CHAPTER 7 EVALUATION KIT

CHAPTER CONTENTS

Refer to this chapter for the following:

- Description of evaluation kit

- Installation instructions for WinOncore

- Functionality of the PC Controller Utility

- PC Controller command lists

OVERVIEW

This section is a road map to guide the operator during setup and operation of the Oncore evaluation kit.

Equipment Description

Oncore Evaluation Kit Contents

- 8-parallel channel Oncore GPS receiver mounted on a motherboard inside an aluminum housing (see Figure 7.1 for an exploded view).
- Active patch antenna with magnetic mount, 6m of RG-78 cable, terminated with a BNC connector.
- Power/data cable (see Figures 7.2 and 7.3 for connections)
- Cigarette lighter to banana plug cables
- Cigarette lighter Y adapter
- Oncore User's Guide
- WinOncore windows controller software
- DOS PC controller software

System Description Minimum Requirements

The minimum usable system includes the Motorola GPS receiver, a system controller (such as a personal computer), and a GPS antenna.

Oncore Receiver Description

The Oncore GPS receiver is an intelligent position sensor that is used as a component in a precision navigation or timing system. The Oncore receiver provides autonomous position, velocity and time information over a serial port.

The Oncore GPS receiver in the evaluation kit has the following characteristics:

- Motorola binary format
- 1 pulse per second output
- On-board lithium battery
- Configured for use with active GPS antenna
- DGPS ready (GT Oncore only)
- NMEA output (GT Oncore only)
- Time RAIM (UT Oncore only)
- Autosurvey (UT Oncore only)
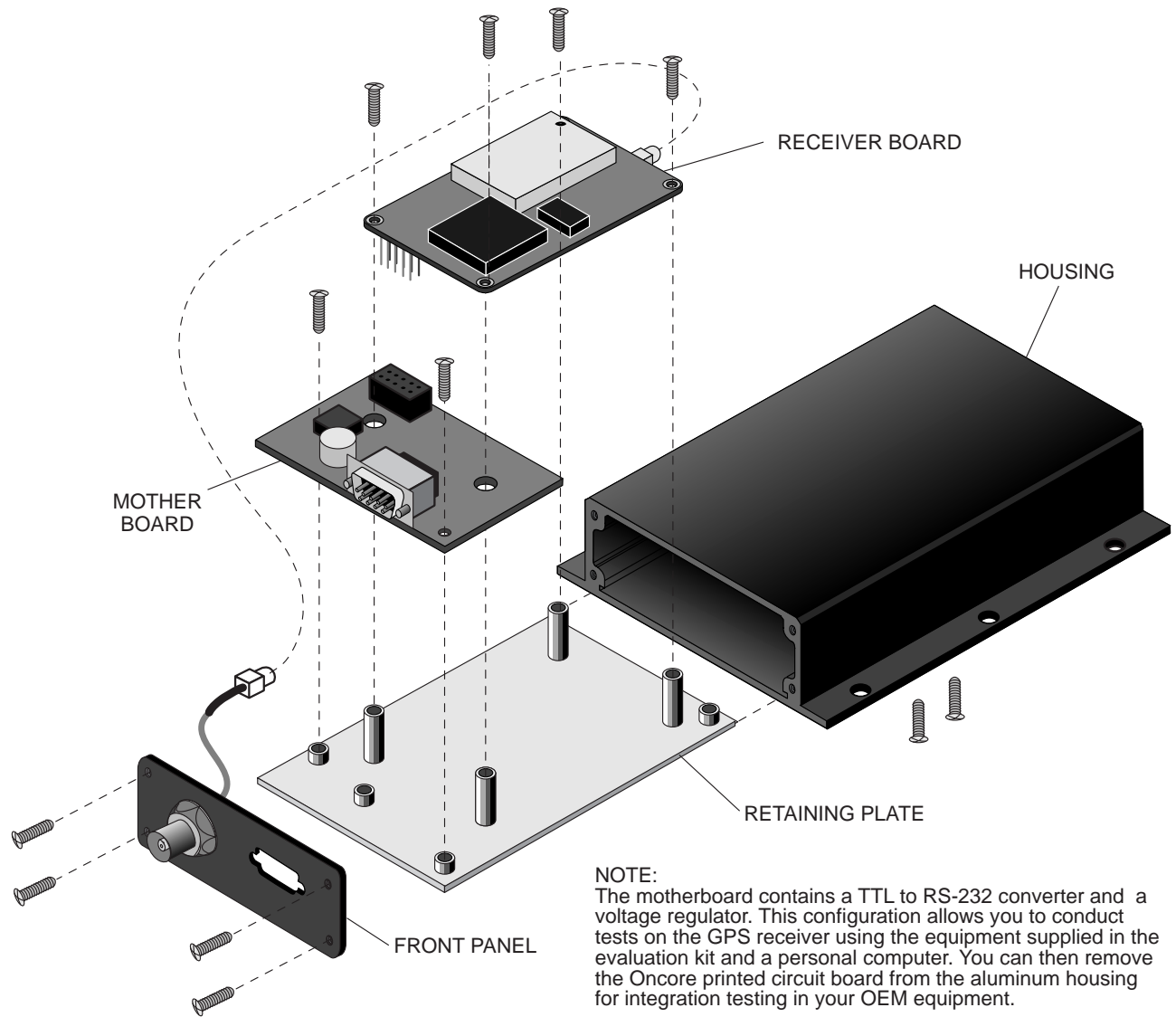- 100PPS output (UT Oncore only)

RECEIVER BOARD

HOUSING

MOTHER
BOARD

RETAINING PLATE

NOTE:
The motherboard contains a TTL to RS-232 converter and a voltage regulator. This configuration allows you to conduct tests on the GPS receiver using the equipment supplied in the evaluation kit and a personal computer. You can then remove the Oncore printed circuit board from the aluminum housing for integration testing in your OEM equipment.

FRONT PANEL

Figure 7.1: Oncore Evaluation Module Exploded View
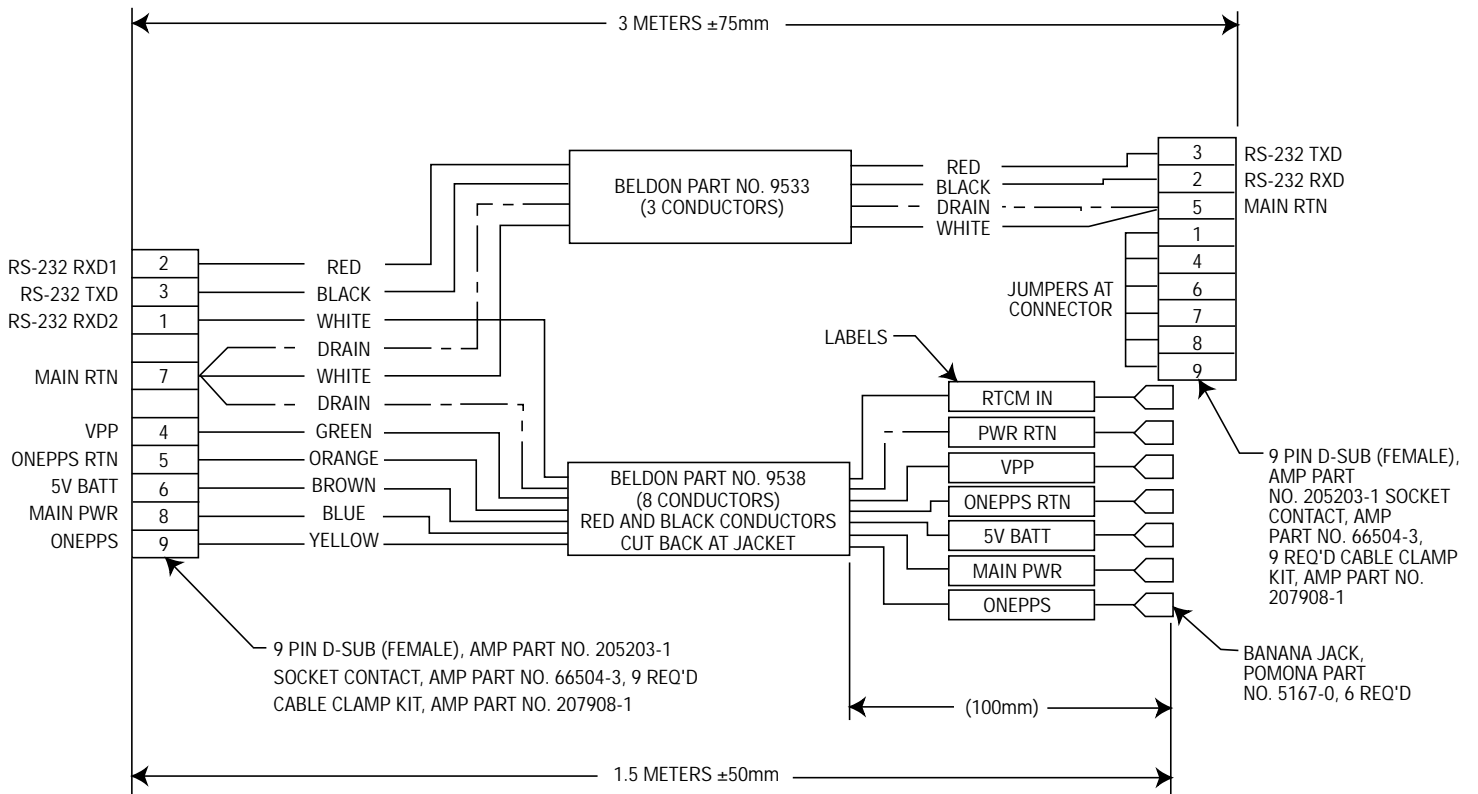
Figure 7.2: Oncore Evaluation Power/Data Cable

POWER/DATA CONNECTOR

PIN 1

PIN 9
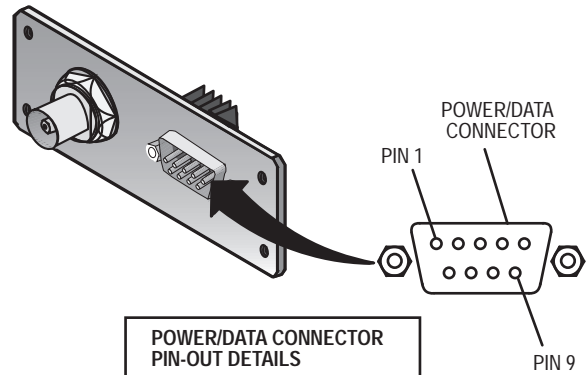
POWER/DATA CONNECTOR PIN-OUT DETAILS	
PIN NUMBER	SIGNAL NAME
1	RS-232 RXD2
2	RS-232 RXD1
3	RS-232 TXD
4	VPP
5	ONEPPS RTN
6	5V BATT
7	PWR RTN AND RS-232 RTN
8	MAIN PWR
9	ONEPPS

Figure 7.3: Oncore Pin Out Designations

MOTOROLA WINONCORE

Motorola WinOncore is the Windows utility for Oncore GPS receivers. WinOncore was developed for both new and existing users of Oncore GPS receivers. The interface and support features have been expressly designed to make it easier for you to evaluate, test, and develop with Motorola Oncore GPS receivers.

WinOncore enables Oncore users to do the following:

- Display Oncore output data in various formats

- Plot position output on a grid with a breadcrumb trail

- Print position plots or copy them as images to another application

- Record output data in multiple formats (binary or NMEA)

- Replay a previously recorded Motorola binary or NMEA file

- Parse a previously recorded Motorola binary file into a comma separated .ps8 or a .ts8 format.

One of the highlights of WinOncore is the set of Wizards for initializing the receiver. The Wizards guide the user through the recommended sequence of steps for initializing the GPS receiver for positioning or timing applications or for uploading or downloading an almanac.

WinOncore has multiple display views, icons, and shortcut keys for easier operation. The extensive help file documents the operation of WinOncore and also the Oncore receiver itself. Each function of WinOncore can be related to the corresponding Oncore receiver command required to perform the function.

WinOncore was designed specifically, but not exclusively, for the GT and UT Oncore GPS receivers. WinOncore was not designed to do everything that the DOS PC controller software does. For example, WinOncore does not support command line input or macros. Many of the VP Oncore commands and some of the newer commands available on the GT and UT Oncore receivers are not supported in the initial version of WinOncore. Users of VP, Basic, and XT Oncore receivers will still find WinOncore to be a valuable tool since these receivers support most of the GT and UT Oncore input and output messages.

WinOncore is now included in all new GT and UT evaluation kits at no additional cost. The current DOS PC controller software will continue to be included in the evaluation kits. WinOncore is also available separately. Contact your local Oncore reseller for more information.

Installation

For further information on WinOncore operation, refer to the WinOncore help included with the software.

Motorola WinOncore is subject to the terms detailed in the license agreement accompanying it. For the latest information on WinOncore, see the 'readme.txt' file included with the software.

Minimum PC requirements:

- 386 CPU

- 8 MB RAM

- Windows 3.1 / 95 / NT

Note that with the minimum requirements, the software will run, but may not be able to handle one second updates. Try setting the GPS receiver update rate to two second intervals using the Receiver Setup Wizard and/or the Timing Pulse Setup Wizard.

To install WinOncore:

1) Insert WinOncore Disk 1.
2) Use the File/Run... command or file manager to run "setup.exe".

If you have difficulties, send an email to g14029@email.mot.com describing your problem.

Using Maps with WinOncore

The plotting function of WinOncore supports bitmap images of various formats. The bitmap image can be created by scanning a paper map or exporting from mapping software. To be used with WinOncore, the bitmap image must be georeferenced. This is the process of giving the image map coordinates so that WinOncore will know where to plot the GPS position on the map. The best way to georeference a map image is by using the Geographic Transformer software available from Blue Marble Geographics. The software is included on the showcase CD-ROM that is distributed with WinOncore and can be purchased from Blue Marble Geographics with a credit card.

For more information, contact Blue Marble Geographics at:

Blue Marble Geographics

261 Water Street

Gardiner, Maine 04345

US and Canada:	1.800.616.2725
International:	1.207.582.6747
Fax:	1.207.582.7001
e-mail:	geoinfo@bluemarblegeo.com
Web site:	http://www.bluemarblegeo.com

PC Controller Operating Instructions

Purpose of PC Controller Software Program

This program is a user friendly tool for use with the Oncore evaluation kit for rapid prototyping of responses and commands sent and received by the Oncore receiver. Special features of the program are:

- English commands for most binary I/O commands listed in Chapter 6.

- Simple readouts for receiver responses displayed on the computer screen.

Controller DOS Minimum Requirements

The DOS PC Controller software included in the evaluation kit can be used to control the Oncore GPS receiver. The software runs on IBM compatible PCs with the following requirements:

Component	Minimum Requirement
CPU	80286
Operating System	DOS 3, 4 or 5
Clock Speed	8 MHz
RAM	1 Mb
Hard Drive	0.5 Mb available memory
RS-232 Port	COM1 or COM2

PC Controller DOS Compatibility

The PC controller software for the Oncore family of GPS receivers uses a set of utility programs to handle the communications port setup and takedown. These programs store the communications port settings when the controller program is started and then restore the original communications port settings when the controller program is terminated. These utility programs only work with DOS versions 3, 4, or 5. In order for them to work properly when using DOS 6.x, the 'SETVER' command should be used. To do this, do the following:

1) Add the following line to the 'CONFIG.SYS' file:

DEVICEHIGH /L:1,12048 = C:\DOS\SETVER.EXE

2) Execute the following commands once at the DOS prompt (do not add to the 'AUTOEXEC.BAT' or 'CONFIG.SYS' files):

C:\> SETVER MARKNET.EXE 4.00

C:\> SETVER RELNET.EXE 4.00

C:\> SETVER GPSCOMMS.EXE 4.00

3) Reboot the computer.

The commands in step #2 add entries into the 'SETVER' database so that when 'SETVER' is loaded (in the 'CONFIG.SYS' file), the correct versions of DOS will be used when those programs are run.

General Description of Process of Using PC Controller

After all hardware setup is completed, install the PC controller software as shown in the Quick Start section. A gps directory is made on the hard drive, where the PC Controller Software is then loaded. In the gps directory, type **gps** to run the controller software.
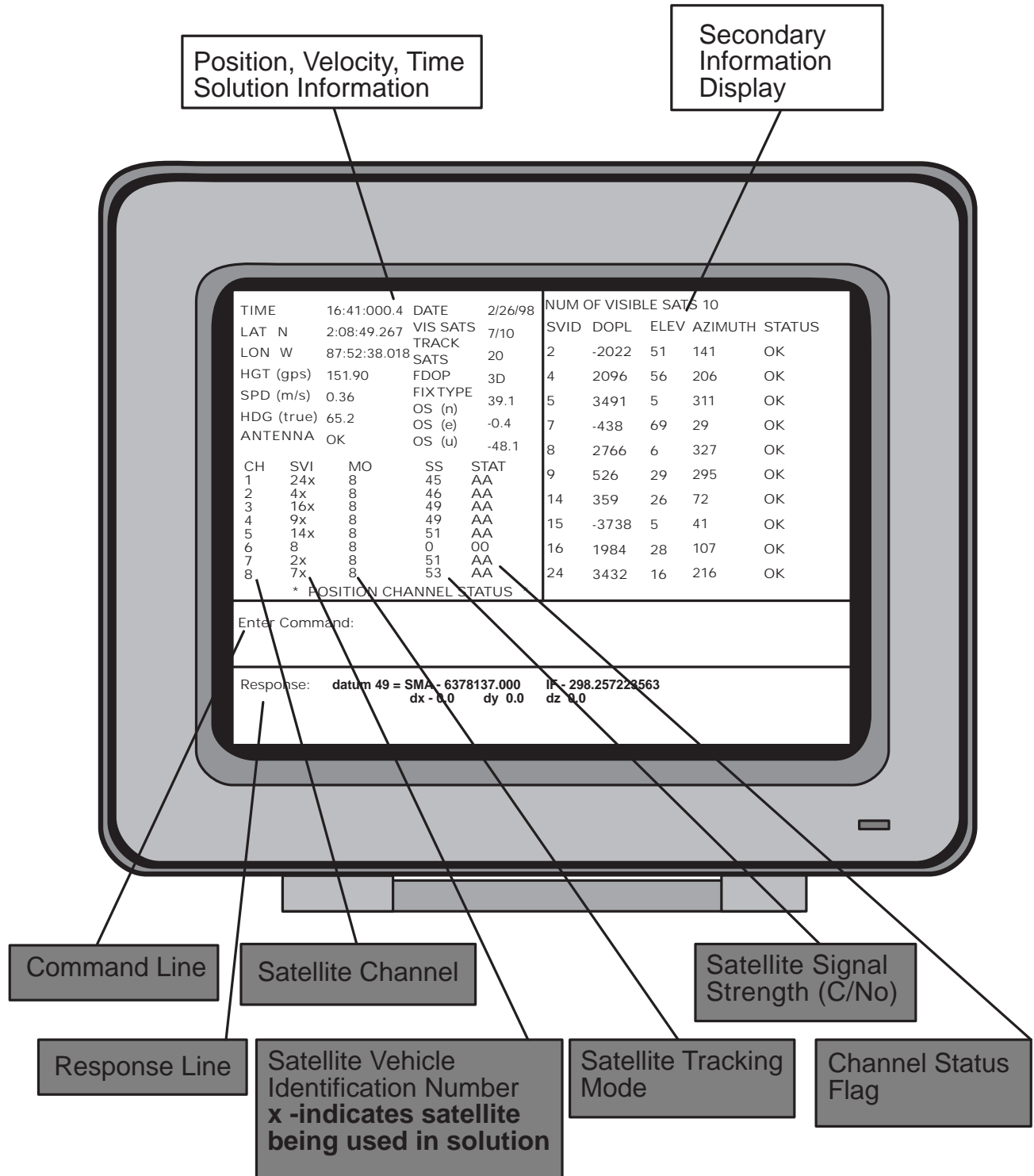
The screen display is divided into four areas. The top part of the screen shows two large boxes side by side. Below these top two areas are two wider areas that rest one over the other and stretch the entire width of the screen. The top right hand area has no information at first. The remaining three areas have information that either request the operator to input data or to read receiver responses. The top left hand area contains the software **name, part number, version number, revision number,** and **release date.** The first box below the two larger boxes is the **Command** line. You will input commands at this location. The bottom area is the receiver's **Response** line.

Selecting the correct comm port provides an I/O path between the computer and Oncore receiver and starts the receiver initialization. The controller software will then attempt to send the time and date to the Oncore receiver. If successful, the datum ID command will also be sent. Otherwise, the PC controller software will switch to other communications modes and attempt to switch the receiver to Motorola binary mode. The **Response** line area will then contain the datum information, which indicates that the receiver is communicating.

General Description of Process of Using PC Controller (Continued)

Requesting a position update once each second updates the data on the left display screen one time each second. Example: **ps8 1** <ENTER>

The data in the top left hand area of the display monitor gives the position data for this receiver location. Satellites are considered tracked when an **X** appears beside the satellite identification number in the top left hand area of the display monitor ("SVID" column).

Position, Velocity, Time Solution Information

Secondary Information Display

TIME	16:41:000.4	DATE	2/26/98
LAT N	2:08:49.267	VIS SATS	7/10
LON W	87:52:38.018	TRACK SATS	20
HGT (gps)	151.90	FDOP	3D
SPD (m/s)	0.36	FIX TYPE	39.1
HDG (true)	65.2	OS (n)	-0.4
ANTENNA	OK	OS (e)	-48.1
		OS (u)	

NUM OF VISIBLE SATS 10

SVID	DOPL	ELEV	AZIMUTH	STATUS
2	-2022	51	141	OK
4	2096	56	206	OK
5	3491	5	311	OK
7	-438	69	29	OK
8	2766	6	327	OK
9	526	29	295	OK
14	359	26	72	OK
15	-3738	5	41	OK
16	1984	28	107	OK
24	3432	16	216	OK

CH	SVI	MO	SS	STAT
1	24x	8	45	AA
2	4x	8	46	AA
3	16x	8	49	AA
4	9x	8	49	AA
5	14x	8	51	AA
6	8	8	0	00
7	2x	8	51	AA
8	7x	8	53	AA

* POSITION CHANNEL STATUS

Enter Command:

Response: datum 49 = SMA - 6378137.000 IF - 298.257223563
dx - 0.0 dy 0.0 dz 0.0

Command Line

Satellite Channel

Satellite Signal Strength (C/No)

Response Line

Satellite Vehicle Identification Number
x -indicates satellite being used in solution

Satellite Tracking Mode

Channel Status Flag

Description of Most Used Commands

The following is a list and a description of the controller commands. When entering these commands, use the example shown.

Function Key and Screen Display

Overview

Some of the computer keyboard function keys are associated with screen displays. The computer display monitor presents these displays in the top right hand corner of the display screen.

Use this table to determine which function key to select for a particular screen display.

Function Key	Screen Display
F1	Satellite Visibility data
F4	Almanac data
F8	Self-Test
F10	Event Message Record
Shift-F4	Time RAIM Setup & Status - UT Oncore only
Shift-F5	ASCII Position data – GT Oncore only

Receiver Operation

About Receiver Operation

The PC Controller Software performs the following functions on startup.

- Displays the Motorola copyright on the left side of the computer screen.

- Prompts to select COM1 or COM2 as a port for RS-232 communication.

- Prompts to select the type of product (6, 8 or GT).

- Updates the receiver date and time with the system date and time from the computer.

- Requests the **select Datum** command.

- Receives data from the receiver for display at the bottom of the computer screen.

- Reads reference point default data (waypoint data) in the computer file **gps_dflt.dta**.

COMM Port Prompt

Select a COMM port for communication between the PC controller software and the Oncore receiver. Default is COM1.

GMT Offset

After acquiring a position fix, the receiver displays time in Greenwich Mean Time (GMT) unless the operator enters the GMT offset for the local time zone. See the **GMT offset** command.

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Default Reference Point Prompt

After initialization, the PC Controller software program reads default reference point (waypoint data in the RAM file **gps_dflt.dta**. The default reference point shows the difference between the present location and the default reference point. The following table lists the default reference points resident in the **gps_dflt.dta** file.

Command	Description	Default Value
lat	Latitude	000 00 00.000
lon	Longitude	000 00 000.000
hgt	Altitude	000 00 000.000

Differences Between Reference Point and Current Position

The Oncore receiver compares the current position data to the reference point data stored in the **gps_dflt.dta** file. The Position/Status/Data display shows the differences between the current position and the stored reference points as north, east, and up offset components. Note that these offsets are computed within the controller software and not the receiver.

Changing default Reference Point

Changing the default reference point provides a method of viewing differences in position from a reference or a known point. Store the changed reference point value in the PC Controller Software **gps_dflt.dta** file, by typing the command **quit<ENTER>**.

Time To First Fix

After applying power, the Oncore receiver starts searching for satellites. The Time To First Fix (TTFF) required to compute the receiver position can vary from seconds to several minutes.

Motorola Binary Message Format

Data messages used by the Motorola receivers consist of a variable number of binary characters. The message begins with the ASCII @@ characters and end with the ASCII carriage return <CR> and line feed <LF>. Refer to Chapter 6 for a complete description of the binary data messages.

Input Message and Response Message Description

All Motorola binary format input messages have a corresponding receiver response message. Checking the response message verifies the acceptance or rejection of the receiver input message commands. The response messages are echoed in the **Response** line area on the screen.

Error Message

If the GPS receiver does not respond to a command, neither an error message nor a response message is displayed. The message **Bad data received** is displayed when the controller software does not receive a complete message. This is most often due to powering down the GPS receiver while it is outputting data, yet may also be caused by serial port problems. This message is not generated by the GPS receiver.

Signal Strength

The "ss" field indicates carrier to noise density ratio for the received satellite signal (refer to Figure 3.13).

Upload and Download Almanac Data

The ability to upload an almanac data set from a file can be very useful in reducing the time to first fix or initializing a receiver with an old almanac. The PC Controller program provides the following capabilities:

Download Almanacs

To record an almanac to a file:

- Monitor the almanac data displayed for completion of almanac output (F4).
- Enter the command "record alm <ENTER>" into the PC Controller.
- Enter the command "almout 0 <ENTER>".
- Enter the command "record alm c".

The almanac has been stored in a file with a ".alm" extension in the current working directory.

Upload Almanacs

To upload an almanac from a file to the receiver:

- Enter the command "run XXXXXXXX.alm <ENTER>" into the PC Controller where XXXXXXXX.alm is the almanac data file to be sent to the receiver.

- Monitor the almanac input response for completion of almanac input.

Record Data

The PC controller software can be used to record data from the Oncore receiver. Application software such as Microsoft Excel can then be used to process or view the data. The following information can be recorded:

- alm – Almanac data

- as8 – **ACSII Position Message** (GT Oncore only)

- bin – All binary data from receiver

- evt – Event data (a user message written to a file corresponding to a user-defined event)

- ps8 – **Position/Status/Data Message**

- ts8 – **Time RAIM Setup and Status Message** (UT Oncore only)

The Record Command

The record command format is:

record [option]

Options are: **alm, as8, bin, evt, ps8, ts8,**

To start the recording process:

Type in the appropriate command for the type of data you want to record. You may enter input commands in the upper or lower case. A file will be opened in the same directory as the PC Controller program. The data will be stored automatically in that file at the rate output by the receiver.

For example, the command **record ps8** will start the recording process for position data.

NOTE: The receiver must be configured to output the desired data. For example, to record **Position/Status/Data Message** once per second, type:
> **ps8 1**
> **record ps8**

To stop the recording process:

Type the record command as you did to start the recording process followed by the letter **c**. This command will close the file.

For example, **record ps8 c** stops the recording process for position data and closes the file.

If you wish to continue recording but want to start a new file, type "record ps8". Quitting the PC controller software also closes all open record files.

Event Message Record Key, F10

Press the <F10> function key to open an event file with the .evt extension. At the moment <F10> is pressed, a file is created/opened. Answer the event "id" prompt with a file name of X characters in length and press <ENTER>. You can them type a text message, which can be stored and time tagged with the system time. To close the file, press <F10> again, or quit the program.

File Formats

Data recorded by the PC Controller program has specific file format information associated with it. File names are assigned automatically by the PC Controller program based on the date and the file number. File extension names are unique.

File format naming convention:

> **yymmdd##.ext**

For example, a file name such as **96061604.ps8** is a file created on the sixteenth of June, 1996. It is the fourth file of its type created that day, and its extension indicates it contains **Position/Status/Data Message** records.

The Record Command (Continued)

The following table defines possible file types, formats, and file extensions:

Table 7.1: File Types

File Type	File Format	File Extension
Almanac data	Motorola binary format	.alm
ASCII Position Message	Comma separated value format	.as8
All data	Motorola binary format	.bin
Event data	Text	.evt
Time RAIM Setup and Status Message	Comma separated value format	.ts8
Position/Status/Data Message	Comma separated value format	.ps8

All files recorded in the comma separated variable (CSV) format can be imported to Excel, Lotus, or other spreadsheet programs for plotting.

Import Data Files into Microsoft Excel

To import comma separated variable (CSV) format files into Microsoft Excel **5.0**, perform the following actions:

- Start the Microsoft Excel program.
- From the Microsoft Excel menu choose File, Open.
- Choose "All Files" [*.*] from the "File/Open/List Files of Type:" submenu.
- Change File/Open/Directory to PC Controller Program GPSXX.
- Select file from File/Open/File Name.
- Choose "Delimited" from the "Text Import Wizard/Original Data Type" (Step 1 of 3)
- Choose "Comma" from "Text Import Wizard/Delimitations (Step 2 of 3)

To import Comma Separated Variable Format files into Microsoft Excel **3.0/4.0**, perform the following actions:

- Start the Microsoft Excel program.
- From the Microsoft Excel menu choose "File," "Open."
- Choose "Text" from the File/Open submenu.
- Choose "Comma" from the File/Open/Text submenu.
- Choose the data file from the appropriate directory.

On the following page is an example of position information recorded by the PC Controller program and imported into Microsoft Excel. The column headings, shown as shaded areas, are part of the data file as it is created by the PC Controller program. When you import the file in the comma separated variable format, the column headings automatically appear at the top of each column.

The Record Command (Continued)

In order to import files into Excel **2.0**, change the file name extension to CSV before importing the file using the DOS rename command. For example, to change the file DATA.PS8 to DATA.CSV, type the following:

rename data.ps8 data.csv

Table 7.2: Data File (ps8) In Microsoft™ Excel

month	day	year	hour	minutes	seconds	lat(ms)	long(ms)	height	height_msl	north	east	vertical	velocity
7	22	1996	15	50	33.0007603	151701036	-316809700	252.19	0	351.8	222.9	52.2	13.33
7	22	1996	15	50	34.0008131	151701028	-316810196	252.19	0	351.6	234.3	52.2	12.11
7	22	1996	15	50	35.0008658	151701022	-316810647	251.97	0	351.4	244.7	52.0	11.02
7	22	1996	15	50	36.0009185	151701013	-316811103	251.86	0	351.1	255.1	51.9	10.69
7	22	1996	15	50	37.0009713	151701000	-316811547	251.78	0	350.7	265.3	51.8	10.38
7	22	1996	15	50	38.000024	151700997	-316811939	251.66	0	350.6	274.3	51.7	9.53
7	22	1996	15	50	39.0000767	151700990	–316812266	251.42	0	350.4	281.9	51.4	8.27

heading	dop_type	dop	no_vis_sat	no_tracked	revr_status	antenna	svid_1	ch_mode_1	sig_str_1	ch_stat_1	svid_2	ch_mode_2	sig_str_2
89.2	PDOP	1.7	8	8	20	OK	16	8	50	AA	6	8	50
88.9	PDOP	1.7	8	8	20	OK	16	8	49	AA	6	8	50
88.9	PDOP	1.7	8	8	20	OK	16	8	48	AA	6	8	51
88.7	PDOP	1.7	8	8	20	OK	16	8	47	AA	6	8	48
88.0	PDOP	1.7	8	8	20	OK	16	8	44	AA	6	8	48
88.8	PDOP	1.7	8	8	20	OK	16	8	47	AA	6	8	49
88.6	PDOP	1.7	8	8	20	OK	16	8	47	AA	6	8	52

ch_stat_2	svid_3	ch_mode_3	sig_str_3	ch_stat_3	svid_4	ch_mode_4	sig_str_4	ch_stat_4	svid_5	ch_mode_5	sig_str_5	ch_stat_5	svid_6
AA	24	8	42	AA	26	8	47	AA	17	8	49	AA	28
AA	24	8	40	AA	26	8	47	AA	17	8	47	AA	28
AA	24	8	40	AA	26	8	48	AA	17	8	48	AA	28
AA	24	8	41	AA	26	8	50	AA	17	8	44	AA	28
AA	24	8	42	AA	26	8	51	AA	17	8	47	AA	28
AA	24	8	45	AA	26	8	49	AA	17	8	46	AA	28
AA	24	8	43	AA	26	8	48	AA	17	8	48	AA	28

ch_mode_6	sig_stat_6	ch_stat_6	svid_7	ch_mode_7	sig_str_7	ch_stat_7	svid_8	ch_mode_8	sig_str_8	ch_stat_8
8	46	AA	27	8	40	AA	23	8	45	AA
8	46	AA	27	8	39	AA	23	8	44	AA
8	46	AA	27	8	38	AA	23	8	44	AA
8	44	AA	27	8	40	AA	23	8	43	AA
8	47	AA	27	8	39	AA	23	8	43	AA
8	48	AA	27	8	40	AA	23	8	43	AA
8	50	AA	27	8	40	AA	23	8	42	AA

Creating Macros

A macro is a file containing a list of receiver commands to speed up command entry. Any command in the PC Controller Command List, or in Chapter 6 can be used in a macro file. It is suggested that the "run <filename>" command not be used within these macros unless it is the last command in a macro file.

Any unformatted text editor can be used to create macro files. Examples include WordPerfect 5.1, Microsoft Word for Windows or the Edlin Text Editor in DOS. When using a word processing application to create macro files, save the file as unformatted text so that none of the page formatting information is included in the macro file. For more information, refer to the section on file formats in the reference manual of the word processing application being used.

Creating Macros (Continued)

Some of the functions that macros can be used to perform are:

- Enter default parameters such as latitude, longitude, height, and Greenwich Mean Time (GMT) offset.

- Record preselected receiver data.

- Record all receiver data for later review or post-processing.

- Close selected or all files.

- Post-process specific data file types from ".bin" files.

File names are limited to eight characters with a three-character file extension; i.e., cccccccc.ccc

Run a macro file by typing the run command at the command prompt, followed by the name of the macro file.

For example:

run testfile.dta

Example 1: This macro will set the date, the GMT offset, latitude, longitude, and height, wait two minutes, then record all output data to a file.

date 12 12 92

gmt –07:00

lat 60 50 10.999

lon 100 20 20.555

hgt 1000 g

pause 120

record bin

NOTE: The pause command is as follows:

pause [1 . .255] (units are seconds)

Example 2: This macro will record the position and almanac.

record ps8

ps8 1

record alm

almout 1

Example 3: This macro will close all data files.

record ps8 c

record alm c

record evt c

record bin c

Creating Macros (Continued)

Data recorded in a file using the PC Controller program can be reviewed. To review data stored in a file, perform the following actions.

1. Disconnect the GPS receiver.

2. Run the GPS program.

3. Run your data file using the Run command.

When the data file is running, the keyboard will not respond to commands.

Parsing Data Files

Record Specific Data File Types from a ".BIN" File

A ".bin" file will contain all data output by the receiver at time of recording. Record any of the specific data file types from a ".bin" file by entering the **record** command for the specific file type, then running the ".bin" file.

For example, with the GPS program running and the receiver disconnected, enter:

> **record ps8<ENTER>**

> **run filename.bin**

This set of commands will record the position information from the ".BIN" file in a new file. The position information file created will follow the naming convention as stated previously. The file extension will be ".ps8". Position information is stored in comma separated variable (CSV) format as if it were recorded directly during data collection. This file can then be imported into applications such as Microsoft Excel for plotting.

PC CONTROLLER COMMAND REFERENCE

Overview

The following is the command list for the PC Controller software. The commands appear in the form of mnemonics with an associated narrative description of the commands. Refer to Chapter 6 for a full breakout and description of each command. On some commands, there are "See Also" entries. These related commands have a cause and effect on the specific command.

- ( ) indicates optional entries and [a | b] denotes command entry options; i.e., enter either a or b.

- For optional entries, entering the command without the optional entries will cause the receiver to output the current state associated with that command.

PC CONTROLLER COMMAND REFERENCE
(Continued)

- With the exception of the **record** command, all commands with command entries accept a short form for the command entry options (i.e., accept the first letter of the command entry or accept the equivalent entry number). For example, the **Position Hold Mode** command has the following form:

  To enable position hold, type:

  ph enable<ENTER>

  or

  ph e<ENTER>

  or

  ph 1<ENTER>

- Either upper or lower case is accepted by the controller. The controller reduces all user input to lower case before processing

  Table 7.3 provides a cross reference between the controller mnemonic command and the binary command.

Table 7.3: Input Commands Listed by Function

Receiver Commands

Description	Binary Command	Controller Command	User Guide Page #
1PPS Cable Delay	@@Az	ppsdelay	7.22
1PPS Offset	@@Ay	ppsoff	7.22
Almanac Data Input	@@Cb	almin	7.22
Almanac Data Output	@@Be	almout	7.23
Altitude-Hold Height	@@Au	ahp	7.23
Altitude-Hold Mode	@@Av	ah	7.24
ASCII Position Message	@@Eq	as8	7.24
Atmospheric Correction Mode	@@Aq	ion	7.25
Date	@@Ac	date	7.25
Ephemeris Data Input	@@Bf	ephin	7.25
GMT Offset	@@Ab	gmt	7.26
Height	@@Af	hgt	7.26
Latitude	@@Ad	lat	7.27
Leap Second Pending Status	@@Bj	leapsec	7.27
Longitude	@@Ae	lon	7.28
Position-Hold Mode	@@At	ph	7.28
Position-Hold Position	@@As	php	7.28
Position/Status/Data Message	@@Ea	ps8	7.29
Pulse Mode	@@AP	pps100hz	7.29
Receiver ID	@@Cj	id	7.29
RTCM Port Mode	@@AO	p2baud	7.30
Select Datum	@@Ao	datum	7.30
Self-Test	@@Fa	selftest8	7.31
Set User Datum	@@Ap	udatum	7.34
Set-to-Defaults	@@Cf	default	7.31
Switch to NMEA	@@Ci	ioformat	7.32
Time of Day	@@Aa	time	7.32
Time Mode	@@Aw	utc	7.33
Time RAIM Setup and Status Message	@@En	trstat8	7.33
UTC Offset Status Message	@@Bo	utcoff	7.34
Velocity Filter	@@AN	filter	7.35

Controller Commands

Description	Binary Command	Controller Command	User Guide Page #
Controller ID	N/A	cid	7.35
DOS Shell	N/A	dos	7.36
Exit to DOS	N/A	quit	7.36
Record GPS Data	N/A	record	7.36
Run Command	N/A	run	7.37
Set Reference Point	N/A	refpt	7.37

COMMAND DESCRIPTIONS

The command name is the mnemonic for the command. Enter it exactly as shown. The parameter list contains one or more parameters for the command. Parameters listed inside square brackets (**[ ]**) are mutually exclusive choices. For example [**e** | **d**] means enter either "e" or "d." The bar character (**|**) is a separator and is not part of the entry. Separate each parameter with at least one space.

For most commands, entering the command name mnemonic without parameters will return the current setting for that command. The "Notes" section describes exceptions for that command.

Only one command can be entered at a time. If there is a sequence of commands used often, such as a start-up procedure, combine all those commands into a macro file for easy, one-step operation. See how to build and use macros in the Creating Macro section.

In the following command descriptions of time and latitude/longitude, either a colon (**:**), space, or forward slash (**/**) may be used to separate the parts of time (*i.e.* mm**:**dd**:**yyyy etc.), or latitude/longitude (*i.e.* ddd/mm/ss.sss). For ease of operation, the forward slash (**/**) only requires one keystroke; the colon requires two keystrokes. Parts of commands shown on the display screen will appear with a colon (**:**) between each part.

COMMAND DESCRIPTIONS

1PPS Cable Delay
ppsdelay

Function	Instructs the Oncore receiver to output the 1PPS output pulse earlier in time to compensate for antenna cable delay.
Syntax	**ppsdealy ([0.0...0.000999999])**
Example	**ppsdelay 0.000000051<ENTER>**
Notes	Delay is in seconds. This command is available only with the UT Oncore.
See Also	None
Binary Equivalent	**@@Az**

1PPS Offset
ppsoff

Function	Instructs the UT Oncore receiver to offset the 1PPS output pulse from the top of the UTC/GPS second tick mark.
Syntax	**ppsoff ([0.0 .. 0.999999999])**
Example	**ppsoff 0.000000051<ENTER>**
Notes	Delay is in seconds. This command is only available with the UT Oncore.
See Also	None
Binary Equivalent	**@@Ay**

Almanac Data Input
almin

Function	Manually enters an almanac data message into the Oncore receiver.
Syntax	**almin (subframe page byte1, byte2..byte 34)**
Example	**almin...............<ENTER>**
Notes	Inputs an almanac to the Oncore receiver. The almanac consists of 34 subframe or page messages. A better method of inputting an almanac is to use the **run xxxxxxxx.alm** command to output an almanac stored in a receiver file by the **Almanac Data Output** and **Record GPS Data** commands.
See Also	**Almanac Data Output (almout)** **Record GPS Data (record)**
Binary Equivalent	**@@Cb**

COMMAND DESCRIPTIONS

**Almanac Data Output
almout**

Function	Outputs current almanac data contained within the Oncore receiver.
Syntax	**almout ([0 | 1])** *0* outputs almanac once *1* outputs almanac upon change
Example	**almout 0<ENTER>**
Notes	The Oncore receiver outputs the almanac as thirty-four 33-byte messages. Running the command **record alm** prior to the **Almanac Data Output** command stores data in Motorola binary format in a file with extension ".alm". Use the **run** command to input the stored almanac data to a receiver. Press F4 to view the Almanac data screen.
See Also	**Input Almanac Data Input (almin)** **Record GPS Data (record)**
Binary Equivalent	**@@Be**

**Altitude-Hold Height
ahp**

Function	Sets the height for use with the altitude-hold feature.
Syntax	**ahp (hhhhh.hh [g])** hhhhh.hh −1000.00 to 18,000.00 meters g GPS ellipsoid height
Example	**ahp 350.98 g<ENTER>**
Notes	The height is specified in meters to a resolution of 0.01 m. The altitude entered is referenced to the GPS ellipsoid height (height above the reference ellipsoid being used). This command is available only with the GT Oncore.
See Also	Altitude-Hold Mode (**ah**)
Binary Equivalent	**@@Au**

COMMAND DESCRIPTIONS

Altitude-Hold Mode
ah

Function	Disables or enables the altitude-hold feature.
Syntax	**ah ([d | e])** d disable e enable
Example	**ah e<ENTER>**
Notes	Enabling the altitude-hold feature forces the receiver to use the entered **Altitude-Hold Height** rather than the calculated height. When the altitude-hold feature is disabled, the receiver uses the calculated height. This command is available only with the GT Oncore.
See Also	Altitude-Hold Height (**ahp**)
Binary Equivalent	**@@Av**

ASCII Position Message
as8

Function	The ASCII position output message has a comma separated format with values and units similar to NMEA messages. This command controls the output of the ASCII Position Message.
Syntax	**as8 ([0 .. 255])** 0 outputs message one time only 1 .. 255 outputs message at update interval
Example	**as8 1<ENTER>**
Notes	This message provides position, velocity, time, and receiver status. The **record** command can be used to record output files of this format with the .as8 extension by entering **record as8**. This command is available only with the GT Oncore.
	Press Shift-F5 to view the output from this message.
See Also	None
Binary Equivalent	**@@Eq**

COMMAND DESCRIPTIONS

**Date
date**

Function	Changes the current date in the Oncore receiver. If the date is not specified, this command requests the receiver to send the current date.
Syntax	**date (mm/dd/yy** or **mm/dd/yyyy)**
Example	**8/13/1998<ENTER>**
Notes	If the receiver has acquired at least one satellite, the receiver ignores the change date command and responds with the current date.
See Also	None
Binary Equivalent	**@@Ac**

**Ephemeris Data Input
ephin**

Function	Used to input ephemeris data one satellite at a time. The entire ephemeris data set is input by using the **run** command.
Syntax	**ephin svid byte1 byte2..byte73**
Example	**ephin 3<ENTER>**
Notes	Use the run command with a filename with the .eph extension to input the entire latest ephemeris data set in one step. A VP Oncore receiver can be used to create the .eph file of ephemeris data. This command is available only with the GT Oncore.
See Also	None
Binary Equivalent	**@@Bf**

COMMAND DESCRIPTIONS

GMT Offset
gmt

Function	Changes the offset between GMT and local time.
Syntax	**gmt ([– | + |] hh:mm)**
	(–) for time zones west of Greenwich, England
	( ) or (+) for time zones east of Greenwich, England
	hh hours
	mm minutes
Example	**gmt –07:00<ENTER>**
Notes	None
See Also	None
Binary Equivalent	@@Ab

Height
hgt

Function	Sets the initial height coordinate of the Oncore receiver.
Syntax	**hgt ((–)hhhhh.hh g)**
	g indicates GPS height
Example	**hgt 351.23 g<ENTER>**
Notes	If the receiver is computing a 3D fix, the receiver ignores the change height command and responds with the current height.
See Also	None
Binary Equivalent	@@Af

COMMAND DESCRIPTIONS

Latitude
lat

Function	Sets the initial latitude coordinate of the Oncore receiver.
Syntax	**lat ((–)dd mm ss.sss)**
Example	**lat –33:27:54.207<ENTER>**
Notes	If the receiver is computing a 2D or 3D fix, the receiver ignores the change latitude command and responds with the current latitude.
See Also	**Longitude (Ion)**
Binary Equivalent	**@@Ad**

Leap Second Pending
Status
leapsec

Function	Used to determine if there is a pending leap second correction.
Syntax	**leapsec m**
	m mode *0* = output response message once
Example	**leapsec 0<ENTER>**
Notes	This is a polled-only output message. If a correction is pending, the direction of the correction is indicated.
See Also	None
Binary Equivalent	**@@Bj**

COMMAND DESCRIPTIONS

**Longitude
lon**

Function	Sets the initial longitude coordinate of the Oncore receiver.
Syntax	**lon ((–)ddd mm ss.sss)**
Example	**lon –111:54:08.444<ENTER>**
Notes	If the receiver is computing a 2D or 3D fix, the receiver ignores the change longitude command and responds with the current longitude. The **lon<ENTER>** command will output the current longitude in the receiver.
See Also	**Latitude (lat)**
Binary Equivalents	**@@Ae**

**Position-Hold Mode
ph**

Function	Turns the position-hold function on and off.
Syntax	**ph ([d | e])** *d* disable *e* enable
Example	**ph d<ENTER>**
Notes	This command is available only with the UT Oncore
See Also	**Position-Hold Position (php)**
Binary Equivalent	**@@At**

**Position-Hold Position
php**

Function	Inputs the coordinates of the position to be held by the Oncore receiver.
Syntax	**php (lat lon hgt g)**
	lat (–) dd mm ss.sss
	lon (–) ddd mm ss.sss
	hgt (–) mmmmm.mm g
	g indicates GPS height
Example	**php 33 27 54.207 -111 54 08.444 350.000 g <ENTER>**
Notes	This command is available only with the UT Oncore
See Also	Position - Hold Mode (ph)

COMMAND DESCRIPTIONS

Position/Status/Data Message
ps8

Function	Outputs the **Position/Status/Data Message**
Syntax	**ps8 ([0 | 1 .. 255])**
	output rate in seconds
	0 one time only
	1..255 rate of message repetition (in seconds)
Example	**ps8 0<ENTER>**
Notes	Data can be output one time (0) or at a specified rate of one time every 1 to 255 seconds.
See Also	None
Binary Equivalents	**@@Ea**

Pulse Mode
pps100hz

Function	To change the timing pulse from 1PPS to 100PPS
Syntax	**pps100hz ([d | e])**
	d disable
	e enable
Example	**pps100hz e <ENTER>**
Notes	Disabling the 100PPS puts the timng pulse into normal 1PPS mode.
See Also	None
Binary Equivalent	**@@AP**

Receiver ID
id

Function	Commands the Oncore receiver to output an ID message which contains receiver copyright, version and revision information.
Syntax	**id**
Example	**id<ENTER>**
Notes	To view the ID message, turn off (or slow down) the **Position/Status/Data Message**.
See Also	**Position/Status/Data Message (ps8)**
Binary Equivalent	**@@Cj**

**RTCM Port Mode
p2baud**

Function	Sets the baud rate of the RTCM input port.
Syntax	**p2baud ([2 | 4 | 9])**
	2 2400
	4 4800
	9 9600
Example	**p2baud 4<ENTER>**
Notes	RTCM corrections can be input directly on the second comm port of the receiver on pin 5. The baud rate of this port is independent of the status of the primary serial port. This command is available only with the GT Oncore.
See Also	None
Binary Equivalent	@@AO

**Select Datum
datum**

Function	This command allows you to select which datum the GT Oncore 2.0 receiver uses in performing position and velocity calculations.
Syntax	**datum ([id])**
	id 49 .. 50
Example	**datum 49<ENTER>**
Notes	The WGS-84 datum is referenced by ID number 49. The user defined datum is referenced by ID number 50.
See Also	Set User Datum (**udatum**)
Binary Equivalent	**@@Ao**

COMMAND DESCRIPTIONS

Self-Test
selftest8

Function	Causes the receiver to perform a self-test.
Syntax	**selftest8**
Example	**selftest8<ENTER>**
Notes	Press F8 to view the Self-Test data screen and invoke a self-test.
See Also	None
Binary Equivalent	**@@Fa**

Set-to-Defaults
default

Function	Sets all the Oncore receiver parameters to the factory default values.
Syntax	**default**
Example	**default<ENTER>**
Notes	*IMPORTANT: Upon executing this command, the current almanac loaded in RAM is automatically deleted.* Before using this command, make sure you have made backup copies (on a separate diskette) of your own almanac file and/or the almanac file that was provided with the receiver. The almanac must then be reloaded after using the **default** command. The time and date stored in the internal real-time clock is *not* changed by the **default** command.
See Also	None
Binary Equivalent	**@@Cf**

Switch to NMEA
ioformat

Function	Switches the primary port to NMEA format with a baud rate of 4800.
Syntax	**ioformat ([1])**
	1 NMEA-0183
Example	**ioformat 1<ENTER>**
Notes	When this command is executed, the GT Oncore 2.0 configures the port baud rate to 4800. The host PC port is not affected. To monitor the NMEA data, use a terminal emulation program and set the baud rate to 4800. This command is available only with the GT Oncore.
See Also	None
Binary Equivalent	**@@Ci**

Time of Day
time

Function	Changes the current time of day in the receiver or if there is no time specified, requests the receiver to output the current time.
Syntax	**time (hh:mm:ss)**
	hh hours
	mm minutes
	ss seconds
Example	**time 23:23:23<ENTER>**
Notes	If the receiver has acquired at least one satellite, the receiver ignores the change time command and responds with the current time. The receiver output time is either GMT or local time, depending on the setting of the GMT offset parameter.
See Also	None
Binary Equivalent	**@@Aa**

COMMAND DESCRIPTIONS

Time Mode
utc

Function	References the time sent as part of the **Position/Status/Data Message** to GPS or UTC time.
Syntax	**utc ([d | e])** *d* disable (GPS time) *e* enable (UTC)
Example	**utc e <ENTER>**
Notes	The satellite 1PPS output signal is referenced in the Oncore receiver to UTC or GPS time based on this command.
See Also	None
Binary Equivalent	**@@Aw**

Time RAIM Setup and Status Message
trstat8

Function	This command provides dual functionality. First, it allows the user to input the Time RAIM setup configuration. Second, it outputs the Time RAIM setup and status information. The setup information configures the Time RAIM algorithm with the user defined parameters. The status portion informs the user of the state of the algorithm and outputs the fractional portion of the GPS local time estimate for each of the satellites being tracked.
Syntax	**trstat8 (mrate, enable, alarm, mode, 0, 0, 0, 0, 0, 0, 0)** *mrate* [0 I 1...255] *enable* [0 I 1] *alarm* [3...65535] *mode* [0...3]
Example	**trstat8 1 1 3 1 0 0 0 0 0 0 0 <ENTER>**
Notes	Data can be output one time (0) or at a specified rate of one time every 1 to 255 seconds. This command is available only with the UT Oncore Press <shift> F4 to view the Time RAIM Setup and Status screen.
See Also	**Time Mode (utc)**
Binary Equivalent	**@@En**

COMMAND DESCRIPTIONS

Set User Datum
udatum

Function	Defines the user-defined datum stored in datum ID number 50.
Syntax	**udatum (id sma if dx dy dz)**
	id 50
	sma semi major axis
	if inverse flattening constant
	dx delta x
	dy delta y
	dz delta z
Example	**udatum 50 6378206.4 294.9786982 –7 162 188<ENTER>**
Notes	Defines the constants used for a custom datum. These five parameters uniquely define a reference ellipsoid.
See Also	None
Binary Equivalent	@@Ap

UTC Offset Status Message
utcoff

Function	Outputs the current number of integer seconds between UTC and GPS time.
Syntax	**utcoff ([0 | 1])**
	0 outputs message one time only (polled)
	1 outputs message when UTC offset information changes
Example	**utcoff 1<ENTER>**
Notes	If the response to this message is zero, the UTC information is not present in the receiver. This command is available only with the UT Oncore.
See Also	None
Binary Equivalent	@@Bo

COMMAND DESCRIPTIONS

Velocity Filter
filter

Function	Used to control the amount of velocity filtering.
Syntax	**filter ([f])**
	f 10 .. 100
Example	**filter 50<ENTER**
Notes	This command is available only with the GT Oncore.
See Also	None
Binary Equivalent	@@AN

Visible Satellite
Status Message
vis

Function	Outputs the results of the most current satellite alert computation.
Syntax	**vis ([0 | 1])**
	0 outputs message one time only (polled)
	1 outputs message when visibility information changes
Example	**vis 1<ENTER>**
Notes	This message gives summary of the satellite visibility status.
	Press F1 to view the Visible Satellite Status Screen.
See Also	None
Binary Equivalent	**@@Bb**

Controller ID
cid

Function	Displays the PC controller software copyright and version/revision information.
Syntax	**cid**
Example	**cid<ENTER>**
Notes	None

COMMAND DESCRIPTIONS

DOS Shell
dos

Function	This command temporarily exits the controller to execute a DOS command.
Syntax	**dos**
Example	**dos**<ENTER>
Notes	To return to the controller, type: **exit**<ENTER>
See Also	None

Exit to DOS
quit

Function	Closes all open files, saves the current reference point, closes the program, and exits to DOS.
Syntax	**quit**
Example	**quit**<ENTER>
Notes	None
See Also	None

Record GPS Data
record

Function	This command controls the opening and closing of files for storing data.
Syntax	**record [alm | as8 | bin | evt | ps8] (c)**
Example	**record bin**<ENTER> **record bin c**
Notes	The file is opened by using the **record** command and files type. The file is closed by repeating the **record** command and file type followed by a "c" or by invoking the **quit** command, which closes all open files. All data stored in the files is stored in either comma-separated variable (CSV) format, Motorola binary format, or ASCII text, depending on the file type. The **bin** option stores all data from the receiver in binary format. This command opens or closes the file; it does not invoke the command requesting the required data.
See Also	None

COMMAND DESCRIPTIONS

Run Command
run

Function	This command inputs the contents of the specified file instead of accepting input from the keyboard.
Syntax	**run [filename]**
Example	**run testfile.dta<ENTER>**

Set Reference Point
refpt

Function	Enters a reference point or a waypoint to be used to calculate north, east, and vertical offsets between the receiver-calculated position and this known reference position.
Syntax	**refpt (lat lon hgt g)**
Example	**refpt 33:27:54.207 –111:54:08.444 350.00 g <ENTER>**
	g indicates GPS height
Notes	These offsets are displayed as part of the Position/Status/Data display.
See Also	**Position/Status/Data Message (ps8)**