ORION

Model 565

Programmer's Reference Guide

Revision 1.2

www.rfsquared.com

www.tentec.com

TEN-TEC

Contents

Introduction

Ten-Tec has produced this document as a starting point for software developers undertaking the development of a PC based Orion (Model 565) Interface program. The Ten-Tec Orion DSP HF transceiver is a product that is defined more by firmware than hardware. As such, it is subject to change based on customer needs. The information presented here is based on version x.xx of the Orion firmware. It is advisable to check for a more recent update at the Ten-Tec firmware update site, www.rfsquared.com.

Information contained in this document applies to firmware version 1.367 and later.

Conventions used in this manual

Numeric Types:

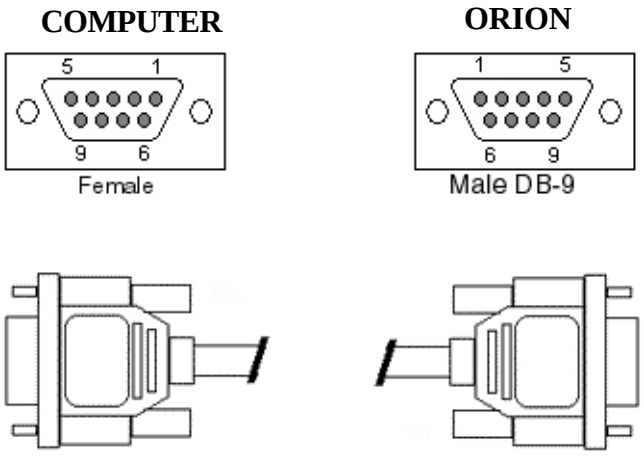
0x0A, 0Ah	Hexadecimal Numbers.
10	Decimal Number.
'A'	ASCII character code. example: ASCII 'A' is 0x41.
BCD	Binary Coded Decimal format example: decimal 25 is 0x25 in BCD format

Interface Settings

The RS-232 serial interface on the Orion is controlled by a Uart Peripheral of the DragonBall processor located on the Logic/DSP board. The interface parameters are fixed at 57,600 baud, No Parity, 8 Data bits, 1 Stop bit. The UART uses hardware handshaking to control the data flow between the PC and the radio. The host PC should be set to use RTS/CTS signalling.

The diagram below shows the wiring and associated signals for a 9 pin to 9 pin serial cable required to connect the Orion transceiver to a standard PC. If you purchase a premade serial cable it should be a straight through cable.

Computer	Pin	Orion
CD.	1	N.C.
RXD	2	Serial Data Out
TXD	3	Serial Data In
DTR.	4	N.C.
GND	5	GND
DSR.	6	N.C.
RTS (out)	7	RTS (in)
CTS (in)	8	CTS (out)
RI.	9	N.C.



The ORION Command Set

The Orion command set is similar to the command sets for the RX-320 & RX-350 receivers and Pegasus/Jupiter transceivers.
The command set is extensive and every effort has been made to keep the individual commands as simple as possible. Although the ORION interface operates at 57,600 baud short commands are used to keep the processing overhead to a minimum.

In general an ORION instruction is a two or three character command which may be followed by data and then terminated by a carriage return <cr>. The ORION operates with plain-text data unless otherwise noted. This eliminates the need to provide special pre-formatting to the data before sending it to the radio.

The ORION interface requires that data be in a format compatible with each command. Programmers should ensure that the supplied data is correct. Where a command is unrecognized or data is invalid the radio will send back a response consisting of the letters 'Z!' followed by the first 2 characters of the command string that caused the error and finally, a carriage return <cr>. Command characters are case sensitive! In general, the query are identical to the set command except the command is prefixed with a '?' character.

Because the ORION was built to be reprogrammed in-system the command set presented here is subject to change or enhancement. We will make every effort to make the system backward compatible with existing documented commands whenever possible. However, the ORION is an HF TRASNCEIVER PLATFORM that could host a variety of radio services. Persons or companies developing control software for the ORION should not assume that the radio is operating original factory firmware but rather should always query the radio's firmware revision to ensure compatibility.

Restart and Notify

This command will cause the radio to do a software restart. Upon start-up the radio will issue the start message "ORION START" indicating that it is initialized and ready to accept commands. Sending this command to the ORION will cause the DSP firmware to reinitalize and generate the "ORION START" message. This command can be used to determine that a Ten-Tec Flash Based radio is attached.

format:	'X' 'X' <cr>
where:	'X'= is the ASCII 'X' character (0x58)
	<cr> = ASCII carriage return (0x0D)
response:	" ORION START"

Receiver Modes

The ORION supports AM,FM,LSB,USB,UCW,LCW & FSK modes.

Setting: *RMM<mode_code><cr> for main receiver.
*RSM<mode_code><cr> for sub receiver.

<mode_code> = Main receiver Mode
ASCII '0' (0x30) for USB mode
ASCII '1' (0x31) for LSB mode
ASCII '2' (0x32) for UCW mode
ASCII '3' (0x33) for LCW mode
ASCII '4' (0x34) for AM mode
ASCII '5' (0x33) for FM mode
ASCII '6' (0x34) for FSK mode
<cr> = ASCII carriage return (0x0D) character.

examples:
*RMM1<cr> Sets Main Receiver to LSB mode.
*RMM2<cr> Sets Main Receiver to UCW mode.
*RSM4<cr> Sets Sub Receiver to AM mode.
*RSM5<cr> Sets Sub Receiver to FM mode.

Query: ?RMM<cr> for main receiver.
?RSM<cr> for sub receiver.

Radio will respond with @RMM<mode code><cr> for main receiver.
and @RSM<mode code><cr> for sub receiver.

sample responses:

@RMM2<cr> Indicates main receiver is in UCW mode.

@RSM0<cr> Indicates sub receiver in USB mode.

Audio Level Controls

The 'U' command is used to set the volume of each receiver and select how the audio is routed the speaker and headphones. As with other commands, the data fields are unformatted text strings.

Setting the audio volume of the receivers.

Setting: *UM<value><cr> for main receiver.
*US<value><cr> for sub receiver.
*UB<value><cr> for both receivers.
<value>= volume setting. range 0 (off) to 255 (maximum volume setting).
<cr>=ASCII carriage return (0x0D)

examples:

*UM125<cr> sets main receiver volume to 125.
*US90<cr> sets sub receiver volume to 90.
*UB200<cr> sets both the main receiver volume and sub receiver volume set to 200.

Query: ?UM<cr> for main receiver
?US<cr> for sub receiver

sample responses:

@UM50<cr> Indicates main volume at 50.

@US0<cr> Indicates sub audio at 0.

@UM163S255<cr>
Response from Both Query inicates both volume settings.

Binaural Receive Control

A variation of the 'U' command provides for control of Binaural Receive Mode.

Setting: *UR<s><cr>

<s>= Left headphone output selection.

'M' for Main Receiver.

'S' for Sub Receiver

'O' for Off.

<cr>=ASCII carriage return (0x0D)

examples:

*URM<cr> Sets Binaural Receive mode for the main receiver.

*URS<cr> Sets Binaural Receive mode for the sub receiver.

*URO<cr> Turns OFF Binaural Receive mode.

Query: ?UR<cr>

sample responses:

@URO<cr> Indicates Binaural Receive Mode is OFF

@URM<cr> Indicates Binaural Receive Mode enabled for the main receiver.

Speaker & Headphone Settings

Routing Speaker and Headphone Outputs

A variation of the 'U' command provides for control of receiver audio routing. This form differs from the volume setting
.

Setting: *UC<lv><rv<sv><cr>

<lv>= Left headphone output selection.
'M' for Main Receiver.
'S' for Sub Receiver
'B' for Both Receivers.

<rv>= Right headphone output selection.
'M' for Main Receiver.
'S' for Sub Receiver
'B' for Both Receivers.

<sv>= Speaker output selection.
'M' for Main Receiver.
'S' for Sub Receiver
'B' for Both Receivers.

<cr>=ASCII carriage return (0x0D)

examples:

*UCBBB<cr> Sets audio of both receivers to the the Left, Right & Speaker outputs.

*UCMSB<cr> Routes Main Receiver to the Left headphone and the speaker and routes Sub Receiver to the Right Headphone and the speaker.

Query: ?UC<cr>

sample responses:

@UCBBB<cr> Indicates Left, Right and Speaker will contain audio from BOTH receivers.

@UCMSB<cr> Indicates
Left headphone=main receiver audio.
Right headphone=sub receiver audio.
Speaker = Audio from both receivers.

Receive Filter

The ORION does not contain a predefined DSP filter set. When a filter is selected the DSP creates the requested filter on-the-fly. Filters can be programmed between 100 and 6000 Hz to a resolution of 1 Hz.

Setting: *RMF<bw> <cr> for main receiver
*RSF<bw> <cr> for sub receiver

<bm>=receiver bandwidth 100hz to 6000 hz.
<cr>= carriage return.

examples:
*RMF1200<cr>
Sets main receiver fillter bandwidth to 1200 Hz.

*RSF6000<cr>
Sets sub receiver fillter bandwidth to 6 kHz.

Query: ?RMF<cr> for main receiver.
?RSF<cr> for sub receiver.

sample responses:
@RMF2400<cr>
indicates the main receiver filter is 2400 Hz wide.
@RSF400<cr>
indicates the sub receiver filter is 400 Hz wide.

Antenna Selections

The Orion contains two transceiver antenna ports and an auxillary receiver port.

Setting: *KA[ant1][ant2][rxant] <cr>

[ant1] = Antenna 1 Selection
- 'S' for rx/tx.
- 'M' for main receiver.
- 'B' for both.
- 'N' for not assigned

[ant2] = Antenna 2 Selection
- 'S' for rx/tx.
- 'M' for main receiver.
- 'B' for both.
- 'N' for not assigned

[rxant] = Auxillary Receive Antenna Selection
- 'S' for rx/tx.
- 'M' for main receiver.
- 'B' for both.
- 'N' for not assigned.

<cr> = ASCII carriage return (0x0D)

NOTE: Main rx/tx must be assigned to either ANT1 or ANT2.

examples: * KAMMM<cr>
Sets Antenna 1 to the Tx, Sub Rx and sets aux rx for the main receiver.

* KAMSN<cr>
Sets Antenna 1 to the Main Rx and Tx, Sub Rx on Antenna 2. Aux antenna not selected.

* KABNN<cr>
Sets Antenna 1 to the Main Rx and Tx and Sub Rx. Antenna 2 and Aux antenna not selected.

Query: ?KA<cr>

sample responses:

@KAMMM<cr>

Indicates Antenna 1 to the Tx, Sub Rx and sets aux rx for the main receiver.

@KAMSN<cr>
Indicates Ant 1 to the Main Rx and Tx, Sub Rx on Ant 2. Aux antenna not selected.

Frequency Tuning

Extensive tuning cababilities are built into the Orion command set. Besides independent of the A and B VFOs, the radio may be tuned in ABSOLUTE, OFFSET or INCREMENTAL modes using plain-text character strings. In addition, compatibility with other Ten-Tec transceivers is maintained through a 4-byte binary frequency tuning mode.

ABSOLUTE:
The abosolute tuning mode provides a means to tune the vfo directly to the desired frequency. The command prefix is *AF for VFOA or *BF for VFOB. The target frequency may be specified in Hz or MHz.

example1: *AF14.250<cr> tunes VFOA to 14.250
example2: *BF10.113<cr> tuned VFOB to 10.113
example3: *AF10.113<cr> tuned VFOA to 10.113

OFFSET:
The offset tuning mode allows a VFO to be adjusted by a given amount. The command prefix is *A+ or *A- for VFOA and *B+ or *B- for VFOB. The offset amount is specified in Hz.

example1: if VFOA is 10.150 MHz then *A-1000<cr> would change VFOA to 10.149 MHz
example2: if VFOB is 3.980000 MHz then *A+500<cr> would change VFOB to 3.980500 MHz
example3: if VFOB is 7.100000 MHz then *A+1<cr> would change VFOB to 7.100001 MHz

NOTE!! Changes smaller than current step size will be ignored.

INCREMENTAL:
The incremental tuning mode allows a vfo to be stepped up or down in increments of the selected tuning step. The comamnd prefix is *AS+ or *AS- for VFOA and *BS+ or *BS- for VFOB. The increment is specified in steps and has a range of +/- 32767 steps.

example1: *AS+10 causes VFOA to move up in frequency by 10 tuning steps
example2: *BS+10 causes VFOB to move up in frequency by 10 tuning steps
example3: *AS-22 causes VFOA to move down in frequency by 22 tuning steps

4-Byte Binary Format

A 4-byte binary format may also be used to set the VFO frequency. This is provided to be backward compatible with other Ten-Tec radios.

format: '*' ['A' or 'B'] b3 b2 b1 b0 <cr>

where: '*' = the ASCII '*' symbol (0x2a).
A = the ASCII 'A' character (0x41).
B = the ASCII 'B' character (0x42).
b3-b0 =
Frequency in Hz as a 4 byte binary number. The most sugnificant byte is b3. The least significant byte is b0.

example1: *A <0x00> <0xe4> <0xe1> <0xc0> <0x0d> would set the A vfo to 15,000,000 Hz or 15 MHz.

example2: *B <0x00> <0x5b> <0x2b> <0xd8> <0x0d> would set the B vfo to 5,975,000 Hz or 5.975 MHz.

default: none

QUERY: ?AF<cr> for ASCII frequency of VFOA.
?BF<cr> for ASCII frequency of VFOB.
?A<cr> for VFOA contents in 4-byte format.
?B<cr> for VFOB contents in 4-byte format.

response examples:

@AF14200000<cr>
Indicates VFOA set to 14.2 MHz.

@A<0x00><0x6A><0xCF><0xC0> <cr>
Indictes VFOA set to 7 MHz in 4-byte format.

Passband Tuning (PBT)

The passband tuning range of the ORION is +/- 8000 Hz. Setting the PBT to 0 will turn the passband tuning control OFF. The data format is an ASCII number which represents the PBT value in Hz.

Setting: *RMP<pbt_val> <cr> for main receiver
*RSP<pbt_val><cr> for sub receiver.

<pbt_val>=Passband offset in Hz. Range +/- 8000 Hz.
<cr> = ASCII carriage return (0x0D) character.

examples:

*RMP150<cr>
would set the Main Receiver's PBT to +150 Hz.
*RMP-200<cr>
would set the Main Receiver's PBT to -200 Hz.
*RSP+200<cr>
would set the Sub Receiver's PBT to +200 Hz.

Query:

?RMP<cr> for main receiver.
?RSP<cr> for sub receiver.

sample responses:

@RMP-200<cr>
Indicates main receiver PBT value is set to -200 Hz.

@RSP0<cr>
Indicates sub receiver PBT is set to 0.

VFO Lock/Unlock

Locking a VFO prevents unintended frequency tuning. Each VFO can Locked/Unlocked independently.

Setting:

*AL<cr> to Lock VFOA.
*AU<cr> to Unlock VFOA.
*BL<cr> to Lock VFOB.
*BU<cr> to Unlock VFOB.
<cr>=ASCII carriage return (0x0D)

examples:		
	*AL<cr>	Locks VFO-A.
	*BL<cr>	Locks VFO-B.
	*AU<cr>	Unlocks VFO-A.

Query:

?AU or ?AL for VFOA.
?BU or ?BL for VFOB.

samples response:

@AL<cr> indicates VFOA is locked.
@AU<cr> indicates VFOA is unlocked.

AGC Mode Control

Setting: *RMA<agc_mode> <cr> for main receiver.
*RSA<agc_mode> <cr> for sub receiver.

<agc_mode> = Receiver AGC mode
O = off
F = fast
M = medium
S = slow
P = program

examples: *RMAF<cr>
sets main receiver AGC operation to FAST.

*RSAS<cr>
sets sub receiver AGC operation to SLOW.

*RMAO<cr>
sets main receiver agc to OFF.

Query:

?RMA for main receiver.
?RSA for sub receiver.

sample responses:

@RMAO<cr>
Indicates main receiver AGC is OFF.
@RSAF<cr>
Indicates sub receiver is set to FAST AGC.

RF Gain Control

The relative RF gain can be controlled over a range of 0-100. A setting of 0 represents full RF gain whereas a setting of 100 represents the maximum RF gain level. Because this control directly affects the RF hardware this will directly affect S-Unit responses and Squelch settings.

Setting: *RMG<gain_value> <cr> for main receiver
*RSG<gain value><cr> for sub receiver.

<gain_value> = Receiver RF gain. Range 1-100.
<cr> = carriage return.

examples: *RMG100<cr>
Sets main receiver rf gain to 100.

*RSG50<cr>
Sets sub Receiver RF Gain to 50.

*RSG1<cr>
Sets Sub Receiver RF Gain to 1.

Query:

?RMG for main receiver.
?RSG for sub receiver.

sample responses:

@RMG100<cr>
indicates main receiver RF Gain setting at 100%.

@RSG50<cr>
indicates sub receiver RF Gain setting at 50%.

RF Attenuator

Setting: *RMT[val] <cr> for main receiver.
*RST[val] <cr> for sub receiver.

[val]=
For Attenuator
'0' (0x30) = OFF
'1' (0x31) = 6dB
'2' (0x32) = 12 dB
'3' (0x33) = 18dB
<cr> = ASCII carriage return (0x0D)

examples: *RMT0<cr>
sets the Main Receiver Attenuator OFF.
* RST2<cr>
sets the Sub Receiver Attenuator to 12 dB.
* RST0<cr>
sets the Sub Receiver Attenuator to OFF.
* RMT1<cr>
sets the Main Receiver Attenuator to 6 dB.

Query:
?RMT for main receiver.
?RST for sub reciever.

sample responses:
@RMT1<cr>
indicates main receiver attenuator set to 6 dB.

@RST0<cr>
indicates sub receiver attenuator set to OFF.

VFO Assignments

The Orion contains two independent VFOs coupled to a ham-bands-only transceiver and general-coverage sub-receiver. Before the main receiver, transmitter or sub-receiver can be tuned it must be associated with one of the two available vfos. The VFO assignment command allows for arranging the receiver/transmitter/VFO combinations. In general this is a simple process but the contents of a particular VFO may prevent the assignment. When a VFO contains a frequency that is out-of-range for the intended receiver/transmitter ALL the assigments are rejected and the Orion will respond with an error string indicating the particular VFO that is out-of-range.

format: *KV[mrx][srx][mtx] <cr>

[mrx] = VFO associated with the main receiver.
'A' for VFOA.
'B' for VFOB.
[srx] = VFO associated with the sub receiver.
'A' for VFOA.
'B' for VFOB.
'N ' for no assignment.
[mtx] = VFO associated with the transmitter.
'A' for VFOA.
'B' for VFOB.
'N' for no assignment.
<cr> = ASCII carriage return (0x0D)

response: If not possible to make the assignements the radio will respond with
Z!A<cr> indicating VFOA out-of-range
or
Z!B<cr> indicating VFOB out-of-range
or
Z!AB<cr> indicating BOTH out-of-range

examples: * KVAAA<cr>
Set Main Rx, Sub Rx and Tx to VFOA.

* KVABA<cr>
Sets Main Rx and TX to VFOA and Sub Rx to VFOB.

* KVA <cr> Set Main Rx to VFOA and removes association with Sub receiver and Transmitter.

Query:

?KV<cr>

sample response:

@KVABA<cr>

indicates main receiver on VFOA, sub receiver on VFOB and main transmitter on VFOA.

Squelch (all mode)

The squelch is active in all modes. Each receiver has a seperate setting. The adjustment range is 0 to -127 dBm.

Setting: *RMS<setting><cr> for main receiver.
*RSS<setting> for sub receiver.

<setting>=0 to -127 dBm;
<cr> = ASCII carriage return (0x0D)

examples: *RMS-50<cr>
Sets main receiver squelch to -50dBm.

*RSS50<cr>
Sets sub receiver squelch to -50 dBm.

Query:

?RMS<cr> for main receiver.
?RSS<cr> for sub receiver.

sample respones:

@RMS-127<cr>
Indicates main receiver squelch set to -127 dBm.

@RSS0<cr>
Indicates main receiver squelch set to 0 dBm.

Memory Store

The ORION contains 200 memories. The memory store command will write the current contents of A and B VFOs to the indicated memory channel.

format: *KWA<memory> <cr> for VFOA
*KWB<memory><cr> for VFOB

where: <memory> = the memory channel. Range 0 to 200.
<cr> = ASCII carriage return (0x0D) character.

response: none.

example1: *KWA10<0x0d>
would write the contents of vfo A to memory channel 10.

example2: *KWB100<0x0d>
would write the contents of vfo B to memory channel 100.

Memory Recall

The ORION contains 200 memories. The memory recall command will recall the selected memory channel. If the the memory is empty the operation will not be performed. If the memory data is valid the stored data will replace the vfo contents.

format: *KRA<memory> <cr> for recall to VFO A
*KRB<memory> <cr> for recall to VFO B

where:
<memory> = the memory channel in a one byte binary format 1 to 200.
<cr> = ASCII carriage return (0x0D) character.

response: none.

example1: *KRA20<cr> would recall the contents of memory channel 20 to VFO A.

example2: *KRB190<cr> would recall the contents of memory channel 190 to VFO B.

Noise Blanker, Automatic Notch and Noise Reduction

The Noise Blanker (nb), Automatic Notch (an) and Noise Reduction (nr) are available for use in all modes. They can be used individually or together.

format: *RMN<A/B/N><val><cr> for main receiver.
*RSN<A/B/N><val><cr> for sub receiver.

where:

<A/B/N>=
A for Automatic Notch
B for Noise Blanker
N for Noise Reduction

<val>= 1 to 9 for setting or 0 for off..
<cr> = ASCII carriage return (0x0D)

response: none.

example1: *RMNN5<cr>
Sets the main receiver noise reduction to a setting of 5.

example2: *RSNA5<cr>
Sets the sub receiver automatic notch to a setting of 9.

example2: *RSNB<cr>
Sets the sub receiver noise blanker to OFF.

CW & Keyer Settings

format: *CK1<cr> to turn keyer ON.
*CK0<cr> to turn keyer OFF.
*CS<val><cr> for keyer speed setting. Range 10 to 60.
*CW<val><cr> for weighting. Range 50 to 150.
*CT<val><cr> for sidetone frequency. Range 300-1200.
*CV<val><cr> for sidetone volume. Range 0 to 100.
*CD<val><cr> for CW attach/decay dynamics. Range 3 to 10 ms.
*CQ<val><cr> for QSK delay setting. Range 0 to 100.

examples: *CW90<0x0d>
Set Keyer weighting to 90%.

*CS35<0x0d>
Set Keyer speed to 35 wpm.

*CK1<0x0d>
Turns Keyer ON.

*CK0<0x0d>
Turns Keyer Off.

*CV35<0x0d>
Sets sidetone volume to 35%.

*CT800<0x0d>
Sets sidetone frequency to 800 Hz.

Query: ?CK<cr> to test keyer On/Off.
?CS<cr> to read keyer speed setting.
?CW<cr> to read weighting setting.
?CT<cr> to read sidetone frequency.
?CV<cr> to read sidetone volume.
?CD<cr> to read CW attach/decay dynamics.
?CQ<cr> to read QSK delay setting.

sample responses:
@CK0<cr>
Indicates CW Keyer is OFF.

@CS40<cr>
Indicates CW Speed set to 40 WPM.

Keying Command

Format: *TK<cr> to key the transmitter
*TU<cr> to unkey the transmitter.

example:
*TK<cr>
Will key the transmitter.
*TU<cr>
Will unkey the transmitter.

Query: No Associated Query

Microphone Gain

Setting:
*TM<val><cr> Range 0 to 100.

examples:
*TM50<cr>
Sets Microphone Gain to 50%.
*TM100<cr>
Sets Microphone Gain to 100%.

Query:
?TM<cr>

examples response:
@TM50<cr>
Indicates Microphone Gain set to 50%

Transmit Audio Monitor

Setting: *TO<val><cr> Range 0 to 100.

Example:

*TO50<cr>

Sets the Monitor Output to 50%.

*TO0<cr>

Turns the Monitor Output OFF.

Query: ?TO<cr>

Sample response:

@TO45<cr>

Indicates Monitor Output set to 45%.

Transmit Power

Setting: *TP<val><cr> Range 0 to 100

Example:

*TP100<cr>

Sets the Transmit Power to 100%.

*TP0<cr>

Turns off the Transmitter.

Query: ?TP<cr>

Sample response:

@TP100<cr>

Indicates Transmit Power set to 100%

@TP0<cr>

Indicates the Transmitter is disabled.

SSB Transmit Bandwidth

Setting: *TF<bw><cr>

Where bw is between 900 and 3900.

example:

*TF3000<cr>

Sets the transmit filter to 3 kHz.

*TF3900<cr>

Sets the transmit filter to 3.9 kHz.

Query:

?TF<cr>

Sample Response:

@TF1500<cr>

Indicates the Transmit Filter set to 1500 Hz.

@TF900<cr>

Indicates the Transmit Filter set to 900 Hz.

Speech Processor

Setting:

*TS<val><cr> Range 0-9 (0=OFF)

Example:

*TS0<cr>

Turns off the speech processor

*TS5<cr>

Sets speech processor to level 5.

Query:

?TS<cr>

sample response:

@TS0<cr>

Indicates the Speech Procesor is turned OFF.

@TS9<cr>

Indicates the SPeech Processor set to level 9.

VOX Controls

Setting:

*TV1<cr> Turns VOX ON.
*TV0<cr> Turns VOX OFF.
*TG<val><cr> Sets Vox Trigger Level. Range 0 to 100.
*TA<val><cr> Sets Anti-Vox Level. Range 0 to 100.
*TH<val><cr> Sets Vox Hang Time. Range 0 to 10 seconds. in 0.01 second increments.
example:

*TH2<cr>

Sets Vox Hang to 2 seconds.

*TA35<cr>

Sets Anti-Vox level to 35%.

*TG20<cr>

Sets Vox trigger level to 20%.

Query:

?TG<cr> for Vox Trigger Level
?TA<cr> for Anti Vox Level.
?TH<cr> for Vox Hang Time.

sample responses:

@TH3<cr>

Indicates Vox Hang time of 3 seconds.

@TA50<cr>

Indicates Anti-Vox level of 50%.

@TG50<cr>

Indicates Vox Trigger level of 50%.

Tuner Controls

Setting:

*TT0<cr> to Disable the Optional Internal Tuner.
*TT1<cr> to Enable the Optional Internal Tuner.
*TTT<cr> to Initiaite a Tune Cycle

Example:

*TT1<cr>

Enabled the Internal Tuner.

*TTT<cr>

Starts a Tune Operation.

Keying Loops and Key-Out Delay

Setting:

*TL11<cr> To enable Keying Loop #1.
*TL10<cr> to Disable Keying Loop #1.
*TL21<cr> To enable Keying Loop #2.
*TL20<cr> to Disable Keying Loop #2.
*TD1<val><cr> to set External T/R Output #1 delay. Range 0 to 100.
*TD2<val><cr> to set External T/R Output #2 delay. Range 0 to 100.

Examples:

*TD150<cr>

Sets External T/R Output #1 delay to 50%.

*TL11<cr>

Enables Keying Loop #1.

Query:

?TL1<cr> for Keying Loop 1.
?TL2<cr> for Keying Loop 2.
?TD1<cr> for T/R delay of Output #1.
?TD2<cr> for T/R delay of Output #2.

Sample Responses:

@TD150<cr>

Indicates External Delay for Output #1 is set to 50%

@TL11<cr>

Indicates Keying Loop #1 is eanbled.

Transverter Control

Setting:

*TX1<cr> to enable the transverter outputs.
*TX0<cr> to disable the transverter outputs.

Query:

?TX<cr>

sample response:

@TX0<cr>

Indicates the transverter outputs is disabled.

Signal Strength Query

Format:

?S<cr>

Radio will respond with the sginal strenth reading of both receivers.
The response format is.
@SRM<main S value>S<sub S value l><cr> if the radio is in receive

or

@STF<fwd watts>R<ref watts>S<swr><cr>

sample responses:

@SRM10S5<cr>

Indicates an s-meter reading of 10 for the main receiver, and a reading of 5 for the sub-receiver.

@STF50R2S1.1<cr>

Indicates the radio is in transmit with a forward power of 50 watts. A refelected power of 2 watts and an SWR of 1.1:1.

Preamp Control

Setting: *RME1<cr> to turn Main Receiver Preamp On.
*RME0<cr> to turn Main Receiver Preamp Off.
Sub-Receiver does not contain a Preamp.

Query:

?RME<cr>

sample response:

@RME1<cr> indicates te Preamp is On.

Receiver Tuning Step

Setting:

*RMI<step><cr> for the main receiver.
*RSI<step><cr> for the sub receiver.
Allowed Steps are....
1,10,100,1000,5000,10000,100000

sample:

*RMI5000<cr>
Sets main receiver step to 5kHz.
*RSI100<cr>
Sets sub receiver step to 100 Hz.

Query:

?RMI<cr> for main receiver tuning step.
?RSI<cr> for sub receiver tuning step.

sample responses:

@RMI100<cr>
Indicates main receiver tuning step at 100 Hz.

@RSI1<cr>
Indicates sub receiver tuning step at 1 Hz.

Query Response Prefix Character Option

The Query response character is the @ character by default. However, it may be set to any printable character.

Setting:

*Q<chr><cr> to set the query response character.

example:

*Q$<cr>
Sets the query response character to the dollar sign character.

Q<rc>
Sets the query response character to the * symbol.

This defaults back to the @ symbol when power is removed from the radio.

RIT/XIT Setting

Setting:

*RMR<val><cr> for main receiver RIT.
*RSR<val><cr> for sub receiver RIT.
*RMX<val><cr> for main XIT.

<val> range +/- 8000 Hz.

Sub receiver does not contain an XIT setting.

example:

*RMX500<cr>

Sets main XIT to +500 Hz.

*RSR0<cr>

Sets sub receiver RIT to 0.

Query:

?RMR<cr> for main receiver RIT.
?RMX<cr> for main XIT.
?RSR<cr> for sub receiver RIT.

sample responses:

@RMR200<cr>

Indicates main receiver RIT set to 200 Hz.

@RSR1000<cr>

Indicates sub receiver RIT set to 1000 Hz.

302 Remote Keypad/Encoder Control

The Orion supports use of 302 Remote Keypad/Encoder as with other Ten-Tec tranceivers. In addition to the typical 302 operations presented in the Orion's menu the Orion allows for a special Pod Routing mode. In this mode, button presses and encoder movements on the Remote Pod bypass the radio and are sent to the host PC via the Orion's serial port. This allows programmer's to extend the 302 functionality when the Orion is under PC control.

Setting:

*P1<cr> To enable routing of Pod activity to the Host PC.
*P0<cr> To disable routing of Pod routing to the Host PC and resume normal Pod operations

example:

*P1<cr>
Enables Pod Routing.
*P0<cr>
Disables Pod Routing.

Query:

?P<cr>

sample responses:

@P0<cr>
Indicates Pod Routing Not enabled.
@P1<cr>
Indicates Pod Routing is Enabled.

When Pod Routing is enabled the Orion will send indormation tot he Host PC in response to Pod activity as idicated below.

Encoder Movement:

Encoder steps are counted and transmitted to the Host.

@PVn<cr>
Where n is a signed ascii number

Example:

@PV10<cr>
Encoder moved 10 steps clockwise.
@PV-5<cr>
Encoder moved 5 steps counterclockwise.

Keypad:

The Orion sends information to the Host inicating key-up and key-down activities. Key-Up is the keycode +128. Keycodes are ASCII numeric values prefixed with '@PK'.

KEY	#	KEY	#	KEY	#	KEY	#	KEY	#
'F1'	17	'F2'	18	'F3'	19	'.'	46	'0'	0
'E'	13	'1'	1	'2'	2	'3'	3	'4'	4
'5'	5	'6'	6	'7'	7	'8'	8	'9'	9

Example:

@PK19<cr> Indicates F3 key depressed
@PK147<cr> Indicates F3 key releaseed

CW Character Send

Version 1.367 of the Orion firmware added a new CW Send feature. This allows the Orion to transmit CW codes based on ASCII characters. In addition to the standard alphabet the ORion can transmit special procedural symbols as indicated in the table below. This command has no associated query command.

CW is transmitted using the Orion's current CW settings. The Internal Keyer must be enabled, otherwise the Send CW command is ignored.

Setting:

/c<cr> Send the CW character or Procedural Symbol indicated by 'c'.

example:

/b<cr>

Send the CW letter 'b'

/w<cr>

Send the CW letter 'w'

ASCII	CW Transmitted
*	AA Traffic Handling Signal
+	AR Procedural Symbol
$	SK Procedural Symbol
^	KN Procedural Symbol
?	Question Mark
.	Period
=	BT
/	DN
,	Comma
;	Semi-Colon
:	Colon

Transmitter Control Group

Command	Group	Function	Sub Function and Data			Parameter
*						
	T					**Transmitter Group**
		K				**Key The Transmitter**
		U				**Unkey The Transmitter**
		M	Range 0-100			**Microphone Gain**
		O	Range 0-100			**Monitor Output**
		P	Range 0-100			**Tx Power**
		F				**Tx Filter**
		V				**Vox Control**
			Zero			Off
			One			On
		A		Range 0-100		Antivox
		G		Range 0-100		Vox Gain
		H		Range 0-100		Vox Hang
		S	Range 0-100			**Speech Processor**
		T				**Tuner Sub Group**
			Zero			Disable
			One			Enable
			T			Start Tune Operation
		L				**Keying Loop Group**
			One			Antenna 1 Select
				Zero		Disable
				One		Enable
			Two			Antenna 2 Select
				Zero		Disable
				One		Enable
		D	0 to 100			**T/R Delay**
		X				**Transverter Control**
			Zero			Disable
			One			Enable
		I	Range 0-100			**Aux Input Gain**

Main Receiver Control Group

Command	Group	Function	Sub Function and Data			Parameter
*						
	R					Receiver Group
		M				Main Receiver Select
			M	Range 0-7		Mode Select
			F	Range 100-6000		Receive Filter
			A			AGC Sub Group
				F		Fast AGC
				M		Medium AGC
				S		Slow AGC
				P		Program AGC
				H	range needed	Program AGC Hang
				D	range needed	Program AGC Decay
				T	range needed	Program AGC Threshold
			S	range needed		Squelch Setting
			X	range needed		XIT Setting
			R	range needed		RIT Setting
			I	1,10,100,1000,5000,10000,100000		Step Setting
			G	range 0-100		RF Gain
			T			Attenuator Setting
				Zero		Off
				One		6 dB
				Two		12 dB
				Three		18 dB
			P	range needed		Passband Tuning

Sub Receiver Control Group

Command	Group	Function	Sub Function and Data			Parameter
*						
	R					Receiver Group
		S				Sub Receiver Select
			M	Range 0-7		Mode Select
			F	Range 100-6000		Receive Filter
			A			AGC Sub Group
				F		Fast AGC
				M		Medium AGC
				S		Slow AGC
				P		Program AGC
				H		Program AGC Hang
				D		Program AGC Decay
				T		Program AGC Threshold
			S	0 to -127		Squelch Setting
			X	+/- 2000		XIT Setting
			R	+/- 2000		RIT Setting
			I	1,10,100,1000,5000,10000,100000		Step Setting
			G	1 -100		RF Gain
			T			Attenuator Setting
				Zero		Off
				One		6 dB
				Two		12 dB
				Three		18 dB
			P	+/- 8000		Passband Tuning

Main Receiver Query Group

Command	Group	Function	Sub Function and Data			Parameter
?						Query Command Prefix
	R					Receiver Group
		M				Main Receiver Select
			M			Mode Select
			F			Receive Filter
			A			AGC Sub Group
						Fast AGC
						Medium AGC
						Slow AGC
				P		Program AGC
					H	Program AGC Hang
					D	Program AGC Decay
					T	Program AGC Threshold
			S			Squelch Setting
			X			XIT Setting
			R			RIT Setting
			???			Step Setting
			G			RF Gain
			T			Attenuator Setting
						Off
						6 dB
						12 dB
						18 dB
			P			Passband Tuning
			I			Tuning Increment

Sub Receiver Query Group

Command	Group	Function	Sub Function and Data			Parameter
?						Query Command Prefix
	R					Receiver Group
		S				Sub Receiver Select
			M			Mode Select
			F			Receive Filter
			A			AGC Sub Group
						Fast AGC
						Medium AGC
						Slow AGC
				P		Program AGC
					H	Program AGC Hang
					D	Program AGC Decay
					T	Program AGC Threshold
			S			Squelch Setting
			X			XIT Setting
			R			RIT Setting
			???			Step Setting
			G			RF Gain
			T			Attenuator Setting
						Off
						6 dB
						12 dB
						18 dB
			P			Passband Tuning
			I			Tuning Step

VFO Control Group

Command	Group	Function	Sub Function and Data			Parameter		
*								
	A					**VFO A Setting**		
		L				Lock VFO		
		U				Unlock VFO		
		F				Set VFO Frequency		
		S	+/-steps (max +/-16385)			Step VFO by # of steps		
		plus	range 0 to 30000000			add to frequency		
		minus	range 0 to 30000000			subtract from frequency		
		default	binary 4 byte format			Set VFO Frequency		
	B					**VFO B Setting**		
		L				Lock VFO		
		U				Unlock VFO		
		F				Set VFO Frequency		
		S	ps (max +/-16385)			Step VFO by # of steps		
		plus	e 0 to 30000000			add to frequency		
		minus	e 0 to 30000000			subtract from frequency		
		default	binary 4 byte format			Set VFO Frequency		

Audio Control Group

Command	Group	Function	Sub Function and Data			Parameter	
*							
	U					Speaker/Headphone Control Group	
		M	Range 0 - 100			Main Volume	
		S	Range 0 - 100			Sub Volume	
		B	Range 0 - 100			Both Volumes Set to Same	
			Speaker	Left	Right		
		C	M/S/B	M/S/B	M/S/B	Speaker/Headphone Select	

Antenna Control Group
Memory Access Functions

Command	Group	Function	unction and Data			Parameter	
*						Set Command Prefix	
	K					Antenna & VFO Selection	
			Main Rx	Sub Rx	Main Tx		
		V	A/B	A/B/N	A/B/N	VFO Assignments	
			Ant 1	Ant 2	Aux Ant		
		A	M/S/B	M/S/B	M/S/B/N	Antenna Assignments	
		M				Select Main Receiver	
		S				Select Sub Receiver	
		W	A/B	memory number		Write A or B to memory	
		R	A/B	memory number		Read A or B from memory	

REVISION NOTES

Manual Revision 1.1 associated with firmware revision 1.346.

Added Binaural Receive command to the serial interface.

Manual Revision 1.2 associated with firmware revision 1.366

Added CW character transmit to the PC interface

Documented POD routing command.