

H2X : H2 eXplorer

Autonomous Dual Navigation System Vehicle

A vehicle that can autonomously navigate itself to user specified waypoints while reporting and avoiding obstacles on the way.

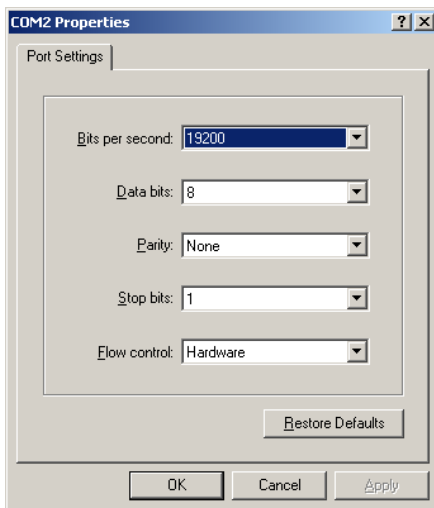
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User interface through Windows Hyper Terminal

Setup

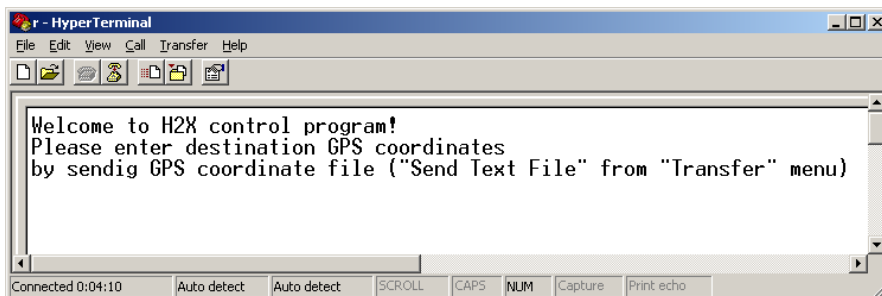
First, Windows Hyper Terminal session has to be created on the serial port of the modem with settings as it is shown in this image:



Standard modem AT commands are used to dial remote modem telephone number:
ATD<tel number>

Usability

After modem has connected to the remote modem on the vehicle a welcome message will be displayed similar to this:



When GPS coordinates were obtained by the vehicle a “GO” command will start the vehicle moving and navigating to the destination point.

```

r - HyperTerminal
File Edit View Call Transfer Help
Welcome to H2X control program!
Please enter destination GPS coordinates
by sendig GPS coordinate file ("Send Text File" from "Transfer" menu)
-----
Recieived! Type G0 to start the vehicle moving towards destination
Connected 0:09:21 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo

```

There will be few information messages displayed every second, as the vehicle is moving towards the destination point: encountered obstacles GPS coordinates, how much distance left towards the destination and error messages (no GPS signal, or any problems with vehicle component operation):

```

r - HyperTerminal
File Edit View Call Transfer Help
Welcome to H2X control program!
Please enter destination GPS coordinates
by sendig GPS coordinate file ("Send Text File" from "Transfer" menu)
-----
Recieived! Type G0 to start the vehicle moving towards destination
50m left heading 33 deg
50m left heading 34 deg
49m left heading 33 deg
48m left heading 33 deg
47m left heading 34 deg
46m left heading 35 deg
Obstacle dddmm.mmmm lat dddmm.mmmm lon (324,10deg)
46m left heading 59 deg
Error: No GPS signal ... waiting for GPS signal
Error: No GPS signal ... waiting for GPS signal
45m left heading 59 deg
Connected 1:06:34 Auto detect Auto detect SCROLL CAPS NUM Capture Print echo

```

There are few control commands available for the user while the vehicle is moving:

- RST** – (reset) stops the vehicle navigation, reinitializes all the vehicle components and internal program variables. Welcome message is displayed again as at the initial point after modem connection.
- PSE** – (pause) pauses the vehicle moving. Error messages are still displayed. The destination meter count down will be paused.
- RES** – (resume) resumes the vehicle movement. The destination meter countdown is resumed.
- GO** – (start movement & navigation) no effect while the vehicle is moving

If NO CARRIER appears on the screen, the connection to the vehicle has been lost (vehicle will stop and reset itself). The user must restart the procedure from the beginning (dial telephone num, send coordinate file, etc).

GPS coordinate destination file:

GPS coordinate file should be in the following format:

```
$GPRMC, , , dddmm.mmmm, , dddmm.mmmm, , , , , *hh<CR><LF>
```

Where latitude goes first, longitude second. The user can specify only the coordinate fields. All the characters should be exactly as they appear above. CR and LF is hex for 0x0D and 0x0A (Enter Key)