MOTOROLA

TRAXAR™

GPS NAVIGATOR

OWNER'S MANUAL

For additional operating information, call Motorola at 1-800-272-1477 (8:00 a.m. - 5:00 p.m. CST, weekdays).

Read This Manual

Instructions critical to proper usage are provided throughout this manual including: how to hold your unit to give it a clear view of satellites; how to determine if position information is current; what range of accuracy you can expect; how to estimate battery life; and significant limitations on altitude accuracy experienced by all GPS receivers. "Factors That Affect Accuracy" are reviewed on pages 22-24. Read them and the entire manual thoroughly before using the TRAXAR GPS Navigator.

Welcome

...and congratulations! With the TRAXAR GPS Navigator, you now have a link to Global Positioning System (GPS) satellites orbiting almost 11,000 miles above the earth.

The TRAXAR GPS Navigator uses data from GPS satellites to provide you with highly accurate position, navigation, velocity and time information — all at the touch of a button, at any time of day, and even in harsh weather.

This manual provides step-by-step instructions on how to use this handheld navigation computer. If you're anxious to get started, look for the "Quick Start" pages marked with blue borders. Before you embark on your first trip, however, be sure to read the entire manual for important operational and safety information.

About This Manual

Quick Start pages with blue borders are practical exercises to help you quickly master the basics.

Divider pages provide a detailed table of contents for each section.

Icons in the upper left corner of each page help you identify the topic of each section.

Exclamation points identify important information. Be sure to read these notices.

Read Me First

How Does It Work?

The TRAXAR GPS Navigator receives signals from the U.S. government's Global Positioning System, a network of high altitude satellites that transmit time and location information 24-hours-a-day. It uses this information from three or more satellites to determine your position on the earth's surface.

When locked on to signals from three satellites, the TRAXAR GPS Navigator can display your position in terms of latitude and longitude (2-dimensional, or "2D" position). From four or more satellites, it can additionally determine your height, or altitude (3-dimensional, or "3D" position).

Occasionally, the TRAXAR GPS Navigator may not be able to display your current position, even though it seems to be locked on to enough satellites. This will occur if the locked satellites are poorly positioned.

GPS Limitations

The U.S. Department of Defense controls the GPS system, and can place limitations on accuracy which affect all GPS receivers. At the time this manual was printed, limitations under the policy of "Selective Availability" (page 22) were in effect indefinitely.

For these reasons, this product is intended to be an aid to navigation only. It should be used in conjunction with other navigation methods as appropriate, and never relied upon exclusively. Always use caution and good judgement when navigating.

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Getting Started

What's In This Section?

Package Contents

Inventory Checklist:

- TRAXAR GPS Navigator
- Carrying Case
- Detachable Wrist Strap (lanyard)
- 6 AA Alkaline Batteries
- Warranty Card (complete and mail)
- Map
- Owner's Manual (this manual)
- Quick Reference Card

If any of these items are not included in your box, or if any item is defective, call Motorola at 1-800-272-1477.

Built-in Antenna

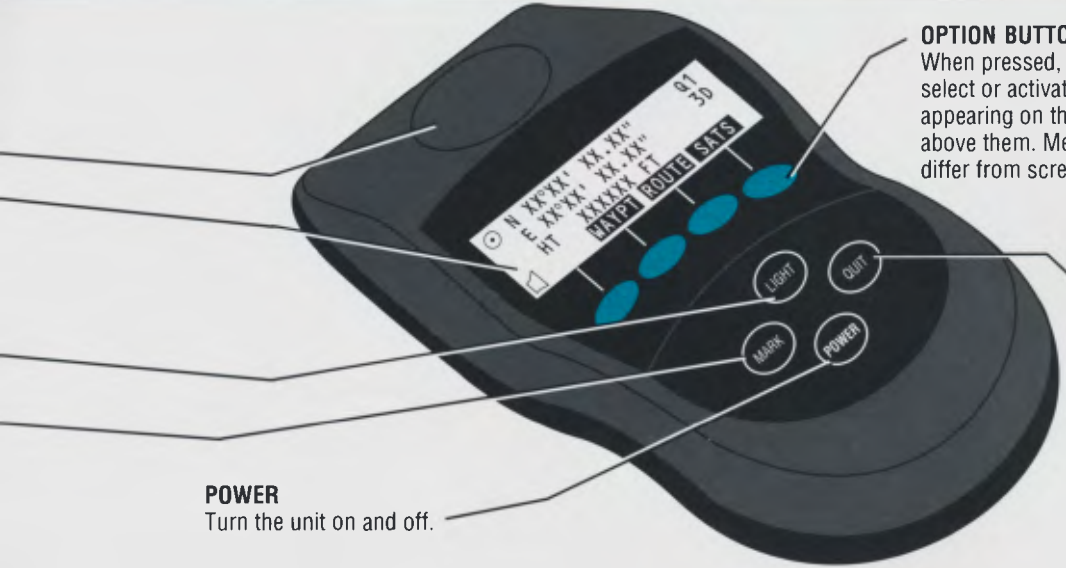
Display Screen

Function Keys

These keys allow the user to:

LIGHT
Light the LCD screen.

MARK
Store position coordinates displayed on the screen.



OPTION BUTTONS
When pressed, these buttons select or activate menu options appearing on the LCD screen above them. Menu options differ from screen to screen.

QUIT
Return to previous menus; ultimately, to the main menu.

POWER
Turn the unit on and off.

Installing Batteries

Typically, 6 AA alkaline batteries will provide 6 hours of continuous satellite tracking. Other types of batteries are not recommended. The unit also accepts external power when using mounting bracket accessory.
Note: The "Elapsed Battery Time" indicator does not predict remaining battery life! See page 63 for details.

The Battery Pack

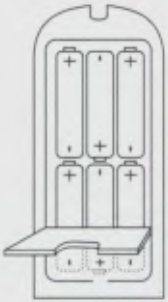
Holding unit face down in one hand.

Ⓐ **To open:** Press battery pack down toward bottom until it pulls away slightly from the unit. Slide up to remove.

Ⓑ **To close:** Slide the bottom end into position first, then push lid to close.

Installing Batteries

To lift up the plastic lid, insert the tip of your finger or a small object into the rounded opening at the bottom of the detached battery pack. Pull up on lid. Insert batteries as indicated. When finished, reset "elapsed battery time" counter as explained on page 63.

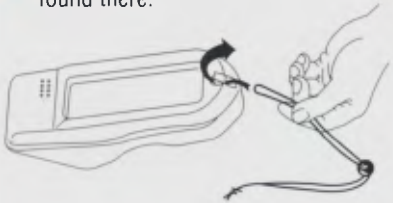


Attaching the Wrist Strap

A battery back-up in your unit will maintain data stored in the TRAXAR GPS Navigator's memory for an average of two months. If you install fresh batteries before storing, data can be maintained for nine to 20 months.

The wrist strap attaches at the back and bottom of the unit.

1. Feed the loop through the hole found there.

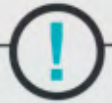


2. Feed the loose ends and bead back through the loop and tighten.

Turning the Unit On & Off

To turn on: Firmly depress and hold the **POWER** key. The word "TRAXAR," a self-test message and the elapsed battery time appear, followed by the main menu screen.

To turn off: Depress and hold the **POWER** key. A screen appears showing time to shutdown. You'll also have the option to **ABORT,** which returns the unit to the main menu screen.



If the Unit Malfunctions:

The TRAXAR GPS Navigator is factory sealed; DO NOT OPEN THE UNIT TO ATTEMPT REPAIR. Return it to Motorola for service if necessary. Work performed on the unit by anyone other than authorized Motorola personnel will void the warranty.

What's Been Covered?

The first section described what your package should contain; explained the difference between option buttons and function keys; and showed you how to prepare the unit for use.

Finding Your Position

What's In This Section?

Quick Position! *is a practical exercise in which you'll determine your actual position.*

Quick Position!

In this exercise you will find your position and speed. You must be outside, with an unobstructed view of the sky, to acquire satellite signals. Think of the built-in antenna as an eye which must be able to "see" satellites to receive signals from them. Hold the unit horizontally in your hand to provide it with the greatest field of view.

Before You Begin

The unit must be in "continuous" acquisition mode for this exercise; in other modes, it will not search continually for satellite signals. If this is the first time you've used your TRAXAR GPS Navigator, it will already be in this mode.

If your mode has been changed, review pages 60-62 to learn how to change it back. You may also default all settings to factory settings as explained on page 64; however, this will also reset elapsed battery time, erase the almanac (resulting in a "cold start"), and erase all stored waypoints and routes!

The TRAXAR GPS Navigator also must have correct date and time information to predict which satellites are overhead. When you first use it, the unit should already be programmed with settings that will suffice for this exercise.

Now...Find Your Position!

1. From main menu, select **1 Position**. A position screen like the one on page 16 will appear. Is this your position? Read on →

Is the Position Display Current?

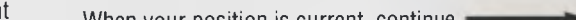
If the terms OLD or EST appear in the upper right corner of the screen, the answer is no. Until sufficient satellite data is obtained, the position displayed will be estimated (EST; one that you or the factory previously entered) or the last position fix the unit made (OLD).

You should also look at the circle symbol (Tracking Indicator) in the upper left corner. Is it flashing? If so, this is a warning that the position displayed is not based on current satellite data. When the Tracking Indicator stops flashing, the position is current; the terms OLD or EST will be replaced with either 2D or 3D. In either case, your latitude and longitude are current. The height (Ht) reading is based on current data only when 3D is shown. Otherwise, the last known or estimated height (altitude) is displayed.

How Long Will It Take?

The first time you use the unit, it should take 5-10 minutes to get a position fix. It may take longer if: you're using it for the first time in a country other than the United States; you haven't used the unit for a long time; you've moved more than 1000 miles since its last fix; or you've defaulted to factory configuration settings.

If it takes more than 10-15 minutes, follow directions on page 18 to view the Satellite Status screen. If the words "Collecting Almanac" appear, you'll have to wait a while longer. If not, turn the unit off and on, then try again. If the unit is being used outside the United States for the first time, you should also input an estimated position (see page 15).

When your position is current, continue 

Quick Position! (cont.)

Finding Speed and Direction

2. Now select **SATS**, then **SPEED**.
3. COG (course over ground) shows the direction you are headed relative to North. SOG (speed over ground) is your speed. Is it correct?

Variations in Speed and Altitude

When moving at very slow speeds (or not at all), you may notice discrepancies in the SOG display. This is a normal effect of "Selective Availability," a policy under which the U.S. government introduces slight errors into GPS satellite signals. The effect will dissipate as your speed increases.

Selective Availability (SA) may produce a significant effect on height. At the time of this printing, SA was in effect indefinitely. See pages 22-24 for more information on accuracy.

CONGRATULATIONS! *You have learned the basic steps involved in determining your position and speed. The following pages provide further detail on how to interpret the position screen and check satellite status.*

Date, Time and Estimated Position

You should change these settings, if: 1) your unit is taking more than 10-15 minutes to get a position fix; 2) the unit is being used outside the United States for the first time; 3) you have moved the unit more than 1000 miles since its last fix; or 4) you wish to correct the time displayed on your screen.

Default Settings

When you first use the unit, it will be programmed with the time in Greenwich, England (Greenwich Mean Time; UTC Offset is 0.0). It will also have an estimated position in the United States near Phoenix, Arizona.

Changing Date, Time and UTC Offset

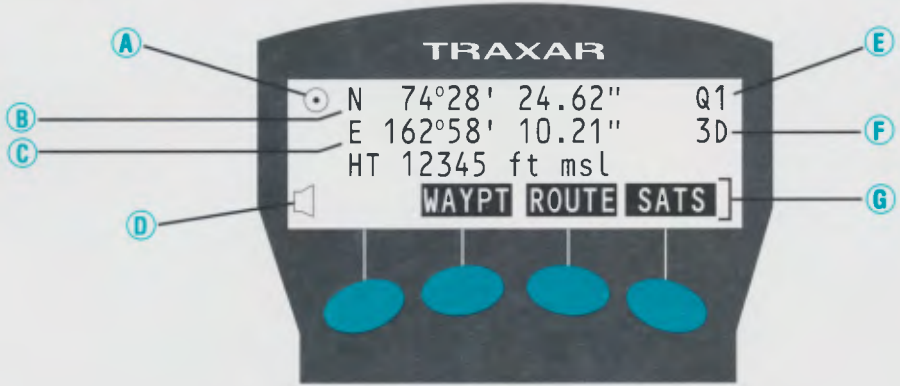
To change the date and time display:

1. **POWER** on.
2. Select **MORE** menu options; then **6 Configuration;** then **MORE** menu options, twice.
3. Select **7 Time Entry**. Date is highlighted. Use up or down arrow to scroll through numbers; set correct day of month. Use right arrow to move to next character when correct. Repeat steps for month and year. **ENTER** when correct.
4. Time is highlighted. Repeat steps; enter time and select a.m., p.m. or 24 hr display. **ENTER.**
5. UTC Offset is highlighted. Repeat steps; enter the difference between the time in your area and in Greenwich, England. If you're not sure, consult a map or pages 79-80. **ENTER** when correct. **QUIT.**

Directions for changing estimated position are provided on pages 60-61.

Reading the Position Screen

A screen similar to this one was displayed during the Quick Position! exercise. The position screen may look slightly different if you've changed certain factory settings on the unit.



Example

Position Screen

A Tracking Indicator
When flashing, this symbol warns that the position displayed is not based on current satellite data. When sufficient data is available for a 2D or 3D reading, the symbol will stop flashing and appear solidly on the screen.

B Latitude

C Longitude

D Alarm Symbol
Flashes when certain alarms are activated; stops once you check alarm status. Also appears when unit is turned on.

E Position Quality Rating
The quality of incoming satellite data, which affects accuracy, varies. The TRAXAR GPS Navigator assigns a quality rating of Q1 (best), Q2, Q3 or Q4 to each position fix. A Q rating appears on current, OLD and EST position screens, sometimes along with an asterisk. More on pages 23-24.

F Position Type
EST, OLD, 2D or 3D (see page 13 for explanation).

G Menu Option Box
Options differ from screen to screen. To select, press button directly below option box.

Checking Satellite Status

You can "toggle" between the position screen, speed/direction screen, and a screen which graphically represents the acquisition of satellite signals. Watch the Satellite Status screen to check the unit's progress in getting a position fix (at least three satellites locked on).

Checking Satellite Status:

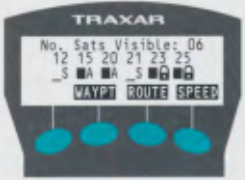
From the main menu screen:

1. Select **1 Position.**
2. Select **SATS.**

The screen that appears shows how many satellites should be overhead, and lists up to six tracked on the unit's six channels. Symbols under each show if the unit is:

- **S** Searching for its signal.
- **A** Acquiring its signal.
- 🔒 Locked on to its signal.

A bar next to the symbol changes in size to illustrate increasing and decreasing signal strength.



Satellite Status Screen Example

*From this screen, select **SPEED** to see your speed and course over ground. From there, select **POS** to return to the position screen.*

More About Positioning

What's Been Covered?

You've learned the basic steps required to prepare your TRAXAR GPS Navigator and use it to find your position and speed. The last section also explained how to interpret information on the position and Satellite Status screens.

What's In This Section?

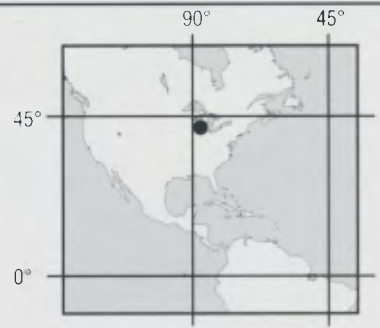
For Your Information

Latitude, Longitude, and Waypoints

The TRAXAR GPS Navigator displays your two-dimensional position with latitude and longitude coordinates. When saved in the computer's memory, a latitude/longitude coordinate is called a "waypoint."

Latitude indicates distance north or south from the equator, and is represented by horizontal lines on a globe or map. Longitude indicates distance east or west of the prime meridian, and is represented by vertical lines. A position (waypoint) exists at the point where latitude and longitude intersect on the earth's surface.

Both are described in "degrees," "minutes" and "seconds." The TRAXAR GPS Navigator will display these units in one of two formats you select: DDD°MM'SS.SS" or DDD°MM.MMM' (D=degrees; M=minutes; S=seconds). See pages 60-64 for explanation.



Latitude: N 42° 8' 54.02"
Longitude: W 87° 52' 27.54"
Location in Chicago, Illinois: USA

For Your Information

Understanding Height

Reference Points

Height (altitude) can be referenced either to mean sea level (MSL) — the average level of the sea between high and low tide — or to a map datum. You can tell your TRAXAR GPS Navigator which reference to use by selecting **6 Configuration** from the main menu, then **4 Operate Setup.** Refer to page 22 for more information on height, including normal accuracy limitations.

Map Datums

A map datum factors variations in the earth's shape into position readings (the earth is not perfectly spherical). If you wish to navigate in conjunction with a map, you should instruct the TRAXAR GPS Navigator to determine your position based on the same datum that was used to create the map. If you do not, you may find inconsistencies in your readings. The unit has 49 datums in its memory to choose from. A complete list is on page 83.

For Your Information

Factors that Affect Accuracy

The TRAXAR GPS Navigator is capable of providing highly accurate position, navigation, velocity and time data. Like all GPS receivers, however, it is affected by certain limitations of the satellite system.

Potential Sources of Error

The accuracy of information provided by all GPS receivers is affected 1) by slight errors introduced deliberately into satellite data by the U.S. government; and 2) by the relative positions of satellites from which data is used (satellite geometry).

Selective Availability

The availability and accuracy of the GPS system is controlled by the U.S. government. For national security reasons, the U.S. Department of Defense can introduce errors into GPS signal transmissions, in a policy known as Selective Availability (SA).

The resulting effect on accuracy is unlikely to pose a serious problem for most navigators...but it is enough to ensure that commonly available GPS signals will not be used by unfriendly individuals or governments in a military application. As a result, you may be near, but not exactly on, the position displayed.

General accuracy guidelines appear later in this section. Please note that height accuracy may be significantly affected by SA and should not be relied upon exclusively when SA is in effect.

Satellite Geometry
The TRAXAR GPS Navigator uses signals sent by three GPS satellites to determine your 2-dimensional position, and from four satellites for your 3-dimensional position.

Generally speaking, geometric principles dictate that the more dispersed the satellites are in the sky, the better the receiver's calculation will be.

For each position displayed on the TRAXAR GPS Navigator's screen, a rating is assigned to reflect the quality of this satellite input — the Q (position quality) rating. The Q rating may change as you or the satellites move.

Position Quality Ratings
The quality of satellite geometry for a given position is labeled either Q1 (most accurate), Q2, Q3 or Q4. If satellite geometry falls below Q4 levels, a current position will not be displayed. Accuracy ranges exist for each Q level; see next page for general guidelines. A Q rating is displayed for your current position as well as for OLD positions to help you evaluate accuracy ranges associated with them. A Q rating also appears on an estimated position screen but may be disregarded.

An asterisk will appear next to the Q rating when you turn on the Q alarm in the configuration menu (see pages 60-61).

For Your Information

Accuracy Ranges

The illustration below represents potential error in latitude and longitude at various Q levels.

Potential Latitude and Longitude Error*

Q1 Actual position ± 0-100 meters
Q2 Actual position ± 0-200 meters
Q3 Actual position ± 0-400 meters
Q4 Actual position ± 0-1,000 meters

Note: Illustration shows maximum potential error. Your actual position will often be much closer. For example, at Q1 with SA in effect, the position displayed will be within 40 meters, about half of the time.

*At least 95% of the time. SA in effect.

When maximum potential error exceeds 1,000 meters, the TRAXAR GPS Navigator will not display current position information, although it may appear to be locked on to a sufficient number of satellites.

For Your Information

Acquisition Time

The time it takes for the TRAXAR GPS Navigator to lock on to enough satellites to determine your position varies, depending on a number of factors. The unit does not begin searching for satellites when you turn it on—you must first select **1 Position**, **2 Select Waypoint** or **3 Select Route** from the main menu.

Typical Acquisition Times

Your unit will have a **hot start** when its last position fix is less than two hours old (Avg.: 24 seconds). A **warm start** occurs when the last fix was within one week (Avg.: 45 seconds). A **cold start** typically occurs when the unit has been stored for several months (Avg.: 15 minutes).

Improving Acquisition Time

An almanac in the unit's memory tells it which GPS satellites should be orbiting overhead. If your unit is not used for a long period of time, it may have to acquire an updated almanac (the words "Collecting Almanac" will appear on the Satellite Status screen). This results in a cold start.

If you have moved more than 1,000 miles since the unit's last position fix, you can shorten acquisition time by estimating your position: from the main menu, select **6 Configuration**, then **2 Estimated Position**. Enter coordinates using arrows. **ENTER**. If it still takes more than 10-15 minutes to get a position fix, check/correct the Date, Time, UTC Offset and Estimated Position. Also check the Satellite Status screen. If the words "Collecting Almanac" appear, you'll have to wait a while longer. If not, turn the unit off and on, then try again.

Storing Your Current Position

You can mark and store your current position in a few simple steps. A word of caution: The TRAXAR GPS Navigator will store the coordinates displayed on the position screen, even if they are OLD or ESTimated. Check the Tracking Indicator to see if the position is current before marking.

1. Press the **MARK** key. The position will appear with a waypoint number and a time code.
2. Press one of the following buttons to:

   GO TO: Store current position in waypoint directory and display navigation screen.

   STORE: Store waypoint in directory and display previous screen.

   NAME: Replace the time code with a name before storing.

   CANCL: Abort the procedure and display previous screen.

Waypoint Time Code

The TRAXAR GPS Navigator automatically assigns a waypoint number and time code when you mark a position. This enables you to store the waypoint quickly, then retrieve it later to name it. Waypoint numbers are assigned sequentially to avoid duplication. Time codes have eight characters, which represent:

XX	XX XX XX
Day of Month	Time Marked (Hour/Minutes/Seconds)

What's Been Covered?

The use of various positioning functions and an evaluation of position accuracy were presented. Acquisition times and tips for improving them were also reviewed. The next section will tell you how to navigate from your position to a destination of your choice.

Navigation Basics

What's In This Section?

Quick Navigate! *is a practical exercise in which the TRAXAR GPS Navigator will guide you to a destination.*

Quick Navigate!

This exercise shows you how to navigate to a waypoint. You will store a destination waypoint in your directory; find your position; select your destination; and use navigation screens to get there.

Unit should be in "continuous" acquisition mode for this exercise; see page 12 for explanation.

Begin By Storing a Waypoint

1. Go outside where you will have an unobstructed view of the sky. Hold unit horizontally in your hand.
2. From the main menu screen, select **1 Position**. When your position is current, select **MARK** key. **NAME** the waypoint "Home" using up/down arrows to scroll through numbers and letters, and right arrow to advance to next character. **ENTER** when correct. **STORE**.
3. Press **QUIT** key twice. Now, walk to a new position several hundred yards away.

4. Select **1 Position**. When position is current, select **WAYPT**. The Waypoint Directory will be displayed.

   If the waypoint "HOME" appears, select **OK** to select it as your destination. If not, select **CHANG** and use arrows to scroll through waypoint directory until "HOME" appears (then **ENTER**).

5. Speed, course, range and bearing are displayed on the first navigation screen, NAV1. In order to get valid information, you must be moving. If not moving, asterisks may be displayed in place of selected data.

6. Select **NAV2** (graphic steering guide displayed), then **NAV3** (Time to Go and Estimated Time of Arrival displayed). Select **NAV1** to return to first navigation screen.

   *Note: You can select **POS** from any navigation screen to return immediately to the position screen.*

   That's all there is to it!

Navigation Screens

There are five navigation screens, two of which appear only when you navigate along a route. Use the screens to determine what course to take to reach your destination, and more.

STORE
waypoints and routes in directories

↓

SELECT
waypoint or route from directories

↓

NAVIGATE
using navigation screens

Overview

You must have entered waypoints into your directory before you can navigate with the TRAXAR GPS Navigator. You also may travel along a route — but waypoints must first exist in the Waypoint Directory to create routes.

From the position screen or main menu, you can select a waypoint or route as your destination. The first navigation screen will then appear. From any navigation screen, you can select **POS** to return to the position screen, or **WAYPT** or **ROUTE** to change your destination.

Navigation Screens

After you select your destination, the first navigation screen appears. Additional navigation screens appear in a series when you select the NAV option button repeatedly.

Screens NAV1, NAV2 and NAV3 apply to waypoint and route navigation. NAV4 and NAV5 appear only when you are navigating along a route.

Navigation information is displayed as follows. Refer to the diagrams with navigation terms in this section for definitions.

NAV1 SOG (speed over ground); COG (course over ground); RNG (range); BRG (bearing)

NAV2 Graphic Steering Guide; RNG (range)

NAV3 Date; Time; TTG (time to go); ETA (estimated time of arrival)

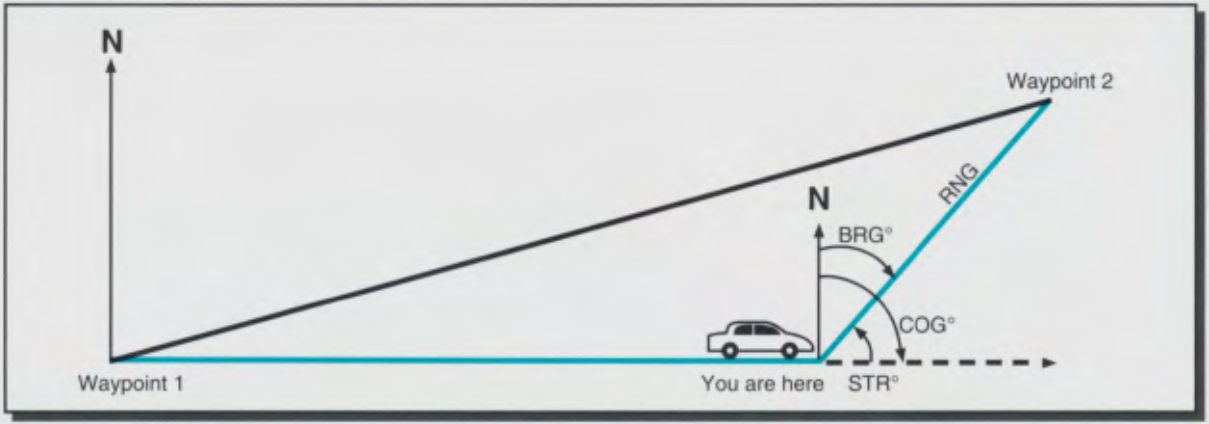
NAV4 XTE (cross track error); TMG (track made good)

NAV5 ATD (along track distance); DTK (desired track); DMG (distance made good); CMG (course made good); OFF (distance off); SMG (speed made good)

For Your Information

Navigation Terms

These acronyms appear on waypoint and route navigation screens.



Glossary

BRG Bearing The direction to your destination waypoint, measured in degrees from North.

COG Course Over Ground Your actual direction of travel, measured in degrees from North.

ETA Estimated Time of Arrival Estimated time you will reach destination (assumes you maintain current speed).

RNG Range Distance to destination (assumes direct course).

SOG Speed Over Ground Speed in direction of COG; speed.

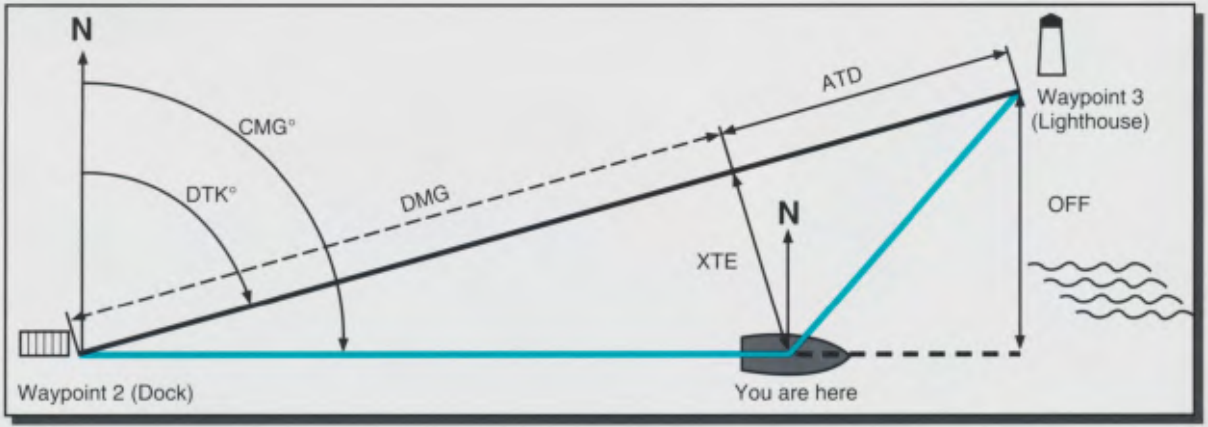
STR Direction to Steer Change in course required to reach selected destination waypoint, expressed in degrees to the left or right.

TTG Time to Go Estimated remaining travel time to destination waypoint (assumes you maintain current speed).

For Your Information

Route Navigation Terms

These acronyms appear only on route navigation screens (NAV4 and NAV5).



Glossary

ATD Along Track Distance — Distance to destination waypoint along the desired track.

CMG Course Made Good — Current course in degrees from North, measured from point of departure.

DMG Distance Made Good — Distance traveled along desired track.

DTK Desired Track — Direction to travel to reach destination waypoint on direct course from the point of origin for the selected leg of the route.

DFF Distance Off — Distance by which you will miss destination if you continue traveling in the current direction.

NEXT Navigate to Next Waypoint — Manually advances to navigation information for the next set of waypoints in route (next leg).

SMG Speed Made Good — Speed of progress toward your destination along the desired track.

TMG Track Made Good — Percentage of desired track completed.

XTE Cross Track Error — Deviation from your desired course.

"Help" Screens

The TRAXAR GPS Navigator has a special directory in its memory to help answer questions you may have.

Using the Help Screens

To use the help screens, select **7 Help** from the main menu. There are six categories of subjects available:

1 Almanac

2 Icons

3 Operate Modes

4 Satellite Tracking

5 Terms

6 Waypoints and Routes

Select the option box for the subject you are interested in, then use up and down arrows to scroll through explanatory screens. **QUIT** to exit subject and return to help menu. **QUIT** again to return to main menu.

More About Navigation

What's Been Covered?

The last section introduced a number of terms that appear on navigation screens. In the quick start exercise, you navigated to an actual waypoint using the TRAXAR GPS Navigator.

What's In This Section?

Navigation Overview

Navigation involves three basic steps: storing destinations (waypoints or routes) in directories; selecting them; and navigating to them from your current position.

STORE

To store waypoints and routes:

- Select **4 Waypoint Directory** from main menu; enter coordinates
- Select **5 Route Directory** from main menu and create a route

or

- **MARK** and **STORE** current position

SELECT

To select a destination:

- Select **2 Select Waypoint** from main menu; choose waypoint
- Select **3 Select Route** from main menu; choose route

or

- Select **WAYPT** or **RDUTE** from position screen

NAVIGATE

The first navigation screen (NAV1) will be displayed after you select your destination. Display additional screens by selecting NAV option button at the far left.

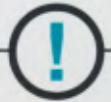
About Storing

You can store latitude and longitude coordinates for up to 100 locations in the Waypoint Directory. A waypoint must be in the directory before it can be used as part of a route.

Routes are made up of a maximum of 10 waypoints stored in the order you choose to travel between them. You can create and store up to 10 routes in the directory.

About Selecting

The waypoint or route you select as your destination is referred to as the waypoint or route "in control."



Check the Tracking Indicator when using navigation screens to ensure that information is based on current satellite data.

It is normal for the unit to lose its position fix periodically; for example: when satellite geometry becomes poor, or when the antenna's view of satellites is obstructed.

Waypoint Directory

Store waypoints in the Waypoint Directory by entering latitude and longitude coordinates or by storing a current position. Up to 100 waypoints may be stored.

The Waypoint Directory

With the Waypoint Directory screens you can:

- **FIND** a waypoint
- **EDIT** waypoints
  - –Store **NEW** waypoints
  - –**ALTER** waypoints
  - –**COPY** waypoints
  - –**DLETE** waypoints
- Get **INFO** on a waypoint
- **LOCK** or **UNLOK** a waypoint

Finding a Waypoint

Waypoint Directory Screen Example

Steps

From the main menu screen, select:

1. **4 Waypoint Directory.**
2. **FIND.**
3. **Up/down arrow** buttons to scroll through waypoints by number, or

   NAME and arrows to scroll by name.
4. **ENTER** when you find the waypoint you want.

INFO About Waypoints

Information Screen Example

Select **INFO** to see when the waypoint displayed was created. **CONT** brings back the EDIT screen.

LOCK or UNLOK Waypoints

Select **LOCK** or **UNLOK** to change access to waypoints in the directory. When locked, the padlock symbol in the upper right corner is closed. If you lock a waypoint, it cannot be altered or deleted from the directory. When unlocked, it may be changed.

Storing New Waypoints

WAYPOINT

You can input latitude and longitude coordinates to enter a waypoint into the directory, and assign it a name with up to eight characters.

Edit Screen Example

Steps

From the main menu screen, select:

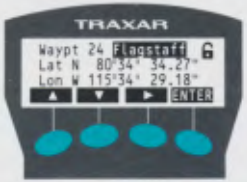
1. **4 Waypoint Directory**, then **EDIT** and **NEW.**
2. **Up/down arrow** buttons if you wish to change the assigned waypoint number.
3. **ENTER** when correct.
4. **Up/down/right arrows** to assign a name (you must enter a name; time codes are only assigned when you MARK and STORE a position).
5. **ENTER** when correct.
6. **Up/down/right arrows** to enter latitude.
7. **ENTER** when correct.
8. **Up/down/right arrows** to enter longitude.
9. **ENTER** when correct.
10. **ALTER** if not correct.
    STORE if correct.
    ABORT to leave the procedure without storing information.

Final Screen in Procedure Example

WAYPOINT

Altering Existing Waypoints

You can modify information stored in your directory. *Note: Locked waypoints cannot be changed unless you UNLOK them.*



Alter Screen Example

Steps
From the main menu screen, select:

1. **4 Waypoint Directory**, then **EDIT.**
2. **ALTER.**
3. **Up/down/right arrows** to change name.
4. **ENTER** when correct.
5. **Up/down/right arrows** to alter latitude.
6. **ENTER** when correct.
7. **Up/down/right arrows** to alter longitude.
8. **ENTER** when correct.
9. **ALTER** if not correct.
   STORE if correct.
   ABORT to leave the procedure without storing information.

Copying Waypoints

When the latitude and longitude coordinates for two waypoints are similar, you may wish to use **COPY** to reduce keying time. Select **4 Waypoint Directory** from main menu, then **FIND** to display the waypoint you want to copy. **ENTER.**

Steps

Display waypoint to be copied, then select:

1. **EDIT**, then **COPY.**
2. **Up/down arrows** if you wish to change the waypoint number assigned to the new waypoint. **ENTER.**
3. Follow steps 4-10 on page 42 to complete procedure.

Deleting Waypoints

To delete a waypoint from the directory, use **FIND** to display it. Select **EDIT** and **DLETE**. The question, "Are you sure you want to **DLETE** this waypoint?" appears, to protect against unintended deletion. Select **YES** to delete the waypoint.

Selecting Waypoint in Control

The waypoint you select as your destination is the "waypoint in control." You can change it any time while navigating.

Steps

Select:

1a **2 Select Waypoint** from main menu.

or

1b **WAYPT** option from position or navigation screens.

The Waypoint in Control screen appears.

Waypoint in Control Screen Example

2a **OK** if the waypoint displayed is your destination.

or

2b **CHANG** if you wish to select a different destination waypoint.

The Change Screen appears.

Change Screen Example

3a **Up/down arrow** buttons to scroll through waypoint directory by waypoint numbers.

or

3b **NAME** to scroll by names.

4 **ENTER** when the waypoint displayed is your destination. This is your new waypoint in control.

The first navigation screen (NAV1) appears.

Route Directory

Up to 10 routes may be stored in the Route Directory, each consisting of up to 10 waypoints.

The Route Directory

With the Route Directory screens you can:

- **FIND** a route in the directory
- **EDIT** routes
  - –Store **NEW** routes
  - –**ALTER** existing routes
  - –Name routes
  - –Scroll through the **LIST** of waypoints in a route and **INSRT** (insert), **DLETE**, or **CHANG** waypoints
  - –**CLEAR** or delete the entire route
- **LOCK** or **UNLOK** a route

Finding a Route

Route Directory Screen Example

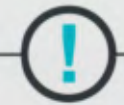
Steps

From the main menu screen, select:

1. **5 Route Directory.**
2. **FIND.**
3. a. **Up/down arrow** buttons to scroll through routes by route numbers.

   or

   b. **NAME** and **up/down arrow** buttons to scroll by names.
4. **ENTER** when the route you want is displayed at the top of the screen.



LOCK or UNLOK Routes

Select **LOCK** or **UNLOK** to change access to routes in the directory. When locked, the padlock symbol in the upper right corner is closed. If you lock a route, all waypoints in that route become locked and you must **UNLOK** the route to modify them in the waypoint directory.

Creating and Storing New Routes

You can combine a series of waypoints to create a route and store it in your Route Directory. Each route must consist of at least two waypoints. Waypoints must exist in the Waypoint Directory before they can be used in routes.

Route Directory Screen Example

Steps

Select:

1. **5 Route Directory** from main menu, then **EDIT** and **NEW.**
2. **Up/down/right arrows** to enter a name for your route (you must assign a name to routes).
3. **ENTER** when correct.

Now you're ready to input the waypoints that will make up your route. You should input them in the order to be traveled. You may later choose to begin navigating along the route at any starting point.

4. Waypoint number "00" is highlighted in the line that shows the first waypoint in your route. Is this your desired starting point? If so, **ENTER**. If not, scroll through directory using up/down arrows. **ENTER** when correct starting point is displayed (you may also scroll by waypoint names by selecting **NAME**).

5. **CONT** to continue assigning waypoints to your route.

6. Repeat step 4 to assign second waypoint in route. Does your route have more than two waypoints? If so, **CONT** and repeat step 4 until all waypoints (up to 10) are assigned. When finished, **STORE** to store, or **ABORT** to quit without storing route. **YES/NO** screen appears before procedure is aborted.

Final Screen in Procedure Example

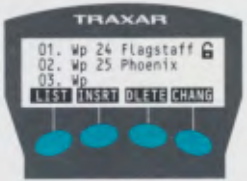
Altering Existing Routes

You can change the name of, or the assignment of waypoints in, a route stored in the Route Directory. Coordinates of a waypoint in a route cannot be changed while in the Route Directory; these must be altered in the Waypoint Directory.

Steps

Select:

1. **5 Route Directory** from main menu.
2. **EDIT**, then **ALTER.**
3. **Up/down/right arrows** to change characters in name.
4. **ENTER** when correct.



Alter Waypoints Screen Example

5. **LIST** to highlight:
   - The position where you want to insert a waypoint.
   - The waypoint you want to change or delete.

   or

6. Do one of the following:
   - To delete a waypoint, press **DLETE** and go to step 9.
   - To insert or change a waypoint select **INSRT** or **CHANG.**

7a **Up/down arrows** to enter waypoints by number.

or

7b **NAME** and **up/down/right arrows** to enter waypoints by name.

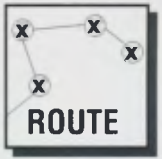
8 **ENTER** when correct.

9 **CONT** to continue altering routes; repeat steps 2-8 for each additional waypoint.

10 **STORE** when you finish entering changes for this route.

Note: You cannot edit/alter the breadcrumb route; see page 58.

Alter Screen Example



Selecting Route in Control

The route you select to navigate along is the "route in control." You can change it at any time while navigating.

Steps

Select:

1a **3 Select Route** from main menu.

or

1b **ROUTE** option from position or navigation screens.

The Route in Control screen appears.

Route in Control Screen Example

2a **OK** if the route displayed is the one you wish to navigate along. If so, the first navigation screen (NAV1) will appear.

or

2b **CHANG** if you wish to select a different route. If so, the change screen appears. Go to step 3.

Change Screen Example

3. **Up/down arrows** to scroll through routes in directory by route numbers. **ENTER** when correct.

4. **Up/down arrows** to select waypoint in route where you would like to start. This enables you to begin navigating at a waypoint in the middle of a route (after you stop for a break, for example). **ENTER** when correct.

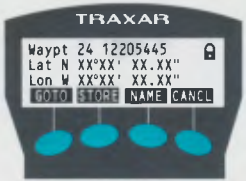
5. **Up/down arrows** to select direction (you can navigate forward through waypoints in a route – from 1 to 2 to 3...– or you can navigate in reverse – from 10 to 9 to 8, and so on). **ENTER** when correct.

6. **Up/down arrows** to select AUTOmatic waypoint advance or USER (manual) waypoint advance. **ENTER** when correct. With AUTO, the unit automatically displays the next leg of your trip when you've reached the previous waypoint. With USER, you must select **NEXT** to receive navigation information for next leg of your trip.

SPECIAL FEATURE

Man Overboard!

You can mark a position and quickly display navigation information to return to it. ***IMPORTANT NOTE: Check Tracking Indicator to see if the position you're marking is based on current satellite data! Also, you must be in continuous acquisition mode to MARK (page 62).***



Mark Screen Example

Steps

From any screen press:

1. **MARK** key.
2. **GO TO**

   The position is stored with the time code as a name and becomes the Waypoint in Control. The first navigation screen appears.
3. Use navigation screens to return to the marked waypoint.

SPECIAL FEATURE

Breadcrumb Route

Note: Waypoints in the breadcrumb route are entered automatically when you mark and store positions. Always check the Tracking Indicator to see if positions you're marking are based on current satellite data.

What Is It?

The TRAXAR GPS Navigator automatically saves the last 10 waypoints you marked in the "Breadcrumb Route" in your Route Directory. These waypoints are like breadcrumbs dropped along your path...they can be followed to retrace your steps. That's what the breadcrumb route does -- it guides you back along the path you've marked.

Note: As with other routes, you can use the Route in Control screen to select USER or AUTO waypoint advance, and travel FWD or REV through waypoints in the route. The unit is preset (will default) to AUTO and REV.

Navigating Along the Route

Once you have marked and stored at least two positions, select:

1. **3 Select Route** from main menu.
2. **HOME**

   The first navigation screen should now be displayed; the last marked position is your first destination waypoint when traveling your prior course in reverse. Use NAV screens as you normally would.

SPECIAL FEATURE

Breadcrumb Route (cont.)

Other Notes

The Breadcrumb Route exists in addition to the 10 routes you can store in the Route Directory.

You should clear waypoints from the breadcrumb route before starting a new trip. If you wish to mark and store waypoints especially for use in breadcrumb navigation, remember that only the last 10 waypoints marked are retained in the breadcrumb route. If you'll have 10 or fewer waypoints in your breadcrumb route, you may wish to name your starting position "START" or "HOME" to help you easily identify when you've returned to your starting point.

You can clear waypoints from the breadcrumb route, but you cannot alter it. Also, when you clear the entire route, it will not appear in the route directory again until you have subsequently marked and stored two positions.

What's Been Covered?

You should now be able to use the TRAXAR GPS Navigator for positioning, navigating and related functions. In the following section, you'll learn more about optional settings and how you can customize your unit.

Customizing Your Unit

What's In This section?

For Your Information

Configuration Menu

You can change settings that affect how the TRAXAR GPS Navigator collects and displays information. These are called "configuration settings."

Listed at right are the nine categories of configuration settings for the TRAXAR GPS Navigator. To work with them, select **6 Configuration** from the main menu.

Configuration Settings

1. **Alarms** – Audio; Arrival; Q; Passed Waypoint; Cross-Track
2. **Estimated Position**
3. **Frame of Reference** – Altitude Reference; Lat/Lon Format; Datum; North Reference
4. **Operate Setup** – Operate Mode; Position Type
5. **Output Options** – Update Rate; IO (Input/Output) Port; IO Format
6. **Power Options** – Battery Saver, Shutdown Time; Light Timer; Elapsed Battery Time
7. **Time Entry** – Date; Time; UTC Offset
8. **Units of Measure** – Dist./Speed; Elevation
9. **Screen Controls** – Contrast

For Your Information

Configuration Settings

The following pages explain the function of various configuration settings. A table showing factory default settings is provided on page 64.

1. Alarms
The alarm symbol flashes on the screen when an alarm is turned on and the parameters for activation have been met. If so, select **8 Alarm Status** from main menu to view message (flashing will then stop). Audible alarms are available when unit is mounted in mounting bracket accessory. Alarms include: arrival (set the alarm limit); Q rating (set limit; an asterisk will appear next to Q rating when this alarm is on); passed waypoint; and cross track error (set limit). More information on alarms is provided on page 75.

2. Estimated Position
You may improve acquisition time by estimating your position. Use up/down/right arrows to enter N or S; E or W; and coordinates for latitude, longitude and height. **ENTER** after each entry.

3. Frame of Reference
Includes choice of altitude reference (relative to mean sea level or calculated using map datum); format you'd like to see latitude and longitude displayed in; selection of map datum; choice of navigation information relative to true or magnetic North; and automatic or manual correction for magnetic variation (input in degrees).

Configuration Settings (cont.)

4. Operate Setup
The unit operates in one of three modes: **In continuous mode,** the unit continually attempts to acquire satellite data; use this mode for navigation on-the-go. This mode consumes the greatest amount of power. **In single-fix mode,** the unit will attempt to acquire satellite data only once, then will shut down after one minute to conserve battery power. Use this mode when referring to screen only periodically for information. **In no-track mode,** the unit will not attempt to acquire satellite data; use this mode while performing tasks which do not require a current position fix. This mode consumes the least amount of power.

In addition to operating mode, position type is selected with this screen: automatic (2D and 3D as available); 2D (2D position displayed only; enter height to hold); or 3D (position only displayed when sufficient satellite data exists to determine height).

5. Output Options
Select rate that information will be updated on your screen (every 1 to 9 seconds). Activate IO Port to output data through mounting bracket accessory; select output format and NMEA output messages.

6. Power Options

Turn battery saver on and off; establish shutdown time (1 to 9 minutes); and turn light timer on and off. Also displays elapsed battery time, and allows you to reset it when new batteries are installed (select **CONT** after checking elapsed battery time; **RESET** to zero). *Note: Elapsed Battery Time is not an indicator of remaining battery life, which is dependent on multiple factors. It also does not reflect the drain on batteries in storage. Used properly, it can be a useful tool for estimating battery life.*

7. Time Entry

Set date; time; a.m., p.m. or 24 hr format; and UTC Offset (-12.0 to +12.0 hrs from Greenwich Mean Time).

8. Units of Measure

Select dist./speed units (m/mps; nm/knots; mi/mph; or km/kph) and elevation units (M or FT).

9. Screen Controls

Use up/down arrows to adjust screen contrast (1-least to 9-most).

For Your Information

Optional and Factory Settings

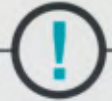
You can return configuration settings to all factory defaults by selecting **9 Utilities** from the main menu, then selecting **3 Default Unit** (**CONT** to default). This also will reset elapsed battery time, erase the almanac (resulting in cold start) and erase all stored waypoints and routes!

Setting	Options	Default
1. Alarms		
Audio	OFF, ON	OFF
Arrival	OFF, ON	OFF
Limit	0-9,999 m*	100 m
Q	OFF, ON	OFF
Limit	2-4	4
Passed Wp	OFF, ON	OFF
Cross-Track	OFF, ON	OFF
Limit	0-9,999 m*	100 m
2. Estimated Position	Your Input	Lat N 00°00'00.00" Lon E 000°00'00.00" Ht +0 m

Setting	Options	Default
3. Frame of Reference		
Altitude Ref	MSL, DATUM	MSL
Lat/Lon Format	DDD°MM'SS.SS", DDD°MM.MMM'	DDD°MM'SS.SS"
Datum	See page 83	WGS 84
North Ref	TRUE, MAGNETIC	TRUE
4. Operate Setup		
Operate Mode	CONT, NO TRK, SINGLE	CONT
Position Type	AUTO, 3D, 2D	AUTO
Ht. to Hold (for 2D)	-1,000 m to +18,288 m -3,280 to +60,000 ft	+0 m

*0 to 9.999 m; 0 to 9.9 km; 0 to 6.1 mi; 0 to 5.3 nm.

Setting	Options	Default
5. Output Options		
Update Rate (screen)	1 to 9 sec.	1 sec.
I/O Port	OFF, ON	OFF
I/O FORMAT	MOTOROLA, NMEA	MOTOROLA
NMEA GGA	OFF, ON	OFF
NMEA GLL	OFF, ON	OFF
NMEA RMB/C	OFF, ON	OFF
NMEA APA	OFF, ON	OFF
NMEA BWC	OFF, ON	OFF
NMEA XTE	OFF, ON	OFF



Output to Other Devices

The TRAXAR GPS Navigator can transfer data to other electronic devices in NMEA 0183, Version 2.00 format. This requires use in a mounting bracket accessory. To activate the data port, select **6 Configuration** from the main menu, then **5 Output Options**. Available NMEA messages include GGA, GLL, RMB/C, APA, BWC and XTE (see glossary for definitions).

For Your Information

Optional and Factory Settings (cont.)

Setting	Options	Default
6. Power Options		
Battery Saver	OFF, ON	OFF
Shutdown Time	1 to 9 min.	3 min.
Light Timer	ON, OFF	ON
Elapsed Battery Time	Actual/Reset	00 hrs 00 min.
7. Time Entry		
Date and Time (set)		
Time	12 hr (p.m./a.m.), 24 hr	12 hr
UTC Offset	-12 to +12.0 hrs	00.0 hrs
8. Units of Measure		
Dist./Speed	M/MPS, NM/KNOTS, MI/MPH, KM/KPH	M/MPS
Elevation	M, FT	M
9. Screen Controls		
Contrast	1 to 9	5

Appendices

What's In This section?

APPENDIX
A

Glossary of Terms

These terms and acronyms relate to operating the TRAXAR GPS Navigator. Refer to pages 32-35 for diagrams explaining selected navigation terms.

Abort/Cancl Option button: returns to previous screen without storing changes or additions.

Acquisition Time Time needed for unit to lock on to the required number of satellites.

Almanac Record of satellite orbits and related data. Used to predict satellite location in the unit's field of view.

Alarms Icons and audio and/or visual indications of a change in status. Alarm symbol appears in lower left corner of the screen.

Alter Option button: enables user to change existing routes or waypoints.

APA NMEA message output to compatible electronic devices; Autopilot Sentence.

ATD Along Track Distance: distance to the destination waypoint along the desired track.

Auto

1. Optional configuration setting for route navigation; when selected, unit automatically will display navigation information for the next set of waypoints in a route when the previous waypoint has been reached.
2. Optional configuration setting which, when selected, instructs the unit to automatically display all position types as available (2D and 3D).

Breadcrumb Navigation	Feature that enables you to retrace your path by navigating back to the last 10 waypoints marked and stored.
BRG	Bearing: the direction to your destination waypoint measured in degrees from North.
BWC	NMEA message output to compatible electronic devices; Bearing & Distance to Waypoint.
Clear	Option button: erases items from memory.
CMG	Course Made Good: current course in degrees from North measured from the point of departure.
CONT	1. Option button: stores data and returns screen to operation in process. 2. Optional operating mode (continuous) in which unit continuously searches for GPS satellite signals.
Copy	Option button: duplicates waypoint or route information under a different waypoint or route number.
COG	Course Over Ground: your actual direction of travel measured in degrees from North.
Configuration Screens	Screens used to customize the unit's operation.
Datum	A point of origin and equations that describe the earth's curve and vertical rise for a specific locale; relates height measurements. The datum used to create a particular map should be identified in the map legend.

APPENDIX
A

Glossary of Terms (cont.)

DMG Distance Made Good: distance traveled along desired track.

DTK Desired Track: direction to travel to reach destination waypoint based on direct course from the point of origin for the selected leg of the route.

Edit Option button: enables a user to make changes or additions to waypoints or routes.

Enter Option button: stores information and displays next screen or moves cursor to next field.

EST Position display is estimated; not current. Q rating may be disregarded.

ETA Estimated Time of Arrival: estimated time you will reach your destination (assumes you maintain current speed).

FIND Option button: enables user to scroll through and display waypoints and routes in directories.

GOTO Option button: stores information and displays navigation screen.

GGA NMEA message output to compatible electronic devices; Global Positioning System Fix Data.

GLL NMEA message output to compatible electonic devices; Geographic Position — Latitude/Longitude.

HOME Option button: selects breadcrumb route and displays navigation screen.

INFO Option button: displays information about when a waypoint was stored in the directory.

Latitude Distance north or south of the equator, measured in degrees.

Longitude Distance, east or west of the prime meridian (a line running through Greenwich, England), measured in degrees.

LIST Option button: scrolls through the waypoints in a route to enable you to highlight one for editing. Depress and hold for a fast scroll.

LOCK Option button: indicated by a closed padlock, it prevents modification of routes and waypoints.

MAGVAR Magnetic variation from true North; dependent on position.

Man Overboard Navigation feature that enables you to mark a location as you pass it and navigate back to it.

MARK Key used to mark current latitude and longitude.

MENU Option button: displays menu screen.

MORE Option button: displays the next screen in a sequence.

MSL Mean Sea Level.

NAME Option button: enables user to search for waypoints or routes by name.

NEXT Option button: manually advances to navigation information for the next set of waypoints on a route.

NMEA National Marine Electronics Association.

NORTHREF The North reference to be used in positioning and navigating either true North or magnetic North.

APPENDIX
A

Glossary of Terms (cont.)

NUMBR	Option button: enables user to search for waypoint or route by number.
Q	Quality Rating: indicates quality level of the geometric arrangement of satellites from which data was used to calculate position.
QUIT	Key that enables you to leave an operation; when pushed repeatedly it returns screen to main menu.
OFF	Distance Off: distance by which you will miss destination if you continue traveling in current direction.
OLD	Position displayed is the last one the unit calculated; not current. Q rating for the old position is displayed.
POS	Position expressed in latitude, longitude and sometimes height.
Position Fix	The latitude, longitude (and sometimes height) of a location based on current satellite data. Position fix may be "lost" if one of the satellites used to determine it is obstructed from view, etc.
Pt	Set of waypoints for which navigation information is to be displayed, in a route; the "leg" or portion of the route to be traveled.
RMB/C	NMEA message output to compatible electronic devices; Recommended Minimum Navigation Information.
RNG	Range: distance to destination waypoint, assuming direct course.
Route	Series of waypoints navigated in a specific order.

ROUTE	Option button: enables user to select route to navigate along.
Route in Control	Route you have selected to travel along.
SMG	Speed Made Good. Speed of progress toward your destination along the desired track.
SOG	Speed Over Ground: speed in direction of COG; speed.
Start Pt	The starting point of your unit when you begin traveling on a route.
STR	Steer: direction to steer from your current position to attain desired bearing to your waypoint, expressed in degrees to the left or right.
STORE	Option button: saves information, completes procedure and displays menu or decision screen.
2D	Latitude and longitude information is current (height may be incorrect.)
3D	Latitude, longitude and height information are current.
TMG	Track Made Good: percentage of desired track completed.

APPENDIX
A

Glossary of Terms (cont.)

Tracking Indicator — Circle symbol in upper left corner of screen. When flashing, warns that position information is not based on current satellite data. When solid, position is current.

TTG — Time to Go: estimated remaining travel time to destination waypoint (assumes you maintain current speed).

UNLOK — Option button: indicated by an open padlock, it allows modification of route and waypoint information.

USER — Optional configuration setting for route navigation; when selected, user manually instructs unit to display navigation information for the next set of waypoints in a route.

UTC — Universal Time Coordinated: The difference, in hours, between the time at your location and the time in Greenwich, England (Greenwich Mean Time). This time entry tells the unit which satellites to search for.

Waypoint — A specific location expressed in latitude and longitude.

WAYPT — Option button: displays the destination or waypoint in control.

Waypoint in Control — Waypoint you have selected as your destination.

XTE

1. Cross Track Error: deviation from your desired course.
2. NMEA message output to compatible electronic devices; Cross-Track Error, Measured.

APPENDIX
B

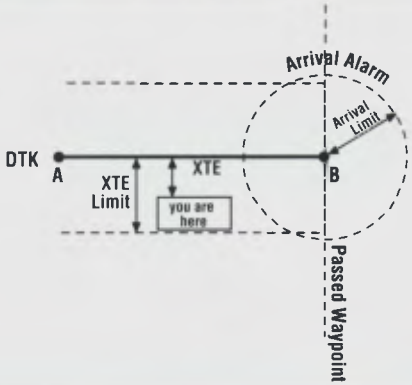
Alarms

You may activate up to five different alarms to assist you while navigating. When tripped, the alarm symbol will flash in the bottom left corner of your screen. If this happens, select **8 Alarm Status** from the main menu to view the message; the symbol will stop flashing.

Working With Alarms

You can work with alarms by selecting **6 Configuration** from the main menu, then **1 Alarms**. Default settings are on pages 64-65, including the parameter ("limit") you can establish for alarm activation. The audible alarm requires use in the mounting bracket accessory.

- Audio Alarm (in mounting bracket only)
- Arrival Alarm
- Q Alarm (Q* will replace Q on your screen when on)
- Passed Waypoint Alarm
- X (Cross)-Track Error Alarm (routes only)



APPENDIX C

Specifications

Physical Specifications

Size:	7.5" x 3.6" x 2.0"
Weight:	17 oz. with batteries
Display:	4-line, 20 character, supertwist, backlit LCD
Temperatures–	
Operating:	+14°F to +140°F
Storage:	-40°F to + 176°F
Relative Humidity:	95% at +140°F
Water Resistant:	Yes
Datums:	49 std datums, default WGS-84

Note: Specifications may change without notice.

Electrical Specifications

6-Channel GPS Receiver

Power:	6 alkaline AA batteries (standard) external 12V (with mounting accessory bracket)
Update Rate:	1.0 second (user selectable, 1-9 seconds)
Accuracy:	SA off ± 25M, 2D RMS (lat/lon) SA on ± 100M, 2D RMS (lat/lon)
Dynamic Tracking:	velocity: 1000 knots (1150 mph, 514 m/sec) acceleration: 4g
Time to first fix:	Hot start - 24 seconds typical Warm start - 45 seconds typical Cold start - 15 minutes typical

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D

Recommended Use Environment

Specifications on page 76 provide outside parameters for handling the TRAXAR GPS Navigator. In normal use, follow these general guidelines:

- Wipe clean with a soft cloth.
- Water resistant, but do not immerse in water.
- Do not store in below zero temperatures or in direct sunlight.
- Do not operate in excessively cold or hot conditions.
- Store with fresh alkaline batteries installed to maintain data for nine to 20 months (see page 9).

APPENDIX
E

Accessories

Ask your dealer, or call Motorola at 1-800-421-2477, for more information on accessories offered for the TRAXAR GPS Navigator. Refer to operating information provided with accessories for guidelines on their proper use.

Smart Bracket™ Accessory

- Enables transfer of data to other electronic devices in NMEA 0183, Version 2.00 format.
- Powers TRAXAR GPS Navigator from external source; accepts 11Vdc to 36Vdc power.
- Provides audible alarms.
- Provides secure mount for TRAXAR GPS Navigator on cabin console, dashboard, etc.
- May be used with or without remote antenna.

Remote Antenna

- Enables reception of satellite data when TRAXAR GPS Navigator is used in an environment which would normally obstruct signal acquisition.
- Must be used in conjunction with Smart Bracket.
- Powered by Smart Bracket.
- Active microstrip patch antenna module.
- Low profile with diameter of only 10 cm.

APPENDIX
F

UTC Offset Map

The UTC Offset value is the difference between the time where you are, and the time in Greenwich, England (Greenwich Mean Time). If you're unsure of your UTC Offset, this and the following map may help although they are not precise. *Note: Be sure to account for daylight savings time and local variations in time zones!*

Standard Time

During Daylight Savings Time in summer, time and UTC Offset are generally set ahead one hour.

APPENDIX
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U.S. Time Zone Map

Note: Be sure to account for daylight savings time and local variations in time zones!

Time Zone	UTC Offset
Pacific	-8.0 hrs
Mountain	-7.0 hrs
Central	-6.0 hrs
Eastern	-5.0 hrs
Atlantic	-4.0 hrs

Standard Time

During Daylight Savings Time in summer, time and UTC Offset are generally set ahead one hour.

APPENDIX G

Selected Position Coordinates

You may improve satellite acquisition time by estimating your position. If you're unsure about what coordinates to use, consult a map showing latitude and longitude. If such a map is not available, this list may help.

United States; Selected Cities:

Alabama (Montgomery), N 32° 23' W 86° 18'
Alaska (Fairbanks), N 64° 51' W 147° 43'
Arizona (Phoenix), N 33° 26' W 112° 04'
Arkansas (Little Rock) N 34° 44' W 92° 17'
California (San Francisco) N 37° 46' W 122° 25'
Colorado (Denver), N 39° 4' W 104° 39'
Delaware (Dover) N 39° 10' W 75° 31'
Florida (Tampa) N 27° 56' W 82° 27'
Georgia (Atlanta) N 33° 44' W 84° 23'
Honolulu (Hawaii) N 21° 19' W 157° 52'
Idaho (Boise) N 43° 36' W 116° 12'
Illinois (Chicago) N 41° 51' W 87° 39'
Indiana (Indianapolis) N 39° 46' W 86° 09'
Iowa (Des Moines) N 41°36' W 93° 36'
Kansas (Topeka) N 39° 02' W 95° 40'
Kentucky (Frankfort) N 38° 12' W 84° 52'
Louisiana (New Orleans) N 29° 57' W 90° 04'
Maine (Portland) N 43° 39' W 70° 15'
Maryland (Baltimore) N 39° 17' W 76° 36'
Massachusetts (Boston) N 42° 21' W 71° 03'
Michigan (Detroit) N 42° 20' W 83° 03'
Minnesota (Minneapolis) N 44° 58' W 93°15'
Missouri (St. Louis) N 38° 37' W 90° 11'
Montana (Helena) N 46° 35' W 112° 02'
Nebraska (Omaha) N 41° 15' W 95° 56'
Nevada (Reno) N 39° 30' W 119° 5'
New Jersey (Trenton) N 40° 13' W 74° 44'
New Mexico (Albuquerque) N 35° 05' W 106° 39'
New York (New York) N 40° 43' W 74° 01'
North Carolina (Raleigh) N 35° 46' W 78° 38'
North Dakota (Bismarck) N 46° 48' W 100° 47'
Ohio (Cleveland) N 41° 29' W 81° 41'
Oklahoma (Oklahoma City), N 35° 28' W 97° 30'
Oregon (Portland) N 45° 31' W 122° 40'

APPENDIX
G

Selected Position Coordinates (cont.)

Pennsylvania (Philadelphia)
N 39° 57' W 75° 09'
Rhode Island (Providence)
N 41° 49' W 71° 24
South Carolina (Columbia)
N 3° 00' W 81° 02'
South **Dakota** (Pierre) N 44° 22' W 100° 21'
Tennessee (Memphis) N 35° 08' W 90° 02'
Texas (Houston) N 29° 45' W 95° 21'
Utah (Salt Lake City) N 40° 45' W 111° 53'
Virginia (Norfolk) N 36° 50' W 76° 17'

Washington (Tacoma) N 47° 15 W 122° 26'
Washington, D.C. N 38° 53' W 77° 02'
West Virginia (Charleston)
N 38° 20' W 81° 37'
Wyoming (Cheyenne) N 41° 08' W 104° 49'

APPENDIX H

Map Datums

The TRAXAR GPS Navigator references mean sea level when displaying your height, when using factory default configuration settings. You may instead designate a map datum as the point of reference. The default datum is WGS-1984; you also may choose another of the 48 datums listed below. The TRAXAR GPS Navigator sometimes refers to them with abbreviations.

ARC 1950
ARC 1960
Australian Geodetic 1966
Australian Geodetic 1984
Bogota Dbservatory
Campo Inchauspe
Cape
Carthage
Chatham 1971
Chua Astro
Corrego Allegre
European 1950 Cyprus
European 1950 Egypt
European 1950 Iran
European 1950 Sicily
European 1979
Gandajika Base
Geodetic Datum 1949
Hjorsey 1955
Indian (Bngldsh/India/Nepal)
Ireland 1965
Kertau 1948
Liberia 1964
Luzon
Massawa
Merchich
Minna
Nahrwan
North American 1927 Conus
North American 1927 Alaska
North American 1927 Canada
North American 1927 Central America
North American 1983
Old Egyptian
Old Hawaiian
Oman
Ordinance Survey of Great Britain 1936
Pitcairn Astro 1967
Quatar National
Qornoq
Schwarzeck
South American 1969
Timbalai 1948
Tokyo
Zanderij
WGS-1972
WGS-1984

APPENDIX I

Common Questions

These are questions that may arise when you first begin using the TRAXAR GPS Navigator. If you need additional assistance, call Motorola at 1-800-272-1477.

Why are my GPS readings so different from my compass readings?
If you compare readings between the TRAXAR GPS Navigator and a compass, they may vary depending on the configuration of your unit. See page 61 for information on selecting true or magnetic North as a North Reference.

Why isn't my unit locking on to satellites?
Make sure you are outside with a clear view of the sky. Hold the unit roughly parallel to the ground. Check your operating mode; you must be in continuous or single-fix mode to acquire satellite signals. Check your date, time and UTC offset; the unit relies on them to predict which satellites should be overhead. If a position fix still is not made within 10-15 minutes, check the Satellite Status screen. If the words "Collecting Almanac" appear, wait a while longer. If not, turn the unit off and on, then try again. *Note: Enter an estimated position if: 1) the unit is positioning outside the United States for the first time; 2) you have moved more than 1000 miles since your last position fix; or 3) you have not positioned with the TRAXAR GPS Navigator for several months.*

How will I know when the position display is current?
The Tracking Indicator will stop flashing and appear solidly on the screen. Also, the terms OLD or EST will be replaced with 2D or 3D.

Why does the screen disappear when I turn the unit on?
Your batteries are probably running low. Replace them (page 8) or check for proper installation.

How can I conserve battery power?
Make sure you're in no-track operating mode when you work with the TRAXAR GPS Navigator inside. You may also wish to use single-fix mode when you're outside and need only one position fix. The automatic shutdown time and light timer can also help you save power.

Why can't I unlock this waypoint and alter it?
The waypoint you've selected must be included in a route that is locked. You may proceed after you unlock this route.

Why do the position and velocity displays indicate movement when I'm standing still?
This is a normal effect of a U.S. government policy called "Selective Availability" (page 22). You may configure the unit to update data less frequently (page 63) if you find it distracting.

I'd like to alter a waypoint in my directory. Why has a question appeared on the screen asking if I want to alter the "route in control"?
The waypoint you're attempting to alter is included on the route that is currently selected for travel. This question prevents you from accidentally changing information about a waypoint you are traveling to.

APPENDIX J

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Your Notes

FCC Information

Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Consult the dealer for help.

MOTOROLA

Part No. 68B40940U02