

**SEA SCAN PC HOST-REMOTE
SERIAL COMMUNICATIONS PROTOCOL
REFERENCE MANUAL**

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1. Outline

This article outlines the design of the SSPC Host-Remote communications protocol that allows a self-contained Sea Scan PC system [HOST] to be controlled by a remote computer [REMOTE] via an RS232 serial line. The HOST accepts control commands from the REMOTE and transmits status information to the REMOTE.

1.1 Host

The HOST computer is a self-contained Sea Scan PC system. The HOST computer will boot into the Sea Scan PC application and be ready for image data acquisition. The HOST application is capable of receiving commands from the REMOTE computer over an RS232 serial line. The HOST application will respond to all valid commands sent by the REMOTE.

1.2 Remote

The REMOTE computer must be capable of transmitting ASCII commands over an RS232 serial line. The REMOTE computer must be capable of receiving status information from the HOST over the same RS232 line. The REMOTE computer must initiate all communication with the HOST system. All commands from the REMOTE will have predetermined responses from the HOST as outlined below.

1.3 Communications Interface

The communication interface is modeled after the NMEA 0183 communications protocol. It provides for flexibility in command control and an adequate level of transmission error detection. Furthermore, the use of the proprietary sentence allowed in the NMEA 0183 communications protocol allows the REMOTE to piggyback the control command sentences with the navigational input. The communication between the REMOTE and HOST computers will be via an RS232 serial line. The ASCII commands are case sensitive.

2. Command, Response and Information Sentences

2.1 General Sentence Structure

All sentences sent by the REMOTE must be prefixed by a '\$', the PSSR identifier (Sea Scan Remote) and a comma (i.e. \$PSSR,). This prefix will allow the HOST to identify that the incoming message is a Sea Scan REMOTE command.

All response sentences are prefixed by a '\$', the PSSH (Sea Scan Host) identifier and a comma (i.e. \$PSSH,). This prefix will allow the REMOTE to identify that the incoming message is a Sea Scan HOST response.

All sentences must be suffixed by a "*", checksum value, carriage return and line feed (i.e. * <CS> <CR> <LF>). The checksum value is calculated using all the characters in the command sentence between the '\$' and "*" characters. The checksum calculation does not include the '\$' and "*" characters. Refer to **3 Checksum Calculation** on page 30 for more information concerning the checksum calculation.

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2.2 Command Sentences

Each command is described in the following manner.

Sentence Description

ASCII command sent by REMOTE

Argument List

Command description

Response:

ASCII response returned by HOST

Response description

Example:

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2.2.1 Command: Debug Mode

`$PSSR,DEBUG,mode,rclogmode* <CR><LF>`

Please note that the DEBUG command does not require the checksum value. The DEBUG command can be sent at any time, even before the IHR command is sent to establish the Host-Remote connection.

mode= ON

Set HOST to DEBUG mode. In DEBUG mode the REMOTE no longer needs to add the checksum to the command sentence. For example, to initiate the connection the REMOTE should transmit `$PSSR, IHR, * <CR><LF>` instead of `$PSSR, IHR, * <CS><CR><LF>`.

Response:

`$PSSH,DEBUG,ON,<rclog filename>* <CS><CR><LF>`

Example:

REMOTE sends:

`$PSSR,DEBUG,ON,ON* <CR><LF>`

Set the HOST to DEBUG mode and create a remote control log file.

HOST replies:

`$PSSH,DEBUG,ON,<rclog filename>* <CS><CR><LF>`

The following response indicates that the HOST system is now in DEBUG mode and a remote control log file, `<rclog filename >`, has been created.

mode= OFF

Set HOST back to STANDARD mode. This is the default mode for HOST and requires the REMOTE to add the checksum to the command sentence. The `rclogmode` argument is ignored.

Response:

`$PSSH,DEBUG,OFF,<rclog filename>* <CS><CR><LF>`

Example:

REMOTE sends:

`$PSSR,DEBUG,OFF,* <CR><LF>`

Reset the HOST to STANDARD mode.

HOST replies:

`$PSSH,DEBUG,OFF,<rclog filename>* <CS><CR><LF>`

The following response indicates that the HOST system is now in STANDARD mode and the remote control log file, named `<rclog filename>` has been closed.

Note that if a remote control log file was not active in the DEBUG state, then the second field is blank

`$PSSH,DEBUG,OFF,* <CS><CR><LF>`

rclogmode= ON or OFF

When the HOST is set to DEBUG mode, the REMOTE may specify if a (R)emote (C)ontrol LOG file is to be created. The remote control log file is a debug text file that logs all serial communication between the REMOTE and HOST. The debug text file is called RCLOGxxx.TXT, where xxx is a sequential number. A new RCLOG file is created every time the HOST is set to DEBUG mode and the REMOTE has specified that a RCLOG file is to be created. When the HOST is reset to STANDARD mode, this argument is ignored.

2.2.2 Command: Initiate Host-Remote Connection

```
$PSSR, IHR, update* <CS><CR><LF>  
IHR: Initiate Host-Remote Connection
```

Initiate the REMOTE-HOST connection. This **must** be the first message sent to the HOST by the REMOTE. This call informs the HOST that a REMOTE is interested in receiving status and warning messages. The HOST will respond to this message with the system status message.

update= <integer>

Interval time in seconds between data storage status sentences. If this value is blank or zero HOST will only send data storage status sentences when the data has been stored, instead of at specific intervals.

Response:

```
$PSSH, STA, ALL, pwr, chan, freq, rng, agint, agtgthi, mode, overlap,  
    res, msglevel, timeout, LEFT, stats, RIGHT, stats, rangedelay* <CS><CR><LF>  
>  
STA: Status
```

See **2.2.4 Command: Query Status** on page 9 for description of STA response sentence.

Example:

REMOTE sends:

```
$PSSR, IHR, 10* <CS><CR><LF>
```

Initialize the REMOTE-HOST connection. Inform HOST that would like to receive the Data Storage Status sentence every 10 seconds.

HOST replies:

```
$PSSH, STA, ALL, OFF, BOTH, LOW, 100, NEVER, 30, 40, ALL, 10, LEFT, 10, 20, 30, 40, 50, 60, 70, 80,  
    RIGHT, 10, 20, 30, 40, 50, 60, 70, 80, 0.0* <CS><CR><LF>
```

Note that the HOST will always start with power off and with default AutoGain parameters. The REMOTE is required to turn the power on and set the preferred AutoGain parameters.

2.2.3 Command: Query Signal Statistics

\$PSSR, QSS, **channel***<CS><CR><LF>

QSS: Query Signal Statistics

channel= LEFT, RIGHT or BOTH

Ask HOST to return the signal statistics of the most recent sonar line for the selected channel. The signal statistics are available for either the single LEFT and RIGHT channels or for BOTH channels simultaneously.

stats=UNAVAIL

or

a1-8 <integer – average signal strength as percentage of maximum signal>

p1-8 <integer – peak signal strength as percentage of maximum signal>

channel avg. <integer – avg. signal strength as percentage of maximum signal>

If the signal statistics are not available, a single field entry, UNAVAIL, is returned in place of the statistics. A signal may not be available if sonar data has been collected yet or if the selected channel is not on.

The average value, as a percentage of total signal strength, is returned for each of the eight gain bins. Then, the peak value, as a percentage of total signal strength, is returned for each of the eight gain bins. The gain bins are divided at 2, 4, 8, 16, 32, 64, 128 and 1000 meters. The channel average is the average signal strength across the whole range. It can be used for noise measurement and rub tests.

If the signal statistics for BOTH channels are requested, the statistics for the LEFT channel are provided first, followed by the statistics for the RIGHT channel.

Response:

\$PSSH, SSS, **channel**, **stats**[, **channel**, **stats**]*<CS><CR><LF>

Example of unavailable LEFT data:

REMOTE sends:

\$PSSR, QSS, LEFT*<CS><CR><LF>

HOST replies:

\$PSSH, SSS, LEFT, UNAVAIL*<CS><CR><LF>

Example of available RIGHT data:

REMOTE sends:

\$PSSR, QSS, RIGHT*<CS><CR><LF>

HOST replies:

\$PSSH, SSS, RIGHT, 85, 83, 78, 75, 74, 0, 0, 0, 100, 100, 96, 85, 86, 0, 0, 0, 79*<CS><CR><LF>

Example of unavailable LEFT data and available RIGHT data:

REMOTE sends:

\$PSSR, QSS, BOTH*<CS><CR><LF>

HOST replies:

\$PSSH, SSS, LEFT, UNAVAIL, RIGHT, 85, 83, 78, 75, 74, 0, 0, 0,
100, 100, 96, 85, 86, 0, 0, 0, 79*<CS><CR><LF>

2.2.4 Command: Query Status

\$PSSR, QST, **cmd*** <CS> <CR> <LF>

QST: Query Status

cmd= ALL

Ask HOST to return all the status information. This includes the system information (SYSTEM), the data storage mode (DATA), the error message (ERRMSG), and the gain parameters (GAIN).

Response:

\$PSSH, STA, ALL, **pwr**, **chan**, **freq**, **rng**, **agint**, **agtgthi**, **mode**, **overlap**,
res, **msglevel**, **timeout**, LEFT, **stats**, RIGHT, **stats*** <CS> <CR> <LF>

For descriptions of the response fields, see individual response sentences from the QST, SYSTEM, QST, DATA, QST, ERRMSG, and QST, GAIN command sentences below.

Example:

REMOTE sends:

\$PSSR, QST, ALL* <CS> <CR> <LF>

HOST replies:

\$PSSH, STA, ALL, OFF, BOTH, LOW, 100, NEVER, 30, 40, AUTO, 50, 1000x512, ALL, 10, LEFT,
10, 20, 30, 40, 50, 60, 70, 80, RIGHT, 10, 20, 30, 40, 50, 60, 70, 80* <CS> <CR> <LF>

cmd= DATA

Ask HOST to return the current data storage information.

Response:

\$PSSH, STA, DATA, **mode**, **overlap**, **res*** <CS> <CR> <LF>

mode= AUTO or MANUAL

Specifies the current data storage mode.

AUTO: Sonar image data is stored automatically at (1000 - overlap) line intervals.

MANUAL: Sonar image data is NOT stored automatically. User must request data storage.

overlap= 0, 10, 25 or 50

Number of lines of overlap in the sonar image files. The sonar image data will be stored every (1000 - overlap) lines.

res= 1000x512, 1000x256, 500x512, 500x256

Data storage resolution. First number indicates the transverse resolution (1000 is full resolution and 500 is half resolution). The second number indicates the axial resolution (512 is full resolution and 256 is half resolution)

Example:

REMOTE sends:

\$PSSR, QST, DATA* <CS> <CR> <LF>

HOST replies:

\$PSSH, STA, DATA, AUTO, 25, 1000x512* <CS> <CR> <LF>

cmd= ERRMSG

Ask HOST to return the current error message information.

Response:

\$PSSH, STA, ERRMSG, msglevel, timeout * <CS> <CR> <LF>

msglevel= ALL, OPTIONS or NONE

Specifies the level of error messages that the HOST will send to the REMOTE.

ALL: all error messages are sent to REMOTE.

OPTIONS: only error messages that allow optional responses from the REMOTE are sent.

NONE: no error messages are sent to REMOTE and the default action is always taken.

timeout= <integer>

Time in seconds the HOST will wait for a response from the REMOTE. If the REMOTE has not responded within the allowable time the HOST will assume the default response for the action that generated the latest error message.

Example:

REMOTE sends:

\$PSSR, QST, ERRMSG * <CS> <CR> <LF>

HOST replies:

\$PSSH, STA, ERRMSG, ALL, 30 * <CS> <CR> <LF>

cmd= SYSTEM

Ask HOST to return the current system parameters

Response:

\$PSSH, STA, SYSTEM, pwr, chan, freq, rng, agint, agtgtlow, agtgthi, * <CS> <CR> <LF>

pwr= ON, OFF

Current power state.

chan= LEFT, RIGHT, BOTH

Current channel in use.

freq= HIGH, LOW, SINGLE

Current transducer frequency in use. If the HOST system is not capable of supporting a dual frequency towfish, this will field will return as SINGLE.

rng= <integer>

Current range in meters.

agint= NEVER, CONTINUOUS, 1MIN, 2MIN, 5MIN, 10MIN

Current AutoGain operation interval.

agtgtlow= <integer – percentage of total signal strength>

Current AutoGain target signal strength – Low bounds.

agtgthi= <integer – percentage of total signal strength>

Current AutoGain target signal strength – High bounds.

Example:

REMOTE sends:

\$PSSR, QST, SYSTEM * <CS> <CR> <LF>

HOST replies:

\$PSSH,STA,SYSTEM,OFF,BOTH,LOW,100,NEVER,30,40*<CS><CR><LF>

cmd= GAIN

Ask HOST to return the current gain parameters

Response:

```
$PSSH,STA,GAIN,LEFT,left1,left2,left3,left4,left5,left6,left7,lef  
t8,  
RIGHT,right1,right2,right3,right4,right5,right6,right7,right8*  
<CS><CR><LF>
```

left1-8= <integer – percentage of maximum gain>

Current gain settings for the Left channel. The gain bins are divided at 2, 4, 8, 16, 32, 64, 128 and 1000 meters.

right1-8= <integer – percentage of maximum gain>

Current gain settings for the Right channel. The gain bins are divided at 2, 4, 8, 16, 32, 64, 128 and 1000 meters.

Example:

REMOTE sends:

```
$PSSR,QST,GAIN*  
<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,GAIN,LEFT,10,20,30,40,50,60,70,80,  
RIGHT,10,20,30,40,50,60,70,80*  
<CS><CR><LF>
```

cmd= RNGDELAY

Ask HOST to return the current range delay parameters

Response:

```
$PSSH,STA,RNGDELAY,rangedelay*  
<CS><CR><LF>
```

rangedelay= <float – meters – 0.0 to MAXFLOAT>

Current range delay.

Example:

REMOTE sends:

```
$PSSR,QST,RNGDELAY*  
<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,RNGDELAY,2.1*  
<CS><CR><LF>
```

2.2.5 Command: Set Data Storage Parameters

```
$PSSR,SDP,mode,overlap,res,action*<CS><CR><LF>
```

```
SDP: Set Data Storage Parameters
```

This command asks the HOST to change the current data storage parameters. If a command argument is not specified (i.e. the field is blank) the corresponding data storage parameter is not changed.

mode= AUTO

Ask HOST to change the data storage mode to the AUTOSAVE mode, and perform the specified action as indicated by the **action** field.

action= NONE or RESETCOUNT

This field determines the data storage action that is to be performed. If the action is set to RESETCOUNT, the line count is cleared. This allows the Remote to set the starting point for a new set of data files. If the action is set to NONE, then the standard operation is performed. The line count is not cleared. If the required number of lines has been collected since the previous data storage, then a new data file is stored immediately. The NONE action is the default action in order to remain compatible with previous versions of the Host-Remote Communications Protocol.

Response:

```
$PSSH,STA,DATA,mode,overlap,res*<CS><CR><LF>
```

Returns the standard status response for the data storage parameters.

```
$PSSH,DSS,numline,numfile,spaceavail,lastfile,update*<CS><CR><LF>
```

```
DSS: Data Storage Status
```

The DSS information sentence is sent if the RESETCOUNT action is requested. See **2.3.3 Information: Data Storage Status** on page 26 for a description of the DSS sentence.

Example:

REMOTE sends:

```
$PSSR,SDP,AUTO,,RESETCOUNT*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,DATA,AUTO,25,1000x512*<CS><CR><LF>
```

```
$PSSH,DSS,0,4,762,28JUN003,10*<CS><CR><LF>
```

mode= MANUAL

Ask HOST to change the data storage mode to the MANUAL mode, and perform the specified action as indicated by the **action** field.

action= NONE or SAVENOW

This field determines the data storage action that is to be performed. If the action is set to SAVENOW, a data file is stored immediately. This allows the Remote to save data even though the required number of sonar lines has not yet been collected. If the action is set to NONE, then no data storage action is performed. The NONE action is the default action in order to remain compatible with previous versions of the Host-Remote Communications Protocol.

Response:

```
$PSSH,STA,DATA,mode,overlap,res*<CS><CR><LF>
```

Returns the standard status response for the data storage parameters.

```
$PSSH,DSS,numline,numfile,spaceavail,lastfile,update*<CS><CR><LF>
```

```
DSS: Data Storage Status
```

The DSS information sentence is sent if the SAVENOW action is requested. See **2.3.3 Information: Data Storage Status** on page 26 for a description of the DSS sentence.

Example:

REMOTE sends:

```
$PSSR,SDP,MANUAL,,SAVENOW*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,DATA,AUTO,25,1000x512*<CS><CR><LF>
```

```
$PSSH,DSS,0,5,761,28JUN004,10*<CS><CR><LF>
```

overlap= 0, 10, 25 or 50

Ask HOST to change the current data storage overlap to the indicated value.

Response:

```
$PSSH,STA,DATA,mode,overlap,res*<CS><CR><LF>
```

Returns the standard status response for the data storage parameters.

Example:

REMOTE sends:

```
$PSSR,SDP,,50,*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,DATA,AUTO,50,1000x512*<CS><CR><LF>
```

res= 1000x512, 1000x256, 500x512, 500x256

Ask HOST to change the current data storage resolution. The first number indicates the transverse resolution (1000 is full resolution and 500 is at half resolution). The second number indicates the axial resolution (512 is full resolution and 256 is at half resolution)

Example:

REMOTE sends:

```
$PSSR,SDP,,,1000x256*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,DATA,AUTO,50,1000x256*<CS><CR><LF>
```

2.2.6 Command: Set Gain Parameters

```
$PSSR,SGP,channel,g1,g2,g3,g4,g5,g6,g7,g8*<CS><CR><LF>
```

SDP: Set Gain Parameters

This command asks the HOST to change the current gain parameters. All of the command arguments must be specified. In other words, none of the fields may be blank.

channel= LEFT or RIGHT

Ask HOST to change the data storage mode to the indicated mode.

g1-8= <integer – percentage of maximum gain>

New gain settings for the selected channel. The gain bins are divided at 2, 4, 8, 16, 32, 64, 128 and 1000 meters. The HOST will automatically correct any invalid gain settings.

Response:

```
$PSSH,STA,GAIN,LEFT,11,12,13,14,15,16,17,18,  
RIGHT,r1,r2,r3,r4,r5,r6,r7,r8*<CS><CR><LF>
```

Returns the standard status response for the gain parameters.

Example of valid gain data:

REMOTE sends:

```
$PSSR,SGP,LEFT,10,15,30,40,50,60,70,80*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,GAIN,LEFT,10,15,30,40,50,60,70,80,  
RIGHT,10,20,30,40,50,60,70,80*<CS><CR><LF>
```

Example of invalid gain data:

REMOTE sends:

```
$PSSR,SGP,RIGHT,10,20,15,40,50,30,70,80*<CS><CR><LF>
```

HOST replies:

```
$PSSH,STA,GAIN,LEFT,10,20,30,40,50,60,70,80,  
RIGHT,10,20,20,40,50,50,70,80*<CS><CR><LF>
```

The g3 value for the 4-8 meter range is invalid. The gain for this gain bin is set to the gain value for the previous bin, g2. Similarly, the g6 value is invalid. The gain for this gain bin is set to the gain value for the previous bin, g5.

2.2.7 Command: Shutdown Host-Remote Connection

\$PSSR, SHR* <CS> <CR> <LF>

SHR: Shutdown Host-Remote Connection

There are no arguments with the SHR command. Note that this command is not necessary, however it will set the communication channel as inactive. This call informs the HOST that the REMOTE is no longer interested in receiving the data storage status messages. The HOST will reset to query mode, transmitting the RCA sentence every five seconds.

Response:

\$PSSH, RCA* <CS> <CR> <LF>

RCA: Remote Control Available

See 2.3.4 Information: Remote Control Available on page 28 for description of RCA sentence.

2.2.8 Command: Set Range Delay

\$PSSR, SRD, rangedelay* <CS> <CR> <LF>

SDP: Set Range Delay

This command asks the HOST to the change the current range delay.

rangedelay = <float – meters – 0.0 to range>

Current range delay. The range delay cannot exceed the current range. Additionally, the range delay cannot be less than zero.

Response:

\$PSSH, STA, RNGDELAY, rangedelay* <CS> <CR> <LF>

Example:

REMOTE sends:

\$PSSR, SRD, 2.1* <CS> <CR> <LF>

HOST replies:

\$PSSH, STA, RNGDELAY, 2.1* <CS> <CR> <LF>

2.2.9 Command: Shutdown Remote

\$PSSR, SRE* <CS> <CR> <LF>

SRE: Shutdown Remote

There are no arguments with the SRE command. Note that this command is not necessary, however it will shutdown the HOST Sea Scan PC application on the HOST computer. The HOST computer does not acknowledge this command sentence, however the RCA sentence will no longer be transmitted.

2.2.10 Command: Set System Parameters

\$PSSR, SSP, pwr, chan, freq, rng, agint, agtgtlow, agtolhi* <CS><CR><LF>

SSP: Set System Parameters

This command asks the HOST to change the current system parameters. If a command argument is not specified (i.e. the field is blank) the corresponding system parameter is not changed.

pwr= ON or OFF

Ask HOST to turn the power ON or OFF. The single AutoGain operation cannot be initiated unless the power is on. If the power is off, when the power is turned on the single AutoGain operation will be initiated automatically.

chan= LEFT, RIGHT or BOTH

Ask HOST to change the current transducer channel to the indicated setting. In the case where a new channel is displayed (i.e. from Left Channel only to Both channels) the AutoGain operation will be initiated by default, unless the AutoGain interval is set at NEVER.

freq= HIGH, LOW

Ask HOST to change the current transducer frequency. If the HOST system is not capable of supporting a dual frequency towfish, this will field be ignored. If the frequency is changed the AutoGain operation will be initiated by default, unless the AutoGain interval is set at NEVER.

rng= <integer - 5, 10, 20, 30, 40, 50, 75, 100>

Ask HOST to change the current transducer range to the indicated range [meters]. If the range is increased the AutoGain operation will be initiated by default, unless the AutoGain interval is set at NEVER.

agint= NEVER, CONTINUOUS, 1MIN, 2MIN, 5MIN or 10MIN

Ask HOST to initiate the AutoGain operation at the indicated interval.

agtgtlow= <integer – percentage of total signal strength>

Ask HOST to set the AutoGain low bound of the target signal strength to the specified percentage.

agtolhi= <integer – percentage of total signal strength>

Ask HOST to set the AutoGain high bound of the target signal strength to the specified percentage.

Example:

REMOTE sends:

```
$PSSR, SSP, ON, BOTH, LOW, 75, CONTINUOUS, 35, 50* <CS><CR><LF>
```

HOST replies:

```
$PSSH, STA, SYSTEM, ON, BOTH, LOW, 75, CONTINUOUS, 35, 50* <CS><CR><LF>
```

or

REMOTE sends:

```
$PSSR, SSP, , LEFT, , 100, * <CS><CR><LF>
```

HOST replies:

```
$PSSH, STA, SYSTEM, ON, LEFT, LOW, 100, CONTINUOUS, 30, 40* <CS><CR><LF>
```

2.2.11 Command: Set Data Storage Status Update

\$PSSR,SSU,update*<CS><CR><LF>

SSU: Set Data Storage Status Update

Sets the Data Storage status update interval, without having to reset the Host-Remote connection using the IHR command sentence.

update= <integer>

Interval time in seconds between data storage status sentences. If this value is blank or zero HOST will only send data storage status sentences when data has been stored, instead of at specific intervals.

Response:

\$PSSH,DSS,numline,numfile,spaceavail,lastfile,update*<CS><CR><LF>

DSS: Data Storage Status

See **2.3.3 Information: Data Storage Status** on page 26 for a description of the DSS sentence.

NOTE: HOST will only send the DSS sentence if the HOST power is on.

Example:

REMOTE sends:

\$PSSR,SSU,10*<CS><CR><LF>

Sets the data storage status update interval to 10 seconds. The HOST will send the DSS information sentence once every 10 seconds and every time the data has been stored.

HOST replies:

\$PSSH,DSS,134,3,765,28JUN002,10*<CS><CR><LF>

The following response indicates that HOST will send the DSS information sentence every 10 seconds.

2.2.12 Command: Query Version

\$PSSR,VER*<CS><CR><LF>

VER: Query Version Information

There are no arguments with the VER command. This command asks the HOST to transmit the version of the Sea Scan PC application.

Response:

\$PSSH,SSV,**major,minor,beta,custom***<CS><CR><LF>

SSV: Sea Scan PC Version

major = specifies major version number – 1 to MAXINT

minor = specifies minor version number – 1 to MAXINT

beta = specifies beta version number – may be empty or zero

custom = specifies custom Sea Scan PC release– may be empty or ASCII

Example:

REMOTE sends:

\$PSSR,VER*<CS><CR><LF>

HOST replies:

\$PSSH,SSV,1,6,3,*<CS><CR><LF>

The preceding response indicates that the HOST is currently running Sea Scan PC v1.6.3.

REMOTE sends:

\$PSSR,VER*<CS><CR><LF>

HOST replies:

\$PSSH,SSV,1,0,3,HS*<CS><CR><LF>

The preceding response indicates that the HOST is currently running Sea Scan PC High Speed v1.0 Release 3

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2.3 Information Sentences

Each information sentence is described in the following manner.

Sentence Description

ASCII sentence sent to REMOTE

Argument List

Command description

Example

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2.3.1 Information: AutoGain Status

```
$PSSH,AGS,status*<CS><CR><LF>
```

AGS: Auto Gain Status

Whenever the AutoGain status changes, the AGS information sentence is sent to the REMOTE.

status= INITIATE, CONTINUOUS or SHUTDOWN

Current AutoGain status.

Example:

Consider the situation where the operator has requested the AutoGain operation to be initiated every 2 minutes. Upon the successful startup of the AutoGain operation the following AGS sentence is sent to the REMOTE.

```
$PSSH,AGS,INITIATE*<CS><CR><LF>
```

This sentence indicates that a single AutoGain operation has been initiated.

or

Consider the situation where the operator has requested the AutoGain operation to be run continuously. Upon the successful startup of the continuous AutoGain operation the following AGS sentence is sent to the REMOTE.

```
$PSSH,AGS,CONTINUOUS*<CS><CR><LF>
```

This sentence indicates that the continuous AutoGain operation has been initiated.

When the AutoGain operation is shutdown, either automatically in the case of the single AutoGain operation or by command in the case of the continuous AutoGain operation the following AGS sentence is sent to the REMOTE.

```
$PSSH,AGS,SHUTDOWN*<CS><CR><LF>
```

This sentence indicates that the latest AutoGain operation has been shutdown.

2.3.2 Information: Command Error

\$PSSH, CER, **errMode**, **chksm**, **cmd*** <CS><CR><LF>

ERR: Command Error

There is an error with the previous command sentence

errMode= INVALID

INVALID: Invalid

Previous Command contains Invalid Arguments

Example:

REMOTE sends:

\$PSSR, DSP, , 20, * <CS><CR><LF>

A value of 20 is not a valid overlap value for the data storage parameters.

HOST replies:

\$PSSH, CER, INVALID, <CS>, DSP, , 20, * <CS><CR><LF>

errMode= NACMD

NACMD: Not a Command

Previous Command was "Not a Command"

Example:

REMOTE sends:

\$PSSR, ABC* <CS><CR><LF>

ABC is not a known command.

HOST replies:

\$PSSH, CER, NACMD, <CS>, ABC* <CS><CR><LF>

errMode= CHKSM

CHKSM: Check Sum

Probable transmission error since invalid checksum value. The checksum computed by HOST for the previous command sentence does not match the checksum contained in the command sentence.

Example:

REMOTE sends:

\$PSSR, SSP, ON, BOTH, LOW, 75, 300* <CS><CR><LF>

HOST replies:

\$PSSH, CER, CHKSM, <CS>, ON, BOTH, LOW, 75, 300* <CS><CR><LF>

errMode= ISCMD

ISCMD: Invalid Sequence Command

The previous command, although valid, is not in a valid sequence. This occurs when the HOST is not able to process the previous command because it is not in the correct "state."

Example:

Consider the situation where the REMOTE already sent the Initiate Host-Remote Connection (IHR) command sentence to the HOST. Any subsequent transmission of the IHR sentence, unless the Shutdown Host-Remote

Connection (SHR) has been sent, will result in the ISCMD command error sentence.

REMOTE sends:

\$PSSR, IHR, * <CS> <CR> <LF>

HOST replies:

\$PSSH, CER, ISCMD, <CS>, IHR, * <CS> <CR> <LF>

Consider the situation where the HOST has sent an OER information sentence and is waiting for an ROE command sentence. Transmission of any REMOTE command sentence other than the ROE sentence during the specified timeout will result in the ISCMD command error sentence.

HOST has sent:

\$PSSH, OER, 402, 115, 8567, CONT_RETRY, 30 * <CS> <CR> <LF>

REMOTE sends within time out allowance:

\$PSSR, QST, DATA * <CS> <CR> <LF>

HOST replies:

\$PSSH, CER, ISCMD, <CS>, QST, DATA * <CS> <CR> <LF>

chksm= <CS> of the previous command as calculated by HOST.

cmd= previous command sentence without prefix and suffix.

2.3.3 Information: Data Storage Status

\$PSSH,DSS,numline,numfile,spaceavail,lastfile,update*<CS><CR><LF>

DSS: Data Storage Status

Whenever the sonar image data is stored the DSS information sentence is sent to the REMOTE.

The DSS information sentence is also sent to the REMOTE at the time interval specified by the REMOTE in either the IHR or SSU command sentences. The periodic transmission of the DSS information serves as verification that the HOST is functioning properly.

numline= <integer>

Number of sonar data lines since the last data file was saved.

numfile= <integer>

Number of sonar data files saved since the HOST was last started.

spaceavail= <integer>

Indicates the amount of disk space still available on the current storage device as the number of data files that can be written.

lastfile= <char>

Name of the latest sonar data file that was written to disk. The .MST suffix is not included.

update= <integer>

Interval time in seconds between data storage status sentences. If this value is zero, HOST sends the data storage status sentences only when the sonar data is stored, instead of at specific intervals.

Example:

Consider the situation where the operator has requested the DSS information sentence to be sent only when the sonar data is stored.

```
$PSSH,DSS,0,3,763,28JUN002,0*<CS><CR><LF>
```

This sentence indicates that the sonar data has just been written to the data file 28JUN002.MST.

or

Consider the situation where the operator has requested the DSS sentence be transmitted every 10 seconds. If the power is ON, the REMOTE will receive the following sentence sequence (single sentences transmitted every 10 seconds).

```
$PSSH,DSS,123,3,763,28JUN002,10*<CS><CR><LF>
```

```
$PSSH,DSS,246,3,763,28JUN002,10*<CS><CR><LF>
```

```
$PSSH,DSS,369,3,763,28JUN002,10*<CS><CR><LF>
```

.

When the data is stored automatically, the following information sentence is sent to the REMOTE.

```
$PSSH,DSS,0,4,762,28JUN003,10*<CS><CR><LF>
```

This sentence indicates that the sonar data has just been written to the data file
28JUN003.MST.

2.3.4 Information: Remote Control Available

```
$PSSH,RCA*<CS><CR><LF>
```

```
RCA: Remote Control Available
```

The HOST application always starts up in a query state. The HOST broadcasts the RCA sentence over the RS232 serial connection at a constant interval signaling that it is available for remote control. This allows any REMOTE to determine the availability of the HOST. The HOST transmits this sentence as soon as the system has initialized all the parameters required for remote control. The REMOTE is not required to acknowledge this sentence. Once the REMOTE has initiated a host-remote connection with the IHR command, the RCA sentence is no longer transmitted. Likewise, when the REMOTE ends the host-remote connection with the SHR command, the RCA sentence is transmitted again.

Example:

Consider the situation where the HOST system is not yet powered up. Once the system is powered up and the HOST application has initialized all parameters required for remote control, the following information sentence is transmitted at a constant interval.

```
$PSSH,RCA*<CS><CR><LF>
$PSSH,RCA*<CS><CR><LF>
$PSSH,RCA*<CS><CR><LF>
.
.
.
$PSSH,RCA*<CS><CR><LF>
```

Once the REMOTE initiates the host-remote connection the RCA sentence is no longer transmitted.

```
$PSSH,IHR,*<CS><CR><LF>
.
.
.
```

Once the REMOTE ends the host-remote connection the RCA sentence is transmitted again.

```
$PSSH,SHR*<CS><CR><LF>
$PSSH,RCA*<CS><CR><LF>
$PSSH,RCA*<CS><CR><LF>
$PSSH,RCA*<CS><CR><LF>
.
.
.
```

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3. Checksum Calculation

The checksum calculation is required to confirm data integrity during transmission. The checksum value is calculated by exclusive OR'ing all the characters except the '\$' and '*' delimiters. The checksum is displayed as a two ASCII characters [0-9 and A-F] whose face value represents the one byte hexadecimal value of the checksum. The following is C sample code for the checksum calculation.

```
bool
CalculateChecksum (char *pcHi, char *pcLo, char *str)
{
    unsigned char *p, uc;
    char *strStart;
    char *strEnd;

    short i, sNumChar;

    // Must have $ char at the beginning
    if ( *str != '$' )
        return false;

    // strStart points at first character in string past $
    strStart = str+1;

    // and must have the * at the end
    if ( NULL == (strEnd= strstr(strStart,"*")) )
        return false;

    sNumChar= (short)( strEnd - strStart );

    // compute checksum value.
    p= (unsigned char *)strStart;
    for (i=0, uc =0; i < sNumChar; i++)
        uc ^= *(p++);
    uc &= 0xFF;

    // transfer to High and Low 4-bit components
    *pcLo= uc&0x0F;
    *pcHi= (uc&0xF0)>>4;

    return true;
}
```

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4. Sample Sea Scan PC Operational Sequence

The following sequence demonstrates a typical REMOTE-HOST interaction. All sentences sent by the REMOTE are shown here prefixed by the "H<" symbol indicating the sentence has been received by the HOST. Likewise, all sentences received by the REMOTE are shown prefixed by the "H>" symbol indicating the sentence has been sent by the HOST.

System is powered on.

H>\$PSSH,RCA*<CS><CR><LF>

HOST broadcasts the RCA information sentence every five seconds signaling that it is available for remote control

.
.
.

H>\$PSSH,RCA*<CS><CR><LF>

H<\$PSSR,IHR,0*<CS><CR><LF>

Initialize the communication between the REMOTE and HOST. Inform HOST that only want to receive the DSS sentence when the sonar image data has been stored.

H>\$PSSH,STA,ALL,OFF,LEFT,LOW,50,NEVER,30,40,MANUAL,50,1000x512,ALL,3010,LEFT,10,20,30,40,50,60,70,80,RIGHT,10,20,30,40,50,60,70,80*<CS><CR><LF>

Status response indicates the current status of the HOST. The system is currently configured for the left transducer channel in low frequency mode at a range of 50 meters. The AutoGain operation, although set for a target signal strength between 30 and 40%, will never be initiated because the interval is set to NEVER. The data is not stored automatically, however, when stored manually, it will be recorded at full resolution. All error messages will be sent to the REMOTE with a timeout allowance of 30 seconds. Note that the DSS message is not sent since the Sea Scan PC power is off.

H<\$PSSR,IHR,*<CS><CR><LF>

Attempt to initialize the communication between the REMOTE and HOST again.

H>\$PSSH,CER,ISCMD,<CS>,IHR,*<CS><CR><LF>

The previous command sentence was out of sequence. Any retransmission of the IHR command sentence, unless the SHR command sentence has been sent, will result in an Invalid Sequence Command error from the HOST.

H<\$PSSR,VER*<CS><CR><LF>

Once the communication link has been established, the REMOTE can query the version of the current Sea Scan PC application.

H>\$PSSH,SSV,1,6,12*<CS><CR><LF>

HOST returns the current Sea Scan PC version.

H<\$PSSR,SSP,,BOTH,,100,,,*<CS><CR><LF>

Configure HOST for both transducer channels at a range of 100 meters.

H>\$PSSH,STA,SYSTEM,OFF,BOTH,LOW,100,NEVER,30,40*<CS><CR><LF>

HOST returns the current system parameters.

H<\$PSSR,SDP,AUTO,,RESETCOUNT*<CS><CR><LF>

Set HOST to store the data automatically. Furthermore, indicate that want the line count to be reset.

H>\$PSSH,STA,DATA,AUTO,50,1000x512*<CS><CR><LF>

HOST returns the current data storage parameters. The data is store automatically at full resolution with an overlap of 50 lines.

H<\$PSSR,SSP,,,,,5MIN,MID,*<CS><CR><LF>

Configure HOST to initiate the AutoGain operation every 5 minutes and set the target signal strength to the MID value..

H>\$PSSH,STA,SYSTEM,OFF,BOTH,LOW,100,5MIN,MID,LOW*<CS><CR><LF>

HOST returns the current system parameters.

H<\$PSSR,SSP,ON,,,,,*<CS><CR><LF>

Turn the Sea Scan PC power on.

H>\$PSSH,STA,SYSTEM,ON,BOTH,LOW,100,300*<CS><CR><LF>
HOST returns the current system parameters.

On power up, the HOST Sea Scan PC application will initiate the AutoGain automatically.

H>\$PSSH,AGS,INITIATE*<CS><CR><LF>
Inform REMOTE that AutoGain has been initiated.

.
.

H>\$PSSH,AGS,SHUTDOWN*<CS><CR><LF>
Inform REMOTE that AutoGain has been shutdown.

.
.

Since the Data Storage Status update interval was set to 0, the DDS information sentence is only sent when the data is stored to disk.

H>\$PSSH,DSS,0,1,764,28JUN000,0*<CS><CR><LF>
Inform the host that the sonar data has been stored in the file 28JUN000.MST.

.
.

H>\$PSSH,DSS,0,2,763,28JUN001,0*<CS><CR><LF>
Inform the host that the sonar data has been stored in the file 28JUN001.MST.

.
.

H>\$PSSH,DSS,0,34,731,28JUN033,0*<CS><CR><LF>
Inform the host that the sonar data has been stored in the file 28JUN033.MST.

.
.

H<\$PSSR,SHR*<CS><CR><LF>
Shutdown the communication between the REMOTE and HOST.

H>\$PSSH,RCA*<CS><CR><LF>
HOST broadcasts the RCA information sentence every five seconds signaling that it is available for remote control.

H<\$PSSR,SRE*<CS><CR><LF>
Shutdown the HOST application.

5. Document Revision History

Rev1.7.2 July 2005

Modified the QSS command to return the average signal value for the entire range in the SSS information string.

This modification affects the SSS information string.

Rev1.7.1-HS September 2004

Added actual range values to the Set System Parameters RNG entry

Added the ranges that can actually be used in the **rng** field.

Rev1.7-HS April 2004

Add SRD command

Add the capability to set the range delay.

This addition affects the SRD, QST, and QST,ALL commands.

Modify the VER query

Modify the VER query to report special versions such as SSPC High Speed.

This modification affects the VER command.

Rev1.6.12 September 2002

Modify SDP command

Add an action field that allows the Remote to specify a data storage action when the data storage mode is changed to AutoSave mode or Manual mode. This field allows the Remote to control the data storage operation better. For example, the Remote will be able to store the data at the end of a survey leg and to reset the data storage line counter at the beginning of a survey leg.

This change affects the SDP command sentence.

Rev1.6 March 2001

Remove unimplemented commands from documentation

The unimplemented commands have been removed from the documentation to better reflect the latest release information for the Sea Scan PC application.

This change does not affect any of the existing command and response sentences.

Rev1.5 May 2000

Add Version information

Add VER command sentence to query the version of the Sea Scan PC application. Add the SSV response sentence to transmit the version information.

This change does not affect any of the existing command and response sentences.

Rev1.5 July 1999

Add Gain control and status commands

Add GAIN mode to QST command sentence to query the current GAIN settings. Add SGP command sentence to set the current GAIN settings. Add the QSS command sentence to query the signal statistics of the latest sonar data line.

This change affects the QSS, QST and SGP command sentences and STA and SSS response sentences.

Rev1.5 November 1998

Modify AutoGain settings

The AutoGain target signal strength is now set as a pair of low and high bounds. The bounds are passed as integer values representing the percentage of the total signal strength. The lower bound cannot be less than 10% and the upper bound cannot be greater than 100%. The upper bound must be at least 2% greater than the lower bound.

This change affects the SSP command sentence and STA response sentence.

Rev1.5 September 1998

Reorganize Host-Remote nomenclature

This HOST computer contains the Sea Scan PC application and Sea Scan PC Interface card. The REMOTE computer sends commands to the HOST computer over a serial line.

This change affects all of the command, response and information sentences.

Document Revision History

Include document revision history.