

Commander Help

Commander enables you to

- control your Elecraft, FlexRadio, Icom, Kenwood, TenTec, or Yaesu radio from your PC
- see DX Spots plotted on a zoom-able bandspread display of your radio's currently-active band
- see frequency-dependent control settings for devices like tuners and amplifiers
- store and recall frequencies (and associated modes) from 100 memories organized into 10 banks
- manually or automatically switch between up to four connected radios
- monitor messages between your radio and your PC
- provide DXKeeper, PropView, SpotCollector, and WinWarbler with access to your radio's frequency and mode

Prerequisites

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Configuration

- Radio Model
- Serial port
- Parallel port
- S-Meter Display
- Frequency-dependent devices
- Multiple radios
- Bandspread
- Transverters
- User-defined command sequences
- Sub-band definition

Changing frequency

- using the VFO panel
- via a wheeled mouse
- via keyboard action
- using the Bandspread

Changing mode

Changing receiver bandwidth

Viewing and selecting DX spots

Saving and restoring memories

Switching between radios

Monitoring Messages

Commander Prerequisites

To use Commander, you need

- a PC running Windows 95, Windows 98, Windows 98SE, Windows NT, Windows 2000, or Windows XP,
ideally

 - 133 MHz Pentium or better

 - 64 MB RAM or better

- an SVGA display or better

- a serial port connected to your radio via an appropriate radio interface

If you plan to run other members of the DXLab Suite in parallel with Commander, additional memory and a faster processor will be required for satisfactory performance; beyond 3 or 4 DXLab applications, defects in Windows 95, Windows 98, and Windows 98SE precludes their use.

Commander Download and Installation

Installing or Upgrading the DXLab Launcher

The **DXLab Launcher** automates the installation of new DXLab applications, including Commander, and the upgrading of already-installed DXLab applications.

If you're an aspiring DXLab user who has **not installed any DXlab applications** on your PC, or if you're a long-time DXLab user who has **never installed the Launcher**, then installing the Launcher will make it easy to install new DXLab applications and keep them up to date as upgrades are released.

Step-by-step guides for installing the Launcher are available, both in HTML for browsing (<http://www.dxlabsuite.com/dxlabwiki/InstallLauncher>) and in PDF for printing (<http://www.dxlabsuite.com/Download%20and%20Installation.pdf>).

You can uninstall Commander by running the Add/Remove Programs applet on the Windows control panel.

If you have questions or suggestions, please post them on the DXLab reflector at <http://groups.yahoo.com/group/dxlab>.

If you're not a member, you can sign up at <http://www.dxlabsuite.com/reflector.htm>.

Commander Quick Setup

Quick Setup instructions: controlling one radio

Step	Directions
1	<p>on the Configuration window's General tab</p> <ul style="list-style-type: none"> • select the radio's Model • if you've selected an Icom or TenTec Omni, <ul style="list-style-type: none"> ○ indicate whether you'll be specifying the radio's CI-V Address in decimal or hexadecimal radix (radio addresses given in Icom and TenTec manuals are in hexadecimal) ○ enter the radio's CI-V Address in the specified radix ○ set the radio's CI-V Transceive parameter <i>off</i> (using its menu system) • if you've selected a TenTec Pegasus select, the Control Folder containing your Pegasus control software; this folder should contain a file named PEGASUS.OUT
2	<p>in the Serial Port panel on Configuration window's Ports tab (skip if the radio Model is a TenTec Pegasus or FlexRadio SDR-1000)</p> <ul style="list-style-type: none"> • designate the serial port that is connected to your radio interface • select the baud rate that matches your radio's settings • if the radio requires that the RTS modem control signal be asserted, place this signal in the always on state; the Kenwood TS-2000, for example, has this requirement. • if an external interface is being used and it derives its power from the serial port's DTR and/or RTS modem control signals, place these signals in the always on state
3	<p>on the Configuration window's General tab, check the Continuous Frequency and Mode Interrogation box and set the interval to 200ms</p> <ul style="list-style-type: none"> • older radios like the Yaesu FT-767 require longer intervals, e.g. 400 ms

Note that checking the Continuous Frequency and Mode Interrogation checkbox with your Icom or TenTec Omni radio's CI-V Transceive parameter set *on* will degrade Commander's ability to track changes in your radio's frequency.

Commander Configuration

Commander's Configuration window provides 9 tabs, each contains a related group of settings and controls that you can inspect and/or modify:

General	<ul style="list-style-type: none"> • Radio panel <ul style="list-style-type: none"> ○ radio model and bus address ○ polling rate ○ memory scan dwell time • General panel <ul style="list-style-type: none"> ○ mousewheel disablement ○ Dual Receive enable/disable ○ compute frequency-dependent device settings from transmit frequency when operating split ○ display of User-defined Command Sequence buttons ○ use of dual monitors ○ diagnostic logging enable/disable • transmit/receive switching • VFO autorepeat rate • Initial command • Sub-band definitions • Modem dial command • Online help access
Ports	<ul style="list-style-type: none"> • Serial Port panel <ul style="list-style-type: none"> ○ serial port parameters ○ DTR and RTS behavior • Parallel Port panel <ul style="list-style-type: none"> ○ parallel port parameters ○ radio selection and RX-TX switching ○ data signal specification
Devices (3)	<ul style="list-style-type: none"> • device name (appears as tab caption) • control names • control settings for each frequency
Filter Grps	<ul style="list-style-type: none"> • Filter Group behavior when radio's mode changes
Memories	<ul style="list-style-type: none"> • titles for each memory bank • memory import and export controls
Multi Radio	<ul style="list-style-type: none"> • names and polling rates for up to 4 controlled radios • serial port parameters for each controlled radio • automatic radio selection by band
Bandspread	<ul style="list-style-type: none"> • bandspread dial orientation (lower frequency on top or bottom) • time trigger for pushing a frequency onto the current band stack • bandspread mousewheel control by mode • DX spot parameters
Transverters	<ul style="list-style-type: none"> • supports the specification of transverters for the 6m, 4m, 2m, and 70cm bands

You can define up to two sub-bands per band; when the primary VFO frequency does not lie within a defined sub-band, the frequency is displayed in yellow font.

For information about the purpose of any Commander control, allow the cursor to linger over that control for a second or two; a box containing explanatory text will appear. This feature can be disabled if desired.

General tab

- Radio panel

Model	the radio being controlled
CI-V Address (visible only if the Model is an Icom or TenTec Omni)	the radio's CI-V bus address in either hexadecimal or decimal
Hexadecimal (visible only if the Model is an Icom or TenTec Omni)	if selected, the CI-V Address is interpreted as a hexadecimal (base 16) number
Decimal (visible only if the Model is an Icom or TenTec Omni)	if selected, the CI-V Address is interpreted as a decimal (base 10) number
Continuous interrogation	when checked, Commander will ask the radio to report its frequency, mode, VFO, filter, and S-meter data at the specified rate
Interrogation Interval (visible only if the Continuous interrogation box is checked)	specifies the interval in time (milliseconds) between report requests <ul style="list-style-type: none"> • values less than 50 ms. are interpreted as 50 ms • values greater than 60,000 ms. are interpreted as 60,000 ms. • 200 ms. is a reasonable setting for most PCs and radios; the Yaesu FT-767 defaults to 400 ms.
No interrogation while transmitting	when checked, Commander will not ask the radio to report its frequency, mode, VFO, filter, and S-meter data while directing the radio to transmit
Verify CI-V command acceptance (visible only if the Model is an Icom or TenTec Omni)	when checked, waits for a positive acknowledgement after transmitting each CI-V command and resends the command if either a negative acknowledgement or no acknowledgement is received
Control Folder (visible only if the Model is a TenTec Pegasus)	specifies the folder containing your TenTec Pegasus control software; this folder should contain a file named PEGASUS.OUT
DTS transmission using ANI input (visible only if the Model is a Kenwood TS-480)	when checked, the TS-480 is directed to transmit from its ANI input rather than its MIC input
Scan Dwell	specified the amount of time (seconds) spent listening to a memory's frequency before advancing to the next memory when Memory Scanning is enabled

- General panel

Ignore Mousewheel	when checked, directs Commander to not change transceiver frequency when you rotate your mousewheel
Accept Dual Receive directives	when checked, allows other DXLab applications to enable the radio's Dual Receive (if available), e.g. when double-clicking on one of SpotCollector's Spot Database entries that specifies split frequency operation
Use TX freq for devices when split	when checked, settings for frequency-dependent devices are computed from the transmit frequency when operating split
Show user-defined cmd sequence panel	when checked, the Main window displays a panel containing 8 buttons that can be used to invoke and edit User-defined Command Sequences
Display information in title bar	when checked, the Main window title bar displays the current UTC time, and the radio's frequency and mode updated each second (disable this if running Windows Vista!)
Use multiple monitors	when checked, windows that resided on a secondary monitor during the previous session will be restored to the same secondary monitor on startup; when not checked, all windows are restored to the primary monitor on startup
Log debugging Information	when checked, directs Commander to record diagnostic information in the file <code>errorlog.txt</code> located in Commander's folder

- PTT panel

Commander can switch the radio between receiving and transmitting by

- sending the radio an appropriate command via the serial port (if supported by the radio)
- controlling an external interface via the serial port signals RTS and/or DTR

TX	directs the radio to switch from receiving to transmitting
RX	directs the radio to switch from transmitting to receiving

- VFO Autorepeat Rate panel: determines the rate at which the Main window VFO's ▲, ▼, ◀, and ▶ buttons autorepeat when you click and hold them.
- Initial Command panel: specifies a command to be executed when Commander starts, or when a new radio Model is selected

Command	Function
an even number of hexadecimal characters, e.g. <i>FEFE26EO0700FD</i>	characters are sent to the radio, two per byte (useful for Icom, TenTec, and Yaesu radios)
a sequence of ascii characters preceded by a single apostrophe, e.g. <i>'AN1;</i>	each character following the apostrophe will be sent to the radio (useful for Kenwood and Elecraft radios)

- Sub-band Definitions panel

Edit	edits the sub-band definition file <code>BandSegments.txt</code> ; if this file doesn't exist, creates it from <code>DefaultBandSegments.txt</code>
Reload	reloads sub-band definitions from the file <code>BandSegments.txt</code> if it exists; otherwise, from the file <code>DefaultBandSegments.txt</code>

- You can define up to two sub-bands for each amateur band from 160m to 70cm, excluding 1.25cm; when the primary VFO frequency does not lie within a defined sub-band, the frequency is displayed in yellow font. By default, sub-bands are defined by the contents of the file `DefaultBandSegments.txt` in Commander's folder. Each line in this file defines a sub-band by specifying a name, a lower-bound (in mHz), an upper-bound (in mHz), and an antenna selection code:
 - 160M, 1.800, 2.000, 0
 - 80M, 3.500, 3.750, 0
 - 75M, 3.750, 4.000, 0
 - 40M, 7.000, 7.150, 0
 - 40M, 7.150, 7.300, 0
 - 60M, 5.330, 5.405, 0
 - 30M, 10.100, 10.150, 0
 - 20M, 14.000, 14.150, 0
 - 20M, 14.150, 14.350, 0
 - 17M, 18.068, 18.168, 0
 - 15M, 21.000, 21.200, 0
 - 15M, 21.200, 21.450, 0
 - 12M, 24.890, 24.990, 0
 - 10M, 28.000, 28.300, 0
 - 10M, 28.300, 29.900, 0
 - 6M, 50.000, 54.000, 0
 - 4M, 70.000, 70.500, 0
 - 2M, 144.000, 148.000, 0
 - 70CM, 420.000, 450.000, 0
- To modify these sub-band definitions or define new sub-bands, click this panel's Edit button; this will create a file named `BandSegments.txt` initialize its contents from the file `DefaultBandSegments.txt`, and open `BandSegments.txt` for editing. You can define one or two sub-bands for each amateur band; if you hold a General Class license in the United States, for example, you might define the following two sub-bands:
 - 80M, 3.525, 3.750, 0
 - 75M, 3.850, 4.000, 0
- Save your modifications, and click the panel's Reload button to put your new sub-band definitions into effect. When subsequently started, Commander will load sub-band definitions from `BandSegments.txt`.
- The following sub-bands are currently fixed, and cannot be modified by the user:
 - 1.25M: 222.000 to 225.000
 - 33CM: 902.000 to 928.000
 - 23CM: 1240.000 to 1300.000
- While an antenna selection code is required in each sub-band definition, the use of this code to control an external antenna switch via a PC parallel port is not yet implemented

- Modem Command panel

Command	if Commander is controlling a remote transceiver via a serial port connected to a modem, use this textbox to specify the modem initialization and dialing commands to be sent when the Send button is activated; if a command is specified, Continuous Frequency and Mode Interrogation is disabled on startup
Send button	when clicked, sends the Command to the modem via the serial port

- Guidance panel

Browser pathname	if this setting is blank, Commander displays online help using your PC's default HTML browser; if this setting contains the pathname of an HTML browser, Commander displays online help using that browser.
Select button	displays a file selector dialog that allows you to choose a Browser pathname
show control explanations	when checked, enables the display of explanatory information when the mouse cursor lingers over a textbox, button, checkbox, display pane, or setting.
Help button	displays the information you are now reading

Ports tab

- **Serial Port** panel

- **Selector** panel: specifies the PC serial port to which the radio is connected
- **Baud Rate** panel: specifies the baud rate that the radio is using (hardwired in some radios, menu-configurable in others; consult the radio's manual)
- **Parity** panel: specifies the baud rate that the radio is using (hardwired in some radios, menu-configurable in others; consult the radio's manual)
- **Word Length** panel: specifies the baud rate that the radio is using (hardwired in some radios, menu-configurable in others; consult the radio's manual)
- **Stop Bits** panel: specifies the baud rate that the radio is using (hardwired in some radios, menu-configurable in others; consult the radio's manual)
- **DTR** panel: specifies the behavior of the Data Terminal Ready modem control signal of the selected Com port

always off	DTR is never asserted
always on	DTR is always asserted (required if an external interface that derives its power from DTR is in use)
on to xmit	DTR is asserted when Commander is directed by another application to transmit, or when TX is clicked until RX is clicked
CW	DTR is asserted as Commander is directed by another application to send CW

- **RTS** panel: specifies the behavior of the Request To Send modem control signal of the selected Com port

always off	RTS is never asserted
always on	RTS is always asserted (required if an external interface that derives its power from RTS is in use)
on to xmit	RTS is asserted when Commander is directed by a client application to key the radio, or when the PTT On button is clicked until the PTT Off button is clicked
flow control	RTS is asserted when Commander has data to send to the radio via the serial port; this data will not be sent until the radio responds by asserting the incoming modem control signal Clear To Send (CTS)
CW	RTS is asserted as Commander is directed by another application to send CW

- **Parallel Port** panel

- **Selector** panel: specifies the PC parallel port use for radio selection and/or control of frequency-dependent hardware
- **Radio** panel: if the Enable box is checked, Commander encodes the currently-selected radio on pins 16 and 14 of the specified parallel port, and asserts pin 17 when Commander is directing the transceiver to transmit.

Radio	Parallel port pin 16	Parallel port pin 14
1	0	0
2	0	1
3	1	0
4	1	1

- **Data Signals** panel: if the Enable box is checked, Commander places the integer value of the selected Device Control onto the data bits (pins 2 through 9) of the specified parallel port

Enable	when checked, the integer value of the selected Device Control is placed onto the specified parallel port's data bits
Device	specifies the frequency-dependent device whose Control value is placed onto the specified parallel port's data bits
Control	specifies the frequency-dependent device's Control whose value is placed onto the specified parallel port's data bits

Device tabs

Devices like antenna tuners and linear amplifiers have controls whose settings are frequency-dependent. While high-end units do this automatically, most require the operator to manually set the controls whenever the operating frequency changes. Commander enables you to specify tables for such devices; it then performs a table lookup based on the transceiver's current frequency and displays the correct settings, eliminating the need for paper tables taped to the front-panel. Up to three different frequency-dependent devices are supported, each with up to three controls.

The right side of Commander's Main window is shared by frequency-dependent device readouts, receiver filter controls, and Memory Banks. If the frequently-dependent device panels are not visible, clicking the Main window's **Filters & Devices** button will make them appear.

Initially, Commander refers to the three frequency-dependent devices as Device 0, Device 1, and Device 2; as part of the setup procedure, you can replace these generic names with more meaningful names like *Amplifier*, or *Tuner*.

To setup a frequency-dependent device, use the following procedure:

Step	Directions
1	on Commander's Main window, click the Config button
2	on Commander's Main window, click the Filters & Devices button if its visible
3	on Commander's Configuration window, click the Device 0 , Device 1 , or Device 2 tab
4	check the Device tab's Enabled box; in the Main window, you'll see a Device panel appear (the contents of this panel will be updated as you complete thois procedure)
5	enter the name of the device in the Device Name box

6	enter the number of controls associated with this device in the # Controls box; reasonable values are 1, 2, or 3.
7	enter the name of the first control in the Control 1 box; if there's a second control, enter its name in the Control 2 box and if there's a third control, enter its name in the Control 3 box.
8	<p>scroll the Device Table to the frequencies of interest, and enter the control values for each such frequency; after entering each value, strike the Enter key</p> <ul style="list-style-type: none"> • To modify an existing device table entry, click on its associated cell to display a down-pointing triangle; clicking on this triangle will display a list of alternatives from which you can choose with a mouse click. After modifying any item, a pencil icon appears in the left-most column. To undo the change, strike the ESC key; to record the change, click on any other entry in the table, or strike the UpArrow or DownArrow keys. • To add a new entry to a device table, scroll to its bottom, where you will find a blank line with an asterisk in the grey left-most column. Key in the entry's frequency, and then strike the Enter key. Commander automatically sorts the Device Table in ascending frequency order, so the new entry may disappear from view. If you're planning to add several entries, it is more efficient to first create the entries, and then scroll through the Device Table entering control values for the newly-created entries. • To delete an entry in the device table, select it by clicking in the grey left-most column; then strike the Delete key. • it is not necessary to enter control values for every frequency in the table • depressing the CTRL key while clicking on a Device Table entry will QSY your transceiver to that entry's frequency, making it easy to determine or verify settings
9	<p>enter a percentage in the Tolerance box (2% is a reasonable default)</p> <ul style="list-style-type: none"> • the percentage difference between the frequency of the Device Table entry closest to your radio's current frequency and your radio's current frequency must be less than or equal to the specified Tolerance for that entry's control settings to be displayed • if there is no Device Table entry within the specified Tolerance, the Device's control settings will be blanked
10	click the Save button and specify a destination filename into which the Device data just specified will be saved for use in subsequent Commander sessions.

If Commander is terminated and later restarted, saved Device data will automatically be reloaded for each Device that was enabled when Commander was terminated.

You can use the above procedure to record data for an alternate device -- e.g. a backup amplifier -- in a separate file. The **Select** button allows you to choose the file from which the Device data will be loaded. The **ReLoad** button restores the Device data to the values contained in the most recently-loaded file.

You can select one control of one frequency-dependent device whose integer value will be placed on pins 2-9 of a specified parallel port. This can be used to control an antenna switch, for example.

Filter Grps tab

A Filter Group is a named configuration of one or more receiver bandwidth settings. If Filter Groups are supported for a particular radio Model, Commander remembers the Filter Group last used in each mode. Checking the **restore Filter Group on mode change** box directs Commander to automatically restore the last used Filter Group whenever a new mode is selected.

If the radio Model is set to MP1000 or MP1000MKV, the Filter Grps tab displays the **Yaesu FT1000MP and Mark V** panel which contains a table, each of whose entries defines a Filter Group.

- To modify an item in an existing Filter Group, click on its associated cell to display a down-pointing triangle; clicking on this triangle will display a list of alternatives from which you can choose with a mouse click. After modifying any item, a pencil icon appears in the left-most column. To undo the change, strike the **ESC** key; to record the change, click on any other entry in the table, or strike the **UpArrow** or **DownArrow** keys.
- To delete a Filter Group, click in its left-most column, and then strike the **Delete** key.
- To add a new Filter Group, click on any item in the bottom-most table entry, which is marked with an asterisk in its left-most column; doing so will create an empty new item, which you can populate and then abandon record as when modifying an Filter Group.

Memories tab

Textboxes in this tab's Memory panel allow you to establish a title for each memory bank; this title serves as the caption for the Main window panel that displays the currently-selected memory bank.

- The **Export Memories** button saves the information associated with all memories that contain at least a frequency and mode to a specified file.
- The **Import Memories** button loads memories from information contained in a specified file. Any errors are placed in an error file that's displayed after the operation completes.
- The **Clear Memories** button erases the contents of all memories in the current memory bank

Multi Radio tab

Using the controls on this tab, you can configure Commander to support rapid switching among up to four radios. Switching can be manual, via a set of buttons on the VFO panel on Commander's Main window, or automatic as a function of amateur band.

Controls on this tab's **Control** panel let you specify a transceiver model, a CI-V Address (for Icom and TenTec radios), the need for continuous frequency and mode interrogation, and the interval (in milliseconds) between interrogation commands for up to three radios; these controls are identical in function to the controls on the General tab. You can specify a unique name for each radio, which is used to identify the radio for both manual and automatic switching; if you have a pair of Icom 756 Pro radios, for example, with one dedicated to HF operation and the other to VHF operation, you might name the first *HF 756Pro* and the second *VHF 756Pro*. The enable boxes in this panel let you designate which radios are active. If you are switching between radios 1 and 2, enable them both, and uncheck the enable boxes associated with radios 3 and 4.

Controls on the **Serial port** panel let you specify serial communication port settings for each of four radios. These controls are identical in function to those on the Ports tab's Serial Port panel. If you are controlling multiple Icom or TenTec radios on the same CI-V bus, assign identical serial port parameters to these radios. Due to space compression, the Serial Port control uses a hyphen to mean "none", and the Parity, DTR, and RTS controls use single letter abbreviations:

Parity Abbreviation	Meaning
N	No parity
O	Odd parity
E	Even parity
M	Mark parity
S	Space parity
DTR and RTS Abbreviation	Meaning
N	Always off
Y	Always on
X	On to transmit
F	Flow control (RTS only)
C	CW

By default, switching between radios is manual, effected by clicking the radio selection buttons on the Main window's VFO panel. To enable automatic radio switching, use the **Selection by band** panel to choose a radio for each amateur band, and then check the Auto box.

You can configure Commander to identify the currently-selected radio via a binary encoding on pins 16 and 14 of a specified parallel port.

Bandspread tab

The controls on this tab influence the behavior of the Bandspread window's slide rule dial, its Band Stack, and its presentation of DX Spots.

The **always on top** box, when checked, ensures that the Bandspread window will not be obscured by any other application window except one similarly configured.

The **Orientation** panel determines whether the slide rule dial shows lower frequencies at its top and higher frequencies at its bottom, or higher frequencies at its top and lower frequencies at its bottom.

The **Band Stack** panel's **dwel time** setting specifies the interval that determines how long the radio must pause on a frequency before that frequency is saved onto the current Band Stack; the dwell time is specified in seconds.

The **Mousewheel Motion** panel determines the increment by which your radio is QSY'd when the Bandspread window is active and you rotate your mouse's wheel by one click. Increments are specified by mode, and expressed as a percentage of the slide rule dial's frequency range; negative percentages can be used to reverse the meaning of mouse wheel rotation to suit the user's taste. The mode-specific entries make it convenient to setup a faster tuning rate for SSB operation than for CW or RTTY operation.

the **DX Spot Font Size** panel specifies the font size with which DX spots are to be rendered on the slide rule dial; font sizes can be specified independently for each dial range.

There are several **DX Spot** controls:

- if **hide duplicates** is checked, only a station's most recent spot in each mode will be displayed on the slide rule dial; if not checked, every spot will be displayed.
- spots whose age exceeds the **lifetime** setting (in hours) will not be displayed on the slide rule dial
- the **Log Filter** panel determines which previous QSOs DXKeeper will display when you click on a spot in the Bandsread window
 - if **call** is selected, DXKeeper will display all previous QSOs with the spot's callsign
 - if **entity** is selected, DXKeeper will display all previous QSOs with the DXCC entity associated with the spot's callsign
- clicking the **Clear** button removes all current spots from the slide rule dial
- Controls on the **Interoperation** panel let you specify the Digital Mode Application to which Commander will send frequency and mode information when you select a DX Spot on the Bandsread window, subject to settings on the panels described below. By default, the Digital Mode Application textbox is set to WinWarbler; if the Digital Mode Application textbox is empty on startup, Commander sets it to WinWarbler. If you specify a Digital Mode Application like MultiPSK and click the **Connect** button, then when you select a DX Spot on the Bandsread window, SpotCollector will send the frequency and mode information to that Digital Mode Application from then on.
- the **RTTY Mode if no Digital Mode Application** panel specifies the mode to which the transceiver should be set when you click on a RTTY mode spot with the specified Digital Mode Application not running

RTTY	set the transceiver to normal RTTY mode
RTTY-R	set the transceiver to reversed RTTY mode
USB	set the transceiver to USB mode
LSB	set the transceiver to LSB mode

- the **CW Mode** panel specifies the mode to which the transceiver should be set when you click on a CW mode spot

CW	set the transceiver to normal CW mode
CW-R	set the transceiver to reversed CW mode
CW via DMA	if the specified Digital Mode Application is running, convey the spot information to it if the specified Digital Mode Application isn't running, set the transceiver to normal CW mode

- the **Phone Modes** panel specifies the mode to which the transceiver should be set when you click on an SSB, AM, or FM mode spot

SSB via DMA	if the specified Digital Mode Application is running, convey the spot information to it if the specified Digital Mode Application isn't running, set the transceiver to USB or LSB mode as a function of frequency
AM via DMA	if the specified Digital Mode Application is running, convey the spot information to it if the specified Digital Mode Application isn't running, set the transceiver to AM mode
FM via DMA	if the specified Digital Mode Application is running, convey the spot information to it if the specified Digital Mode Application isn't running, set the transceiver to FM mode

Transverters tab

A transverter is an external device that enables transmission and reception on a frequency significantly offset from that of one's transceiver. When operating with a transverter, Commander's VFO displays the transverter output frequency, and sets your transceiver to the required transceiver input frequency.

Commander supports transverters with outputs on the 6m, 4m, 2m, and 70cm bands, providing a dedicated panel on the Transverters tab that lets you specify the frequency offset (in kHz) and relationship (additive or subtractive) for each band. If, for example, your 6m transverter requires your transceiver to operate on the 10m band, then you would set the 6M transverter panel's offset setting to 22000, select the + (additive) button, and check the Enabled box; If QSYed to 50100, Commander would set your transceiver to 28100. If you have configured Commander to control more than one transceiver, each transverter panel lets you specify the transceiver connected to its associated transverter.

Commander S-Meter Display

If your transceiver is capable of reporting its S-meter reading via its PC interface, then Commander will continuously display this reading above the VFO's frequency display. By default, the numeric value of this reading is displayed as an integer between 1 and 16. If Commander's SMeter subfolder contains a text file whose name matches your transceiver model (as displayed in Commander's title bar), then Commander will use the entries in that file to display textual data rather than integers.

The format of this file is illustrated by the contents of MP1000.txt, which is included with Commander:

```
1, S0
2, S1
3, S2
4, S3
5, S4
6, S5
7, S6
8, S7
9, S8
10, S9
11, S9+10db
12, S9+20db
13, S9+30db
14, S9+40db
15, S9+50db
16, S9+60db
```

Note that there are exactly 16 entries (lines), each containing an entry number, followed by a comma, followed by textual data; the textual data cannot contain a comma. The following example - the contents of FT817.txt -- illustrates the display of more precise signal level information, as described in

http://www.ussc.com/~turner/ft817_rptmon.html .

```
1, < -108 dbm
2, > -108.3 dbm
3, > -107.3 dbm
4, > -106.7 dbm
5, > -106.0 dbm
6, > -105.1 dbm
7, > -104.2 dbm
8, > -103.0 dbm
9, > -100.4 dbm
10, > -84 dbm
11, > -74.5 dbm
12, > -70.1 dbm
13, > -58.9 dbm
14, > -50.8 dbm
15, > -40.8 dbm
16, > -30.1 dbm
```

By default, the S-meter is rendered as a green bar on a black background. An optional third parameter may be added to each line of an S-meter file to specify the color used to render the S-meter at that signal strength. The color-specifying third parameter can be one of the words `black`, `blue`, `cyan`, `green`, `magenta`, `red`, `white`, or `yellow`. Alternatively, the color-specifying third parameter can be of the form

`R-G-B`

where `R`, `G`, and `B` are each integers between 0 and 255 that specify the relative content of red, green, and blue in the desired color. Some examples of valid S-meter file entries that include a color-specifying third parameter follow:

```
11,S9 + 10db,176-0-0
12,S9 + 20db,192-0-0
13,S9 + 30db,208-0-0
14,S9 + 40db,224-0-0
15,S9 + 50db,240-0-0
16,S9 + 60db,red
```

User-defined Command Sequences

Increasingly, modern radios provide for computer control beyond VFO, mode, and filter selection. To provide access to these capabilities, Commander lets you specify up to sixteen sequences of transceiver commands, with each sequence containing up to 32 commands. The sixteen sequences are organized as two banks of eight sequences. Eight buttons are used to activate the sequences in the current bank; you can also activate sequences in the current bank by striking the **F5** through **F12** function keys. The **ALT checkbox** located between the sequence buttons determines which bank is current. To switch banks, check or uncheck the **ALT checkbox**. Depressing the **ALT** key while clicking a sequence button or striking one of **F5** through **F12** activates a sequence in the second bank. You can save a command sequence to a file, and load a command sequence from a file.

Commander's User-defined Command Sequences can be invoked from WinWarbler (version 2.2.0 and later) macros, permitting transceiver control to be automated along with PSK31, PSK63, RTTY, CW, and Phone functions.

To enable the use of User-defined Command Sequences, check the Enabled box in the User-defined Command Sequences panel on the General tab of Commander's Configuration window; a panel containing 8 buttons will appear at the bottom of Commander's main window.

To associated a command sequence with one of these buttons, depress the **CTRL** key while clicking on the button or while striking it's associated function key (**F5** through **F12**, as designated above each button); you can also simply right-click the button. To edit sequences in the second bank, check the **ALT** box or depress both the **ALT** and **CTRL** keys while clicking on a button or while striking its associated function key. Commander will display a dialog box that enables you to name and document a sequence of up to 16 radio commands to be sent to your transceiver when the associated User-defined Command Sequence button is clicked (or its associated function key is struck).

Name	specify the name of the sequence; this name serves as the caption on the associated User-defined Command Sequence button, so choose a name of appropriately-short length <ul style="list-style-type: none">if you plan to use conditional branching commands (see Command table below), the name cannot contain a comma Note: if you wish to include the ampersand character in the name, use a pair of back-to-back ampersands, e.g. R&&B.
Function	specify the function of the sequence; this information will appear in a popup control explanation when the mouse cursor lingers above the associated User-defined Command Sequence button if the display of control explanations is enabled.
Note (1-32)	optional information used to document the associated command; this information is not sent to your radio
Command (1-32)	a sequence of commands to be executed, beginning with Command 1

Valid commands are enumerated in the following table:

Command	Function
an even number of hexadecimal characters, e.g. <i>FEFE26E00700FD</i>	radio command -- characters are sent to your radio, two per byte (useful for Icom, TenTec, and Yaesu radios) <ul style="list-style-type: none"> • execution proceeds with the following command.
a sequence of ascii characters preceded by a single apostrophe, e.g. <i>'AN1;</i>	radio command -- each character following the apostrophe will be sent to your radio (useful for Kenwood radios) <ul style="list-style-type: none"> • execution proceeds with the following command.
<Goto <i>N</i> >	unconditional branch <ul style="list-style-type: none"> • execution proceeds with command <i>N</i>. • be careful to avoid an infinite loop
<End>	termination <ul style="list-style-type: none"> • execution of the sequence terminates.
<IfName <i>name, N</i> >	conditional branch based on the sequence's current button caption <ul style="list-style-type: none"> • if the sequence's button caption is <i>name</i>, then execution proceeds with command <i>N</i> • if the sequence's button caption is not <i>name</i>, then execution proceeds with the following command • the comparison between button caption and <i>name</i> is case-independent. • <i>name</i> can contain spaces, but not a comma • be careful to avoid an infinite loop
<Name <i>text</i> >	sets the sequence's button caption to <i>text</i>
<Tooltip <i>text</i> >	sets the sequence's button popup explanation to <i>text</i>
<Wait>	pauses for the duration indicated in the Interrogation Interval textbox after executing the previous command in the sequence before executing the next command in the sequence.

The conditional branch and sequence button naming commands make it possible to create sequences that toggle a sequence button's function, as shown in this simple example for the Icom 756:

	Note	Command
1		<ifname Ant 1,20>
2	select 20m antenna 1	FEFE50E01200FD
3		<name Ant 1>
4		<tooltip click for Antenna 2>
5		<end>
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20	select 15m antenna	FEFE50E01201FD
21		<name Ant 2>
22		<tooltip click for Antenna 1>
23		<end>
24		
25		
26		
27		
28		
29		
30		
31		
32		

Name:
 Function:

Changing Frequency

Using Commander, you can change your transceiver's frequency via

- activating controls on the Main window's VFO panel
- rotating your mouse's wheel
- striking keyboard shortcuts
- selecting a memory
- scanning memories in the current memory bank
- actions in the Bandsread window

If you have configured Commander to support automatic switching between multiple transceivers, then the above actions may trigger a switch from one transceiver to another when a new amateur band frequency is specified.

If you have configured one or more frequency-dependent device, the settings for these devices will be continuously updated as a function of frequency. The panels displaying these settings reside on the right side of Commander's Main window, along with the secondary VFO, Filter, and PTT panels. This part of the Main window is shared with the Memory Bank panel. If the Memory Bank panel is visible, click the **Filters & Devices** button and the device panels will appear. You can select one control of one frequency-dependent device whose integer value will be placed on pins 2-9 of a specified parallel port. This can be used to control an antenna switch, for example.

The **primary VFO** panel on Commander's Main window displays the frequency last reported by your radio in blue font, unless a transverter is active; if you have configured Commander to support one or more transverters on the 6m, 4m, 2m, or 70cm bands, your transceiver will automatically be set to drive the transverter to the frequency specified by Commander's VFO. The primary VFO panel's caption indicates whether the radio is displaying VFO A, VFO B, the Main VFO, or the Sub VFO. For most Elecraft, Kenwood, TenTec, and Yaesu radios, this VFO identification will always be accurate; for Icom and TenTec Omni radios, however, the VFO identification will only be correct if VFO selection is accomplished via the controls on Commander's Main window, rather than via controls on the radio's front panel. You can define up to two sub-bands per band; when the primary VFO frequency does not lie within a defined sub-band, the frequency is displayed in yellow font.

Commander also displays a **secondary VFO** panel whose caption indicates whether its contents are those of VFO A, VFO B, the Main VFO, or the Sub VFO; the panel's caption **and its contents** will only be valid for Icom and TenTec Omni radios if VFO selection and modification is accomplished via Commander, rather than via the radio's front panel. If the secondary VFO panel is not visible, click the **Filters & Devices** button as described above.

Changing frequency via the primary VFO panel

- Modifying the frequency display contents and striking the **Enter** key will radio's primary VFO to the specified frequency
- The ▲ and ▼ buttons to the left of the frequency display will shift your radio up or down one band; if the **Ham Bands** box is checked, these buttons sequence among the ham bands from 160m to 2m, otherwise these buttons shift up or down 1 MHz. If you click and hold these buttons, they will autorepeat at a rate governed by the VFO Autorepeat Rate slider.
- The ▲ and ▼ buttons to the right of the frequency display will increase or decrease your radio's frequency as shown in the following table:

Control Keys	Change
	10 Hz.
Shift	100 Hz.
Ctrl	1 KHz.
Alt	10 KHz.
Ctrl + Alt	100 KHz.

If you click and hold these buttons, they will autorepeat at a rate governed by the VFO Autorepeat Rate slider.

- The horizontal scrollbar below the frequency display allows rapid frequency change within the current band; the ◀ and ▶ buttons at either end change frequency down or up as shown in the following table:

Control Keys	Change
	1 KHz.
Shift	5 KHz.
Ctrl	10 KHz.
Alt	50 KHz.
Ctrl + Alt	100 KHz.

If you click and hold these buttons, they will autorepeat at a rate governed by the VFO Autorepeat Rate slider.

- Depending upon your radio's capabilities, one or more of the following buttons and checkboxes may appear in the VFO panel:

A	selects VFO A
B	selects VFO B
A = B	sets VFO B to VFO A's frequency
A X B	simultaneously sets VFO A to VFO B's frequency and VFO B to VFO A's frequency
Main	selects the Main VFO
Sub	selects the Sub-receiver VFO
M = S	sets the Main VFO to the Sub-receiver VFO's frequency
M X S	simultaneously sets the Main VFO to the Sub-receiver VFO's frequency and the Sub-receiver VFO to the Main VFO's frequency
XFC	momentarily exchanges the A and B (or Main and Sub-receiver) VFOs

Split box	selects split frequency operation <ul style="list-style-type: none"> • selects VFO B or Sub-receiver VFO on entry • selects VFO A or Main VFO on exit
Dual receive box	selects dual receive or dual watch operation <ul style="list-style-type: none"> • selects VFO B or Sub-receiver VFO on entry • selects VFO A or Main VFO on exit

- The *transceiver command buffer overflow* message indicates that one or more directives from Commander to your radio have been discarded. This occurs when large frequency changes are attempted by holding down auto-repeating keys or buttons, exceeding the radio's ability to keep up. Recovery in this situation is automatic -- simply click the *ok* button, wait for your radio to catch up, and continue.

Changing frequency via the secondary VFO panel

Modifying the frequency display contents and striking the **Enter** key will radio's secondary VFO to the specified frequency.

Changing frequency via mouse wheel

If you have a wheeled mouse, you can QSY your transceiver by rotating the mouse's wheel whenever Commander's Main window is active; to activate the Main window, simply click somewhere within its borders.

When you first rotate the wheel after starting Commander, a cyan-colored horizontal bar will appear over the right-most digit in the primary VFO panel's frequency display; this indicates the rotating the mouse wheel will adjust the transceiver frequency in units of 10 Hz. Clicking the mouse on any other digit position in the VFO panel's frequency will shift the cyan horizontal bar to that digit position, indicating that subsequent mouse wheel rotation will adjust the transceiver frequency in the units of that digit position.

If inadvertent mousewheel rotation is problematic, check the Ignore Mousewheel box and Commander will no longer QSY your transceiver when you rotate the mouse's wheel.

Note: if the minimum adjustment you can achieve by rotating the mouse wheel is larger than one unit, check to see if you are running the most recent driver for your wheeled mouse.

Changing frequency via the keyboard

- After clicking on the primary VFO's frequency display or the Bandspread window, you can increase or decrease your radio's frequency by striking the **PageUp** or **PageDown** keys respectively:

Control Keys	Change
	10 Hz.
Shift	100 Hz.
Ctrl	1 KHz.
Alt	10 KHz.
Ctrl + Alt	100 KHz.

- After clicking on the VFO panel's frequency display, you can select its contents by striking the **Insert** or **CTRL-A** key; any digits subsequently entered will replace the frequency display's contents; strike the **Enter** key to change your radio's frequency to that shown in the VFO.

Changing frequency via the Bandspread window

Clicking the Main window's **Bandspread button** displays Commander's **Bandspread window**, which provides a vertical slide rule dial showing range of frequencies around your radio's current frequency, and a **Band** panel containing an array of buttons corresponding to the 160m through 2m amateur bands. You can resize the Bandspread window both vertically and horizontally.

The **Range** panel determines the range of frequencies depicted on the slide rule dial. You can vary this range from 1 kHz to 100 kHz in six steps; your radio's current frequency will always appear centered in the dial.

Clicking on the dial will QSY your radio to the associated frequency. Double-clicking the dial will QSY your radio to the associated frequency and then reduce the range by one step, unless the range is already 1 kHz. Allowing the mouse cursor to hover over the dial will produce a small popup showing the associated frequency to which your radio would be QSY'd if you were to click or double-click.

You can also QSY via the **PageUp** and **PageDown** keys.

Commander remembers the last 5 frequencies you visited on each band, and the mode in use for each such visit; this information is stored in a **Band Stack** associated with each band. If you QSY the radio, and then let it remain on a frequency for longer than the dwell time setting, the new frequency and mode will be saved on the appropriate Band Stack. The Bandspread window's Band panel contains a button for each band between 160m and 2m. Clicking a band button sets the radio's frequency to the most recent frequency used on that band, and sets its mode to the mode in use at that time; the Band Stack is then advanced, so that clicking the same band button a second time sets the frequency/mode to the next-most-recent frequency/mode used on that band. Using this mechanism, you can QSY to the most recent 5 frequencies.

The memory used to provide the slide rule dial and Band Stack are freed when the Bandspread window is closed.

Viewing and Selecting DX Spots

If SpotCollector (version 2.7.4 or later) is running and Commander's Bandspread window is open, then SpotCollector will automatically send to Commander spots of DX stations operating on the transceiver's current band that meet SpotCollector's current filter criteria (with the exception that wildcard characters in the Call and DXCC filters are not handled). Commander displays each DX spot on the Bandspread window's slide rule dial unless its age exceeds the specified lifetime. The size of the font used to display DX spots can be specified as a function of the slide rule dial range, making it possible to use larger font sizes with smaller ranges. Spotted callsigns that are known to participate in the ARRL's Logbook of the World (LotW) are highlighted with the LotW background color specified in SpotCollector. DX Spots that are close together in frequency are separated horizontally to form a list of up to 8 spots; for busy frequencies and a long lifetime, it may be necessary to expand the Bandspread window horizontally to see all of the spots; alternatively, zooming in to a smaller dial range may separate the spots, or a smaller spot font size can be specified.

- allowing the mouse cursor to hover over a DX spot displays a small popup window showing the spot's callsign, transmit frequency, QSY (listening) frequency if operating split, mode, UTC time last spotted, LotW participation, areas from which the station was spotted, and spot notes
- clicking on a DX spot will
 - if WinWarbler is not running, or if WinWarbler is running but the station's mode is CW, SSB, AM, or FM and Commander has been configured to not route spots in this mode to WinWarbler
 - if the station is operating simplex
 - set the radio to the spot's frequency and the appropriate mode (as specified by the CW mode and RTTY mode panels)
 - configure the radio for simplex operations (disable split and dual mode, if available)
 - if the station is operating split
 - set the radio's VFOs to the appropriate transmit and receive frequencies
 - set the radio to the appropriate mode (as specified by the CW mode and RTTY mode panels)
 - configure the radio for split operations (enable split and dual mode, if available)
 - if WinWarbler is running
 - if the station is operating PSK31, PSK63, or RTTY, direct WinWarbler to the specified mode and optimal frequency
 - if the station is operating CW, SSB, AM, or FM and Commander has been configured to route spots in this mode to WinWarbler, direct WinWarbler to the specified mode and frequency

- direct DXKeeper (if running) to
 - initialize its Capture window with the DX spot's callsign, frequency, mode, and gridsquare (if available)
 - filter its Log Page Display to show all previous QSOs with the DX spot's callsign or DXCC entity, as specified by the Log Filter setting
- if both DXView and DXKeeper are running
 - direct DXView to perform a lookup of the DX spot callsign
 - if the CTRL key was depressed while clicking on the DX spot, rotate the antenna to the short path bearing to the spotted station
 - if the ALT key was depressed while clicking on the DX spot, rotate the antenna to the long path bearing to the spotted station
- double-clicking a spotted callsign performs all of the operations described above under single-clicking, and then reduces the slide rule dial range by one step, unless the range is already 1 kHz.

When the radio QSYs from one band to another with the Bandsread window open, Commander clears the DX spots from the slide rule dial, and SpotCollector sends Commander each Spot Database entry on the new band that meet its current filter criteria (subject to the above-mentioned wildcard character limitation). Thus Commander always displays that subset of SpotCollector's filtered Spot Database entries that are operating in the range of frequencies shown on the Bandsread window's slide rule dial

Commander displays a rectangular indicator in the lower-left corner of the Bandsread window. This rectangle's color indicates the maximum degree of need for any DX spot received by SpotCollector but not visible on the Bandsread window's slide rule dial.

- allowing the mouse cursor to hover over this indicator displays a small popup window showing the most recent and needed unseen spot's callsign, frequency, mode, and time of arrival
- clicking the indicator resets its color to that corresponding with unneeded
- double-clicking the indicator sets the radio's frequency and mode to that of the most recent and needed unseen spot

Clicking the SpotCollector button activates SpotCollector's Main window, if SpotCollector is running. The memory used to maintain and display DX Spots are freed when the Bandsread window is closed.

Commander: Changing Mode and Filter Setting

Buttons representing the modes supporting by your radio appear in the Main window's **Mode** panel, and identify the radio's current mode. To change your radio's mode, click the appropriate button in the Mode panel. You can also change your radio's mode by selecting a memory.

If your radio supports Filter Groups and the restore Filter Group on mode change box is checked, the caption on each mode button will indicate the last Filter Group used in that mode. In this case, clicking a mode button both directs your radio to change mode, and establishes receiver bandwidth settings specified by that Filter Group.

LSB	selects lower sideband modulation
USB	selects upper sideband modulation
CW	selects continuous wave
CW-R	selects continuous wave, reversed
RTTY	selects radioteletype
RTTY-R	selects radioteletype, reversed
FM	selects frequency modulation
WBFM	select wide-band frequency modulation
AM	selects amplitude frequency modulation
PKT	selects packet

Changing Receiver Bandwidth

Radios differ in the degree to which they permit receiver bandwidth to be controlled from PC software. If Commander provides bandwidth controls for the current the radio Model, they are presented in the **Filters panel** on the right side of the Main window, sharing space with the Memory Bank panel; if the Filters panel is not visible, click the **Filters & Devices** button. Commander uses the concept of a **Filter Group** to bridge these disparate capabilities: a Filter Group is a named configuration of one or more receiver bandwidth settings. If Filter Groups are supported for a particular radio Model, Commander remembers the Filter Group last used in each mode. Checking the restore Filter Group on mode change box directs Commander to automatically restore the last used Filter Group whenever a new mode is selected.

Icom Transceivers

Most Icom transceivers define two Filter Groups: **Wide** and **Narrow**. The exact behavior of these groups depends on the currently-selected mode, and the filters installed. Recent Icom transceivers such as the 756 Pro family and 7800 introduce a third Filter Group named **Normal**. With the radio Model set to an Icom transceiver, the Filter panel presents a **Group** selector with choices appropriate for the specified Model. When you change filters via the radio's front panel, the Group selector is updated to reflect your choice.

Yaesu Transceivers

Commander's Filter panel provides comprehensive bandwidth control for the Yaesu 1000MP family, including the MarkV and MarkV Field. The Filters panel provides controls that allow direct selection of 2nd IF, 3rd IF, and sub-receiver filters. With the radio Model set to MP1000 or MP1000MKV, the Config window's Filter Grps tab lets you defines 12 Filter Groups, specifying a name, mode, 2nd IF filter, 3rd IF filter, and sub-receive filter for each; you can revise or delete these definitions, and provide new ones. You can activate a Filter Group by selecting its name in the **Group** selector on the Main window's Filter panel. When you change filters via the radio's front panel, Commander determines whether the new filter configuration matches a defined Filter Group; if so, the Group selector is updated to show the name of the matching Filter Group.

Kenwood Transceivers

Commander provides mode-specific receiver bandwidth controls for the TS-480, TS-570D, TS-570S, TS-870, and TS-2000 as shown in the following table:

Transceiver	SSB	CW, CW-R	RTTY, RTTY-R	AM	FM
TS-480	High-cut, Low-cut	Shift, Width	Width		High-cut, Low-cut
TS-570S, TS-570D	High-cut, Low-cut	Shift, Width	Shift, Width	High-cut, Low-cut	High-cut, Low-cut
TS-870	High-cut, Low-cut	Shift, Width	Width		Width
TS-2000	High-cut, Low-cut	Shift, Width	Width		High-cut, Low-cut

Using Memories

Commander provides 100 memories, organized into ten banks of 10. Memories in the currently-selected memory bank appear in a panel that shares the right side of Commander's Main window with readouts for frequency-dependent devices and receiver filter controls. This panel also contains a button for each memory bank that, when clicked, selects that memory bank and displays its memories. If the currently-selected memory bank is not visible, click the Main window's **Mem** button to make it appear in place of the device and bandwidth controls.

Within a memory bank, each memory stores a frequency, mode, and filter setting.

- Clicking on a memory's **Save** button saves your radio's current frequency, mode, and filter setting in that memory, as well as the state of Commander's Split, Ham bands only, and Dual receive checkboxes (if those functions are supported by your radio)
- You can edit any memory's frequency, mode, and filter setting using standard Window's gestures and keystrokes.
- After clicking on a memory's frequency display, you can select its contents by striking the **Insert** key; any digits subsequently entered will replace the frequency display's contents.
- Clicking on a memory's **Sel** button will set your transceiver to that memory's frequency, mode, and filter setting if the frequency and mode are valid, and will set Commander's Split, Ham bands only, and Dual receive checkboxes to the values stored in that memory (if those functions are supported by your transceiver). Commander disables the **Sel** buttons associated with memories that do not contain a valid frequency and mode.

By editing textboxes in the Memory Banks panel on the Configuration window's Memories tab, you can establish a title for each memory bank ; the title for the currently-selected memory bank serves as the caption of the Main window panel that displays the currently-selected memory bank. To quickly edit a memory bank's title, depress the **Ctrl** key while clicking that memory bank's button.

To help keep track of each memory's purpose, you can record notes that pop up whenever the mouse cursor hovers over the memory's **Sel** button. To record such notes, depress the **Ctrl** key while clicking the **Sel** button; Commander will display a Memory Notes Editor window that allows you to capture notes:

- notes may not contain the angle bracket characters < or > .
- clicking the Notes Editor's **Insert Timestamp** button appends a the current UTC date and time to the notes

You can direct Commander to display each memory's notes in place of its frequency, mode, and filter -- simply click the command button captioned ~ in the upper right corner of the memory bank panel. To return to a display of memory frequency, mode, and filter, click the ~ button again.

To clear a memory's frequency, mode, filter setting, and notes, depress the **Ctrl** key while clicking the **Save** button.

To continuously scan valid memories in the current bank, check the **Scan** box on the Main window. With memory scanning enabled, Commander will sequentially activate each of the current bank's memories that contain a valid frequency and mode, skipping memories not containing a valid frequency or mode. The time between activations is defined by the Scan Dwell setting. If none of the current bank's memories are valid, Commander will uncheck the **Scan** box and stop scanning.

To save the information associated with all memories that contain at least a frequency and mode, click the Export Memories button on the Configuration window's Memories tab. Commander will prompt you for a filename, and then store the data in a format described below.

To load memories with information from a file, click the Import Memories button on the Configuration window's Memories tab. Commander will prompt you for a filename, and then interpret each line of the file as specifying the contents of one memory via the following tags:

Tag	Description
<Memory <i>n</i> >	<i>n</i> is an integer between 1 and 100, inclusive
<Frequency <i>f</i> >	<i>f</i> is a valid frequency
<Mode <i>mode-name</i> >	<i>mode-name</i> specifies a valid mode, e.g. USB or CW
<Filter <i>fg-name</i> >	<i>fg-name</i> specifies a valid filter group name, e.g. narrow or sharp
<Split on>	enables split
<Split off>	disables split (default)
<Hambands on>	enables "ham band only"
<Hambands off>	disables "ham band only" (default)
<Dual on>	enables "dual receive"
<Dual off>	disables "dual receive" (default)
<Notes <i>note-text</i> >	<i>note-text</i> contains any valid ascii characters except the angle brackets < or >

- To be valid, a memory specification line must contain a valid <Memory *n*> tag, a valid <Frequency *f*> tag, and a valid <Mode *mode-name*> tag.
- The absence of a <Split on> tag is interpreted to mean "disable split"; the equivalent is true for the <Hambands on>, and <Dual on> tags.
- The order of memories within the file is irrelevant, as is the order of tags within a line.

Here are some sample memory specification lines:

```
<Memory 1> <Freq 3.013> <Mode CW> <Filter Narrow> <Split On> <Notes 5R8FU stakeout>
<Memory 11> <Freq 14.260> <Mode USB> <Filter Narrow> <Notes 20m IOTA>
<Memory 12> <Freq 21.260> <Mode USB> <Notes 15m IOTA>
```

Errors encountered while importing memory specifications are recorded in an error file that is displayed when the import operation completes. The name of the error file is composed by appending `_errors` to the name of the file being imported.

Commander: Keying and Unkeying

Commander can key or unkey your radio by

- sending the appropriate command (if supported)
- activating serial port signals RTS and/or DTR, as specified in the RTS panel and DTR panel

You can direct Commander to key or unkey your radio by clicking the PTT On button or PTT Off button respectively. Note that a second set of PTT On and Off buttons is available in the main window's **Filter & Device** tab if Device 2 is not enabled.

Controlling Multiple Radios

Commander can be configured to rapidly switch between up to four simultaneously-connected radios. The Configuration window's Multi Radio tab lets you specify control and serial port settings for each radio, and assign each radio a unique name. If a Pegasus or Kachina radio is chosen, a **Select** button appears that when clicked lets you specify a Control Folder or Control File respectively. Each enabled radio's name appears on a selection button on the Main window's VFO panel; a radio can only be enable if its Model has been specified and if its serial port parameters have been specified (for those radios controlled via a serial port). Clicking a radio's selection button sets controls on the Configuration window's General and Ports tabs to the appropriate values for the specified radio, as specified on the Multi Radio tab.

You can configure Commander to automatically switch between simultaneously-connected radios by specifying the radio to use for each amateur band. Check the Selection by band panel's Auto box, and Commander will automatically switch to the correct radio as a function of operating frequency.

You can configure Commander to identify the currently-selected radio via a binary encoding on pins 16 and 14 of a specified parallel port.

Commander: Monitoring Messages

Commander provides a means of capturing the flow of messages between your PC and your radio. To use this mechanism, click the Main window's **Msgs** button, which will display Commander's **Messages window**.

to enable message capture, check the **Capture and Display Messages** box; note that capturing messages may reduce program performance, resulting in poor tracking between the radio's frequency display and the program's frequency display.

captured messages are preceded by a sequence number and date; messages can be displayed in decimal, hexadecimal, or ASCII as specified by settings in the **Message Display** panel

If the Configuration window's Continuous Frequency and Mode Interrogation box is checked, you should see the PC issuing "request frequency report" and "request mode report" messages, and your radio's responses; if not, check your radio's address, baud rate, and PC connections.

If the Configuration window's Continuous Frequency and Mode Interrogation box is not checked, you will only see messages when the radio's frequency, mode, or filter selection changes, or when Commander sends a directive to your radio.

the **Freq?** and **Mode?** buttons send messages to your radio requesting that it report its current frequency and mode respectively.

the **Save** button places all captured messages in a file, and the **Clear** button empties the store of captured messages.

the **Note** button records documentary text to be inserted into the message store; the note will not appear in the message store until the next message arrives