GPS 12CX

Personal Navigator

Owner's Manual & Reference

GARMIN®

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GPS 12CX OWNER'S MANUAL

Packing List

Thank you for choosing the GARMIN GPS 12CX—the smallest, easiest-to-use GPS navigator for outdoor use! The GPS 12CX represents GARMIN's continuing commitment to provide quality navigation information in a versatile and user-friendly flexible design you'll enjoy for years. To get the most from your new GPS, take the time to read through the owner's manual in order to understand the operating features of the GPS 12CX. This manual is organized into four sections for your convenience:

Introduction— gives a quick overview of the manual and contains the table of contents and the glossary of navigational terms.

Quick Start— introduces you to the basic features of the unit and provides a quick-start orientation to the GPS 12CX.

Reference— provides details about the advanced features and operations of the GPS 12CX by topic.

The Appendices— contains initialization instructions and items with multiple listings, such as map datums, time offsets, and the index.

Before getting started with your GPS, check to see that your GARMIN GPS 12CX package includes the following items. If you are missing any parts, please contact your dealer immediately.

Standard Package:

- GPS 12CX Unit
- Owner's Manual
- Wrist Strap
- Quick Reference Guide

Caution

The GPS system is operated by the government of the United States, which is solely responsible for its accuracy and maintenance. The system is subject to changes which could affect the accuracy and performance of all GPS equipment. Although the GPS 12CX is a precision electronic NAVigation AID (NAVAID), any NAVAID can be misused or misinterpreted and, therefore, become unsafe.

Use the GPS 12CX at your own risk. To reduce the risk of unsafe operation, carefully review and understand all aspects of this Operator's Manual and thoroughly practice operation using the simulator mode prior to actual use. When in actual use, carefully compare indications from the GPS 12CX to all available navigation sources including the information from other NAVAIDs, visual sightings, maps, etc. For safety, always resolve any discrepancies before continuing navigation.

NOTE: This device meets requirements for Part 15 of the FCC limits for Class B digital devices for home or office use. It has been tested for compliance with all necessary FCC standards. 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 other equipment, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by relocating the equipment or connecting the equipment to a different circuit than the affected equipment. Consult an authorized dealer or other qualified service technician for additional help if these remedies do not correct the problem. Operation is subject to the following conditions: (1) This device cannot cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The GPS 12CX does not contain any user-serviceable parts. Repairs should only be made by an authorized service center. Unauthorized repairs or modifications could void your warranty and your authority to operate this device under Part 15 regulations.

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Glossary

The GPS 12CX is a powerful navigation tool that can guide you anywhere in the world. To better understand its operation and capabilities, it may be helpful to review the basic terms and concepts briefly explained below.

Other navigation and GPS definitions used in the manual are defined in the appropriate reference sections of the manual.

Almanac Data
Satellite constellation information (including location and health of satellites) that is transmitted to your receiver from every GPS satellite. Almanac data must be acquired before GPS navigation can begin.

Bearing
The compass direction from your position to a destination.

Course Made Good (CMG)
The bearing from the "active from" position (your starting point) to your present position.

Crosstrack Error (XTK)
The distance you are off a desire course in either direction.

Desired Track
The compass course between the "from" and "to" waypoints.

Differential GPS (DGPS)
An extension of the GPS system that uses land-based radio beacons to transmit position corrections to GPS receivers.

Estimated Time of Arrival (ETA)
The time of day of your arrival at a destination.

Estimated Time Enroute (ETE)
The time left to your destination at your present speed.

Glossary

Grid
Coordinate system that projects the earth on a flat surface, using square zones for position measurements. UTM/UPS and Maidenhead formats are grid systems.

Ground Speed
The velocity you are traveling relative to a ground position.

Latitude
The north/south measurement of position perpendicular to the earth's polar axis.

Navigation
The process of traveling from one place to another and knowing where you are in relation to your desired course.

Position
An exact, unique location based on a geographic coordinate system.

Track (TRK)
The direction of movement relative to a ground position.

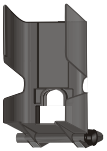
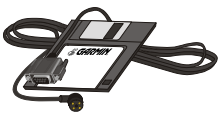
Universal Transverse Mercator (UTM)
A grid coordinate system that projects global sections onto a flat surface to measure position in specific zones.

Velocity Made Good (VMG)
The speed you are traveling in the direction of the destination.

Waypoint
A specific location saved in the receiver's memory.

Accessories

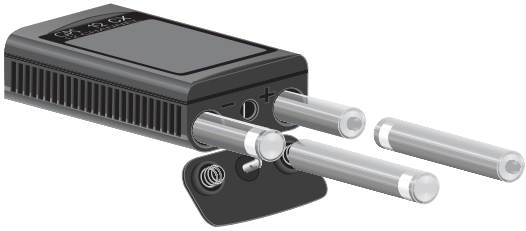
Accessories are available from your dealer or directly from GARMIN. To order an accessory directly from GARMIN, call (913) 397-8200 between 8:00 am and 5:00 pm Central Time.

	*Swivel Mount Bracket* *Part Number—010-10048-00* Mount will swivel 360° at base, unit can be tilted approximately 30° forward or backward.
	Carrying Case *Part Number—010-10117-00* Zippered case is lined and has a belt loop .
	GA 27 Amplified Antenna *Part Number—010-10052-00* Helps the GPS 12CX acquire weak satellite signals. Great for the car!
	Cigarette Lighter Adapter *Part Number—010-10085-00* Plugs into 12 and 24 volt systems to run the GPS 12CX on external battery power.
	*PC Software and Cable Kit* *Part Number—010-10054-00* This DOS based software allows you to easily manage and create waypoint and routes.

Not Shown:

Bicycle Mount – 010-10115-00
Power Data Cable – 010-10082-00
Data Transfer Cable (unit to unit) – 010-10142-00
PC Interface Cable (serial connector only) – 010-10165-00
PC Interface Cable (wo/lighter adapter) – 010-10141-00
GA 28 Marine Antenna – 010-10052-00

Battery Installation

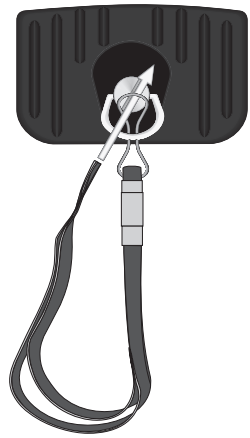


The GPS 12CX operates on 4 AA batteries (included), which are installed at the base of the unit. These batteries provide up to 36 hours of use in "Power Saver" mode.

To install the batteries:

1. Remove the battery cover by turning the thumb loop at the bottom of the unit 1/4 turn counter- clockwise.
2. Insert the batteries into position. The battery pole that you can still see should match the symbol (+ or -) marked on the case.
3. Replace and secure the battery cover by turning the thumb loop 1/4 turn clockwise.

Battery life varies due to a variety of factors, including temperature and backlighting. You may find that lithium batteries provide longer life in colder conditions.



To install the carrying lanyard, place the loop at the end of the lanyard through the thumb loop on the battery cover, route the lanyard back through the loop and pull tight.

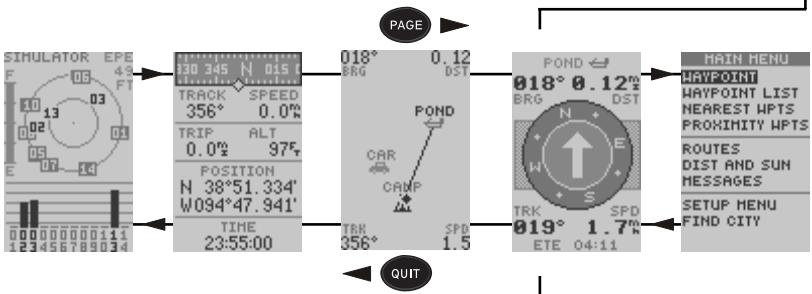
Keypad Usage & Data Entry

*Press the **ROCKER** key up or down to select letters or numbers in a data field. Pressing the **ROCKER** key left or right, moves the cursor forward or backward along the data path.*

	The *POWER* key turns the unit on and off, activates the screen backlighting and contrast control.
	The *PAGE* key scrolls through the main data pages in sequence and returns display from a submenu page to a primary page.
	The *MARK* key captures a position and displays the mark position page.
	The *GOTO* key displays the GOTO page with the waypoint highlighted for GOTO operation. Pressing the GOTO key twice activates MOB.
	The *ENTER* key confirms data entry and activates highlighted fields to allow data entry.
	The *QUIT* key returns the display to a previous page, or restores a data field' s previous value.
	The *IN* and *OUT* keys either increase or decrease the map scale.
	The *ROCKER* key controls the movement of the cursor and is used to select options, positons, and to enter data.

Primary Pages

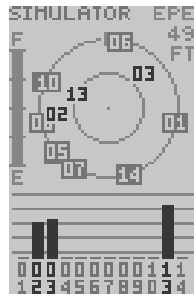
The GPS 12CX has five primary information pages, the Satellite, Position, Map, Navigation and Menu pages. Pressing the ***PAGE*** key will move the display forward through the information pages, pressing the ***QUIT*** key will move the display backward through the pages. Below is a brief overview of each page. A detailed description of each information page is available in the reference section of this manual.



Satellite Page

The Satellite Page shows satellite positions and signal strength. Satellite positions are displayed using two circles and a center point. The outer circle shows satellites on level with the horizon; the inner circle is 45° above the horizon; and the center point represents satellites directly overhead. Knowing satellite positions will show you the direction of any blocked signals.

The bottom of the page contains a row of signal strength bars corresponding to each satellite being used.



Satellite Page

Only solid bars on the Satellite page represent satellites being used for navigation

Position Page

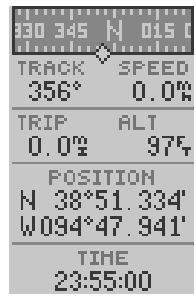
The Position Page shows you where you are, what direction you are heading and how fast you are going.

The top of the page shows a compass tape. The compass tape provides a graphic representation of your track. Your track and speed are displayed directly below the compass tape.

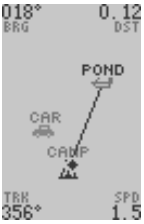
> The graphic compass tape reflects your track only while you are moving.

The next fields on the page are the Trip and Alt fields. Further information on these fields can be found on page (12).

The rest of the page shows your current location in three dimensions; latitude, longitude, and altitude. A 12/24 hour clock is provided at the bottom of the page.



Position Page



Map Page

The Map Page shows your progress on a moving map plotter and gives a bird's-eye-view of surrounding waypoints.

Compass Page

The Compass Page is the default navigation page and will show you the direction of the waypoint relative to the direction that you are traveling.

Menu Page

The Menu Page allows quick access to the unit setups, and the waypoint management system.

Map Page

The **Map Page** allows you to view your position, the "path" you have traveled over, and nearby waypoints.

A diamond icon in the center of the screen represents your current position. As you move, you will see a thin line - called a *track log* - appear along the path you have just covered. Names of stored waypoints can also be shown on the map.

The bottom corners of the map will always display your current track and speed. When going to a waypoint, highlighting an on-screen waypoint, or using the panning target crosshair, the corresponding distance and bearing are shown at the top corners of the map. Press ***ENTER*** to access the setups for this page.

Navigation Page

A navigation page gives you steering guidance when going to a waypoint. The GPS 12CX has two navigation page choices: the Compass Page and the Highway Page. The Compass Page is the default and will be briefly explained here. The Highway Page is covered on page 22.

The **Compass Page** shows the destination waypoint at the top of the page with the bearing (BRG) and distance (DST) to the waypoint shown below. The center of the page contains a compass ring and arrow to show you the direction of the waypoint from the direction you are moving. The bottom of the page gives your track (TRK), speed (SPD), and a selectable field for estimated time to arrival (ETA), estimated time enroute (ETE), course to steer (CTS), crosstrack error, (XTK), velocity made good (VMG), or turn bearing (TRN).

Menu Page

The last primary page is the **Menu Page**. The Main Menu Page gives you access to the GPS 12CX's waypoint management, route, track log, and setup features through a list of submenus.

Power On & Marking a Position

Quick Start Tour

The Quick Start Tour will teach you the basic operation of your GPS 12CX. This tour assumes that none of the factory settings (units of measure, selectable fields) have been changed. If the settings have been changed the pictures and descriptions you see in the manual may not match what you see on the screen.

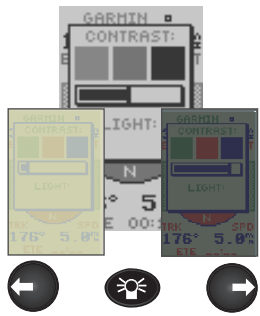
Turning on the GPS 12CX

1. Press the *POWER* key, hold until the unit turns on.

The welcome page and database info pages will appear while the unit conducts a self test. Once testing is complete, the Satellite Page will appear. When sufficient satellite signals have been acquired, the Satellite Page will be replaced by the Position Page.

Adjusting the Contrast

It may be necessary to adjust the display contrast in varying light conditions. The contrast adjustment can be accessed from any of the five main pages by pressing the *POWER* key briefly. After the contrast adjustment page appears, pressing the *ROCKER* left or right will either decrease or increase the display's contrast.



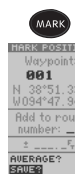
Press the **POWER** *key briefly to activate the contrast adjustment window.* Pressing the ***ROCKER*** left or right will decrease or increase the screen contrast.

Marking a Position

GPS is really about marking and going to places called waypoints. Before we can use our GPS 12CX to guide us somewhere, we have to mark a position as a waypoint. (Your GPS 12CX can hold up to 1000 waypoints.)

To mark your present position:

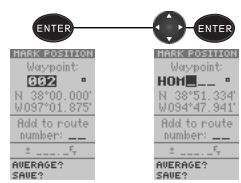
1. Press the *MARK* key. The mark position page will appear, with a default three-digit name for the new waypoint in the upper-left portion of the page.



To Mark Your Present Position

To rename the waypoint:

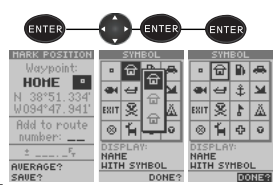
1. Highlight the name field, and press *ENTER*.
2. Enter the waypoint name 'HOME', and press *ENTER*. (See pg. 2 for data entry.) The waypoint symbol field will become highlighted.



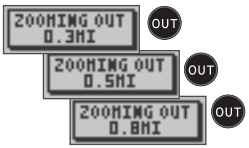
Renaming a Waypoint

To change the waypoint symbol:

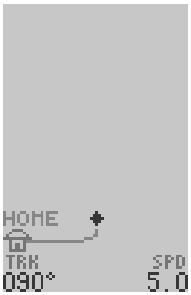
1. Highlight the waypoint symbol field, press *ENTER*.
2. Select the house symbol, and press *ENTER*.
3. Select the desired color and press *ENTER*.
4. Move the cursor to 'DONE?', press *ENTER*.



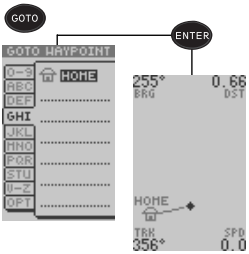
Changing Waypoint Symbol



Selecting Map Zoom Level



Map Page
(making a left turn)



Going to a Waypoint

Using the Position Page

Walk briskly for 3 - 4 minutes and watch the position page. This is a good opportunity to compare the Compass Tape at the top of the page and the Track (the direction that you are moving), as long as you are walking briskly they should be a direct reflection of one another. The speed that you are traveling, distance you have traveled, and the altitude are also displayed on the upper portion of the screen. The lower portion contains your latitude and longitude, notice that the current position is continually updating as long as you are moving. The current time is displayed at the bottom of the page.

Let's continue by looking at the Map Page:

1. Press *PAGE* to display the Map Page.

Map Page

To ensure that we can see our entire trip on the map, lets change the map scale from the default .2 MI to .8 MI.

1. Press and release the *OUT* button three times.

This quickly adjusts the map scale to the desired .5 MI setting. To display the current map scale setting longer, hold the ***IN*** or ***OUT*** button.

The Map Page shows your present position as a diamond icon in the center of the map. The house symbol labeled 'HOME' is the waypoint that you created when you 'MARKED' your position, the line connecting the two is called the 'TRACK LOG'.

1. Now turn approximately 90° to your left and continue walking for another 2 - 3 minutes. Notice how the dis play changes always keeping the direction that you are traveling toward the top of the map and your track log updates continually leaving a breadcrumb trail of where you have been.

Going to a Waypoint

Once you've stored a waypoint in memory, you may return to it by performing a GOTO. A GOTO is a straight-line course from your present position to the destination you've selected. Let's navigate back to our starting position, the HOME waypoint.

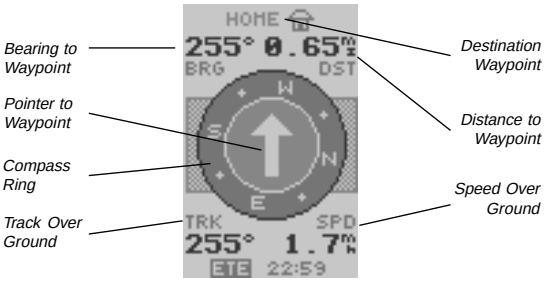
To select a GOTO destination:

1. Press *GOTO*.
2. Highlight the HOME on the 'G-H-I' tab and press *ENTER*. You'll notice that you'll automatically return to the Map Page, and a straight line will connect your current position to the HOME waypoint.

Let's continue by moving to the Compass Page:

1. Press *PAGE* to display the Compass Page

Compass Page



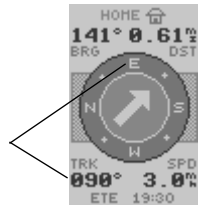
Whenever you select a destination waypoint, the GPS 12CX provides graphic steering guidance with the Compass Page (the default navigation page). The "compass ring" in the middle of the page acts much the same as the "compass tape" at the top of the Position Page, it provides a graphic representation of your present track (TRK). The "pointer" is a graphic representation of the direction or bearing (BRG) to the destination waypoint, and points in the direction you need to travel.

The pointer does not function as a magnetic compass. Navigation is active only while the GPS 12CX is moving.

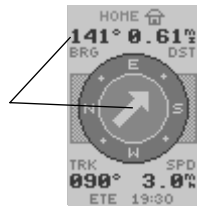
For instance, if the "pointer" is pointing toward the top of the display then you are heading toward the destination waypoint. If the "pointer" is pointing in any other direction, turn in the direction of the "pointer" until it is pointing to the top, then continue in that direction.

The bearing (BRG) and distance (DST) to the destination waypoint are displayed at the top of the screen, the track (TRK) and speed (SPD) are shown below. The default 'ETE' field at the bottom of the screen, is a user selectable field that can provide a variety of navigation information.

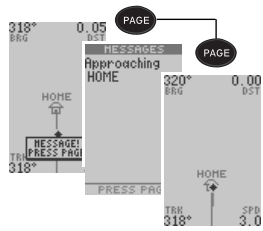
As you get closer to 'HOME', you will be alerted to press *PAGE*. The GPS 12CX will give you the message "Approaching HOME". Once you have arrived the distance field will read 0.00.



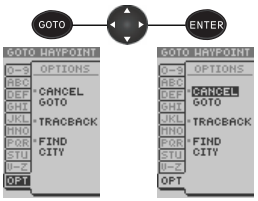
The Compass Ring is a graphic representation of the track (TRK).



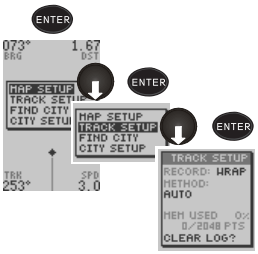
The Pointer is a graphic representation of the bearing (BRG).



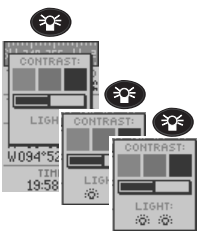
Getting the Message



Cancelling a GOTO



Clearing a Cluttered Map



To activate screen backlighting

Turning off the GPS 12CX

Cancelling a GOTO

If you decide to stop navigating to the active waypoint, all you have to do is cancel the GOTO.

To cancel an active GOTO:

1. Press the *GOTO* key.
2. Use the *ROCKER* to move the highlight to the OPT tab.
3. Highlight 'CANCEL GOTO' and press *ENTER*.

Clearing a Cluttered Map Display

After you have used the GPS 12CX a few times, you may find that the display has become cluttered with old track log information. The track log is the bread crumb trail that you left on the screen. It is generally a good idea to start a trip with a clean track log, so for practice, lets clear the track log we created during this tour.

1. Press *PAGE* or *QUIT* until the Map Page is displayed.
2. Press *ENTER* to display the Map Setup Page.
3. Highlight 'TRACK SETUP' and press *ENTER*.
4. Highlight 'CLEAR LOG?' and press *ENTER*.
5. Highlight 'YES' on the Warning Page and press *ENTER*.

Screen Backlighting

The GPS 12CX has thee levels of screen backlighting available for use, OFF, LOW, and HI. After being activated, the backlighting will remain on for the amount of time specified on the System Setup Page (See page 38).

To activate the screen backlighting:

1. Briefly press the *POWER* key twice to activate the first level (low, one bulb), or three times to activate the second level (hi, two bulbs).

Either one or two bulb icons will be displayed along the bottom of the Contrast Adjustment Page, indicating the level of screen backlighting that you have activated.

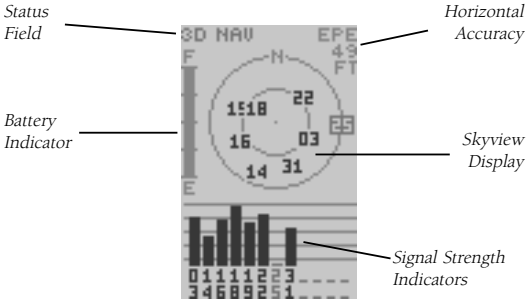
Turning off the Receiver

You have now gone through the basic operation of your new unit and probably know a little more than you think about how it works. We encourage you to experiment with the GPS 12CX until it becomes an extension of your own navigation skills. If you encounter any problems using the unit or want to take advantage of the more advanced features, turn to the reference section starting on page 9.

To turn the GPS 12CX off:

1. Press and hold the *POWER* key for 3 seconds.

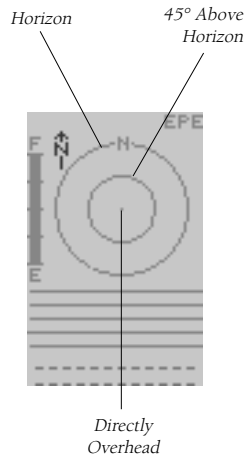
Satellite Page



The GPS 12CX's Satellite Page displays the status of various receiver functions. The status information will help you understand what the GPS 12CX is doing at any given time, and will tell you whether or not the receiver has calculated a position fix.

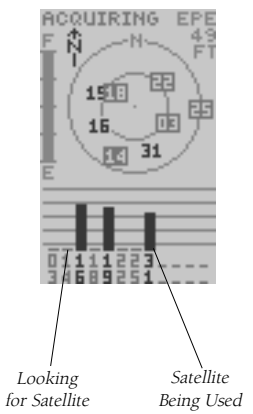
Sky View and Signal Strength Bars

The sky view and signal strength bars give you an indication of what satellites are visible to the receiver, whether or not they are being used to calculate a position fix, and the signal quality. The satellite sky view shows a bird's-eye-view of the position of each available satellite relative to the unit's last known position. The outer circle represents the horizon (north up); the inner circle is 45º above the horizon; and the center point is directly overhead.



You can use the sky view to help determine if any satellites are being blocked, and whether you have a current position fix (indicated by '2D NAV' or '3D NAV' in the status field). You can also set the sky view to a track up configuration by changing the 'orientation' option on the Map Page. (See pg. 16 for setup instructions.)

When the receiver is looking for a particular satellite, the corresponding signal strength bar will be blank and the sky view indicator will be highlighted. Once the receiver has found the satellite, a strength bar will appear indicating that the satellite has been found and the receiver is collecting data from it. The satellite number in the sky view will no longer appear highlighted. As soon as the GPS 12CX has collected the necessary data to calculate a fix, the status field will indicate a 2D or 3D status.



Satellite Status Page

Receiver Status

Receiver Status Options

To access the EZ-Init feature, without satellite coverage press ***ENTER*** *while the Satellite Status Page is displayed.*

Receiver Status

Receiver status is indicated at the top left of the page, with the current horizontal accuracy (estimated position error, in feet or meters) at the top right. The status will be shown as one of the following conditions:

Searching – the GPS 12CX is looking for any available satellites in view.

AutoLocate – the GPS 12CX is initializing and collecting new almanac data. This process can take 5 minutes, depending on the satellites currently in view.

Acquiring – the receiver is collecting data from available satellites, but has not collected enough data to calculate a 2D fix.

2D Nav (2D Navigation) – at least three satellites with good geometry have been locked onto and a 2-dimensional position fix (latitude and longitude) is being calculated. '2D Diff' will appear when you are receiving DGPS corrections in 2D mode.

3D Nav (3D Navigation) – at least four satellites with good geometry have been locked onto, and your position is now being calculated in latitude, longitude and altitude. '3D Diff' will appear when you are receiving DGPS corrections in 3D mode.

Poor Cvg (Poor GPS Coverage) – the receiver isn't tracking enough satellites for a 2D or 3D fix due to bad satellite geometry.

Not Usable – the receiver is unusable, possibly due to incorrect initialization or abnormal satellite conditions. Turn the unit off and back on to reset, and reinitialize the receiver if necessary.

Simulator – the receiver is in simulator mode.

EZinit Option Prompt

The Satellite Page also provides access to the EZinit prompt whenever a position fix has not been calculated. (The unit must be in searching, AutoLocate, acquiring, simulator, or poor coverage mode.) This allows you to reinitialize the unit (see Appendix A), and is useful if you have traveled over 500 miles with the receiver off and must initialize your new position.

EZinit Option Prompt (continued)

(The EZinit prompt will automatically appear if the receiver needs to be initialized. The prompt may also appear during normal use if the antenna is shaded or the unit is operated indoors.)

Battery Level Indicator

The Satellite Page also features a battery level indicator, located to the left of the sky view, which displays the strength of the unit's batteries.

> The battery level indicator is calibrated for alkaline batteries. Ni-Cad and lithium batteries will not display accurately.

The GPS 12CX features a rechargable internal lithium battery that will maintain the unit's memory for several months without batteries installed. When new batteries are installed or the unit is operated on external power, the internal lithium battery will renew its charge.

Backlight Bulb Icon

The GPS 12CX features three level (off, low, high) full-screen backlighting. Anytime the backlight is on, a bulb icon will be displayed on the satellite page.

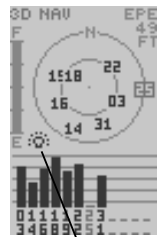
Emergency Erase Function

You may erase the GPS 12CX's memory in four quick steps. This will cause all stored data to be deleted, including routes, waypoints, and the track log.

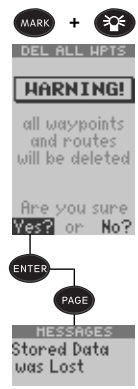
To erase all stored data:

1. Ensure that the GPS 12CX is turned off.
2. While holding down the MARK key, turn the unit on. Once the unit is on release the keys. A warning message will appear with 'YES' highlighted, and ask you to confirm your selection.
3. If you **do** wish to complete the emergency erase, press *ENTER* to confirm.
4. If you **do not** wish to erase all stored data, press the *ROCKER* to the right to select 'NO' then press *ENTER*.

When the Emergency Erase is complete, a message will verify that the "Stored Data Was Lost".



Backlight Bulb Icon



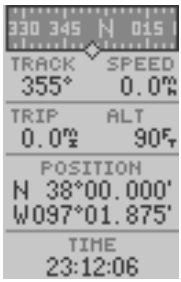
Emergency Erase

Emergency Erase Abort

Position Page

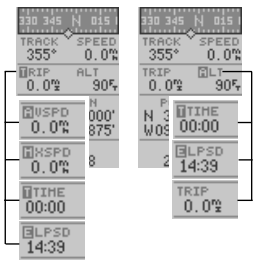
The second page in the GPS 12CX's primary page sequence is the Position Page. This page shows you where you are, what direction you're heading, and how fast you're going, and it's most useful when you are traveling without an active destination waypoint. The Compass Tape at the top of the page is a graphic representation of the track, and indicates the direction you're heading while you're moving.

Directly below this display are the track, speed, trip odometer and the altitude (default) fields. Below these fields is the position field. The position field indicates your current latitude and longitude in degrees and minutes. The GPS 12CX uses this basic information to mark exact positions as waypoints, which help guide you from one place to another. The bottom of the page contains a 12- or 24-hour clock.



Position Page

Both the trip odometer and the altitude fields are user selectable, and both offer a trip odometer, trip timer, and elapsed time. This way, you can always be sure of viewing this information regardless of the option you've selected for the other user-selectable field.



User Selectable Options

The following user-selectable options are available on the Position Page:

Trip Odometer (TRIP)— total distance traveled since reset.

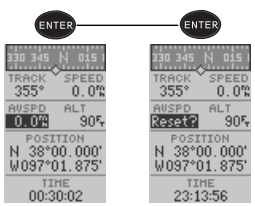
Trip Timer (TTIME)— total (cumulative) time in which a ground speed has been maintained since last reset.

Elapsed Time (ELPSD)— total time in hours and min utes since last reset.

Average Speed (AVSPD)— average speed traveled since last reset.

Maximum Speed (MXSPD)— maximum speed traveled since last reset.

Altitude (ALT)— vertical distance above mean sea level.



To Reset TTIME, MXSPD, AVSPD, or TRIP

To reset TTIME, MXSPD, AVSPD, or TRIP:

1. Highlight the user-selectable field, and press *ENTER*. 'Reset' will appear as a selectable option.
2. Press *ENTER* to confirm or *QUIT* to exit.

The trip odometer, trip timer, and average speed fields are linked. Resetting one of these options in a user-selectable field will automatically reset the corresponding data in the other. This ensures that information shown in these fields reflects your current trip.

Maximum Speed Field

To obtain the most accurate reading of your maximum speed, keep in mind that due to the sensitivity of the GPS 12CX's antenna, your maximum speed value may include the effects of rapid movement, such as swinging your arm while holding the unit.

To reset the maximum speed field:

1. Highlight the 'MXSPD' field, and press *ENTER*.
2. Press *ENTER* to confirm the 'RESET?' prompt.

Altitude Field

When the GPS 12CX is acquiring satellites or navigating in the 2D mode, the last known altitude is used to compute your position. You may also manually enter your altitude for greater accuracy. In cases where the GPS 12CX has 2D coverage, entering your approximate altitude will enable the receiver to determine a more accurate position fix.

To enter an altitude:

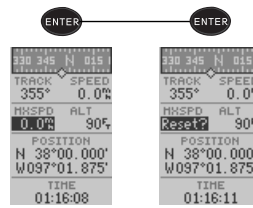
1. Highlight the 'ALT' field, and press *ENTER*.
2. Enter a value, and press *ENTER*.

Position Field

The GPS 12CX displays the current GPS location in degrees-minutes -decimal minutes (default) or a variety of user selectable position formats. See page 39 for more information on user selectable position formats.

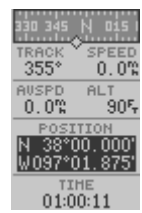
12/24 Hour Clock

The GPS clock can be configured to display in a 12 or 24 hour format. For more information on setting up the clock see page 37.



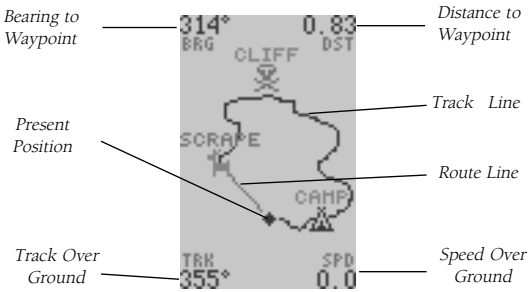
Maximum Speed Reset

Entering an Altitude



Position Field

Map Page



Map Scale 5.0 miles

Map Scale 3.0 miles

Map Scale 2.0 miles

Increasing or decreasing the map scale varies the level of detail available on the map. A small map scale increases the "up-close" detail on the map, while a large map scale increases the "overall" viewing area.

The Map Page shows your current position and surroundings, and provides you with a target cursor that lets you pan ahead to nearby waypoints, determine the distance and bearing to a map position or nearby waypoint, and mark new waypoints while you navigate.

The map displays your present position as a diamond icon, with your track and/or route displayed as a solid line. Nearby waypoints are represented as squares or icons with the waypoint name listed above. You may select the features that are displayed on the map through the map setup submenu page (see page 16 for more information).

The four corners of the Map Page are used to display navigation data, including the bearing and distance to a destination waypoint and your current track and speed over ground. The two fields at the top corners of the map show your bearing and distance to one of three selectable destinations: an active destination waypoint, a highlighted waypoint, or the panning target crosshair. If you are not navigating to a waypoint or using the panning function, the top data fields will not be displayed. Your current track and speed are shown at the bottom corners of the display.

Zooming — Changing the Map Scale

The map scale can be changed to display the map at 18 different zoom levels.

To select a map scale:

1. Press the *IN* or *OUT* key until the desired zoom level is displayed on the map.

Panning

To pan around the map simply use the ***ROCKER*** to control the direction that the target crosshair will travel. To quit the pan function and resume tracking on the map, press the ***QUIT*** key

As you move around the map the distance and bearing from the current GPS location to the crosshair will be displayed in the top corners of the map. As you pan near a waypoint you will notice that the crosshair will "snap" to on-screen waypoints. Once a waypoint is highlighted, you can either review its waypoint definition page, the waypoints display options, or execute a GOTO function right from the Map Page.

To review waypoint definition page for highlighted waypoint:

1. Press *ENTER* while waypoint is highlighted.

From the waypoint definition page, you can also define how each individual waypoint is displayed on the map. The GPS 12CX displays waypoints as a name with a corresponding symbol (e.g., "camp" and the camp site symbol), or a 16-character comment and corresponding symbol, (e.g., "great boat ramp" and the boat symbol). The waypoint name has a six character limit while the "comment" field has a 16-character limit, and there are 16 waypoint symbols available.

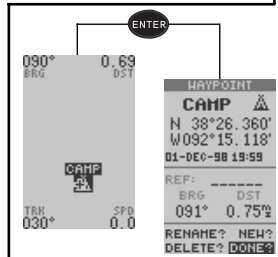
To select a waypoint display option:

1. Highlight the "symbol" field (to the right of the name field), and press *ENTER*.
2. Move the cursor to the 'DISPLAY' field and press *ENTER*.
3. Using the *ROCKER*, select one of the display options: 'NAME WITH SYMBOL', 'SYMBOL ONLY', or 'COMMENT WITH SYMBOL'.
4. Press *ENTER* to confirm the selection.
5. With 'DONE' highlighted press *ENTER* to return to the waypoint definition page.
6. With 'DONE' highlighted press *ENTER* to return to the Map Page.

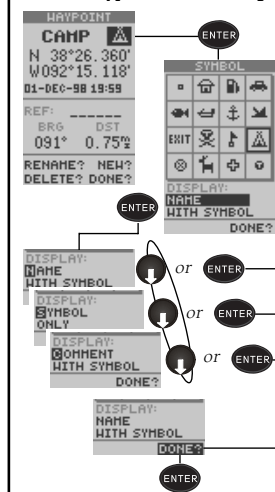
The last function that you can perform with a waypoint highlighted, is a GOTO (see page 29 for more on the GOTO function) the highlighted waypoint.

To go to a waypoint highlighted on the Map Page:

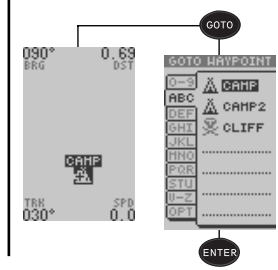
1. Press the *GOTO* key.
2. Press *ENTER* to confirm the GOTO.



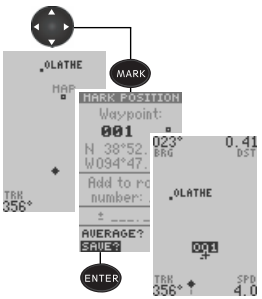
Review Waypoint Definition Page



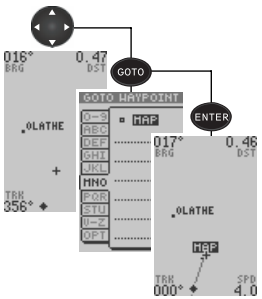
Select Waypoint Display Options



GOTO Map Waypoint

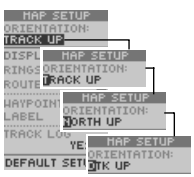


Marking Target Crosshair



Going to the Target Crosshair

Map Option Window



Map Orientation Setting

Using the Cursor to Mark and Goto Waypoints

During panning, the crosshair represents a target position right on the Map Page, with the range and bearing to the target displayed at the top corners of the screen. You can also use the target crosshair to mark a new waypoint position or as a GOTO destination right from the map field.

To mark the target crosshair as a new waypoint:

1. Pan to the desired position on the map and press *MARK*.
2. Enter a name and/or route number, and press *ENTER*.

You can also use the target crosshair as an instant GOTO destination. This feature is similar to the MOB mode, and will allow you to mark and instantly set a course for a new waypoint called 'MAP'.

To go to the target crosshair:

1. Place the target crosshair on the desired location.
2. Press *GOTO*, and press *ENTER*.

Note: To save the MAP waypoint, be sure to rename it because it will be overwritten the next time a GOTO is performed using the target crosshair.

Accessing Map Option Windows

You can access four map option pages, (Map Setup, Track Setup, Find City, and City Setup) from the Map Page by pressing ***ENTER***, except when panning or pointing.

To select a map option:

1. Highlight the desired option and press *ENTER*.

Map Setup Page and Orientation

The map setup page lets you select the Map Page and satellite sky view orientation, as well as specify what items are displayed. The Map and Satellite Pages may be oriented to 'NORTH UP,' 'TRACK UP' (the direction of current travel), or 'DTK UP' (desired track up, or the direction of the desired course). The default setting is 'TRACK UP'.

To change the map orientation:

1. Highlight the 'map' field and press *ENTER*.
2. Select the desired orientation and press *ENTER*.

Selecting the 'DTK UP' option will set the satellite sky view to 'track up' orientation.

Map Setup Page and Orientation (cont.)

The rest of the map setup page lets you specify what items are displayed on the map and their color.

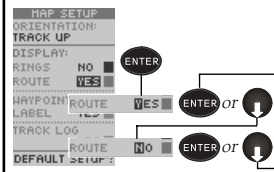
- 'Rings'– displays three range rings on the map at incre ments of 1/5th the selected map scale.
- 'Route'– plots the straight-leg lines between waypoints of an active route and displays all route waypoint names.
- 'Waypoint'– displays the nine nearest waypoints.
- 'Label'– displays the waypoint label or comment.
- 'Track Log'– displays and plots track log points on the map.

To turn a display option on or off:

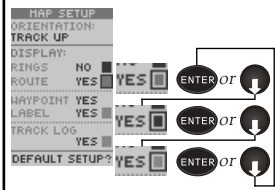
1. Highlight the data field next to the desired option and press *ENTER*.
2. Select 'YES' or 'NO' and press *ENTER*.

To assign a color to a display option:

1. Highlight the color box next to the option data field and press *ENTER*.
2. Highlight the desired color and press ENTER to confirm the selection.



Changing the Route Display Option



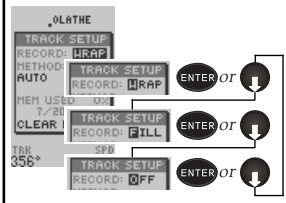
Changing the Route Display Color

Track Setup Page

The track setup page lets you manage the GPS 12CX's track log data. You can select whether to record a track log and define how it is recorded.

- Off – Disables the track log.
- Wrap – Allows the unit to continue updating the tracklog after all track log points are used by eliminating the oldest track log information.
- Fill – Records track log information until all track log points are used.

Note: Turning the track recording off will prevent you from using TracBack.



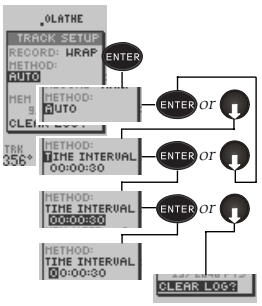
Changing the Track Record Option

Track Method

The track 'method' option determines how often positions are stored in the track log. The default setting is 'auto', which records track points based upon a set variance from your projected course over ground. This setting provides the most efficient use of track memory and the best TracBack performance.

To record points based on a specific time interval:

1. Highlight the 'METHOD' field, and press *ENTER*.
2. Select 'TIME INTERVAL', and press *ENTER* twice.
3. Enter hours, minutes, and seconds, press *ENTER*.



Changing the Track Method

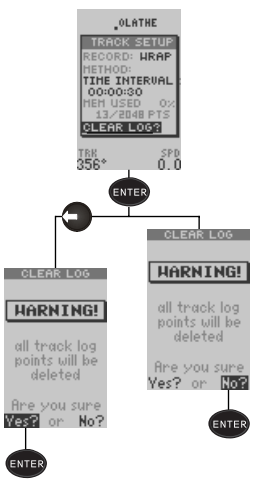
Managing and Clearing the Track Log

The rest of the track setup window displays the percentage of available memory currently used to store track log data, as well as a function field to clear the track log memory.

To clear the track log:

1. Highlight 'CLEAR LOG?', and press *ENTER*.
2. Highlight 'Yes?', and press *ENTER*.

Note: It's a good idea to clear the track log at the beginning of the trail, etc., in order to make the best use of the TracBack feature (see pg. 8).



Clearing the Track Log

Selecting a Navigation Page

Once you've selected a GOTO destination or activated a TracBack, MOB, or route; the GPS 12CX will provide graphic steering guidance to the destination with one of two navigation pages:

Compass Page

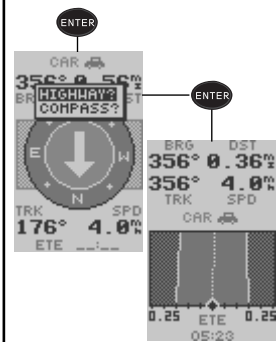
Highway Page

- The Compass Page (default) provides a directional pointer indicating the bearing to your destination and a rotating compass ring which shows your direction of travel (track) at the top of the ring. The Compass Page provides better guidance for car travel, hiking, or biking; where straight-line navigation is often not possible.
- The Highway Page provides a graphic highway display that shows your movement relative to the desired course, with an emphasis on your cross track error (the distance and direction you are off course). The cross track error (XTK) is depicted on a course deviation indicator (CDI) (see pg. 40). The Highway Page is well-suited for boating or some types of off-road recreation where straight line navigation is typically possible and maintaining a specified course is desirable.

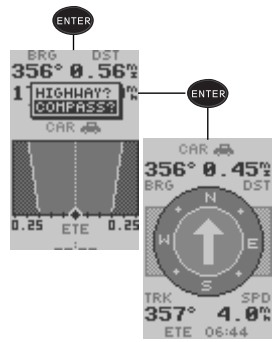
Both pages provide a digital display of the bearing and distance to the destination, and your current speed and track over the ground. You can switch to either Navigation Page at any time.

To select either Navigation Page:

1. Press *ENTER* from the existing Navigation Page, and *ENTER* again to change the page.

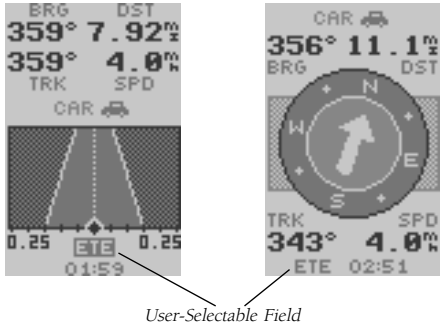


To switch from the Compass Page to the Highway Page, press ***ENTER*** *twice.*



To switch from the Highway Page to the Compass Page, press ***ENTER*** *twice.*

Customizing the Navigation Pages



User-Selectable Field

The 'ETE' field, located at bottom center on both pages, is a user-selectable field that allows you to display a variety of navigation values for your trip.

To access the user-selectable field:

1. Highlight 'ETE', and press *ENTER*.
2. Use the keypad to scroll through the possible options.

The following data options are available:

Estimated Time Enroute (ETE)— the estimated time remaining to reach your destination based on your present speed and track.

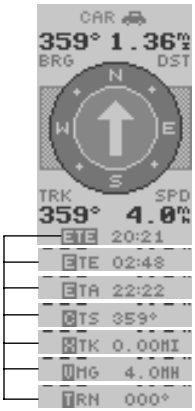
Estimated Time of Arrival (ETA)— the estimated time of day at which you will arrive at your destination based on current ground speed and track.

Course to Steer (CTS)— the recommended course to follow in order to reduce cross track error and stay on course. Provides the most efficient heading to get back on course and proceed along your route or GOTO.

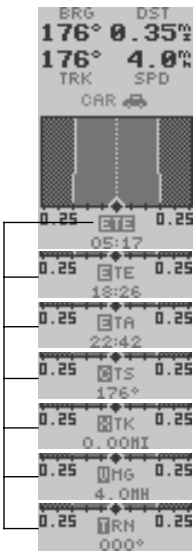
Crosstrack Error (XTK)— the distance you are off the desired course in either direction, left or right. This field will give you a digital readout of the data depicted by the CDI.

Velocity Made Good (VMG)— the speed you are closing in on a destination along the desired course. Also referred to as the 'vector velocity' to your destination.

Turn (TRN)— the angle difference between the bearing to your destination and your current track. 'L' indicates you should turn left, 'R' indicates you should turn right.

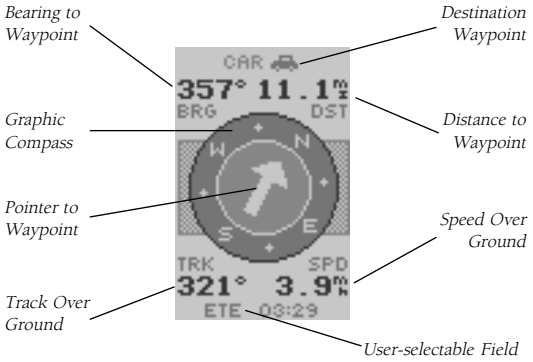


Compass Page User-selectable Options



Highway Page User-selectable Options

Using the Compass Page



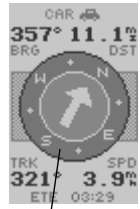
The Compass Page provides better steering guidance than the Highway Page for travel at slower speeds (e.g., walking), travel with many directional changes and when it's not necessary to follow an exact course.

The bearing (BRG) and distance (DST) to the waypoint are displayed at the top of the page, below the destination waypoint name. The distance displayed is the straight-line distance from your present position to the destination waypoint. The bearing indicates the exact compass heading from you to the destination.

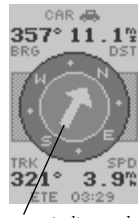
The middle of the page features a rotating "compass ring" that shows your track, or course over ground while you are moving, with a "pointer" to the destination displayed in the center. The "pointer" shows the direction of your destination relative to the direction you are moving. For instance, if the arrow points up, you are going directly to the waypoint. If the arrow points any direction (left, right, down, etc.), turn toward the arrow until it points up. Then continue in that direction.

The bottom of the page shows your track (TRK), speed (SPD), and a user-selectable field for ETE, ETA, CTS, XTK, VMG, or TRN.

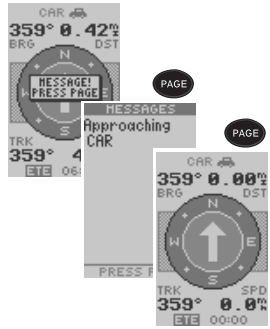
When you are one minute away from your destination (based on your current speed and track over ground), the GPS 12CX will alert you with a flashing on-screen message box.



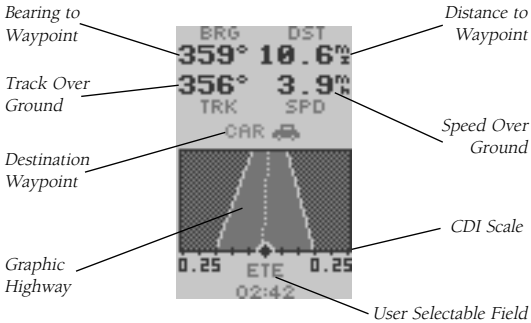
*The **COMPASS RING** indicates your track (TRK), the direction that you are traveling.*

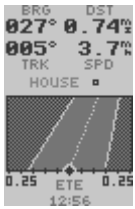


*The **POINTER** indicates the bearing (BRG) to the destination waypoint. When navigating, turn in the direction of the pointer until the pointer is straight up, then continue in that direction. A quick check to verify that you are indeed traveling in the right direction, if the bearing and track are the same then you are exactly on course.*



Using the Highway Page





This example indicates that you are off course to the left and need to steer right to get back on course. Continue turning in the direction of the highway until the highway is pointing straight up, then continue in that direction.

If you get too far off course, a message box will appear indicating a course to 'STEER' to get back on the most efficient course.

The GPS 12CX's Highway Page provides graphic steering guidance to a destination waypoint, with a greater emphasis on the straight-line desired course and the distance and direction you are off course. The bearing and distance to a waypoint—along with your current track and speed—are displayed at the top of the screen.

As you head toward your destination, the middle of the screen provides visual guidance to your waypoint on a moving graphic "highway." Your present position is represented by the diamond in the center of a course deviation indicator (CDI) scale. The line down the middle of the highway represents your desired track. As you navigate toward a waypoint, the highway will actually move—indicating the direction you're off course—relative to the position diamond on the CDI scale. When the highway is pointing straight up the screen, the waypoint is directly ahead. If the destination waypoint is to the left, the top of the highway will lead to the left, and vice versa. To stay on course, simply steer in the direction the highway leads (left or right) until the highway leads straight up the page.

If you do get off the desired course by more than 1/5th of the selected CDI range, the exact distance you are off course will be displayed where the CDI scale setting normally appears. If you get too far off course (the highway has disappeared off either side of the highway display), a message box will appear to indicate what course to steer to get back on course. (For information on how to set this scale, see pg. 40.) As you approach a waypoint, a horizontal "finish line" will move toward the bottom of the highway. When the finish line reaches the CDI scale, you've arrived at your destination.

Creating Waypoints

The GPS 12CX allows you to store up to 1000 positions as waypoints. A waypoint can be entered by taking an instant electronic fix, by manually entering coordinates, by using the bearing and distance to a known position or by marking a position on the map page.

Marking a Position

The GPS 12CX can instantly capture and store the present GPS location in memory for future use.

To mark your present position:

1. Press *MARK*. The mark position page will appear, showing the captured position and a default three-digit name.
2. To save with the default name and symbol, press *ENTER* to confirm the 'SAVE?' prompt.

Changing the default waypoint name

The GPS 12CX will assign a numeric default name when marking a waypoint. The name can be changed using the six digit waypoint name field.

To enter a different waypoint name:

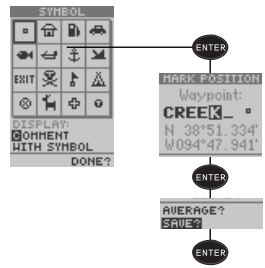
1. Highlight the waypoint name field, and press *ENTER*.
2. Make the appropriate changes, and press *ENTER*.
3. If finished changing the waypoint, Highlight 'SAVE?', and press *ENTER*.

Waypoint Symbols

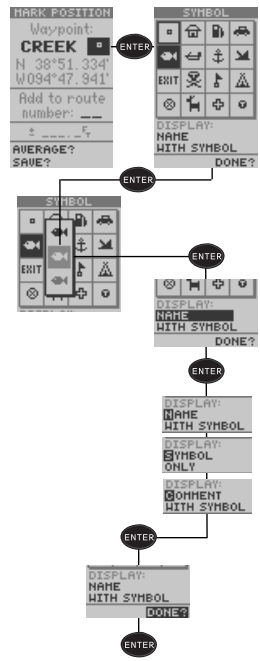
The GPS 12CX allows you to select one of 16 symbols for each waypoint for easy recognition on the map display. From the symbol page, you may also select how the waypoint appears on the map.

To select a waypoint symbol:

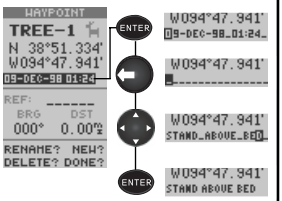
1. Highlight the symbol field on the waypoint definition page, and press *ENTER*.
2. Use the arrow keypad to select the desired symbol, and press *ENTER*.
3. Select the display color for the symbol and press *ENTER*.
4. The cursor will move to the display field, where you can select which waypoint information is displayed on the map.
5. To change the display option press *ENTER*, and us ing the *ROCKER*, select one of the following; 'NAME WITH SYMBOL', 'SYMBOL ONLY,' or 'COMMENT WITH SYMBOL'.
6. Press *ENTER* to confirm your selection, and *ENTER* again to confirm the 'DONE?' prompt.



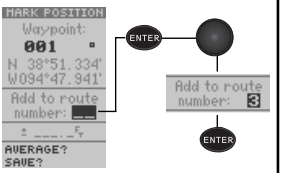
Changing the Waypoint Name



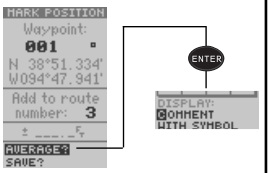
Changing the Waypoint Symbol



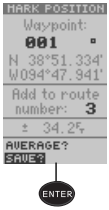
Waypoint Comments



Adding Waypoint to Route



Position Averaging



Saving the Waypoint

Waypoint Comments

Each waypoint stored in the GPS 12CX has a user defined 16-character comment field. The default comment is the UTC (or Greenwich Mean Time) date and time of the waypoint's creation.

To change or add a comment:

1. Highlight the comment field.
2. Press *ENTER*.

Note: You can clear the comment field by pressing the left side of the rocker keypad.

3. Enter the desired comment, using the *ROCKER*.
4. Press *ENTER*.

Adding the Waypoint to a Route

The GPS 12CX can automatically add marked waypoints to a user-selected route. This works well when you want to create a return route while moving.

To add this waypoint to a route:

1. Highlight the 'Add to route number' field, and press *ENTER*.
2. Enter a route number, press *ENTER* to confirm the route number, and *ENTER* again to save the waypoint. The waypoint will be added to the end of the selected route—after any other waypoints already in the route.

Position Averaging Function

The GPS 12CX can use the positioning averaging function to help reduce the effects of selective availability and provide more accurate saved positions.

1. After you have pressed the *MARK* key, highlight the 'AVERAGE?' field and press *ENTER*. The Figure of Merit (+/-) field will display a value reflecting estimated accuracy of the averaged position.

Note: As the GPS 12CX calculates the FOM, initially it will change rapidly then begin to stabilize over time.

2. The unit will continue averaging until you have highlighted 'SAVE?' and pressed *ENTER*.

Saving the Waypoint

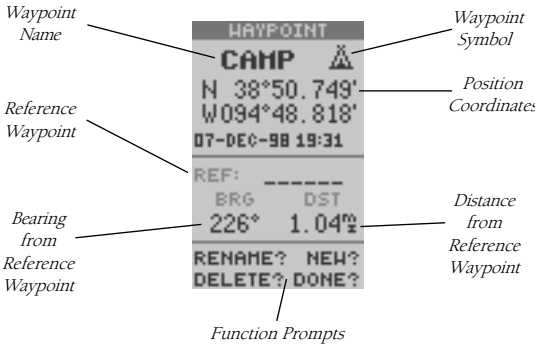
After you have finished making any changes to the waypoint remember to save the waypoint.

1. Highlight 'SAVE' and press *ENTER*.

Waypoint Pages

The GPS 12CX has three waypoint pages that let you quickly manage up to 1000 waypoints. These pages—waypoint definition, nearest waypoints, and waypoint list—can be accessed through the Main Menu Page.

Waypoint Definition Page



The waypoint definition page lets you create new waypoints manually or review and edit an existing waypoint's coordinates, symbols, and comments. It is also used to delete an individual waypoint from memory (see pg. 26). To create a new waypoint manually, you'll need to know its coordinates or its approximate distance and bearing from an existing waypoint.

To create a waypoint by entering coordinates:

1. From the waypoint definition page, highlight 'NEW?', and press *ENTER*.
2. Enter a waypoint name, and press *ENTER*.
3. Press *ENTER* to select a waypoint symbol, make your selection, and press *ENTER*.
4. Highlight the 'DONE?' prompt, and press *ENTER* to return to the waypoint page.
5. Highlight the position field, and press *ENTER*. Input your position using the *ROCKER*, and press *ENTER*.
6. Press *ENTER* to confirm the 'DONE?' prompt.

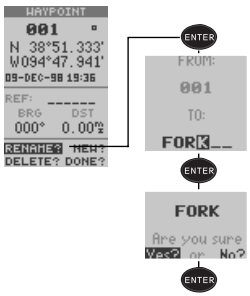
The GPS 12CX's advanced waypoint planning features allow you to create new waypoints and practice navigation without ever setting foot outside.

If you create a new waypoint be entering coordinates from a map, you may want to re-mark the waypoint's exact position once you get there.

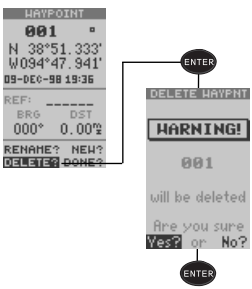
To re-define an existing waypoints position coordinates from the waypoint definition page, simply highlight the DST field and press ENTER. Press the ROCKER to the Left to set the distance to 0.00, then press ENTER to confirm.

The previous coordinates will be replaced by the coordinates of your present position.

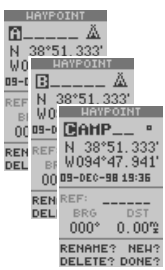
Rename, Delete & Scan Waypoints



Renaming a Waypoint



Deleting a Waypoint



Scanning Waypoints

Reference Waypoints

To create a new waypoint manually without knowing its position coordinates, you'll need to enter its bearing and distance from an existing waypoint or your present position.

To create a new waypoint by referencing a stored waypoint:

1. From the waypoint definition page, highlight ' NEW?', and press *ENTER*.
2. Enter a waypoint name, and press *ENTER*.
3. Highlight the 'REF' field, and press *ENTER*.
4. Enter a reference waypoint name (or leave the field blank to use your present position), and press *ENTER*.
5. Enter the bearing ('BRG') and distance ('DST') of your new waypoint from the reference waypoint.
6. Press *ENTER* to confirm the 'DONE?' prompt.

Renaming and Deleting Waypoints

The rename and delete function fields are located along the bottom left side of the waypoint definition page.

To rename a stored waypoint:

1. Highlight 'RENAME?', and press *ENTER*.
2. Enter the new waypoint name, and press *ENTER*
3. Press *ENTER* to confirm the 'Yes?' prompt.

To delete a stored waypoint:

1. Highlight 'DELETE?', and press *ENTER*.
2. Highlight the 'Yes?' prompt, and press *ENTER*.

Scanning Waypoints

As you manually enter a waypoint's name, the GPS 12CX's waypoint scanning feature will automatically display the first numerical or alphabetical match of the character you have entered to that point. This helps eliminate the need to always enter a waypoint's complete name.

To scan waypoints from a waypoint field:

1. Highlight the waypoint name field, and press *ENTER*.
2. Press the left side of the *ROCKER* to clear the name field
3. Scroll through the waypoints.

Note: The GPS 12CX's waypoint scanning feature will offer the first waypoint that matches the character or characters you have entered up to that point. If you have more than one waypoint that begins with the same letter or number, move to the next character position as needed.

4. When you find the desired waypoint, press *ENTER*.

Waypoint List Page

The waypoint list page provides a complete list of all waypoints stored in the GPS 12CX. The waypoints are conveniently located on alphabetical tabs that allow quick access to any of the 1000 available waypoints. From the waypoint list page, you can retrieve a waypoint definition page, delete all user-defined waypoints, delete waypoints by symbol, or review and perform a GOTO to a selected waypoint.

To locate and review a waypoint:

Note: If the highlight is not on an alphabetical tab, press the ***ROCKER*** to the left.

1. Select the tab that corresponds with the first letter of the waypoint.
2. Using the ROCKER move the highlight to the way point list.
3. Scroll through the list until the desired waypoint is highlighted.
4. Press ENTER to review the waypoint definition page.

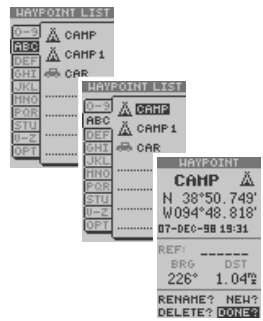
To delete all user-defined waypoints:

1. Highlight 'OPT' tab and press *ENTER*.
2. Highlight 'DELETE ALL' and press *ENTER*.
3. Highlight the 'YES' prompt and press *ENTER*.

To delete waypoints by symbol:

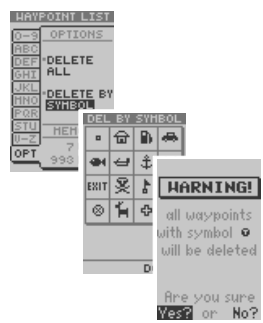
1. Highlight 'OPT' tab and press *ENTER*.
2. Select 'DELETE BY SYMBOL' and press *ENTER*.
3. Select the symbol corresponding to the waypoints you wish to delete. Press *ENTER*.
4. Press *ENTER* to confirm the 'DONE' prompt, high light the 'YES?' prompt, and press *ENTER*.

Note: This feature is handy for deleting temporary waypoints created by the TracBack function.

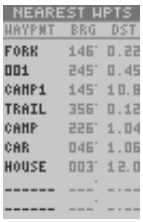


Locate and Review Waypoint

Delete All Waypoints

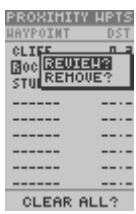


Delete Waypoints by Symbol



The compass heading (BRG) and distance (DST) to the nine nearest waypoints are updated continuously.

The Proximity Alarm will trigger when the distance to the waypoint is smaller than the distance entered in the 'DST' field.



Quickly edit or remove proximity waypoints, by highlighting the waypoint name and pressing ENTER.

Nearest Waypoints Page

The nearest waypoints page shows the nine nearest waypoints that are within 100 miles of your present position, with the bearing and distance noted for each waypoint. This page will also let you retrieve a waypoint definition page or GOTO a selected waypoint right from the list.

To review the definition page of a selected waypoint:

1. Highlight the desired waypoint.
2. Press *ENTER*.

To return to the nearest waypoint page:

1. Highlight 'DONE?'.
2. Press *ENTER*.

To go to a highlighted list waypoint:

1. Highlight the desired waypoint, and press *GOTO*.
2. Press *ENTER*.

Proximity Waypoint Page

The GPS 12CX's proximity waypoint function warns you when you are getting too close to hazardous waypoints. This function allows you to create up to nine proximity waypoints and designate an alarm circle for each waypoint. If you enter this circle, a warning message will alert you.

To enter a proximity waypoint from the Main Menu Page:

1. Highlight 'PROXIMITY WPTS' and press *ENTER*.
2. Highlight the first empty waypoint field and press *ENTER*.
3. Use the *ROCKER* to scroll through stored waypoints until the desired waypoint appears.
4. Press *ENTER*. The distance (DST) field will be automatically highlighted. Press *ENTER* and enter the desired distance.
5. Press the *ENTER* key.

To review or remove a proximity waypoint:

1. Using the *ROCKER*, select a proximity waypoint and press *ENTER*.
2. Highlight 'REVIEW?' or 'REMOVE?' and press *ENTER*.

If 'REVIEW?' is chosen, the waypoint page will appear, and you may make any changes to the selected waypoint. If 'REMOVE?' is chosen, the proximity waypoint will be removed from the list. Press ***QUIT*** or ***PAGE*** to return to the Main Menu Page.

Selecting a GOTO Destination

The GPS 12CX provides four ways to navigate to a destination: GOTO, MOB, TracBack, and Route navigation. The most basic method of selecting a destination is the GOTO function, which lets you choose any stored waypoint as the destination and quickly sets a direct course from your present position.

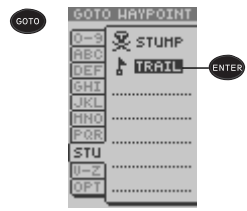
To activate the GOTO function:

1. Press the *GOTO* key.
2. Select the waypoint that you want to navigate to and press *ENTER*.

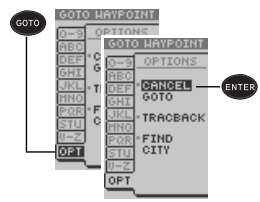
Once a GOTO waypoint has been activated, the Compass Page or Highway Page will provide steering guidance to the destination until either the GOTO is cancelled or the unit has resumed navigating the active route.

To cancel an active GOTO:

1. Press the *GOTO* key.
2. Highlight the "OPT" tab
3. Highlight 'CANCEL GOTO?', and press *ENTER*.



Activating a Direct GOTO



Cancelling an active GOTO

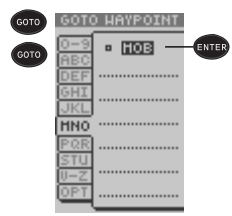
Man Overboard Function

The GPS 12CX's man overboard function (MOB) lets you simultaneously mark and set a course to a position for quick response to passing positions.

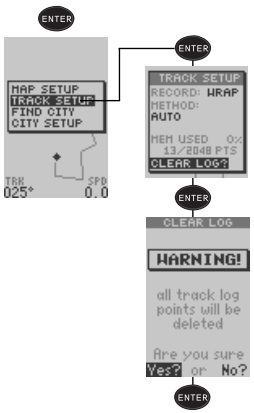
To activate the MOB mode:

1. Press *GOTO* twice. The GOTO waypoint page will appear with 'MOB' selected.
2. Press *ENTER* to begin MOB navigation.

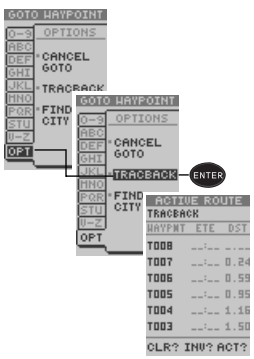
The GPS 12CX will now guide you to the MOB waypoint until the MOB GOTO is cancelled. If you want to save the MOB waypoint, be sure to rename it because it will be overwritten the next time a MOB is activated.



Man Overboard Function



Clearing the Track Log



Activating a TracBack Route

TracBack Navigation

GARMIN's patented TracBack feature allows you to quickly retrace your path using the track log automatically stored in the receiver. This feature eliminates the need to mark waypoints along the way and manually create and activate a route back to where you began your trip.

Once a TracBack route is activated, it will lead you back to the oldest track log point stored in memory, so it's usually a good idea to clear the existing track log at the start of each trip.

To clear the track log and define a starting point for a TracBack route:

1. From the Map Page, press *ENTER*, highlight the 'TRACK SETUP' option, and press *ENTER*.
2. Highlight 'CLEAR LOG?', press *ENTER*, highlight 'Yes?', and press *ENTER*.

To activate a TracBack route:

1. Press *GOTO*,
2. Highlight the 'OPT' tab.
3. Highlight 'TRACBACK' and press *ENTER*.

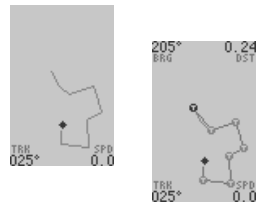
Once the TracBack function has been activated, the GPS 12CX will take the track log currently stored in memory and divide it into segments called legs. Up to 30 temporary waypoints will be created to mark the most significant features of the track log in order to duplicate your exact path as closely as possible. These points will be indicated by 'T###' (e.g., 'T001') on the waypoint list, and by a 'T' symbol on the Map Page.

The active route page will appear, showing a route from your present position to the oldest track log point in memory. Steering guidance to each waypoint will be provided back to the starting point of your track log.

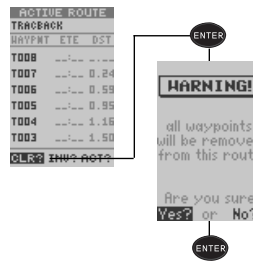
You may delete a TracBack waypoint from a route, but only if the route is not active.

Tips On the TracBack Feature

- Always clear your track log at the exact point that you want to go back to (trail head, truck, etc.).
- The 'RECORD' option on the track log setup page must be set to 'WRAP' or 'FILL'.
- There must be at least two track log points stored in memory to create a TracBack route.
- If there is not enough available memory to add more waypoints and create a TracBack route, you will be alerted with a 'waypoint memory full' message, and the receiver will use any available waypoints to create a TracBack route with an emphasis on the track log closest to the destination (the oldest track log point in memory).
- If the 'METHOD' option on the track log setup page is set to a time interval, the TracBack route may not follow your exact path. (Keeping the criteria set to automatic will always provide the most detailed TracBack route.)
- If the receiver is turned off or you lose satellite coverage during your trip, the TracBack route will simply draw a straight line between any point where coverage was lost and where it resumed.
- If the changes in direction and distance of your track log are complex, 30 waypoints may not be enough to accurately mark your exact path. The receiver will then assign the 30 waypoints to the most significant points of your track, and simplify segments with fewer changes in direction.
- To save a TracBack route, copy route 0 to an open storage route before activating another TracBack. Activating another TracBack or storage route will overwrite the existing TracBack route.
- Whenever a TracBack route is activated, the receiver will automatically erase any temporary waypoints ('T###') that are not contained in routes 1-19. If there are temporary waypoints stored in routes 1-19, the receiver will create any new tem porary way points using the first three-digit number available. (You can also quickly delete all temporary TracBack waypoints in memory by using the 'DELETE BY SYMBOL' method described on pg. 27.)



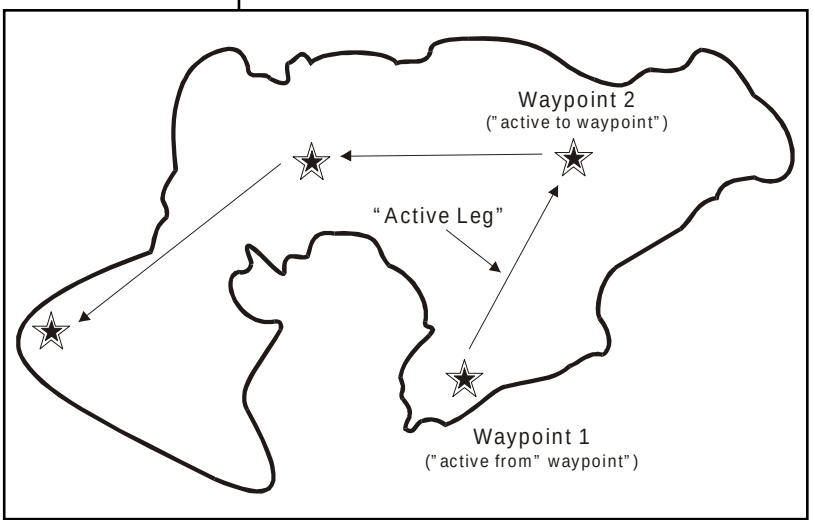
Activating a TracBack will create a route base on your current track log. 'T' waypoints and symbols will be added to the waypoint list and displayed on the map for easy identification. The TracBack will become the 'Active Route' and displayed on the active route page.



To cancel an active TracBack, highlight the 'CLR' field at the bottom of the active route page and press **ENTER**. *Highlight 'YES' on the warning page and press* **ENTER** *again to confirm.*

Route Navigation

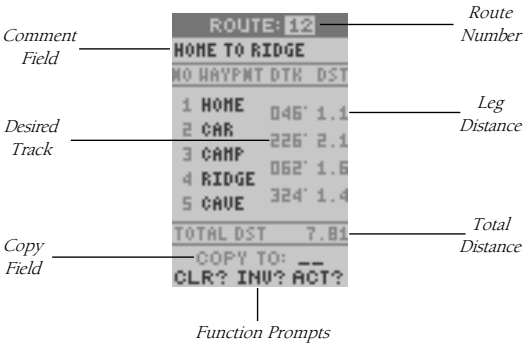
The last form of navigating to a destination with the GPS 12CX is by creating a user-defined route. The route navigation feature lets you plan and navigate a course from one place to another using a set of pre-defined waypoints. Routes are often used when it's not practical, safe, or possible to navigate a direct course to a particular destination (e.g., through a body of water or impassable terrain).



Routes are broken down and navigated in smaller segments called "legs". The waypoint you are going to in a leg is called the "active to" waypoint and the waypoint immediately behind you is called the "active from" waypoint. The line between the "active to" and the "active from" waypoint is called the "active leg".

Whenever you activate a route with the GPS 12CX, it will automatically select the route leg closest to your position as the active leg. As you pass each waypoint in the route, the receiver will automatically sequence and select the next waypoint as the "active to" waypoint.

Route Definition Page



The last form of navigating to a destination with the GPS 12CX is by creating a user-defined route. The GPS 12CX lets you create and store up to 20 routes of 30 waypoints each.

Routes can be copied, cleared, inverted, and activated through the route definition page.

To select the route definition page:

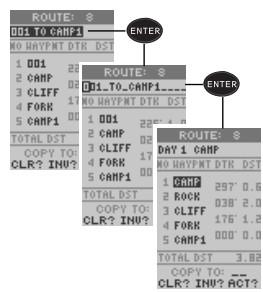
1. Highlight 'ROUTES' from the Main Menu Page, and press *ENTER*.

To Select the Route Definition Page

The 'route number' field is displayed at the top of the page, with a 16-character 'user comment' field directly below. If no user comment is entered, the field displays the first and last waypoint in the route.

To edit the route comment:

1. Highlight the comment field and press *ENTER*.
2. Use the arrow keys to enter a new comment and press *ENTER*.



Entering a New Comment

The waypoint list along the left side of the page accepts up to 30 waypoints for each route, with fields for desired track and distance between legs. The total route distance is indicated below the waypoint list.

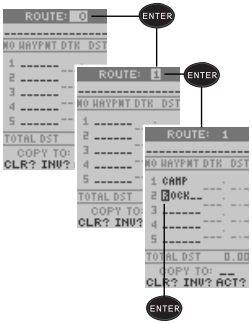
The bottom of the route definition page features several 'function' fields which let you copy, clear, invert, or activate the displayed route. Routes 1-19 are used as storage routes, with route 0 always serving as the active route you are navigating. If you want to save a route that's currently in route 0, be sure to copy it to another open route, as it will be overwritten by the next route activation.

Creating and Navigating Routes

To create a route from the route definition page:

1. Highlight the route number field, and press *ENTER*.
2. Enter a route number, and press *ENTER*. (Select an empty route—without any waypoints listed—when creating a new route.)
3. Enter the first waypoint of your route, and press *ENTER*. As you continue entering the rest of your waypoints, the list will automatically scroll down.
4. To change the route comment (automatically assigned to the route based upon the starting and final destination waypoints), highlight the route comment field and press *ENTER*. Enter the new comment and press *ENTER*.

Whenever you activate a route, it will automatically select the route leg closest to your position as the active leg. As you pass each waypoint in the route, the receiver will automatically sequence and select the next waypoint as the 'active to' waypoint.

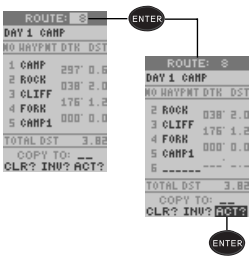


Creating a Route

Activating and Inverting Routes

After a route has been entered, it can be either activated in sequence or inverted from the route definition page. The process of activating or inverting a stored route takes a storage route (routes 1-19) and copies it into the active route (route 0) for navigation. The storage route is no longer needed and will be retained in its original format under its existing route number.

This system allows you to have an active route that you may edit during navigation and save as an entirely new route from the original. You will have to copy the active route to an unused storage route to save it, since new route or TracBack activation overwrites route 0.



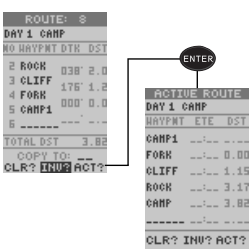
Activating a Route

To activate a route:

1. From the route definition page, highlight the route number field and press *ENTER*.
2. Enter the route number to be activated, and press *ENTER*.
3. Highlight 'ACT?', and press *ENTER*.

To activate a route in inverted order:

1. Follow the steps above, but select 'INV?', and press *ENTER*.



Inverting a Route

Active Route Page

Once a route has been activated, the active route page will display the waypoint sequence of your route with the estimated time enroute (ETE) at your present speed and the distance to each waypoint. As long as you are navigating an active route, the active route page will become part of the main page sequence of the unit. The active route page will also allow you to change the 'ETE' field to display desired track (DTK) or estimated time of arrival (ETA) for each leg. You can also clear or invert the active route.

To display DTK or ETA for each leg:

1. Highlight 'ETE', and press *ENTER*.
2. Select 'DTK' or 'ETA', and press *ENTER*.

The active route page also allows you to clear (stop navigating) or invert the active route without using the route definition page.

To invert a route from the active route page:

1. Highlight 'INV?', and press *ENTER*.

To stop route navigation:

2. Highlight 'CLR?', and press *ENTER*.

To reactivate the route navigation:

3. Highlight 'ACT?', and press *ENTER*.

Copying and Clearing Routes

The route definition page is also used to copy a route to another route number. This feature is useful when you make changes to the active route (or create a TracBack route) and want to save the route in its modified form for future use.

To copy the active route:

1. Highlight the 'COPY TO' field, and press *ENTER*.
2. Scroll through the available routes and select a destination route number. (Only open routes will be available.) Press *ENTER* to copy the route.

To clear a route from memory:

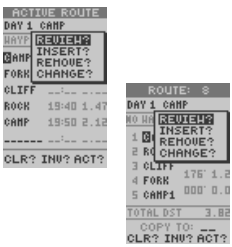
1. Highlight the route number field, and press *ENTER*.
2. Select the desired route number, and press *ENTER*.
3. Select 'CLR?', and press *ENTER*.
4. Highlight 'Yes?', and press *ENTER*.

Displaying 'DTK' or 'ETA'

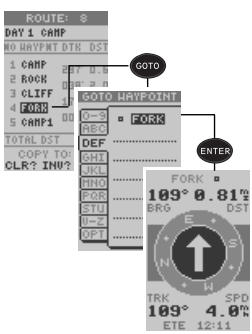
Inverting a Route

Stopping Route Navigation

Reactivating Route Navigation



Editing Routes From the Active Route and Route Definition Pages.



On-Route GOTO

Editing Routes

A route can be edited any time after its creation.

To edit a route from the active route page or the route definition page:

1. Select the waypoint you want to edit, and press *ENTER*.

An on-screen menu of editing choices will appear, with options for reviewing, inserting, deleting, or changing the waypoint field highlighted. This field contains the following options:

- Review?— displays the waypoint definition page for the selected waypoint.
- Insert?— adds a new waypoint directly in front of the selected waypoint.
- Remove?— deletes the selected waypoint from the route
- Change?— allows you to replace the selected waypoint with a new waypoint.

Note: Editing the original storage route will not affect route 0. If you want to save an edited version of route 0, save it to an open storage route.

On-Route GOTOs

At the beginning of this section, we mentioned that the GPS 12CX will automatically select the route leg closest to your position as the active leg. This will give you steering guidance to the desired track (desired course) of the active leg. Note that the first waypoint selected as the destination waypoint will be along the route leg closest to your present position. This may mean you're not navigating to the first waypoint in the active route—you may even be navigating to the last. You can manually navigate a route out of sequence at any time (bypassing one or more interim waypoints) by perform an "on-route GOTO" from the active route page.

To perform an "on-route GOTO" from the active route page:

1. Highlight the desired route waypoint, and press *GOTO*.
2. Once the GOTO waypoint page appears with the waypoint highlighted, press *ENTER*.

Note that after you reach the on-route GOTO waypoint, the GPS 12CX will automatically resume navigating the rest of the route in sequence.

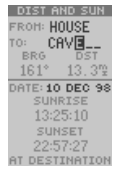
Distance and Sun Calculations

The distance and sun calculation page will give you the distance and bearing between any two waypoints or between your present position and a waypoint. It will also calculate the sunrise and sunset (in local time) for a particular date ant either your present position or any stored waypoint.

To perform a distance and sun calculation:

1. Highlight the 'FROM ' field and press *ENTER*.
2. Enter the desired waypoint and press *ENTER*.
3. Highlight the 'TO' Field and press *ENTER*.
4. Enter the desired waypoint and press *ENTER*.
5. The 'DATE' field will become highlighted. Enter the date that you will arrive at the destination and press *ENTER*.

If you leave the 'TO' field blank, the sunrise and sunset at your present location will be shown.



Distance and Sun Calculations Page

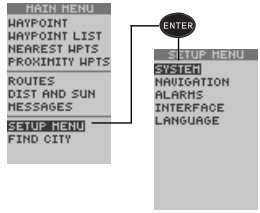
System Setup

The system setup page is used to select the operating mode, time offset, and screen preferences. The GPS 12CX has three operation modes:

- Normal Mode—operates the unit at maximum perfomance, and provides battery life of up to 24 hours on alkaline batteries.
- Power Save Mode—allows the receiver to operate in an energy efficient manner and provides battery life of up to 36 hours on alkaline batteries.
- Simulator Mode—allows you to operate the unit without acquiring satellites, and is ideal for practicing or entering waypoints and routes while at home.

To select an operating mode:

1. Highlight the 'MODE' field and press *ENTER*.
2. Select the desired mode and press *ENTER*.



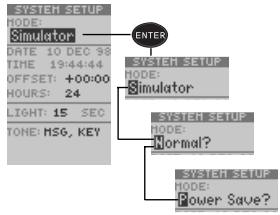
System Setup Submenu

Date and Time Setup

The date and time is located directly below the mode field.

Date and Time information is derived from the GPS satellites and cannot be changed by the user

Because the time shown is UTC time (Greenwich mean time), you will need to enter a time offset to display the correct local time for your area. To determine the time offset for your area, note your position and refer to the chart in Appendix C.



Operating Modes

Date and Time Setup (cont)

To enter the time offset:

1. Highlight the 'OFFSET' field and press *ENTER*.
2. Enter the time offset, and press *ENTER*.

Time Format

The time display shown on the system setup and Position Pages may be set to display the time in a 12 or 24-hour format.

To select the time format:

1. Highlight the 'HOURS' field and press *ENTER*.
2. Select the 12 or 24 hour format and press *ENTER*.

Backlight Timer

The screen backlight timer is adjustable for 0, 15, 30, 60, 120, or 240 seconds. If the timer is set to '0' then the backlight will operate continuously after being activated. When the backlight is activated a bulb icon will appear on the satellite status page.

To set the backlight timer:

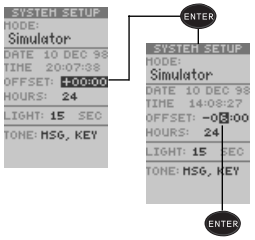
1. Highlight the 'LIGHT' field and press *ENTER*.
2. Select the desired setting and press *ENTER*.
3. To turn the backlight on and off, press the *POWER* key briefly.

Tone Setting

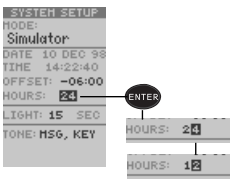
The GPS 12 CX allows you to choose a tone for messages only, messages and keystrokes, or no tone at all.

To set the tone:

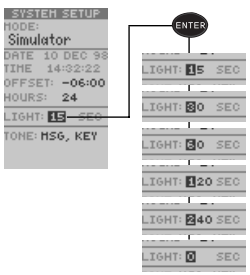
1. Highlight the 'TONE' field and press *ENTER*.
2. Select the desired tone setting and press *ENTER*.



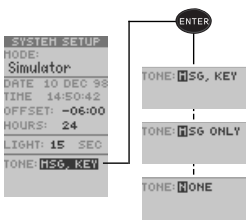
Entering a Time Offset



Selecting a Time Format



Backlight Timer Settings



Tone Settings

Navigation Setup

The navigation setup submenu page is used to select the Position Format, Map Datum, CDI Scale, Units of Measurement, and Heading information.

Position Formats

The default position format for the GPS 12 CX is latitude and longitude in degrees and minutes (hddd° mm.mmm'). You may also select degrees, minutes and seconds (hddd°mm'ss.s"); degrees only (hddd.ddddd°); UTM/UPS; MGRS; Maidenhead; User-defined Grid; or regional British, German, Irish, Indo So LCO, Indian, New Zeland, Swedish, Swiss, Taiwan and West Malayan Grids.

To select a position format:

1. Highlight the 'POSITION FRMT' field, and press *ENTER*.
2. Select the desired setting, and press *ENTER*.

User Grid Position Format

The 'User Grid' option lets you create a user-defined position format by establishing factors such as longitude of origin, scale, and false Easting or Northing.

To define a user grid:

1. Select 'User Grid', and press *ENTER*.
2. Enter values for longitude origin, scale, and false Easting and Northing, and press *ENTER*.
3. Highlight 'SAVE?', and press *ENTER*.

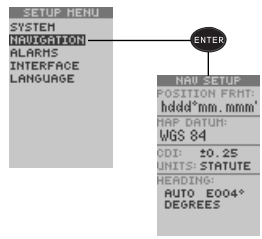
Map Datums

The 'MAP DATUM' field comes with a 'WGS 84' default setting. Although over 100 map datums are available for use (see Appendix D for map datums), you should only change the datum if you are using maps or charts that specify a different datum than WGS 84. If no datum is specified, you may select each datum applicable to your region until you find the datum that provides the best positioning at a known point.

To select a map datum:

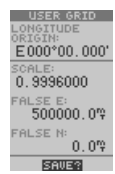
1. Highlight the 'MAP DATUM' field, and press *ENTER*.
2. Select the desired setting, and press *ENTER*.

Warning: Selecting the wrong map datum can result in substantial position errors. When in doubt, use the default WGS 84 datum for best overall performance.



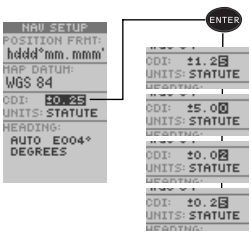
Navigation Setup Submenu Page

Position Format Field

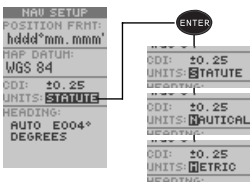


User Grid Page

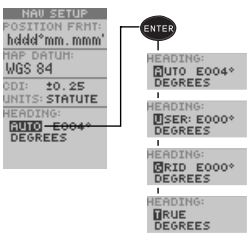
Map Datum Field



CDI Scale Settings



Units of Measurement Settings



Heading Settings

Map Datums (cont)

To define a user datum:

1. Highlight the 'MAP DATUM' field, and press *ENTER*.
2. Scroll through the map datum options until 'User' appears, and press *ENTER*.
3. Enter the five parameters of the map datum—'DX', 'DY', 'DZ', 'DA', and 'DF'—using the rocker keypad, and press *ENTER*. The signs of each value should follow the convention: WGS 84 +/- local geodetic system.
4. Highlight 'SAVE?', and press *ENTER*.

CDI Scale

The course deviation indicator (CDI) field lets you select the range of the CDI bar scale on the Highway Page. Four scales are available: +/- 0.02, 0.25 (default), 1.25, and 5.0 miles or kilometers. Note: This CDI value represents the full scale limits (left or right from center) of the CDI.

To enter a CDI scale setting:

1. Highlight the 'CDI' field, and press *ENTER*.
2. Select the desired setting, and press *ENTER*.

Units of Measure

The GPS 12 CX lets you select statute (default), nautical, or metric units of measure for all speed and distance readouts.

To change the unit of measure:

1. Highlight the 'UNITS' field, and press *ENTER*.
2. Select the desired units of measure, and press *ENTER*.

Heading Reference

The GPS 12CX's heading information can be displayed referencing magnetic north (automatic or user-defined), true north, or calculated grid headings. The default setting is automatically-calculated magnetic north, which is suitable for most applications.

To select a heading reference:

1. Highlight the 'HEADING' field, and press *ENTER*.
2. Select the desired heading reference, and press *ENTER*.

To enter a user-defined magnetic heading:

1. Select 'User Mag' and press *ENTER*.
2. Enter the degrees and direction of magnetic variation, and press *ENTER*.

Angular Heading Selection

The GPS 12CX gives you the ability to change your angular display. Choose this field to toggle between degrees and MILS.

To change between degrees and MILS:

1. Highlight the angle heading field and press *ENTER*
2. Select the desired setting and press *ENTER*.

Alarms Setup

The alarms setup submenu page is used to set two alarms on the GPS 12CX: arrival and CDI. The arrival alarm will alert you when you are approaching a waypoint. The arrival alarm has three available settings:

- 'Off'— No alarm will occur.
- 'On'— The alarm will occur at the user-specified distance from the destination waypoint.
- 'Auto'— The alarm will occur at one minute away (based upon current speed, distance & track) from the each waypoint in the active route or from the GOTO destination.

To set the arrival alarm:

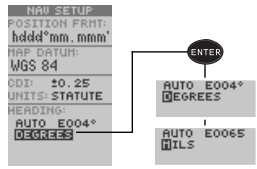
1. Highlight the 'ARRIVAL' field and press *ENTER*.
2. Select 'On', 'Auto' or 'Off', and press *ENTER*.
3. If 'On' is selected, highlight the distance field, press *ENTER*, enter the desired distance and press *ENTER*.

The CDI alarm will alert you if your position deviates off course (left or right) beyond the limits specified.

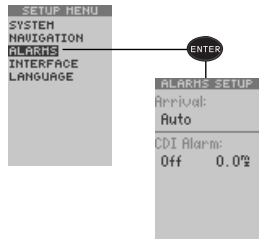
To set the CDI alarm:

1. Highlight the 'CDI Alarm' field and press *ENTER*.
2. Select 'On' or 'Off', and press *ENTER*.
3. If 'On' is selected, highlight the distance field, press *ENTER*, enter the desired distance and press *ENTER*.

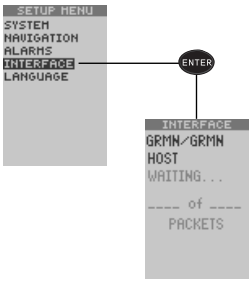
Note: The arrival and CDI alarms both have setting ranges from 0.0 to 9.9 units (statute miles/nautical miles/kilometers). Setting the CDI alarm to its lowest limits may cause false alarms due to the effects of DOD-imposed Selective Availability. Selective Availability can degrade your GPS position by as 100 meters.



Angular Heading Settings



Alarms Setup Submenu Page



Interface Setup Submenu Page

I/O Format Field

Transfer Mode Field

Interface Setup

The GPS 12CX's interface page lets you specify the formats for connecting external devices. There are six options: GRMN/GRMN, None/None, RTCM/None, RTCM/NMEA, NMEA/NMEA, and None/NMEA. Each option lists the input format first, followed by the output format.

To select an I/O format:

1. Highlight the I/O field and press *ENTER*.
2. Select the desired setting and press *ENTER*.

The GRMN/GRMN setting is a proprietary format that lets you exchange information such as waypoints, routes, and track logs between two GARMIN GPS units or the GPS 12CX and a PC. The transfer mode field is directly below 'GRMN/GRMN', and allows you to specify what information to request or send to a second GPS unit. The 'Host' setting lets you control all data transfer functions from the second GPS unit or a PC.

To select a transfer mode:

1. Highlight the transfer mode field and press *ENTER*.
2. Select a desired setting, and press *ENTER*.

To disable all interfacing capabilities, select the 'None/None' setting. If you want to output NMEA data without any differential input capability, select 'None/NMEA'.

Interface Setup: DGPS

The last two format settings allow the differential-ready GPS 12CX to accept RTCM DGPS corrections in RTCM 104 version 2.0 format. Using DGPS corrections will improve receiver accuracy to 1-5 meters, regardless of errors induced by the U.S. Dept. of Defense Selective Availability (SA) program. Two RTCM options are available: 'RTCM/NONE', which allows connection to a beacon receiver with no output capability; and 'RTCM/NMEA', which allows DGPS input and NMEA output.

When 'RTCM/NMEA' is selected, the GPS 12CX will either automatically try to tune the last frequency and bit rate you selected or will switch to the default frequency of 304.0 kHz with a bit rate of 100 bps if no previous beacon has been tuned. (You may also enter your own frequency and bit rate if desired.) This information is used to tune/control an optional GARMIN GBR 21 differential beacon receiver.

Note: Use the 'RTCM/NONE' setting if your beacon receiver does not support these software-driven controls.

Interface Setup: DGPS (continued)

To enter a DGPS beacon frequency:

1. Highlight the 'FREQ' field, and press *ENTER*.
2. Enter the desired frequency, and press *ENTER*.
3. Highlight the 'RATE' field, and press *ENTER*.
4. Select the desired bit rate (bps), and press *ENTER*.

Note: The frequency and bit rate fields are disabled when the 'RTCM/NONE' option is selected.

When the GPS 12CX is receiving DGPS corrections from the GBR 21, the 'BEACON RECVR' section of the I/O setup page will display the beacon frequency and signal strength, as well as the distance from the beacon transmitter to your present position. At the bottom of the beacon receiver field, a status message will keep you informed of DGPS activity:

- A 'Tuning' message will be displayed while a beacon receiver is selecting a frequency/bit rate and waiting for signal reception.
- Once a valid beacon signal has been received, a 'Receiving' message will be displayed.
- If the beacon signal is received and no correction data is being received, a 'No Data' message will be displayed.
- If a beacon frequency cannot be tuned and/or no signal is received, a 'No Status' message will be displayed.

The message page will alert you to any problems relating to DGPS operation. You may also monitor the DGPS status from the status field on the interface page. The GPS 12CX will display one of three alert messages concerning DGPS operation:

No DGPS Position— there is not enough correction data available to compute a DGPS position.

No RTCM Input— the beacon receiver is not properly connected, the baud rates do not match or no signal is being provided.

RTCM Input Failed— DGPS data was being received but has been lost.

NMEA Setting Field

DGPS Frequency Field

Transfer Rate Field

Beacon Rate Field

Language Setup

The GPS 12CX offers nine different language selections; English, Danish, French, German, Italian, Spanish, Swedish, Portuguese, and Norwegian.

To select a language:

1. From the Setup Menu Page, highlight 'LANGUAGE', and press *ENTER*.
2. Highlight the desired language and press *ENTER*.

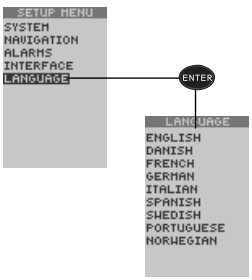
Find City

The GPS 12CX has a built in database of over 30,000 city locations worldwide. The 'Find City' function makes locating, viewing and going to any city in the database easy.

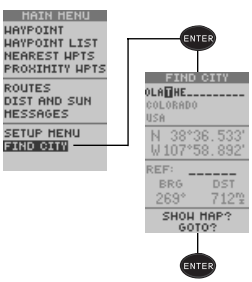
To locate a city:

1. Highlight 'FIND CITY' on the menu and press *ENTER*.
2. The city field will be highlighted, press *ENTER* to activate the field and enter the city name.
3. Press *ENTER* to accept.

As you enter the city name the unit scans the database just like the waypoint scanning function and displays the next available city with the state displayed below. If there are multiple cities with the same name, the state or country of the city will be displayed below the city name, continue scrolling through the same character to see all of the choices. When you have selected a city the location of the city will be displayed.



Language Setup Submenu Page



Locating a City

You can also determine the bearing and distance from your present location or a reference waypoint to the selected city.

To determine bearing and distance:

1. Highlight the 'REF' field and press *ENTER*.

Note: Leave the 'REF' field blank to reference your present location.

2. Enter a waypoint name and press *ENTER*.

To show the city location on the map:

1. Highlight 'SHOW MAP?' and press *ENTER*.

To GOTO the city location:

1. Highlight GOTO and press *ENTER*.

A waypoint with the city name, or an abbreviation of the city name will be added to the waypoint list.

2. Press *ENTER* to activate the GOTO.

Show City Location on Map

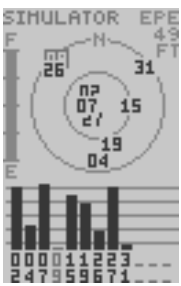
Navigation Simulator

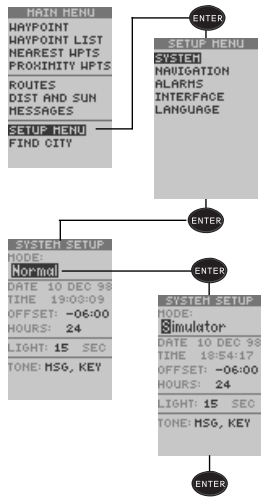
The GPS 12CX's simulator mode lets you practice all aspects of its operation without active satellite acquisition. You can plan and practice trips, enter new waypoints and routes, and save them for use during normal operation.

To activate the simulator:

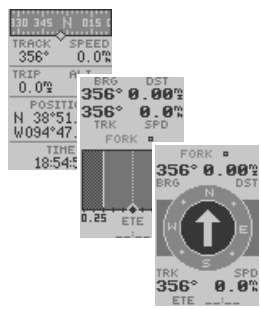
1. From the Setup Menu Page, highlight 'SYSTEM', and press *ENTER*.
2. Highlight the 'MODE' field, and press *ENTER*.
3. Select 'Simulator?', and press *ENTER*.

Once the simulator mode has been activated, use the Position, Compass, or Highway Page to set your speed and track by highlighting the appropriate field, entering the desired value, and pressing ***ENTER***. You may also enter a new position if you desire (from the Position Page).





Putting the GPS 12CX in Simulator Mode



Enter Simulator Speed, Track and Bearing in the appropriate field.

The GPS 12CX does not track satellites in simulator mode. Never attempt to use the simulator mode for actual navigation.

Initializing Your GPS 12CX for First-Time Use

The GPS 12CX typically acquires a position fast enough that initialization is not required. However, initialization may be necessary for the following:

- After memory loss
- When the receiver has been moved more than 500 miles with the power off.

Additionally, it may be necessary to initialize the unit the first time you use it, if it does not acquire a fix after the first few minutes.

The receiver is shipped from the factory in AutoLocate™ mode, which enables the GPS 12CX to determine its location anywhere in the world. To speed up the initialization process, we recommend using the graphic initialization described below, which will usually provide a fix in a few minutes.

Welcome Page

To turn the GPS 12CX on:

1. Press the *POWER* key until the receiver turns on .

The welcome page will be displayed while the unit conducts a self test. Once testing is complete, the welcome page will be replaced by the Satellite Page, and the EZinit prompt may appear prompting you to select one of two initialization methods

- Select Country – allows you to initialize the receiver by selecting your present position from a list of countries in the GPS 12 CX's internal database. This typically provides a position fix in under three minutes.
- AutolocateTM – allows the GPS 12CX to initialize itself and calculate a position fix without knowing your present position. This usually provides a fix in 3-5 minutes.

If the EZinit prompt has not automatically appeared on the Satellite Page:

1. Press the *ENTER* key.

The EZ-Init prompt will automatically appear if the receiver needs to be initialized. The prompt may also appear during normal use if the antenna becomes shaded.

Note: If the EZinit prompt ever appears after you have initialized the receiver (due to the antenna's view of satellites being obstructed by trees, etc.), highlight the 'NO RE-INIT' selection with the arrow keypad and press ***ENTER***.

To initialize the receiver:

1. If the 'COUNTRY' option is not highlighted, press the *ROCKER* down repeatedly to move the field highlight to the 'COUNTRY' option.
2. Press the *ENTER* key.
3. Use the *ROCKER* key to scroll through the list options until the country of your present position appears.
4. Press the *ROCKER* key up to highlight the country/state/region you're in. If the country you're in is not listed, select any other country within 500 miles of your present position.
5. Press *ENTER* to finish.

The GPS 12CX will now begin searching for the appropriate satellites for your location and should acquire a position in under three minutes. You can verify that you have acquired a position by watching the Satellite Page transition to the Position Page (provided you haven't pressed any other buttons) or by looking for a '2D NAV' or '3D NAV' status at the top-left corner of the Satellite Page.

*Use the **ROCKER** to highlight the country, region or state of your present position from the list and press **ENTER**. If the country is not listed, select the closest country instead.*

Initialization Troubleshooting

If you have trouble initializing the receiver or acquiring a position, check the following:

- Does the unit have a clear view of the sky?

If there are large buildings or mountains nearby, or if there is heavy tree cover, the receiver may not be receiving enough satellite signals to calculate a position.

- Have you selected the right country/state/region from the EZinit list?

Check for the correct approximate lat/lon on the Position Page, or reselect the appropriate country from the list to restart the initialization.

- Have you moved more than 500 miles from the last calculated position with the receiver off?

Reinitialize the receiver, selecting the country/state/region of your new location from the EZinit list. Your unit should now be initialized.

APPENDIX B

Specfications & Wiring

Never attempt any repairs yourself. To protect your GPS 12CX, keep it in a covered container or case when not in use, and never allow gasoline or other solvents to come into contact with the case. Clean the case and lens with a soft cloth and a household window cleaner.

PHYSICAL

Case:	Waterproof*
Size:	5.3 x 14.7 x 3.1 cm
Weight:	Approx 9.5 ounces (269g) w/ batteries
Temperature Range:	5º to 124ºF (-15º to 55ºC)

PERFORMANCE

Receiver:	12 parallel channel, differential-ready
Acquisition Time:	Approx. 15 seconds (warm start)
	Approx. 45 seconds (cold start)
	Approx. 5 minutes (AutoLocate™)
Update Rate:	1/second, continuous
Position Accuracy:	1-5 meters (3-17 ft.) with DGPS corrections**
	15 meters (49 ft.) RMS***
Velocity Accuracy:	0.1 knot RMS steady state
Dynamics:	6g

POWER

Input:	Four 1.5 volt AA batteries or 10-32v DC
Power Consumption:	1 watt
Battery Life:	Up to 36 hours (with 4 AA batteries)
Internal Backup:	lithium battery

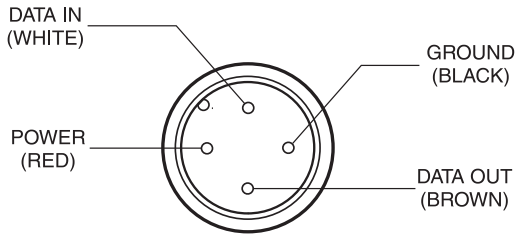
NOTE: Alkaline batteries lose a significant amount of their capacity as temperature decreases. If you're using the GPS 12CX in below freezing temperatures, use lithium batteries for longer battery life. Extensive use of screen backlighting will significantly reduce battery life.

Specifications subject to change without notice.

* Meets IEC (European Community Specification) 529 IPX7 for protection against immersion for 30 minutes at a depth of 1 meter.

** With optional DGPS input.

*** Subject to accuracy degradation to 100m 2DRMS under the US DOD-imposed Selective Availability Program.



Three optional cables are available to connect the GPS 12CX to an external power source or interface with another unit or PC:

- Cigarette Lighter Adapter— Allows connection to a 12-volt DC cigarette lighter plug. Part No. 010-10085-00.
- Data Transfer Cable— Allows data transfer between GARMIN GPS units. The GPS 12CX is compatible with the following units: GPS 38/40/45/45XL, GPS II/II plus, GPS 12, and GPS 12XL. Information that can be transferred includes the almanac, waypoints, routes, and tracklog. However, waypoint symbols are only transferrable from or to units that support waypoint symbols such as the GPS II plus, GPS 12, and GPS 12XL software version 3.01 or later. Part No. 010-10142-00.
- PC Kit Interface Cable— PC interface cable with 9-pin 'D' serial data connector. Part No. 010-10141-00. (A combined Cigarette Lighter Adapter and PC Interface Cable is also available as Part No. 010-10165-00.)

The following interface formats are supported by the GPS 12CX for connection to up to three NMEA devices:

• NMEA 0180

• NMEA 0182

• NMEA 0183 version 1.5

Approved sentences:

GPRMB, GPRMC, GPWPL

Proprietary sentences:

PGRMM (map datum), PGRMZ (altitude), PSLIB (beacon rec. control)

• NMEA 0183 version 2.0

Approved sentences:

GPGGA, GPGSA, GPGSV, GPRMB, GPRMC, GPRTE, GPWPL

Proprietary sentences:

PGRME (estimated error), PGRMM (map datum), PSLIB (beacon receiver control)

DGPS corrections are accepted on RTCM-104 v. 2.1 format.

APPENDIX C

Messages

The GPS 12CX uses a flashing on-screen message indicator to alert you to important information. Whenever the message indicator appears, press PAGE to view the message page. There are two types of messages: temporary alerts and condition alerts. Temporary alerts are cleared from the message page after viewing, while condition alerts remain until the condition has been resolved. Pay careful attention to all messages for your own safety.

Active WPT Can't be Deleted – You have attempted to change the "active to" or "active from" waypoint. Clear the active route or GOTO before making your changes.

Accuracy has been Degraded – The accuracy of the GPS 12CX has been degraded beyond 500 meters due to poor satellite geometry or data quality. You should check other navigational sources to verify the position indicated.

Already Exists – The name you are entering already exists in the GPS 12CX's memory.

Arrival at (or Approaching) – You are one minute away from reaching a destination waypoint or at the distance specified on the alarms submenu.

Battery Power is Low – The batteries are low and should be replaced.

CDI Alarm – You are left or right of course, beyond the limits set on the alarms submenu.

No DGPS Position – Not enough data is available to compute a DGPS position.

No RTCM Input – Beacon receiver is improperly connected or baud rates do not match.

Poor GPS Coverage – The GPS 12CX cannot acquire the necessary number of satellites to compute a position. Try another location with a clearer view of the sky.

Power Down and Re-init – The GPS 12CX is not able to calculate a position due to abnormal satellite conditions. Turn the unit off and verify the last position shown by other means. Try the unit again later, possibly in a different location.

PROX Alarm – You have entered the alarm circle for a specific proximity waypoint.

Proximity Overlapped – The alarm circles of two proximity waypoints overlap which could cause difficulty in monitoring distances to each waypoint.

Messages

Proximity Wpt can't be Deleted – The waypoint you are trying to delete is listed as a proximity waypoint and must be removed from the list before it can be deleted.

Read Only Mem has Failed – The permanent memory has failed and the unit is not operable.

Received an Invalid WPT – A waypoint was received during upload transfer that has an invalid identifier.

Receiver has Failed – A failure in receiver hardware has been detected. If this message persists, do not use the unit and take it to an authorized dealer for repair.

Route is Full – You have attempted to add more than 30 waypoints to a route.

Route is not Empty – You have attempted to copy into a route already in use.

Route Waypoint was Deleted – A route waypoint entered does not exist in the database and has been deleted from the route.

RTCM Input has Failed – DGPS data being received has been lost. You are no longer receiving the beacon signal.

Searching the Sky – The GPS 12CX is in searching the sky for almanac data or the unit is in AutoLocate™ mode.

Stored Data was Lost – All waypoints, routes, time and almanac data has been lost due to battery failure or clearing the receiver's memory.

Track Memory is Full – All track log points in memory have been used. You must either delete the current tracklog or switch the record option to 'WRAP' which will begin erasing the oldest tracklog points as new ones are added.

Transfer has been Completed – The receiver is finished uploading or downloading information to the connected device.

WPT Memory is Full – You have used all 1000 waypoints in the GPS 12CX. Delete unwanted waypoints to make room for new entries.

APPENDIX D

Time Offset

Time Offset Chart

The table below gives approximate UTC time offset for various longitudinal zones. If you are in daylight savings time, add one hour to the offset.

Longitudinal Zone	Offset
W180.0º to W172.5º	-12
W172.5º to W157.5º	-11
W157.5º to W142.5º	-10
W142.5º to W127.5º	- 9
W127.5º to W112.5º	- 8
W112.5º to W097.5º	- 7
W097.5º to W082.5º	- 6
W082.5º to W067.5º	- 5
W067.5º to W052.5º	- 4
W052.5º to W037.5º	- 3
W037.5º to W022.5º	- 2
W022.5º to W007.5º	- 1
W007.5° to E007.5°	- 0

Longitudinal Zone	Offset
E007.5° to E022.5°	+ 1
E022.5° to E037.5°	+ 2
E037.5° to E052.5°	+ 3
E052.5° to E067.5°	+ 4
E067.5° to E082.5°	+ 5
E082.5° to E097.5°	+ 6
E097.5° to E112.5°	+ 7
E112.5° to E127.5°	+ 8
E127.5° to E142.5°	+ 9
E142.5° to E157.5°	+10
E157.5° to E172.5°	+11
E172.5° to E180.0°	+12

APPENDIX E

Map Datums

Adindan	Adindan- Ethiopia, Mali, Senegal, Sudan
Afgooye	Afgooye- Somalia
AIN EL ABD '70	AIN EL ANBD 1970-Bahrain Island, Saudi Arabia
Anna 1 Ast '65	Anna 1 Astro '65- Cocos Isl.
ARC 1950	ARC 1950- Botswana, Lesotho, Malawi, Swaziland, Zaire, Zambia, Zimbabwe
ARC 1960	ARC 1960- Kenya, Tanzania
Ascnsn Isld '58	Ascension Island '58- Ascension Island
Astro B4 Sorol	Astro B4 Sorol Atoll- Tern Island
Astro Bcn "E"	Astro Beacon "E"- Iwo Jima
Astro Dos 71/4	Astro Dos 71/4- St. Helena
Astr Stn '52	Astronomic Stn '52- Marcus Island
Astrln Geod '66	Australian Geod '66- Australia, Tasmania Island
Astrln Geod '84	Australian Geod '84- Australia, Tasmania Island
Austria	Austria
Bellevue (IGN)	Efate and Erromango Islands
Bermuda 1957	Bermuda 1957- Bermuda Islands
Bogata Observ	Bogata Obsrvatry- Colombia
Campo Inchspe	Campo Inchauspe- Argentina
Canton Ast '66	Canton Astro 1966- Phoenix Islands
Cape	Cape- South Africa
Cape Canavrl	CapeCanaveral- Florida, Bahama Islands
Carthage	Carthage- Tunisia
CH-1903	CH 1903- Switzerland
Chatham 1971 (New Zealand)	Chatham 1971- Chatham Island
Chua Astro	Chua Astro- Paraguay
Corrego Alegr	Corrego Alegre- Brazil
Djakarta	Djakarta (Batavia)- Sumatra Is land (Indonesia)
Dos 1968	Dos 1968- Gizo Island (New Georgia Islands)
Easter Isld 6	Easter Island 1967
European 1950	European 1950- Austria, Belgium, Denmark, Finland, France, Germany, Gibraltar, Greece, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland
European 1979	European 1979- Austria, Finland, Netherlands, Norway, Spain, Sweden, Switzerland
Finland Hayfrd	Finland Hayford- Finland
Gandajika Base	Gandajika Base- Republic of Maldives
Geod Datm '49 New Zealand	Geodetic Datum '49-
Guam 1963	Guam 1963- Guam Island
Gux 1 Astro	Gux 1 Astro- Guadalcanal Island
Hjorsey 1955	Hjorsey 1955- Iceland
Hong Kong '63	Hong Kong '63- Hong Kong
Hu-Tzu-Shan Taiwan	
Indian Bngldsh	Indian- Bangladesh, India, Nepal
Indian Thailand	Indian- Thailand, Vietnam
Indonesia '74	Indonesia 1974- Indonesia
Ireland 1965	Ireland 1965- Ireland
ISTS 073 Astro	ISTS 073 ASTRO '69- Diego Garcia
Johnston Island	Johnston Island Kandawala Kandawala-SriLanka
Kerguelen Islnd	Kerguelen Island, Kandawala, Sri Lanka
Kertau 1948	Kertau 1948- West Malay sia, Singapore
L. C. 5 Astro	Cayman Brac Island
Liberia 1964	Liberia 1964- Liberia
Luzon Mindanao	Luzon- Mindanao Island
Luzon Philippine	Luzon- Philippines (excluding Mindanao Island)
Mahe 1971	Mahe 1971- Mahe Island
Marco Astro	Marco Astro- Salvage Island
Massawa	Massawa- Eritrea (Ethiopia)
Merchich	Merchich- Morocco
Midway Ast '61	Midway Astro '61- Midway
Minna	Minna- Nigeria
NAD27 Alaska	North American 1927- Alaska

APPENDIX E

Map Datums

NAD27 Bahamas	North American 1927- Bahamas (excluding San Salvador Island)
NAD27 Canada	North American 1927- Canada and Newfoundland
NAD27 Canal Zone	North Am. 1927- Canal
NAD27 Caribbn	North American 1927- Caribbean (Barbados, Caicos Islands, Cuba, Dom. Rep., Grand Cayman, Jamaica, Leeward and Turks Islands)
NAD27 Central	North American 1927- Central America (Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua)
NAD27 CONUS	North Am. 1927- Mean Value
NAD27 Cuba	North American 1927- Cuba
NAD27 Grnland	North American 1927- Greenland (Hayes Peninsula)
NAD27 Mexico	N. American 1927- Mexico
NAD27 San Sal	North American 1927- San Salvador Island
NAD83	North American 1983- Alaska, Canada, Central America, CONUS, Mexico
Nhrwn Masirah	Nahrwn- Masirah Island (Oman)
Nhrwn Saudi A	Nahrwn- Saudi Arabia
Nhrwn United A	Nahrwn-United Arab Emirates
Naparima BWI	Naparima BWI- Trinidad and Tobago
Obsrvtorio '66	Observatorio 1966- Corvoand Flores Islands (Azores)
Old Egyptian	Old Egyptian- Egypt
Old Hawaiian	Old Hawaiian- Mean Value
Oman	Oman- Oman
Ord Srvy GB	Old Survey Grt Britn- England, Isle of Man, Scotland, Shetland Isl., Wales
Pico De Las Nv	Canary Islands
Potsdam	Potsdam-Germany
Ptcairn Ast '67	Pitcairn Astro '67- Pitcairn Is
Prov S Am '56	Prov So Amricn '56- Bolivia, Chile,Colombia, Ecuador, Guyana, Peru, Venezuela
Prov S Chln '63	Prov So Chilean '63- S. Chile
Puerto Rico	Puerto Rico & Virgin Islands
Qatar National	Qatar National- Qatar
Qornoq	Qornoq- South Greenland
Reunion	Reunion- Mascarene Island
Rome 1940	Rome 1940- Sardinia Island
RT 90	Sweden
Santo (Dos) Island	Santo (Dos)- Espirito Santo
Sao Braz	Sao Braz- Sao Miguel, Santa Maria Islands (Azores)
Sapper Hill '43	Sapper Hill 1943- East Falkland Island
Schwarzeck	Schwarzeck- Namibia
Sth Amrcn '69	South American '69- Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Guyana, Paraguay, Peru, Venezuela, Trinidad and Tobago
South Asia	South Asia- Singapore
SE Base	Southeast Base- Porto Santo and Madiera Islands
SW Base	Southwest Base- Faial, Graciosa, Pico, Sao Jorge and Terceira Islands (Azores)
Timbalai 1948	Timbalai 1948- Brunei and E. Malaysia (Sarawak and Sabah)
Tokyo	Tokyo-Japan, Korea, Okinawa
Tristan Ast '68	Tristan Astro 1968- Tristan da Cunha
Viti Levu 1916	Viti Levu 1916- Viti Levu/ Fiji Islands
Wake-Eniwetok	Wake-Eniwetok- Marshall Isl.
WGS 72	World Geodetic System 1972
WGS 84	World Geodetic System 1984
Zanderij	Zanderij- Surinam

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