = 1400 | | 2500 | | | | | |
| | | 01 = 1600 | | 3000 | | | | | |
| | | 02 = 1800 | | 4000 | | | | | |
| | | 03 = 2000 | | 5000 | | | | | |
| | | 04 = 2200 | | | | | | | |
| | | 05 = 2400 | | | | | | | |
| | | 06 = 2600 | | | | | | | |
| | | 07 = 2800 | | | | | | | |
| | | 08 = 3000 | | | | | | | |
| | | 09 = 3400 | | | | | | | |
| | | 10 = 4000 | | | | | | | |
| | | 11 = 5000 | | | | | | | |

| | | | | | | | | | |
|--|----------------------|----|----|---|-----|--|--|--|--|
| SL Sets or reads VFO A DSP Filter Low Cut Index | | | | | | | | | |
| Get | SL | ; | | | | | | | |
| Set | SL | P1 | P1 | ; | | | | | |
| Answer | SL | P1 | P1 | ; | | | | | |
| Notes | LSB/USB/CW/DIGU/DIGL | | | | AM | | | | |
| | 00 = 0 | | | | 0 | | | | |
| | 01 = 50 | | | | 100 | | | | |
| | 02 = 100 | | | | 200 | | | | |
| | 03 = 200 | | | | 500 | | | | |
| | 04 = 300 | | | | | | | | |
| | 05 = 400 | | | | | | | | |
| | 06 = 500 | | | | | | | | |
| | 07 = 600 | | | | | | | | |
| | 08 = 700 | | | | | | | | |
| | 09 = 800 | | | | | | | | |
| | 10 = 900 | | | | | | | | |
| 11 = 1000 | | | | | | | | | |

| | | | | | | | | | |
|---|----|----|----|----|----|---|--|--|--|
| SM Reads VFO A S-Meter | | | | | | | | | |
| Get | SM | ; | | | | | | | |
| Answer | SM | P2 | P2 | P2 | P2 | ; | | | |
| <p>This command will read the S-Meter value for the slice that is assigned to the CAT port</p> <p>Notes: Read-only</p> <p>P1 = 0, P2 = 0000 - 0030</p> <p>Reads S9 approximately equal to 0015. Use ZZSM if possible.</p> | | | | | | | | | |

| | | | | | | | | | |
|------------------------------------|----|----|----|---|--|--|--|--|--|
| TX Sets Transmit Mode (MOX) | | | | | | | | | |
| Set | TX | P1 | P1 | ; | | | | | |
| Note: TX is a write only command. | | | | | | | | | |

| | | | | | | | | | |
|-----------------------------|----|----|---|--|--|--|--|--|--|
| XT Sets or reads XIT State | | | | | | | | | |
| Get | XT | ; | | | | | | | |
| Set | XT | P1 | ; | | | | | | |
| Answer | XT | P1 | ; | | | | | | |
| Notes: P1: 1 = On, 2 = Off. | | | | | | | | | |

5 OTRSP COMMANDS

The following are the OTRSP commands supported in SmartSDR CAT. The full OTRSP command set can be found here: <http://www.k1xm.org/OTRSP/>.

5.1 SUPPORTED OTRSP COMMANDS

| | |
|------|---|
| RX1 | Connect Radio 1 to both headphones |
| RX2 | Connect Radio 2 to both headphones |
| RX1S | Connect Radio 1 to Left, Radio 2 to Right (focus Radio 1) |
| RX2S | Connect Radio 1 to Left, Radio 2 to Right (focus Radio 2) |
| RX1R | Connect Radio 1 to Right, Radio 2 to Left (focus Radio 1) |
| RX2R | Connect Radio 1 to Right, Radio 2 to Left (focus Radio 2) |
| | |
| TX1 | Set Radio 1 as the transmitter |
| TX2 | Set Radio 2 as the transmitter |

6 WINKEYER COMMANDS

The following are the Winkeyer commands supported in SmartSDR CAT. The full Winkeyer command set can be found here: <http://k1el.tripod.com/files/Winkey10.pdf>.

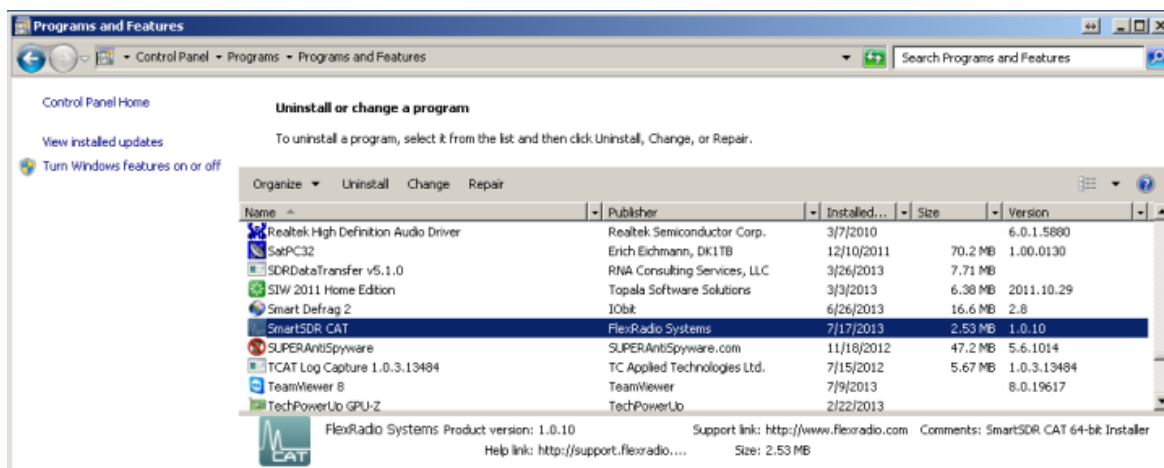
6.1 SUPPORTED WINKEYER COMMANDS

| | |
|--------|--|
| <0x00> | Admin Command |
| <0x02> | Set CW sending speed |
| <0x08> | Backup input pointer (backspace) |
| <0x0A> | Clear input buffer |
| <0x0F> | Load Defaults (speed only) |
| <0x1C> | Buffered Speed Change (implemented as immediate for now) |

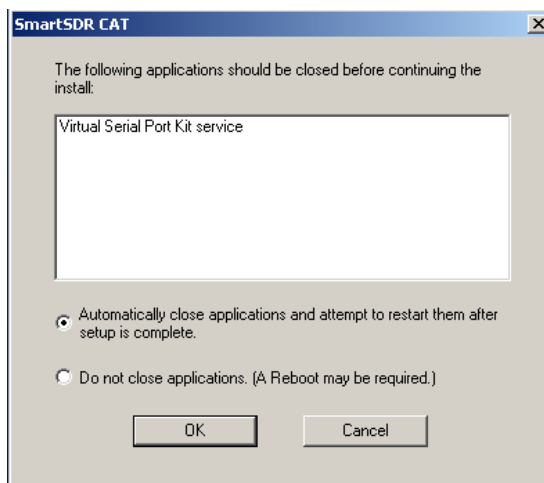
APPENDIX A: Uninstalling SmartSDR CAT versions prior to v1.2.11

THIS PROCEDURE IS NOT REQUIRED IF YOU HAVE INSTALLED SMARTSDR v1.2.17 OR GREATER

1. Close the **SmartSDR CAT** application and any programs that connect to the FLEX-6000 via CAT. This includes DDUUtil.
2. Open the **Windows Control Panel** and select **Uninstall a Program**
3. Look for the **SmartSDR CAT**, **CAT_32** or **CAT_64** program entries and right click on them to display the Uninstall menu



4. Left click on the Uninstall option.
5. Answer **Yes** to the prompt *“Are you sure you want to uninstall SmartSDR CAT”*
6. SmartSDR CAT will begin to uninstall.
7. If you receive a prompt to *“Automatically close applications and attempt to restart them after setup is complete”*, click on **OK** to continue. See image below.



8. After SmartSDR CAT has finished uninstalling, reboot your PC.

APPENDIX B: KEY TERMS

The following table provides definitions for terms relevant to this document.

| Term | Definition |
|--------|---|
| AGC | Automatic Gain Control |
| CAT | Computer Assisted Transceiver |
| DSP | Digital Signal Processing |
| LAN | Local Area Network |
| MOX | Manually Operated switch |
| NR | Noise Reduction |
| OTRSP | Open Two Radio Switching Protocol |
| PA | Power Amplifier |
| RIT | Receiver Incremental Tuning |
| RX | Receive or Receiver |
| SO2R | Single Operator, 2 radios |
| TCP/IP | Transmission Control Protocol / Internet Protocol |
| XIT | transmitter Incremental Tuning |
| TX | Transmit or Transmitter |
| VFO | Variable Frequency Oscillator |