

USING THE NAVLABS REMOTE CONTROL DRIVER



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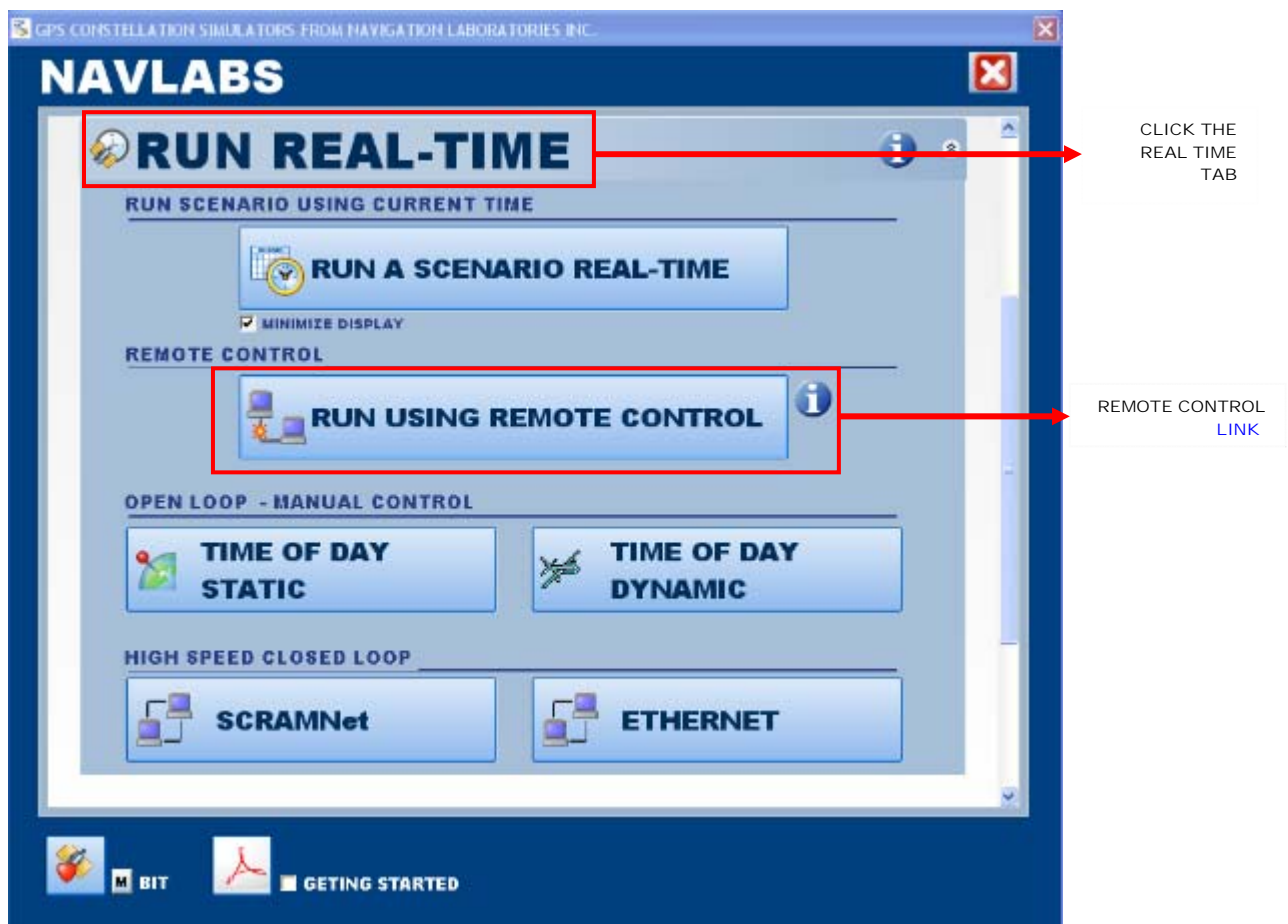
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USING THE REMOTE CONTROL DRIVER

EASY TO START//MONITOR SIMULATIONS ON MULTIPLE SIMULATORS FROM ONE COMPUTER

The Remote Control Feature enables the user to operate a simulation from another computer. This provides an easy to use platform so that the user can start, stop, and monitor a GPS simulation from any computer via Ethernet, GPIB, or serial port.



When running the Remote Control feature the simulator referenced as the **client** and wherever the simulation is being run from, is referenced as the **server**.

After you have started Tapestry and clicked on the “RUN USING REMOTE CONTROL” tab, the simulator will start up its TapRCI (Tapestry remote control interface) program, shown below. Once the Client is connected (green marker showing), the simulator is in “standby” mode, ready for the server to start a simulation.

THE CLIENT WILL NOT CONNECT UNTIL THE SERVER PROGRAM (RCI DRIVER) HAS CONNECTED TO THE CLIENT FROM ANOTHER COMPUTER VIA ETHERBET/GPIB/SERIAL PORT.

Client Connected

If GREEN: client IS connected to the server

If RED: client IS NOT connected to the server

Message Status

Num Msgs Sent:
Num Msgs Rcvd:

Ethernet Server Interface Status

☒ Client NOT Connected

Port: 5000

RCI Status

PPS Counter (s): 92
2 Millisec Counter (ms): 360
Counters Stopped ☐
Reset Counters
External pulse reset not armed.

TapRci Status: Idle

TapMsec Status

Simulator Mode: Idle

Simulation Status

Current Week: Start Week:
Current Seconds: Start Seconds:
Secs Into Sim: RF Gain:
Seconds Left:

Vehicle State

Lat: Vel North:
Lon: Vel East:
Alt: Vel Down:

- Truth Data
- Simulation Data
GPS info:
- Week
- Position
- Velocity

Version: 2.20.1.1 1/22/2013 4:02:06 PM

SETTING UP RCI (Remote Control Driver) DRIVER ON HOST COMPUTER:

On the simulator desktop is a program executable called RCIDriver.exe

Put this executable onto any computer that you would like to run a simulator from.

Once you have successfully installed RCIDriver.exe onto your host computer double click the programs icon.

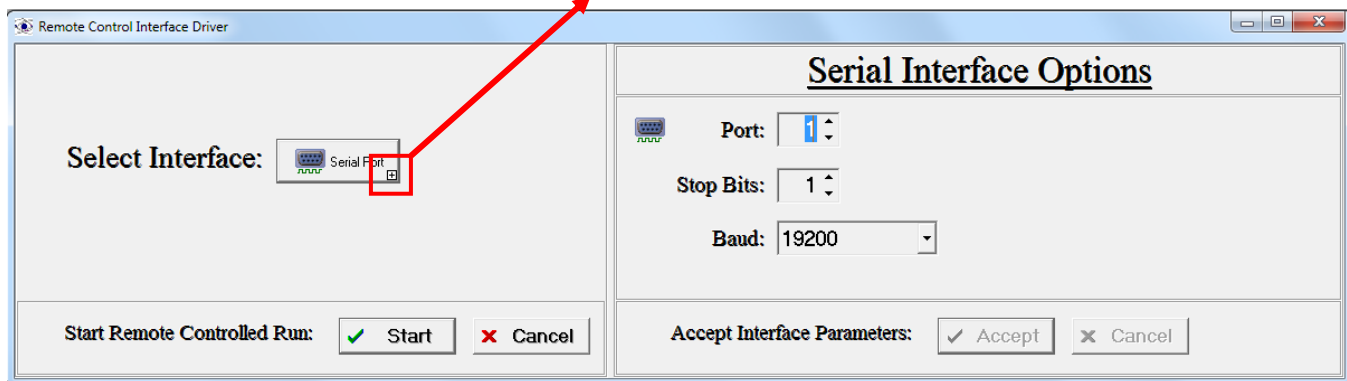


Tap RCI [executable icon](#)

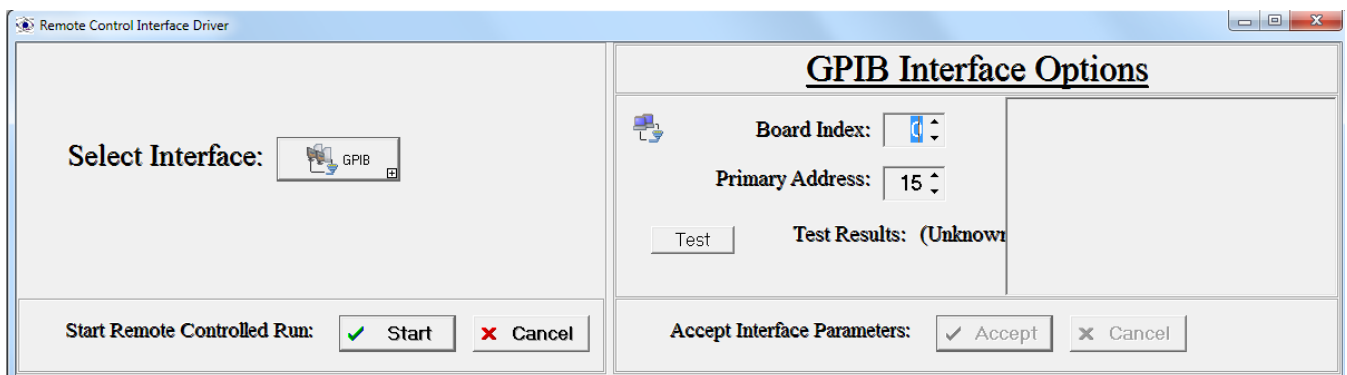
There are 3 ways to connect the server and client to successfully run the Remote Control Feature:

1: Serial Port:

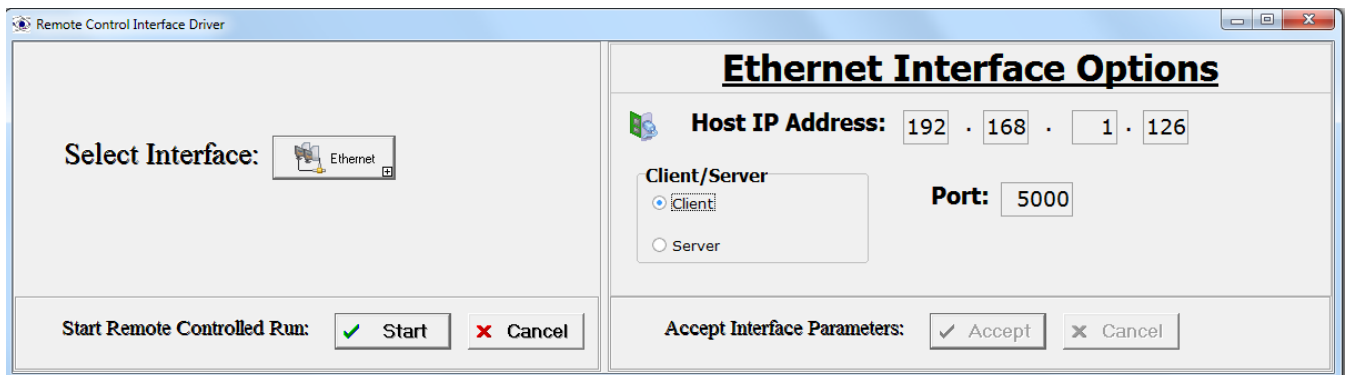
Click (+) sign in bottom right corner to change connection method

The screenshot shows the 'Remote Control Interface Driver' window with the 'Serial Interface Options' tab selected. On the left, under 'Select Interface:', the 'Serial Port' icon is highlighted with a red box, and a red arrow points from a text box above to its bottom-right corner. The right side of the window contains settings for 'Port' (set to 1), 'Stop Bits' (set to 1), and 'Baud' (set to 19200). At the bottom, there are 'Start Remote Controlled Run' buttons (Start, Cancel) and 'Accept Interface Parameters' buttons (Accept, Cancel).

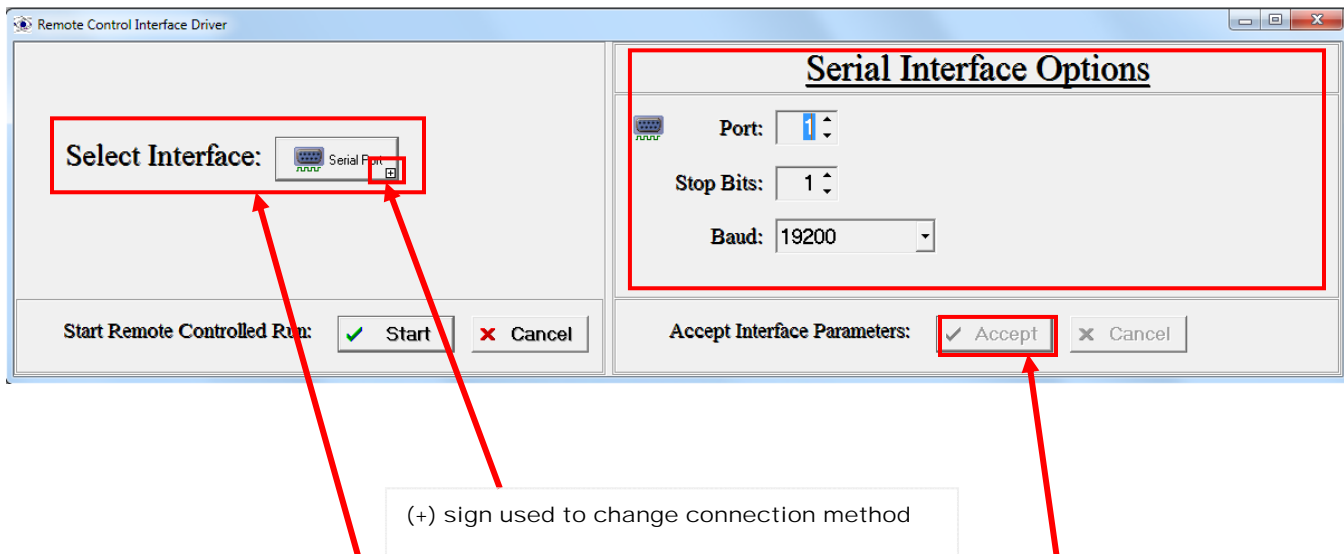
2: GPIB:

The screenshot shows the 'Remote Control Interface Driver' window with the 'GPIB Interface Options' tab selected. On the left, under 'Select Interface:', the 'GPIB' icon is highlighted with a red box. The right side of the window contains settings for 'Board Index' (set to 1) and 'Primary Address' (set to 15). There is a 'Test' button and a 'Test Results' field showing '(Unknown)'. At the bottom, there are 'Start Remote Controlled Run' buttons (Start, Cancel) and 'Accept Interface Parameters' buttons (Accept, Cancel).

3: ETHERNET:

The screenshot shows the 'Remote Control Interface Driver' window with the 'Ethernet Interface Options' tab selected. On the left, under 'Select Interface:', the 'Ethernet' icon is highlighted with a red box. The right side of the window contains settings for 'Host IP Address' (192 . 168 . 1 . 126), 'Client/Server' (radio buttons for Client and Server, with Client selected), and 'Port' (set to 5000). At the bottom, there are 'Start Remote Controlled Run' buttons (Start, Cancel) and 'Accept Interface Parameters' buttons (Accept, Cancel).

Using the Remote Control DRIVER via Serial Port



STEP 1: Under **Select Interface** make sure **Serial Port** is selected, you can scan through other connection options by clicking on the (+) sign in the bottom right corner.

STEP 2: Fill out the **SERIAL INTERFACE OPTIONS**, highlighted in red above.

- Port
- Stop Bits
- Baud Rate

Once you have filled out the right side of the menu click the **ACCEPT** button to load the interface parameters into the driver.

STEP 3: After you have clicked on **ACCEPT** you can now click on the **START** button to begin running the Remote Control Interface.

Using the Remote Control DRIVER via ETHERNET



STEP 1: Under **Select Interface** make sure **ETHERNET** is selected, you can scan through other connection options by clicking on the (+) sign in the bottom right corner.

STEP 2: Fill out the **ETHERNET INTERFACE OPTIONS**, highlighted in red above.

- Under **CLIENT/SERVER** select **CLIENT**
- Port #
- **SERVER**(simulator) IP ADDRESS [shown on Page #6]

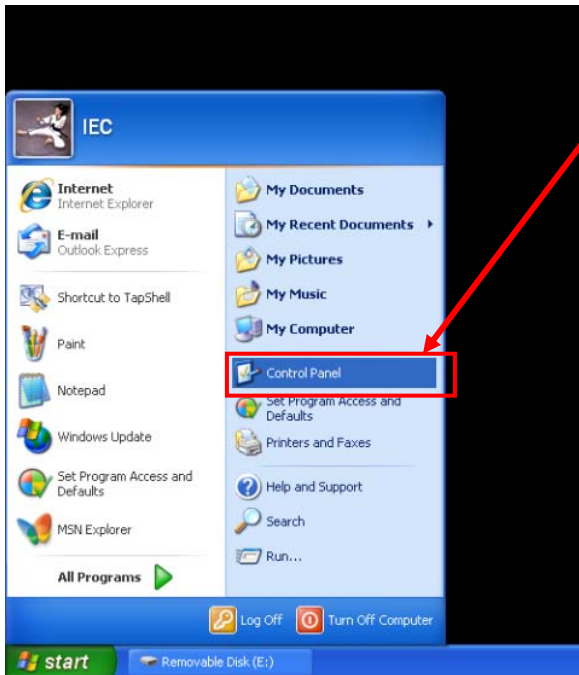
Once you have filled out the right side of the menu click the **ACCEPT** button to load the interface parameters into the driver.

STEP 3: After you have clicked on **ACCEPT** you can now click on the **START** button to begin running the Remote Control Interface.

REMOTE CONTROL DRIVER: FIND THE CLIENT (simulator) IP ADDRESS

If you are using the Ethernet option to run the Remote Control Interface you will need to locate the Server/simulators IP address.

STEP 1: Click the start menu, and select the **control panel**

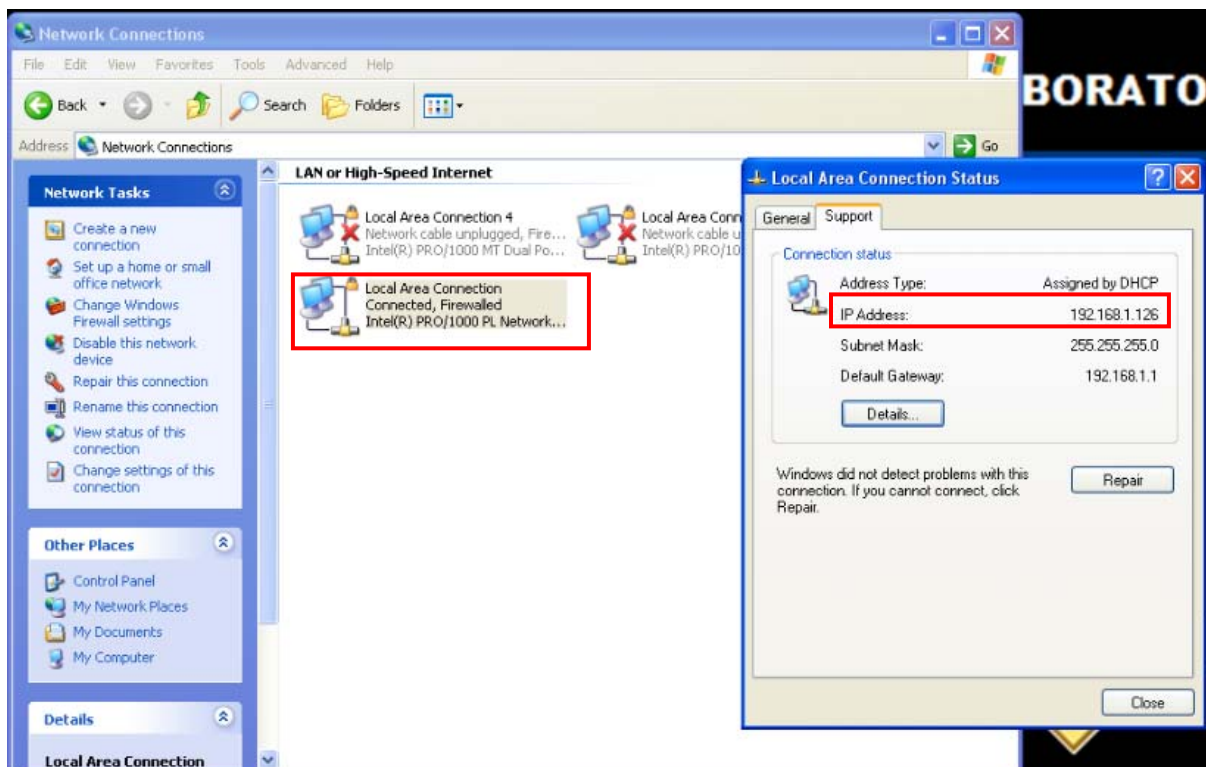


STEP 2: Once the Control Panel is open click on the **NETWORK CONNECTION TAB**

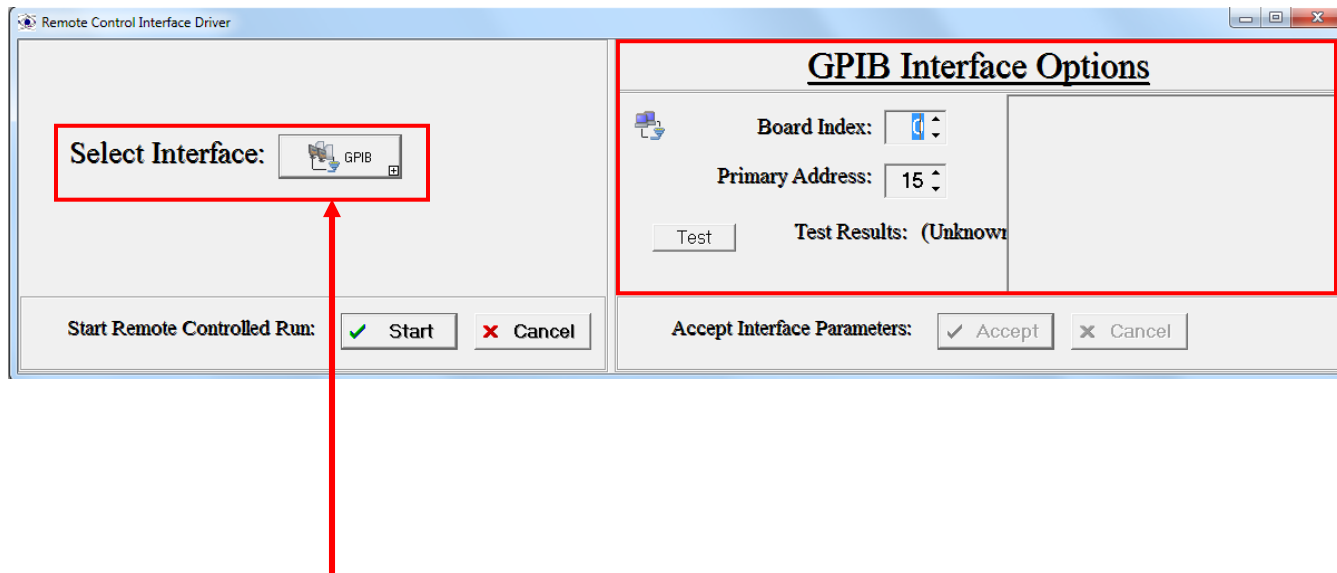


STEP 3: After you click on the **NETWORK CONNECTION TAB** all the possible Ethernet connections on your simulator will be shown, **double click the network that is online.**

STEP 4: After you click on the network the **LOCAL AREA CONNECTION STATUS** menu will open up, click on the **SUPPORT TAB** and you will see your **IP address** under the connection status.



Using the Remote Control DRIVER via ETHERNET



STEP 1: Under **Select Interface** make sure **GPIB** is selected, you can scan through other connection options by clicking on the (+) sign in the bottom right corner.

STEP 2: Fill out the **GPIB INTERFACE OPTIONS**, highlighted in red above.

- Fill out both the **BOARD INDEX** and the **PRIMARY ADDRESS**
- Click the **TEST** button to see if the **GENERAL PURPOSE INTERFACE BUS** is found
- If Test is successful you can then **ACCEPT** the interface parameters to load the interface parameters into the Remote Driver.

STEP 3: After you have clicked on **ACCEPT** you can now click on the **START** button to begin running the Remote Control Interface.

IMPORTANT: The order that you set everything up is important to make sure Remote Control Driver opens up and runs properly. Below is a review step by step going over what has already been talked about to insure this is done properly.

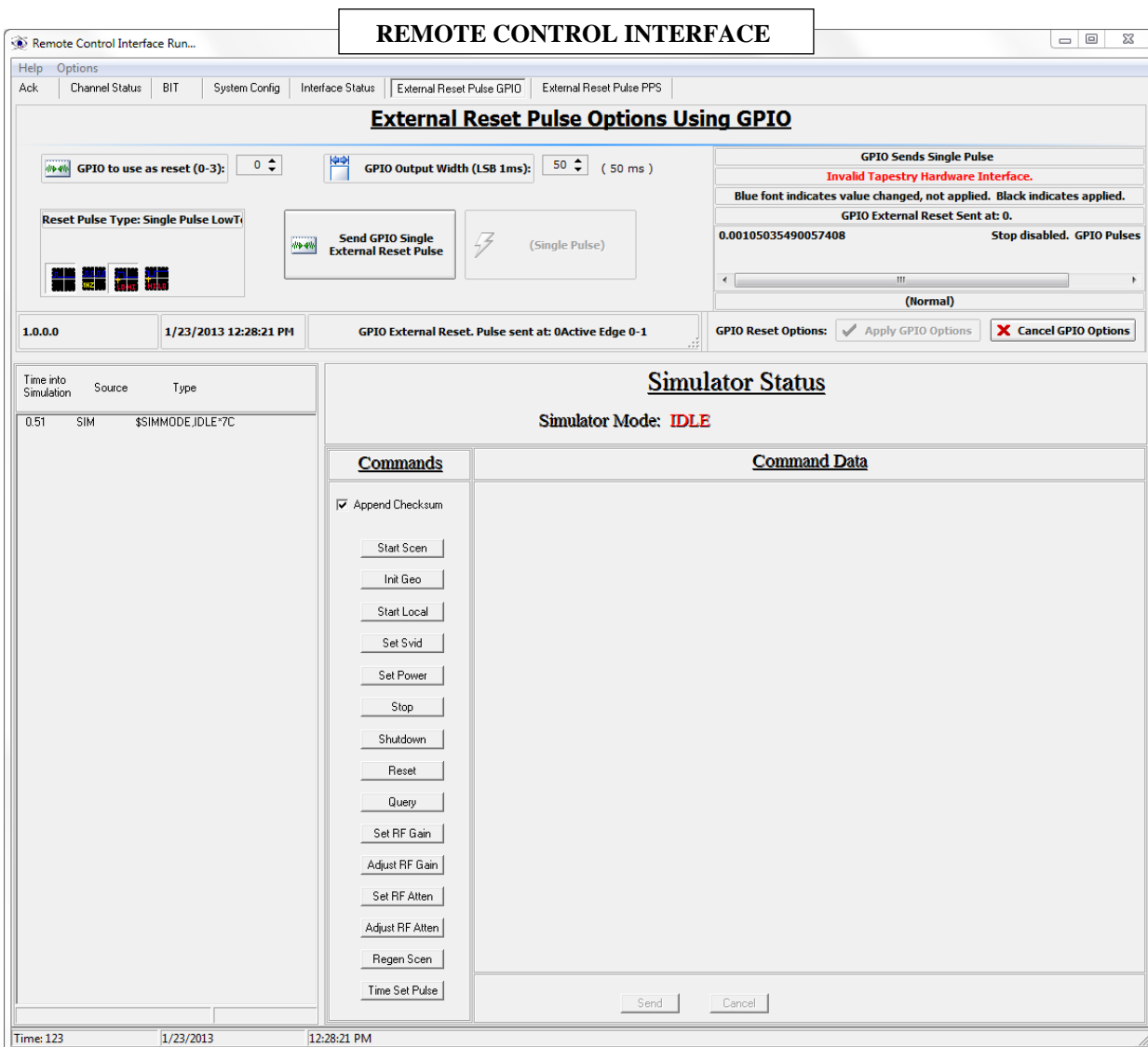
STEP 1: On the SERVER (simulator) click the RUN REMOTE CONTROL tab under real time and let it wait until the CLIENT connects.

STEP 2: On the CLIENT (any computer you want to run/monitor a simulator from) click on the RCI driver on the computer desktop.

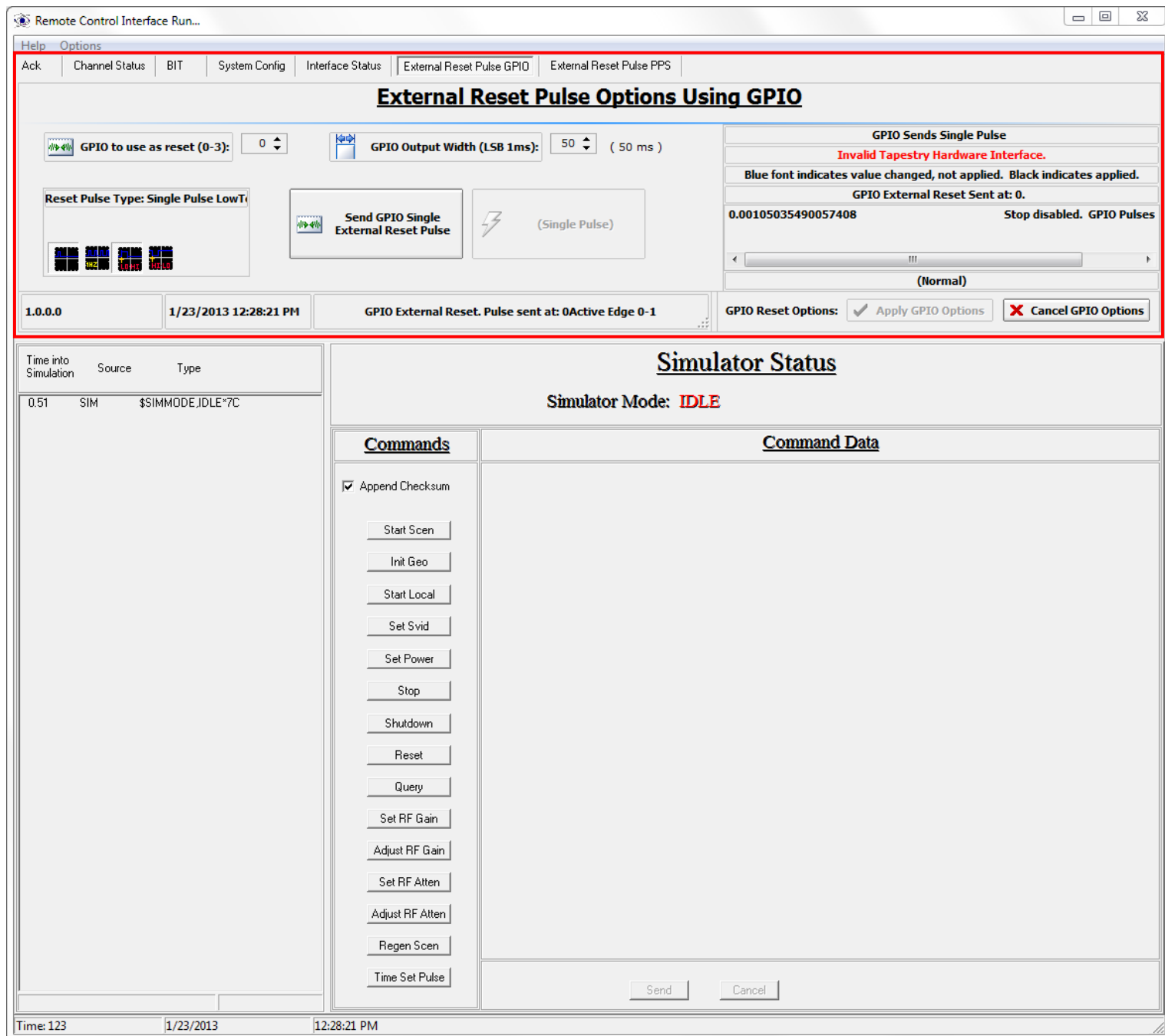
STEP 3: Once the RCI driver menu opens, select your desired connection method, and fill out the appropriate Interface Options.

STEP 4: Accept the Interface Parameters and click the START remote control button.

Once you click the START button, the RCI Program will open (if it does not open, it is most likely because the simulator (Server) does not have TAP RCI open) and you will be connected to the simulator from your computer. The RCI program will not open unless there is a connection to the simulator.



Now that there is a connection between the simulator and your computer, we are ready start a simulation. The next few pages are a review of the most commonly used options and functions of the REMOTE CONTROL DRIVER .



Before we get into the commands, first we will go over the highlighted Red Box shown above, which will be continued on the next page (Page 10).

REMOTE CONTROL DRIVER: TABS

At the Top of the RCI Program you will see a series of 7 tabs, which are used to check the health of the simulator/ channel status as well as augment or resetting the 1PPS if you are using a GPIO.

AckChannel StatusBITSystem ConfigInterface StatusExternal Reset Pulse GPIOExternal Reset Pulse PPS

Acknowledge

Time Rcvd: 727
Acked Msg: INITGEO
Msg Valid: Passed
Sim Mode Valid: Passed

1. The first tab is the **ACKNOWLEDGE** tab, every time you send the simulator a command, the acknowledge tab will tell you when the message was received and whether or not the command was valid.

2. The second Tab is called the **CHANNEL STATUS** tab where you can monitor each channel and its power during the simulation.

AckChannel StatusBITSystem ConfigInterface StatusExternal Reset Pulse GPIOExternal Reset Pulse PPS

Channel Status

Chan:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Svid:	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Power:	0	0	0	0	0	0	0	0	0	0	0	0	0	0

3. The third Tab is called the **BIT (Built in Test)** tab where you can check the health of the simulator hardware.

AckChannel StatusBITSystem ConfigInterface StatusExternal Reset Pulse GPIOExternal Reset Pulse PPS

BIT Results

Date: 01/01/2001	x1: Passed	Interrupt: Passed
Time: 01/01/2001	x2: Passed	Ocxo: Passed
	x3: Passed	PLL: Passed



4. The fourth Tab is called **SYSTEM CONFIG** tab, where you can see the capability of your simulator, such as the number of channels, min/max gain, or if it is L2 capable.

Ack	Channel Status	BIT	System Config	Interface Status	External Reset Pulse GPIO	External Reset Pulse PPS
-----	----------------	-----	----------------------	------------------	---------------------------	--------------------------

System Configuration

Num Chans: 0


Min Power (dBm): 0

L2 Capable: False

Max Power (dBm): 0

5. The fifth Tab is called **INTERFACE STATUS** tab, where you can connect the simulator to a Port

Ack	Channel Status	BIT	System Config	Interface Status	External Reset Pulse GPIO	External Reset Pulse PPS
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Client Connected

Port: 0000

☐ Connected

6. The next 2 tabs are designed to augment/reset the 1PPS using a GPIO board. As you can see below there is quite a bit of capability through using the GPIO board as you can switch the polarity of the 1PPS. You can also adjust the width and reset the GPIO as well.


Ack	Channel Status	BIT	System Config	Interface Status	External Reset Pulse GPIO	External Reset Pulse PPS
-----	----------------	-----	---------------	------------------	----------------------------------	--------------------------


External Reset Pulse Options Using GPIO

GPIO to use as reset (0-3): 0


GPIO Output Width (LSB 1ms): 50 (50 ms)

Reset Pulse Type: Single Pulse LowT





Send GPIO Single External Reset Pulse



(Single Pulse)

GPIO Sends Single Pulse

Invalid Tapestry Hardware Interface.

Blue font indicates value changed, not applied. Black indicates applied.

GPIO External Reset Sent at: 0.

0.00103848648361844 Stop disabled. GPIO Pulses

(Normal)

1.0.0.0

1/23/2013 1:07:48 PM

GPIO External Reset. Pulse sent at: 0Active Edge 0-1

GPIO Reset Options: ☒ Apply GPIO Options ☒ Cancel GPIO Options

REMOTE CONTROL INTERFACE

Now that the Tabs at the top of the RCI program have been discussed, lets now go over some of the basic commands you can send your simulator from your computer. Shown below is the bottom half of the RCI program. In this section of the program you can do 2 things, monitor and view query data, and send the simulator commands.

Command list: different commands you can send the simulator

Simulator Status

If no run is being performed simulator will sit in idle until it is told what to do.

The screenshot displays the RCI interface with several key components highlighted by red boxes and arrows:

- Command list:** A table with columns 'Time into Simulation', 'Source', and 'Type'. It contains a list of commands such as \$INITGEO, \$ACK, \$STARTSCEN, \$SIMMODE, and \$STOP.
- Simulator Status:** A section titled 'Simulator Status' showing 'Simulator Mode: IDLE'.
- Commands:** A vertical list of buttons for sending commands: Start Scen, Init Geo, Start Local, Set Svid, Set Power, Stop, Shutdown, Reset, Query, Set RF Gain, Adjust RF Gain, Set RF Atten, Adjust RF Atten, Regen Scen, and Time Set Pulse.
- Command Data:** A large area titled 'Command Data' showing 'Stop (No User Entered Data)'.
- Send/Cancel buttons:** A box containing 'Send' and 'Cancel' buttons.
- Time and Date:** A status bar at the bottom showing 'Time: 2309', '1/23/2013', and '1:13:33 PM'.

Query: view GPS tracking info at any user selected time into simulation.

AFTER EVERY COMMAND YOU MUST CLICK THE SEND BUTTON

Time and Date, as well as seconds into simulation

Command Data Box: once you select a command, relevant parameters are filled out in this area.

Simulator Status

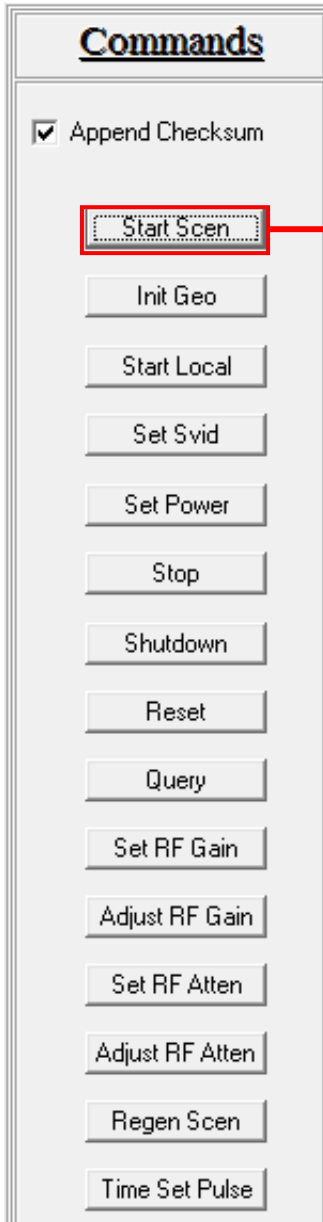
Simulator Mode: **Scenario**

Simulator Status: once a run starts on the simulator the simulator mode will read SCENARIO

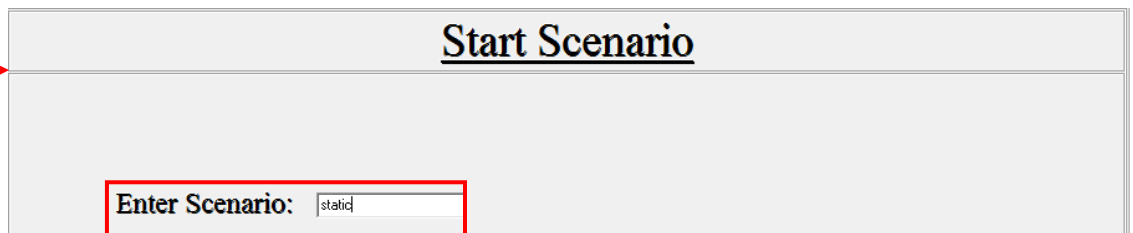


COMMANDS: Now that we are connected to our simulator through the Remote Control Interface it is time to run a scenario from our computer.

Many commands can be sent to the simulator from your host computer. Below is the command list, where you can Query data, initialize your receiver position, change the gain/attenuation, and even shut down your simulator.



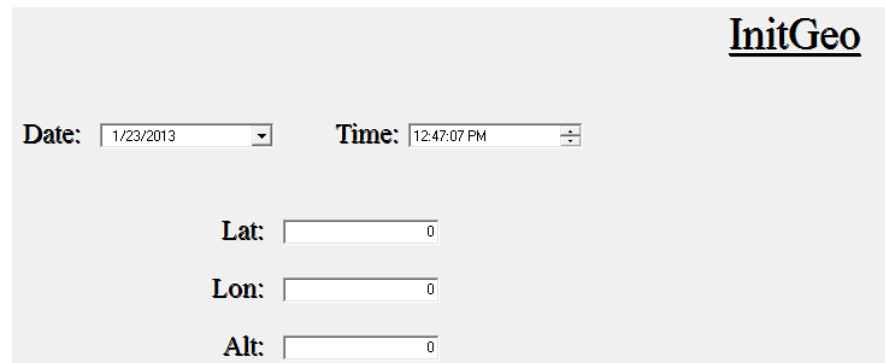
- The first Tab is the most used command in the list, **START SCENARIO**, once you click the start scenario tab the command data area will look like this below. Type the scenario you would like to run into the **ENTER SCENARIO** box. Then click **SEND**



- You can confirm sent commands by looking at either the Query Box (page #12) which will display a 1 line message, or you can make sure the command was sent and verified in the Acknowledgment tab(Page #10 tab#1). Once you have successfully started a scenario, you can then send other commands and query whatever data you need.
 - o **NOTE:** if you Enter a scenario that **DOES NOT** exist on your simulator the command will fail in the acknowledgment tab, and you will have to send a **STOP** command before sending a new scenario.

We now will cover the other 14 command tabs in the Command window

1. **INIT GEO:** used to initialize the receiver's position. Enter appropriate parameters and then click **SEND**.



2. **START LOCAL:** N/A
3. **SET SVID:** Through this command you can assign a satellite of your choice to any channel. For example, if you have a 12 channel simulator you can force all 12 channels to look for only the satellites you want them too. Enter appropriate parameters and then click **SEND**.

Set SVID

Enter Number of Channels:

<u>Chan</u>	<u>Svid</u>
<input type="text" value="1"/>	<input type="text" value="-1"/>
<input type="text" value="4"/>	<input type="text" value="4"/>
<input type="text" value="3"/>	<input type="text" value="10"/>
<input type="text" value="4"/>	<input type="text" value="-1"/>
<input type="text" value="5"/>	<input type="text" value="-1"/>
<input type="text" value="6"/>	<input type="text" value="1"/>

4. **SET POWER:** This command is used if you want to set a specific power to a specific channel. You can set as many channels as you want. Enter appropriate parameters and then click **SEND**.

Set Power

Enter Number of Channels:

<u>Chan</u>	<u>Power</u>
<input type="text" value="1"/>	<input type="text" value="-80"/>
<input type="text" value="2"/>	<input type="text" value="-80"/>
<input type="text" value="3"/>	<input type="text" value="-80"/>
<input type="text" value="4"/>	<input type="text" value="-80"/>
<input type="text" value="5"/>	<input type="text" value="-80"/>
<input type="text" value="6"/>	<input type="text" value="-80"/>

**Power units are measured in absolute power, not relative power.
Where 119 absolute = approx. 45db.**

REMOTE CONTROL: COMMANDS CONT'D

5. **STOP:** used to STOP a running simulation. After you click the **STOP** command tab make sure to then click **SEND**.
6. **SHUTDOWN:** used to Shut down the simulator (Turns the computer off). After you click the **SHUTDOWN** command tab make sure to then click **SEND**.
7. **RESET:** N/A
8. **QUERY:** This is another important command, because this is how you can poll information from your simulator. You can do 2 things through this command, select the message you want to query, and select when you want to receive the data.

The screenshot shows the 'Query' command interface. A red box highlights the 'Message:' dropdown menu, which is set to 'SIMMODE'. Another red box highlights the 'Query When:' dropdown menu, which is set to 'Off'. A red arrow points from the 'Message:' dropdown to the 'MESSAGES' section. A red arrow points from the 'Query When:' dropdown to the 'QUERY WHEN' section. A red arrow points from the 'Interval (s):' input field to the 'Interval (s):' input field in the 'QUERY WHEN' section.

Query

Message:

Query When:

Interval (s):

MESSAGES

SIM MODE: N/A
SYSCFG: hardware configuration (example 12 channel, L1 only, 9600 baud)
BIT RESULTS: simulator health (same as [BIT Tab](#) (page #10 Tab #3))
CHAN STAT: receive each channels SVID (satellite), power, etc.

QUERY WHEN

OFF: No message will be sent
ONCE: Will Query the Data 1 time
On Change: Query data whenever it is changed
Rate: Pick an interval so you can query the data every nth second.

Interval (s):

After you fill out the appropriate parameters, click the **SEND** button. The Query will show up in the **Query Area** (page# 12).

An example of a Query (CHAN STAT) on a 10 second interval is shown below.

The screenshot shows the 'Query Area' with a table of query results. A red box highlights the entire table. Red arrows point from the first column to 'Time into Simulation', from the second column to 'Message', and from the third column to 'Query Data'.

3672.01	SIM	\$ACK,QUERY,MSGVALID,SIMMODEVALID*22
3672.01	SIM	\$CHANSTAT,1,2,-119.00,2,4,-119.00,3,9,-119.00,4,10,-119.00,5,12,-119.00,6,21,-119.00,7,24,-119.00,8,27,
3678.51	CTLR	\$QUERY,BITRESULTS,-1*53
3679.01	SIM	\$ACK,QUERY,MSGVALID,SIMMODEVALID*22
3679.01	SIM	\$BITRESULTS,12/30/1899,12:00:00 AM,0,0,0,0,0*23
3684.51	CTLR	\$QUERY,SYSCFG,-1*4D
3685.01	SIM	\$ACK,QUERY,MSGVALID,SIMMODEVALID*22
3685.01	SIM	\$SYSCFG,12,L1,-131,-95*5A

Time into Simulation

Message

Query Data



9. **SET RF GAIN:** Set the gain on all satellites. (example if you set gain=10 all satellites will have a gain of 10) Once appropriate Gain is set, click **SEND**.
10. **Adjust RF Gain:** if you only want to change the gain, not set it, use this command instead. Enter the amount you want to adjust the GAIN to all satellites and click **SEND**.
11. **SET RF ATTEN:** Set the attenuation on all satellites. Once appropriate Attenuation is set, click **SEND**.
12. **ADJUST RF ATTEN:** if you only want to change the attenuation, not set it, use this command instead. Enter the amount you want to adjust the ATTENUATION to all satellites and click **SEND**.
13. **REGEN SCENARIO:** N/A
14. **TIME SET PULSE:** sets simulator into halted state until reset pulse is sent. Fill out all relevant parameters and then click **SEND**.

Command Data

Time Set Pulse

Date:

Time:

Lat:

Lon:

Alt:

NOTE: This will put the simulator in a state where it is halted and will wait for a reset pulse.

You are now ready to enjoy **REMOTE CONTROL INTERFACE** to run and monitor your simulator at the leisure of any computer you choose.

If you have any further questions please do not hesitate to call, (949)766-0444. If you have any additional comments or suggestions please let us know as we can modify the program to suit your needs.

Thanks For Choosing Navigation Laboratories

