

User Guide

Introduction

AmpCtl is a desktop application that enables a Hardrock 50 (HR50) to track an amateur radio transceiver frequency selection and switch bands as the transceiver is switched from band to band. This is a solution for any transceiver that is supported by hamlib. For transceivers that are not supported, the program has a manual control feature to change bands from the desktop instead of having to change bands on the HR50. This may be more convenient, especially when operating one of the many digital modes.

In addition to displaying the current band, AmpCtl reports HR50 operation. PEP, average power, SWR, temperature, and input voltage are displayed in an easy to interpret presentation. This information is updated automatically at the end of each transmission. You also have the ability to send selected commands to the HR50 to update the display or to change some operating conditions.

The HR50 supports operation on 60 meters only if the Automatic Tuner Unit (ATU) option is installed. AmpCtl detects whether the ATU option is installed and changes operation accordingly.

If the HR50 is switched to 60 meters, whether selected manually or by setting the transceiver to 60 meters, AmpCtl automatically disables keying the HR50 (Key Mode - OFF), and UNK is displayed. The amplifier is taken off-line under these conditions. If *AutoTrack* is enabled, any frequency outside the normal HF Amateur bands causes this response as well.

Unusual or potentially damaging operating conditions may also take the HR50 off-line. The temperature bar is normally green, changing to yellow, and then red as the temperature rises. If the temperature exceeds 160F/70C, the temperature bar changes to purple and keying is suspended. Keying may be restored when the temperature falls below 160F/70C.

If SWR above 4:1 is reported, keying is disabled, and the SWR display changes to red. Correcting the antenna issue and re-selecting the key mode will change the display back to green after the next manual update or after a transmission.

Using AmpCtl

Switch on the HR50, then launch AmpCtl. Click the Port Selection button to open the com port dialog. Be sure that the baud rate 19,200, 8 bits, and no parity are selected. Select the USB port that is associated with the HR50 from the drop down list, and then press **OK** to update the port selection. Next, switch on the transceiver and start the rigctl daemon.

Click the **Connect** indicator to initiate the connection to the HR50. When connection is established, the *Connect* indicator switches from red to green and the label changes from Connect to Disconnect. The application title changes to HARDROCK 50 AMPLIFIER and the Band and Key Mode radio groups are enabled, along with the **AutoTrack** and **RigCtl** indicators.

Attempts to connect to the wrong port or with the amplifier switched off will result in an error message. Acknowledge the error message dialog, correct the error, and try again. In some cases, you may have to close the program and re-open it to establish connection to the amplifier.

The band indicator radio button and LCD display update with current HR50 information. The **AutoTrack** indicator changes from red to green. If hamlib is configured, the program reads the current band from the transceiver and switches the HR50. After each transmission, the HR50 PEP, average power, SWR, and temperature are updated.

If rigctl is not running, the message window at the bottom advises that rigctl could not be found, *AutoTrack* is disabled, and the **AutoTrack** and **RigCtl** indicators are red. If rigctl can be started, clicking on the **AutoTrack** button starts *AutoTrack* and the indicator changes to green. After the first successful rigctl interrogation, the **RigCtl** indicator changes to green. This indicator changes to red during each interrogation and then back to green when successful.

If necessary, change the key mode to your preferred keying method, or select **OFF** to operate straight through. If you have the ATU board installed, you may select **QRP** to operate without amplification, but with the bandpass filters and information display on line. This selection is disabled if no ATU is present, however.

To manually change bands, first click the **AutoTrack LED** to suspend the automatic tracking feature, and then click any of the Band radio buttons. Band selection from the program or from the HR50 is possible with AutoTrack running, but at the next update interval, the band selection is updated from the transceiver.

The AmpCtl *Send Command* feature is used to send select commands to the HR50. These commands perform out-of-cycle updates for the status displays. Additional commands change the temperature reports from Fahrenheit to Celsius, as well as interrogate specific parameters such as temperature, band, and voltage;

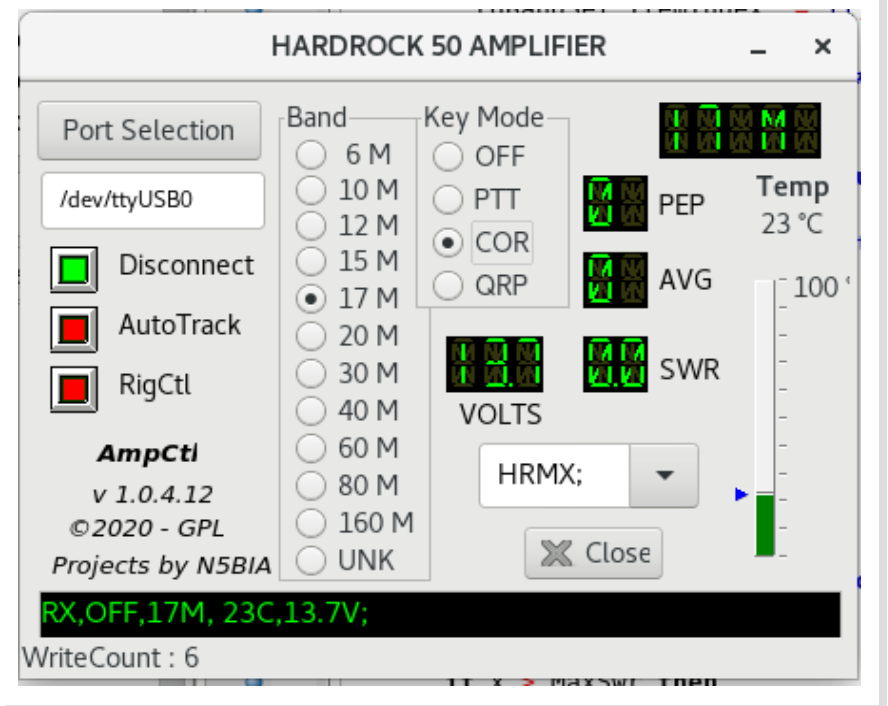
Click the down arrow and select the command from the list. The command is sent when you click on a selection. The **RigCtl LED** turns red, then green when the command is complete. Subsequent commands may be sent as soon as the LED is green.

IMPORTANT: the HR50 does not respond to commands when it is keyed (in transmit mode).

To terminate the program, press either the **X** located at the top left corner of the program window or the **Close** button under the *Send Command* list. You may disconnect from the HR50 first, but this is not required.

Status LEDs/Buttons

- **Connect/Disconnect**
- **AutoTrack**
 - click to suspend automatic frequency tracking, click again to resume automatic tracking
 - steady red - AutoTrack suspended or rigctl not detected
 - steady green – automatically tracking transceiver band changes
- **RigCtl**
 - steady red - rigctl not getting frequency information from the transceiver
 - green / momentary red - rigctl interrogated, frequency processed



A black bar with green text located at the bottom of the AmpCtl window displays the unprocessed information from the HR50, as well as error messages. Windows users will have to click in the black area and scroll up to see the messages. The serial communication status is displayed just below the black bar. These messages may be helpful if troubleshooting is necessary.

Installation

Install the software by copying it to a folder that is in your executable path. On Linux systems, I suggest /user/local/sbin, but if you prefer another location, feel free to experiment. If left in your Home folder, you can also start it with ./AmpCtl. If you want the console messages, append <space><debug>. You may also want to add a menu item to your Ham Radio group.

Window users may create an AmpCtl folder in c:/Program Files, or in User/AppData. Add the path to AmpCtl.exe to your environment. You may also want to add appropriate desktop or menu shortcuts.

For automatic band switching functionality, hamlib must support your transceiver and be running on your system. After installing hamlib, add the hamlib location to your executable path. Install and configure hamlib for your transceiver and verify that is working as expected. If your radio is not supported or you do not want the automatic band switch feature, the status display, key mode selection, and manual band switching features are still functional.

Troubleshooting

AmpCtl can place trace information into the system log or on a console window. Start AmpCtl with a commandline parameter:

AmpCtl debug

Programming Notes

The following information is from notes I made while developing AmpCtl.

- Very important to terminate each command with a semi-colon. The command or query will not be recognized without it!
- All responses are terminated with a CR-LF sequence (#13) (#10) following the semicolon.

Command/response examples (Firmware V4.0E):

Send/response commands set the information listed when the character listed is appended to the 'Send' command. When the 'Send' command is sent with no character other character before the semi-colon, expect the response in the serial data from the amplifier. All commands must have a semicolon as the last character of the command or query. Expect a semicolon as the last legible character in the response.

Send	Response	Notes
HRBN<0-10, 99>;	none	0~7, 9~10, 8 (60M) only when atu present
HRBN;	HRBN<0-10,99>;	Status as above
HRMD<0-3>;	none	OFF(0), PTT(1), COR(2), QRP(3) only with atu
HRMD;	HRMD<0-3>;	Status as above
HRRP<0-1>;	None	OFF(0), Auto HRMX after each TX (1)
HRRP;	HRRP<0-1>;	Status as above
H RTP<0-1>;	None	Fahrenheit (0), Celsius (1)
H RTP;	H RTP<n>F/C;	Temperature (F or C)
HRVT;	HRVT<n.n>V;	HRVT13.7V; Voltage
HRAT;	HRAT<0-1>;	No ATU (0), ATU off (1), ATU active (2)
HRMX;	HRMX P0 A0 S0 T75F;	HRMX P0 A0 S0 T75F;
HRRX;	RX,COR,UNK,75F,13.7V;	RX,COR,UNK,75F,13.7V;

There are several inconsistencies in the responses from the amplifier. These are accounted for in the program, but I thought it important to note for future reference so that I don't create a new issue while working on the program. Of particular note:

- The separator between values in HRMX; are spaces, in HRRX; , commas are used
- The band information is returned as a number between 0 and 10 in the HRBN; command and as the actual band text in HRRX;
- Temperature information in HRRX; is not preceded by T, in HRMX; it is

Program constants

The following program constants determine the timeouts and intervals:

- SleepTime = 400; //pause for amp to catch up - experiment, may decrease
- WaitTime = 7000; //wait for amplifier to respond to initial setup
- BandUpdateInterval = 5000; // milliseconds update interval
- MaxSWR = 40; //HR reports SWR as 10 times the actual

Temperature reporting

Fahrenheit	Celsius	Condition	Color
0-114	0-44	Normal	Green
115-129	45-59	Warm	Yellow
130-159	60-69	Hot	Red
160	70	Critical	Purple - shutdown

Text Conventions

Bold – controls or buttons

Italic – program feature

Underline – Text on application canvas