

Chapter 15: Serial Controlled (HF) Radio Support

This section describes the controller's interface for serial controlled radios. Most such radios are for the HF bands, but some such as the FT-736 handle the VHF and UHF bands. The controller's software will handle frequencies through the 1.2GHz band for radios that support them. When "HF radios" are referred to in this chapter, other serial controlled radios are also included.

HF Radio Interfacing

The audio in, audio out and PTT connections to the serial controlled radio should be made just like for a repeater or any other radio, as described in Chapter 1. If the serial controlled radio has a COR output (from an all-mode squelch), it can be connected normally as well. If the radio does not have a COR output, set the COR polarity for that radio port to active high, so the internal pullup will make it always active (or leave it active low and tie the COR input to ground). This is necessary because the controller normally mutes incoming audio unless the COR line is active (see command 005 for more information). Note that having the COR line always active will make the HF receiver time out, so you might want to disable the time out timer for that radio port by setting it to zero (with command 020). If it does time out, you can reset the time out timer by resetting the controller with command 035 (you will have to exit HF mode to do that).

In addition to the audio in, audio out, COR and PTT signals, you will need to connect the controller to the radio's serial port, so you can control the frequency and other settings. Most serial controlled radios use TTL level signals, rather than the RS-232 signals that computers, mice, modems, and the controller's main serial port all use. RS-232 signals switch between +12 and -12 volts, while TTL signals change from 0 to 5 volts. A few radios use RS-232 level signals. **Do not connect an RS-232 serial port to a TTL serial port without an adapter!** Adapters to convert TTL signals to RS-232 signals can be purchased from the radio manufacturers or built from scratch. Some of these adapters may invert the data (the Kenwood TS-870 for example), just to make it more confusing. We have schematics for the level converters for some radios; check our web page or call us for more information. Once you have connected an adapter to the radio, you can simply connect the RS-232 serial port on the adapter to main serial port on the RLC-DSP404. This is the same serial port you can use to connect the RLC-DSP404 to a computer, so you can only use one at a time: either the HF radio or the computer for control.

If you are using a Kenwood level translator, you may have to connect pins 4 and 5 together on the DB-25 connector that plugs into the level translator. This connects the RTS and CTS handshaking lines.

If you want to use TTL level output, take a 16 pin socket and solder a jumper wire between pins 11 and 14 on the top of the socket. Remove the Max232 and plug in the socket instead (don't plug the Max232 into the socket). It will hook the processor's TTL output up to the data out line on the DB-9 without doing a level conversion like the Max232 does. Please note that hooking up the TTL output directly bypasses the protection of the Max232 and exposes the processor to the outside world. Shorting out the TTL output line or hitting it with static may damage the processor, requiring that it be sent back to Link Communications for repair (the processors are not easy to replace in the field, and if you damage the socket trying, there are 132 little pins to try to decoder to replace it). Use the TTL output at your own risk; getting a level translator from the radio manufacturer is much safer.

HF Radio Control:

There are several commands that are used to set up the HF radio interface. They tell the controller what radio is installed and a few other things. After the radio is set up and you are ready to change frequencies, scan, etc., you can go into a special "HF control mode". When you are in this mode, all of the normal commands are disabled and a separate set of HF control commands are used instead. This makes it possible to control the HF radio with short command codes without having to worry about what other commands might get executed accidentally. These commands are organized by mapping the DTMF keypad in a logical way that makes the various commands easy to remember. When you are done using the HF radio, there is a command code that takes you back to the normal mode where you can execute the normal commands. It is possible to execute HF commands from normal mode using command 199. This is usually used in a macro. There is also a way to execute normal commands while you are in HF mode (see keypad code 4). And finally, there are event triggers (see command 157) that are called when the different HF commands are entered that can be used to customize how the HF commands work (not finished yet). While in HF mode, the '#' key is used as the force-execution digit to make it easier to control the HF remote from the reverse autopatch.

Virtual Radio Features:

Although the RLC-DSP404's HF remote base interface is loaded with features, it uses only the most basic features on the HF radio itself: receive frequency, transmit frequency, vfo, split, and mode. The rest of the features are provided by the RLC-DSP404 itself. This allows the RLC-DSP404 to provide all of those features even on radios that don't have built-in support for them. Scanning is performed by sending a change of frequency several times a second, so the controller always knows what frequency the radio is on and so it can handle scan edges even if the radio doesn't support them directly. Memories are stored on the controller, so radios without built-in memories can support them with the RLC-DSP404. Even VFO A and VFO B are simulated by the controller; they work like you would expect but both use VFO A on the radio (the radio's VFO B is used to handle offsets with some radios). You could call all of these features that are handled by the controller "virtual" features, since they may or may not exist on the radio but the controller makes it work like they do. The only reason you need to know about which features are virtual and which ones actually use the features of the radio is so you can understand why the display on the radio doesn't always reflect the commands you enter. Watching the display on the radio may be more confusing than just using the frequency recall command (keypad command '8') while you are in HF mode.

Default Values:

The first time the HF remote is turned on (or after it has been reinitialized), it will go to 14.25 MHz, USB. All of the virtual memories also default to 14.25 MHz, USB. Of course you can change them to any other frequency you may choose.

Example:

I want to control a Kenwood TS-870S. I want my command prefix digit to be '1', so I enter "195 11". I then enter "196 02 2 0" to set the radio type and tell the controller that it will be connected to port two. The audio cable is built just like the one for my repeater was. Since the TS-870S already has a RS-232 serial port, I don't need a level converter, but I do need a null modem adapter in the serial cable between it and the controller to connect the data out line on each end to the data in line on the other. At least for now, I don't care about transmit or scan band edges, so I am going to skip command 197. Entering "198" from the repeater on port 1 turns on HF mode and sets the frequency to 14.25 MHz. "179" starts it scanning up fast. Kerchunking it stops the scan. "13" will turn of HF mode.

195: Configure HF Mode

This command configures the HF control mode and assigns the HF command prefix digit. It also tells the RLC-DSP404 that the serial port will be used for HF control rather than for programming the controller. You must disable HF control before the serial port will work for programming again.

<195> 0	Disable HF
<195> 1 p	Enable HF and set HF prefix digit to 'p'
<195> 2	Turn HF off without enabling or disabling
<195> 3	Recall HF mode settings

Parameters:

p = the HF command prefix digit. This is the digit that must be pressed before any command is entered in HF mode. It is commonly set to '1'. If you prefer not to use a prefix digit, just enter "195 1".

Notes:

- When you disable HF with "195 0", the HF remote will be turned off if it is in use and it will be disabled so it cannot be turned back on until it is enabled with this command.
- Normally the HF remote will be turned off from the port that is using it, by entering the HF command prefix digit followed by a '3' (the exit command - see the HF commands on the following pages). If you need to turn the HF remote off from another port (one that is not currently controlling the HF remote), you can enter "195 2".

Voice Response:

"HF on/off, key x" where "on/off" indicates whether HF is enabled or disabled (not whether HF mode is turned on or not) and "x" is the HF command prefix digit. "x" will be "clear" if no prefix digit is used.

Example:

I want the remote base turned on and I want my HF command prefix digit to be a '1'.

195 1 1

196: Configure HF Radio

This command tells the controller which radio port the HF radio is interfaced to and which type of radio it is. The controller uses this information to automatically set the baud rate (4800 for Kenwood or Yaesu, 1200 for Icom) and to send the proper command codes for your radio.

<196> 0	Recall HF Radio Configuration
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<196> pp 2 0	Kenwood TS-450, TS-570, TS-690, TS-850, TS-870, TS-950 and other recent radios
<196> pp 2 1	Kenwood TS-50, TS-140S, TS-440, TS-440S, TS-680, TS-711, TS-790A, TS-811, TS-940, R-5000 and other early radios

<196> pp 3 0	Yaesu FT-736
<196> pp 3 1	Yaesu FT-757 (no control of modes), FT757GXII
<196> pp 3 2	Yaesu FT-767
<196> pp 3 3	Yaesu FT-747GX, FT-890, FT-900, FT-990, FT-1000
Not Supported	FT-727R, FRG-8800

<196> pp 1 xx	Icom. See table on next page or check your radio manual to find 'xx' (the address) for your radio
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Parameters:

pp = the radio port that the HF radio is connected to.
xx = radio address (Icom only)

Normally if you are transmitting on the HF radio and you enter a command that causes serial data to be sent to the radio, such as changing a frequency, the controller will automatically drop the PTT to the HF radio while the serial data is sent. Some radios like the Yaesu FT-736 and the Kenwood TS-711 require this. Even radios that don't require it seem to have less problems with getting incorrect commands if they are not transmitting while they receive data, probably due to RF getting into the serial cable. If you want the controller to keep transmitting while it sends serial data, append a '1' to the end of the appropriate command above. For example: "196 02 2 1 1" would select port 02, Kenwood, type 1, leave PTT on when sending serial. "196 02 2 1" would make the PTT drop while sending serial.

Voice Response:

"HF on <port>, <I/K/Y><type> On/Off" where <port> is the radio port on the controller that the HF radio is connected to, <I/K/Y> signifies the brand of the radio (Icom, Kenwood or Yaesu,

respectively), and <type> signifies the radio type. On/Off indicates whether the PTT will be left on while serial data is being sent (default is off).

Icom Notes:

- Because the Icom radios can co-exist on a common serial bus (CI-V), a radio address is needed to select what radio gets the serial data. The list below shows the addresses of some Icom radios. If you don't find your radio listed, check your radio's owner's manual.
- Some Icom radios will let you change their addresses. This should not cause any problems as long as you don't change the address of an IC-735 to anything but 04 and you don't change the address of any other radio to 04. The IC-735 uses a slightly different format to set the frequency and the controller software uses this format whenever the radio address is set to 04.

Example 1:

I want to tell the controller that there is an Icom IC-725 on radio port 02.

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196 02 1 16
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Example 2:

I have a Kenwood TS-440 radio on port 02.

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196 02 2 2
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Icom Radio Addresses

Controller Setting (Decimal)	Radio Setting (HEX)	Radio Type	Controller Setting (Decimal)	Radio Setting (HEX)	Radio Type
04	04	IC-735	36	24	IC-1271 A/E
08	08	IC-R7000	38	26	IC-781
16	10	IC-275 A/E/H	40	28	IC-725
18	12	IC-375 A	42	2A	IC-R9000
20	14	IC-475 A/E/H	44	2C	IC-765
22	16	IC-575 A/H	46	2E	IC-970 A/E/H
24	18	IC-1275 A/E	48	30	IC-726
26	1A	IC-R71 A/E/D	50	32	IC-R72
28	1C	IC-751 A	52	34	IC-R7100
30	1E	IC-761	72	48	IC-706
32	20	IC-271 A/E/H	78	4E	IC-706 MK2
34	22	IC-471 A/E/H	86	56	IC-746

197: Set/Recall Transmit/Scan Band Edges

This command allows you to set and recall the edges of the frequency ranges that you are allowed to transmit in and within which the scanning function will loop. These two features are completely separate: they are stored separately and they operate independently, although the frequency ranges for both are set with this command.

Transmit Edges: The controller will let you receive on any frequency, but only transmit within the transmit edges that you set up with this command. This protects you from accidentally transmitting on a frequency you shouldn't.

Scan Edges: The controller will let you start scanning from any frequency. Since you will often want to focus on a small frequency range, it will also allow you to set a more limited range to scan within. This is the purpose of the scan band edges. Even if you started scanning from a frequency that was not within any of the scan bands, if you are scanning up and reach the top edge of a scan band, it will automatically loop to the bottom edge and continue scanning. If it reaches the bottom edge of a scan band, it will automatically loop to the top edge. It will speak the current frequency immediately before and after looping.

197 e	Recall Edges for all Bands
197 e c	Set Edges for all Bands for a Class (novice..amateur extra)
197 e bb	Recall Edges for one Band
197 e bb c	Set Edges for one Band for a Class
197 e bb u f..f*f..f	Set Upper or Lower Edge for one Band to a Specific Frequency

Parameters:

e = 0 to set a transmit band edge(s), 1 for a scan band edge(s)

c = Class to set edge(s) to. You can find out what the edges are for each class by setting them then recalling them with this command.

0	Novice
1	Technician / Tech Plus
2	General
3	Advanced
4	Amateur Extra

bb = 0..15 which band. See the table below. You don't have to leave the bands as they default if you want to re-assign them some other way. If two bands overlap, the first one found that contains the current frequency will be used.

u = 0 for lower edge, 1 for upper edge. If you try to set the upper edge to a lower frequency than the lower edge, the lower edge will be set to match it. If you try to set the lower edge to a higher frequency than the upper edge, the upper edge will be set to match it.

f..f*f..f = the new frequency. The '*' should go between the 1MHz digit and the 100KHz digit of the frequency. Example "14*25" for 14.25MHz. Frequencies over 2GHz have not been tested.

Defaults:

The following table shows the defaults for both the transmit and scan edges (they can be set separately). These are the edges of the voice bands for the amateur extra class. Note that voice is not allowed on 30 meters. There is also a user defined band at the end that you can set for any other frequency range.

Band	bb	Lower Edge	Upper Edge
160 meters	00	1.8 MHz	2.0 MHz
80 meters	01	3.75 MHz	4.0 MHz
40 meters	02	7.15 MHz	7.3 MHz
30 meters	03	0.0 MHz	0.0 MHz
20 meters	04	14.15 MHz	14.35 MHz
17 meters	05	18.11 MHz	18.168 MHz
15 meters	06	21.2 MHz	21.45 MHz
12 meters	07	24.93 MHz	24.99 MHz
10 meters	08	28.3 MHz	28.999999 MHz
10 meters	09	29.0 MHz	29.7 MHz
6 meters	10	50.1 MHz	54.0 MHz
2 meters	11	144.1 MHz	148 MHz
1.25 meters	12	222.0 MHz	225.0 MHz
70 cm	13	420.0 MHz	450.0 MHz
33 cm	14	902.0 MHz	928.0 MHz
23 cm	15	1240.0 MHz	1300.0 MHz
user defined	16	0.0 MHz	0.0 MHz

198: HF Mode Enable

This command enables the HF remote base mode. This mode re-defines the DTMF keyboard into a quick HF remote access pad. When this mode is enabled, only HF commands can be entered (see the following pages). In order to execute any system wide commands the user must get out of the HF mode with keypad command '3' or use keypad command '4'.

<198>

Parameters:

There are no parameters for this command

Defaults:

HF mode is disabled

Response:

- "HF Remote On <frequency>" if successful.
- "HF is off" if need to enable HF control with command 195.
- "HF busy X" if another port is in HF control mode. X is the number of the port this is currently using the HF remote . If they just forgot to exit HF mode, you can turn them off with "195 2", then enter "198" again to enable control from the port you are using.
- "Error 217" if you are already in HF mode.

HF Prefix:

The HF prefix is a single digit that is configured with Command 195. This digit is always the first digit entered when executing a command while in HF mode. The reason for the prefix digit is to keep single digit entries from accidentally being entered.

Example: I am in HF mode and need to start the scan function for fast up scanning

Enter: 1 79 unkey or '#' Response: "Scan up fast"

Example: I am in HF mode and need to enter a frequency

Enter: 1 29*600 unkey or '#' Response: '2 9 point 6 0 0 0 0'

Example: I am in HF mode and need to recall memory 15

Enter: 1 515 unkey or '#' Response: <frequency>

In all these examples the format for data entry was:

<HF Prefix> <Command> <Additional Data if Needed> <unkey or '#>

HF Remote Base Keypad Definition:

1: RX Only 1x: HF Mode... 1 - USB 2 - LSB 3 - AM 4 - FM 5 - CW	2: RX and TX 21: Toggle PL RX 22: Toggle PL TX 23: PL Off 28: Recall PL 2<Hz>: Set PL Freq	3: Exit HF Mode, Return to Normal Command Mode	A: Bump Up 20Hz
4: Bump Down 100Hz 4<name>: Execute Command by Name	5: Select VFO A 5xx: Recall Memory 0..99	6: Bump Up 100Hz	B: Bump Down 20Hz
7: Bump Down 500 Hz 7x: Start Scan... 1 - Down Slow 3 - Up Slow 4 - Down Med. 6 - Up Medium 7 - Down Fast 9 - Up Fast	8: Recall Current VFO Settings 80: Offset Off 81: Offset On 811: Minus Offset 810: Plus Offset 81xy: Set size of offset for this band	9: Bump Up 500Hz	C: Not Defined
* Use as Frequency <Point> Key	0: Select VFO B 0xx: Write Memory Channel 0..99	#: Force- Execution Digit, Like an Enter Key	D: Not Defined

Explanation of Keypad Commands:

Remember that before pressing the digit shown on the keypad map above, you must enter the HF prefix digit you set with command 195. The prefix digit is shown as a 'p' in the descriptions below; it defaults to '1'.

Digit 1:

- **"p 1":** Selects receive only mode. Keying the repeater will not cause the HF radio to transmit while in receive only mode. You can also go to any frequency the radio supports while in this mode, while the allowed frequency ranges may be restricted when transmit is enabled. Voice response: "HF Receive". This does the same thing as command 001 does when you are not in HF mode.

- **"p 1 x"**: Select radio mode. "x" is from the table below. If your radio supports wide and narrow versions of a mode, the wide version will be used.

"x"	Definition
1	Selects USB Mode
2	Selects LSB Mode
3	Selects AM Mode
4	Selects FM Mode
5	Selects CW Mode

Digit 2:

- **"p 2"**: Select transceive mode. Keying the repeater will cause the HF radio to transmit while in this mode. You can only go to frequencies that are within the transmit band edges while in this mode. If you try to go to a disallowed frequency, or if you try to enable this mode while on a disallowed frequency, the controller will generate the HF error (the default is for it to speak "error 217) and will not do it. If this command is successful, you should hear the voice response: "HF Transmit". This does the same thing as command 000 does when you are not in HF mode.
- **"p 2 1"**: Toggle PL receive requirement. Normally off. If turned on, receiver squelch will not open unless the correct PL frequency is detected. Not supported by all radios. On the Yaesu FT-736, PL receive only works when PL transmit is enabled.
- **"p 2 2"**: Toggle PL transmit setting. Normally off. If turned on, will transmit the current PL frequency. Not supported by all radios.
- **"p 2 3"**: Turn PL receive and transmit off.
- **"p 2 8"**: Recall PL receive and transmit settings and frequency.
- **"p 2 <Hz>"**: Set the current PL frequency to <Hz>. Do not use the '*' as a decimal point. You can enter the frequency to the nearest Hz, and the controller will look it up the nearest exact match for you.

Digit 3:

- **"p 3"**: Exit HF mode and return to normal command mode. Voice response is "HF Off".

Digit 4:

- **"p 4"**: Bump down 100 Hz. If you are in transceive mode, you may get an error if the new frequency would be disallowed by the transmit edges. Voice response is "Down 100".
- **"p 4 <command name>"**: Execute command <command name>. For example: "p 4 026" would recall the time from HF mode, just as "026" would from normal command mode.

Digit 5:

- **"p 5"**: Selects virtual VFO A. Has no effect if you are already using virtual VFO A. Restores the receive frequency, transmit frequency offset and mode to whatever they were when you last used virtual VFO A.
- **"p 5 x"** or **"p 5 xx"**: Recalls the contents of virtual memory "xx" into the current virtual VFO. This includes the receive frequency, transmit frequency offset and mode. Once a memory has been recalled, you can bump up or down, scan, or do anything else you would do with a

frequency you entered directly into the VFO. Since the memories are virtual, that is they are stored in the controller's memory rather than in the radio, all 100 memories will work regardless of whether your HF radio has built-in memories or not.

Digit 6:

- **"p 6"**: Bump up 100 Hz. If you are in transceive mode, you may get an error if the new frequency would be disallowed by the transmit edges. Voice response is "Up 100".

Digit 7:

- **"p 7"**: Bump down 500 Hz. If you are in transceive mode, you may get an error if the new frequency would be disallowed by the transmit edges. Voice response is "Down 500".
- **"p 7 x"**: Start scan type "x" (see table below). Scanning is normally stopped by keying up. If you are using command 199 to control the HF radio, you may find it useful to enter a value for "x" that is not in the table below to stop scanning.

"x"	Definition
1	Scan Down Slow
3	Scan Up Slow
4	Scan Down Medium
6	Scan Up Medium
7	Scan Down Fast
9	Scan Up Fast

Digit 8:

- **"p 8"**: Recalls the current frequency, offset (if not zero) and virtual VFO (if it is VFO B).
- **"p 8 0"**: Turn transmitter frequency offset off (set it to 0). Voice response is "Off".
- **"p 8 1"**: Turn transmitter frequency offset on (set it to whatever offset was last used on this band). Voice response is "<offset frequency> MHz". The controller will not bother to tell the radio to go into split mode unless you have transmit enabled (keypad command 2).
- **"p 8 1 x"**: Turn offset on and make it negative if "x" is 1, positive if x is 0 or 2.
- **"p 8 1 x y"**: Turn offset on and make it negative if "x" is 1, positive if x is 0 or 2. Set offset size "y" from the table below.

Offset Code	Offset size
0	0
1	100 KHz
2	500 KHz
3	600 KHz
4	1 MHz
5	1.6 MHz
6	1.7 MHz
7	5 MHz
8	12 MHz
9	20 MHz

Note: Only some Icom radios support controlling the split function from the serial port. Those that do include the IC-725, IC-726, IC-765, IC-781, and IC-970. The IC-R71, IC-R72, IC-271, IC-275, IC-375A, IC-475, IC-735, IC-471, IC-575, IC-751, IC-751A, IC-761, IC-1271, IC-1275, IC-R7000, IC-R7100, and IC-R9000 do not support turning split on and off from their CI-V interfaces. If you attempt to turn split mode on for a radio that doesn't support it, the controller will send the command and respond as if it worked, but the radio will not change. If you want to control split mode remotely, you can wire one of the controller's open collector output lines to the split button on the radio. Then you will be able to "push" the split button by turning the open collector output line on and off.

Digit 9:

- **"p 9"**: Bump up 500 Hz. If you are in transceive mode, you may get an error if the new frequency would be disallowed by the transmit edges. Voice response is "Up 500".

Digit 0:

- **"p 0"**: Selects virtual VFO B. Has no effect if you are already using virtual VFO B. Restores the receive frequency, transmit frequency offset and mode to whatever they were when you last used virtual VFO B. VFO B is called a "virtual VFO" because the controller keeps track of it separately from virtual VFO A so it will work as you would expect, but both will usually use VFO A on the radio. In other words, if you look at the radio, it will probably show VFO A even when you select virtual VFO B.
- **"p 0 x"** or **"p 0 xx"**: Writes the contents of the current virtual VFO into virtual memory "xx". This includes the receive frequency, transmit frequency offset and mode. Since the memories are virtual, that is they are stored in the controller's memory rather than in the radio, all 100 memories will work regardless of whether your HF radio has built-in memories or not. Voice response is "Write xx".

Digit A:

- **"p A"**: Bump up 20 Hz. If you are in transceive mode, you may get an error if the new before the 100 KHz digit. Voice response is "Up 20".

Digit B:

- **"p B"**: Bump down 20 Hz. If you are in transceive mode, you may get an error if the new before the 100 KHz digit. Voice response is "Down 20".

Digit C and D: Not used.

Digit *: Used only when entering frequencies. See the instructions for "HF Frequency Entry:" below.

Digit #: Used to make a command execute right away, without waiting for you to unkey. Similar to the forced execution digit of 'D' that is used when not in HF mode. If you press '#' after entering a command, you may not be able to hear part of the voice response to that command. Simply unkeying will avoid this problem.

Scanning:

Although your HF radio may have a scan feature built in, it is not used when scanning with the controller (see the "Virtual Radio Features" section at the beginning of this chapter). Instead, the controller sends a new frequency to the radio several times a second. Each time a new frequency is sent, it is 20, 100 or 500Hz different than the previous frequency, depending on whether you have selected slow, medium or fast scanning. A new frequency is sent just as often when scanning slowly as when scanning fast, but because the frequency is changed by a different amount, the resulting scan rate is different. You can change how often a new frequency is sent to the radio by adjusting a timer. Changing that timer will affect all three scan rates. See command 020 in Chapter 4 for information about changing the HF scan timer value.

When the controller reaches the top or bottom of a scan band (see command 197), it will speak the current frequency, wrap around to the other edge of that band, speak the frequency again, and continue scanning. It will also speak the frequency every 10 KHz when scanning slow or medium or every 25 KHz when scanning fast.

HF Frequency Entry:

To enter a new frequency, press the HF prefix digit (default is '1') followed by the frequency. Put a '*' after the 1 MHz digit. For example, to go to 14.25 MHz, enter "1 14*25" and unkey or press '#'. Leading and trailing zeros are optional. The '*' must be entered, as that is the only thing the controller uses to tell whether you are entering a frequency or another command.

Automatic Mode Selection:

When frequencies below 10 MHz are entered, LSB mode is automatically selected. When frequencies between 10 MHz and 29 MHz are entered, USB mode is automatically selected. When frequencies above 29 MHz are entered, FM mode is automatically selected. Of course you can always override the default mode (using keypad command 1). When memories are recalled, they retain the mode they were stored with, rather than using the automatic mode selection feature.

Typical HF remote base session:

- HF Prefix is '1'
- | | | | |
|-----|-----------|------------|----------------------------------------------------|
| 1) | 198 | D or unkey | ; Enable HF remote mode |
| 2) | 1 29*68 # | or unkey | ; Move the HF remote to 29.680 MHz, VFO 'A' |
| 3) | 1 0 # | or unkey | ; Select VFO 'B' |
| 4) | 1 29*58 # | or unkey | ; Move the HF remote to 29.580 MHz, VFO 'B' |
| 5) | 1 5 # | or unkey | ; Select VFO 'A' |
| 6) | 1 8 1 # | or unkey | ; Select Split (Repeater Mode) |
| 7) | 1 2 # | or unkey | ; Go into transmit and receive mode |
| ... | | | |
| | 1 3 # | or unkey | ; Cancel HF mode after communications are complete |

199: Enter HF Command (w/o being in HF mode)

This command allows you to control an HF radio without switching into HF mode with command 198. This may be useful when you just want to change just one thing or if you want to write a macro that will do a lot of things at once. After entering the command name, you should enter your HF prefix digit (if you have one, see command 195, then any other digits you would enter if you were in HF mode (1 for receive, 14*25 to change frequency, etc).

199 p h..h

Parameters:

- p = your HF command prefix digit if you have one (see command 195)
- h..h is a command you would normally enter while in HF mode (they are described after command 198)

Notes:

- It is possible to write a macro that uses command 199 to do several things, then execute that macro from HF mode using the keypad digit 4.

