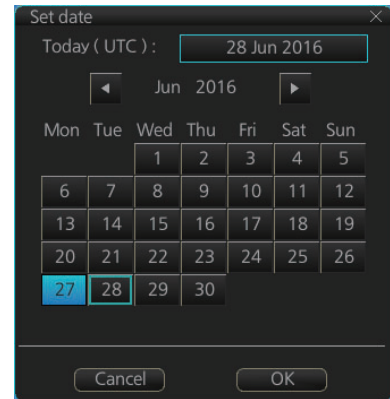


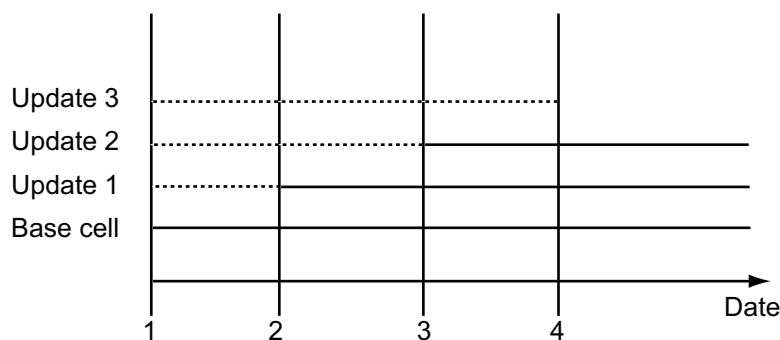
- [Date Range]: Display all charts within the set range.
- Click the date button to show the [Set date] dialog box.
 - Select the appropriate date from the calendar, then click [OK] to close the [Set date] dialog box and return to the [Viewing Dates] dialog box.
 - Click [Close].
 - Check the appropriate charts, then access the Viewing Dates dialog again (see step 1).
 - Select [AUTO - Today] to show the current date's chart.
 - Click [Close].



9.2.3 About chart viewing date dependency of S57 standard

How the issue date of updates changes the visibility of the changes

Study the example below to understand the behavior of updates relative to date.



The figure above shows how updates are dependent Chart viewing dates set in Display/Update Review date settings by user. Actions 1 to 4 are as follows:

- Base cell including three updates is converted into SENC. Display Date is set as current date of the system.
- The date in which update 1 was issued. [Display Date] must be set to correct date in order to see the chart with update 1.
- The date in which update 2 was issued. [Display Date] must be set to correct date in order to see the chart with update 1 and update 2.
- The date in which update 3 was issued. [Display Date] must be set to correct date in order to see the chart with update 1, update 2 and update 3.

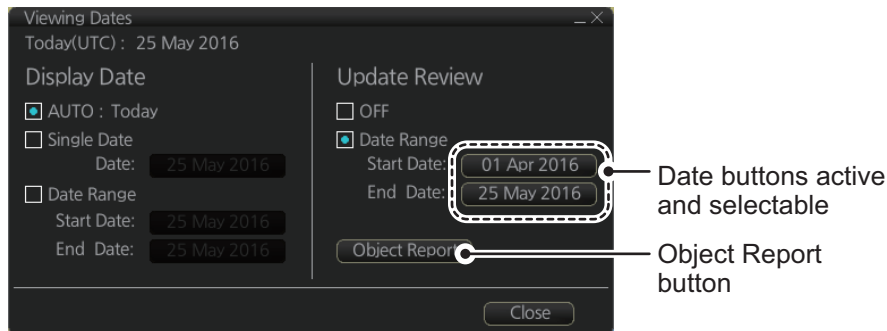
Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: In order to display charts with correct updated situation during route planning, always use planned date of each waypoint to check your plan.

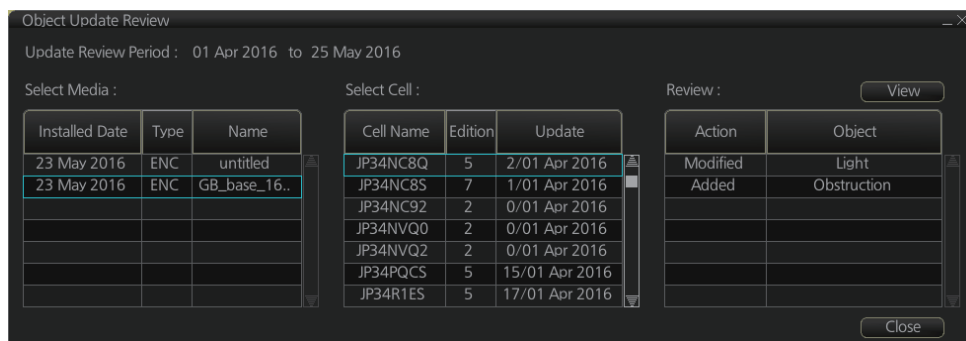
9.2.4 How to approve and highlight S57 chart updates

You can highlight updated data by setting a date (or date period) and creating a report.

1. On the InstantAccess bar™, click the [Chart INFO] and [Viewing Dates] button. The [Viewing Date] dialog box appears.
2. In the [Update Review] column, check the [Date Range] box. The [Start Date] and [End Date] buttons become active and selectable.



3. Click the [Start Date] button to show the [Set date] dialog box.
4. Select the start date, then click [OK].
5. Click the [End Date] button to show the [Set date] dialog box.
6. Select the end date, then click [OK].
7. Click [Object Report]. The [Object Update Review] dialog appears.

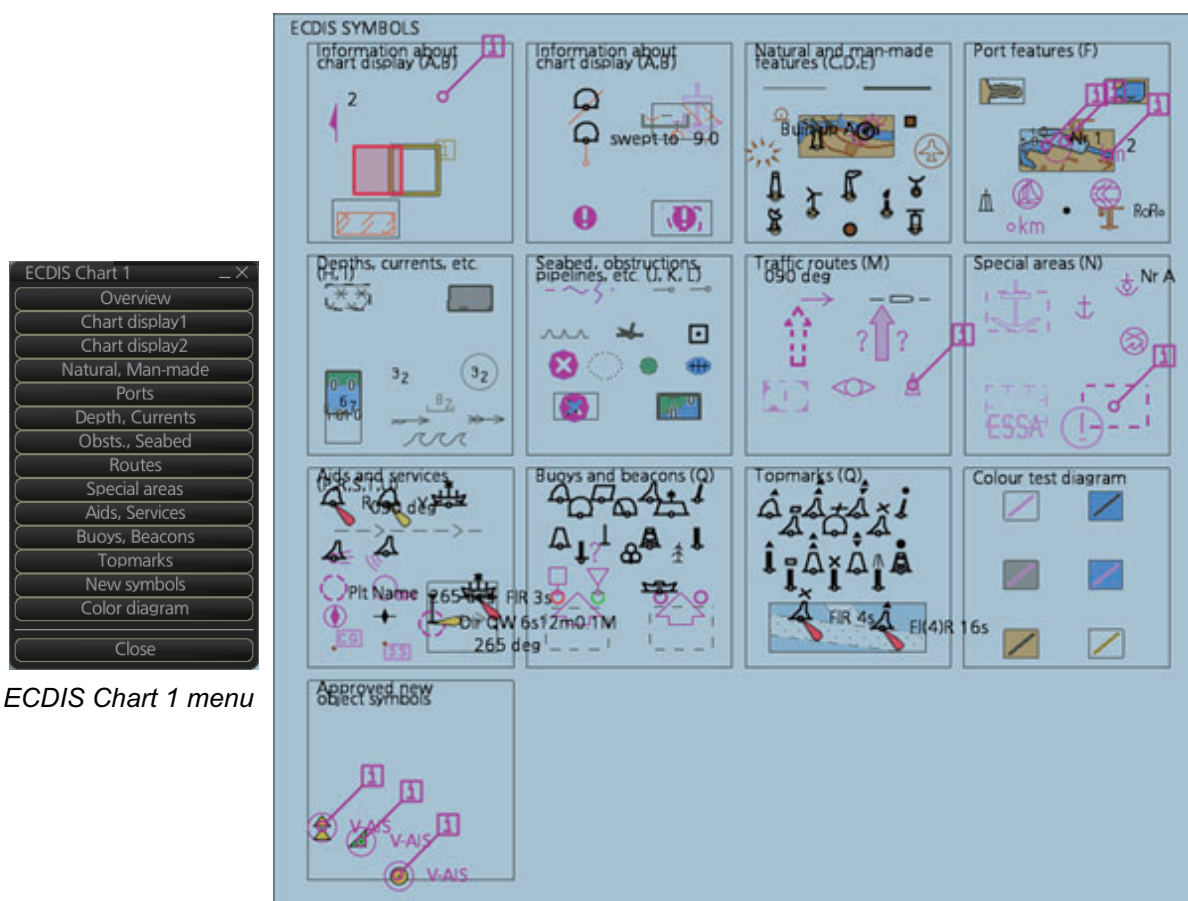


8. Select the items to highlight, then click the [View] button. Items selected here appear with an orange highlight mark.
9. To remove highlights, set the [Update Review] column of the [Viewing Dates] dialog box to [OFF].
10. Click the [Close] button on the [Viewing Dates] dialog box to close the dialog boxes.

9.3 Symbology Used in S57 Charts

You can familiarize yourself with the symbology used by browsing IHO Chart 1, which is included in this system. Note that it behaves as any S57 chart and it follows your selections. See section 8.3.

1. Click the [Chart INFO] and [Chart 1] buttons on the InstantAccess bar™ to show to the [ECDIS Chart 1] menu, shown below.
2. Click a chart feature to show detailed information about the feature. Click [Overview] to show a compilation of all features, shown below.



ECDIS Chart 1 menu

9.3.1 Presentation library used for S57 chart features

The system uses the official IHO presentation library to draw S57 charts. The presentation library is replaceable, but this feature is only intended to be used by qualified service personnel and type approval authorities.

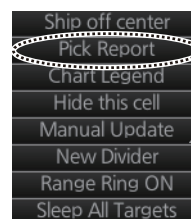
When this manual was published the official presentation library was "pslb04_0.dai", known as "Official IHO presentation library for system Ed 4".

9.4 How to Find Information About S57 Chart Objects

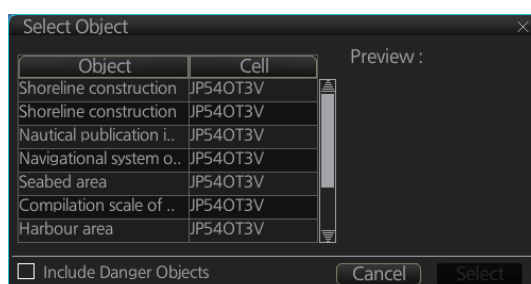
The ability to cursor-pick an object to find additional information about the object is an important function of the system. However, an unprocessed cursor pick, which does not discriminate or interpret and merely dumps on the interface panel all the information available at that point on the display, will normally result in pages of unsorted and barely intelligible attribute information.

Do the following to find information about a chart object.

1. Get into the Voyage navigation mode or Voyage planning mode then right-click an object to show the context-sensitive menu.
2. Click [Pick Report] to show the [Select Object] dialog box.



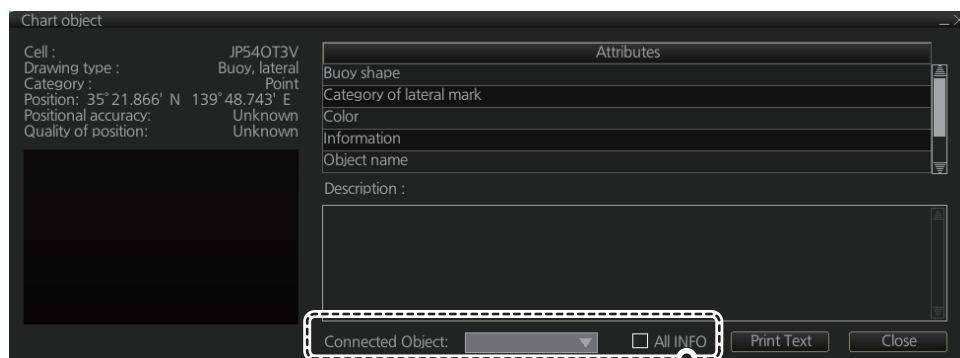
Context-sensitive menu (Voyage navigation mode)



Note: The [Include Danger Objects] check box appears when there is at least one dangerous object. To show dangerous objects in the [Select Object] dialog box, check this box (after the box is checked it becomes unselectable).

3. Click the object for which you want to know its details then click the [Select] button.

Note: Objects selected from the Select Object dialog box are highlighted in orange color and are shown with a broken box(☐).



Depending on the item selected, these indications may be hidden.

- [Description] window: Click an attribute to view its description in this box.
- [All INFO]: Check the [All INFO] box to show all information in the [Attributes] window. (The [All INFO] box becomes unselectable when checked.)
- [Connected Object]: Objects which are connected to the selected object are shown in the drop-down list. Select an object from the list to show its details.

Note 1: If another window is active, the preview window may be partially obscured by that window. Move the window to display the entire preview.

Note 2: The [Attributes] window of the [Chart Object] dialog box changes according to the settings for [Attribute Display] in the [Basic Settings] menu (see section 8.3.2).

9.5 Admiralty Information Overlay (AIO)

The Admiralty Information Overlay includes all Admiralty Temporary and Preliminary Notices to Mariners (T&P NMs) and provides additional navigational significant information from UKHO's ENC validation programme. The AIO is displayed as a single layer on top of the basic ENC and is available free of charge as part of the Admiralty S57 Chart Service and within Admiralty Value Added Resellers' services.

The AIO has been developed to ensure mariners can simply view the information they need - in addition to the standard chart - to navigate safely and compliantly. By clearly showing where important Temporary or Preliminary changes may impact a voyage, the Admiralty Information Overlay will give seafarers the same consistent picture of the maritime environment on their charts as they have always had.

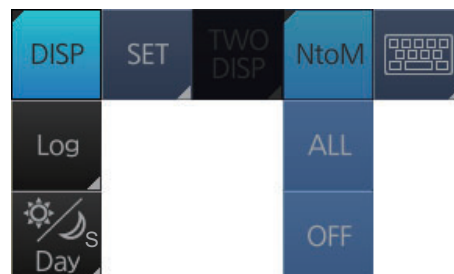
The AIO license is free of charge for AVCS license holders.

9.5.1 Installation

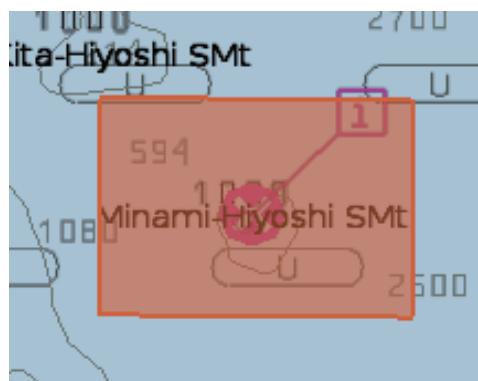
Installation is the same as that for the ENC chart. See section 7.2.

9.5.2 How to display the AIO

Click the [DISP], [NtoM] and [ALL] buttons to show the AIO. To hide the AIO, click the [DISP], [NtoM] and [OFF] buttons.

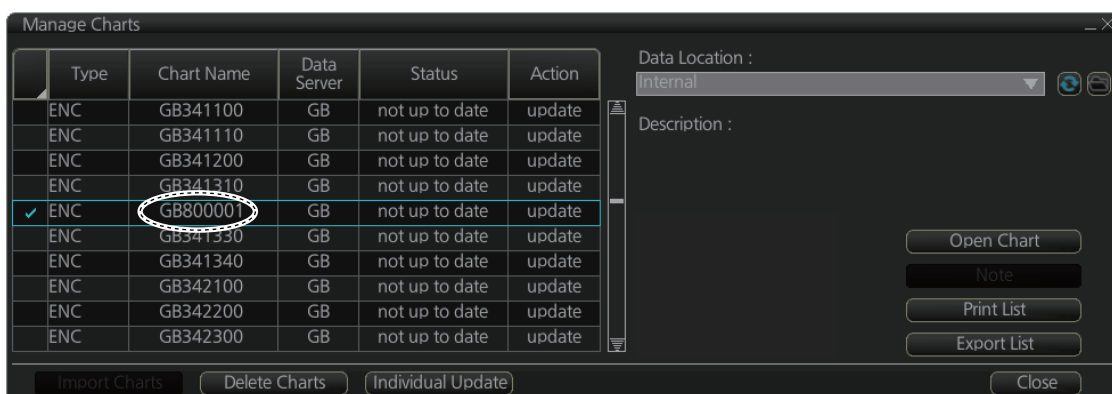


The area(s) that contain temporary or preliminary changes are marked with a hatched red rectangle.



9.5.3 Catalog of AIO cells

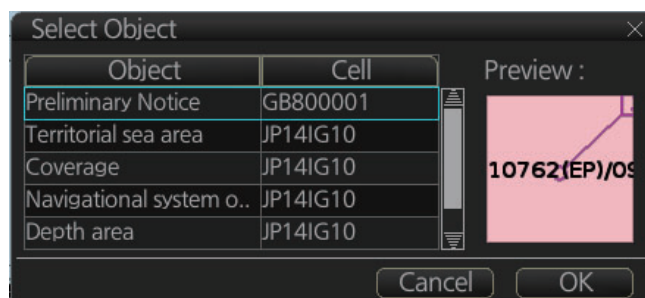
A catalog of AIO cells is maintained in the [Manage Charts] dialog box. To show this box, get into the Chart maintenance mode then click the [Manage Charts] button on the InstantAccess bar™. The AIO cell is GB800001.



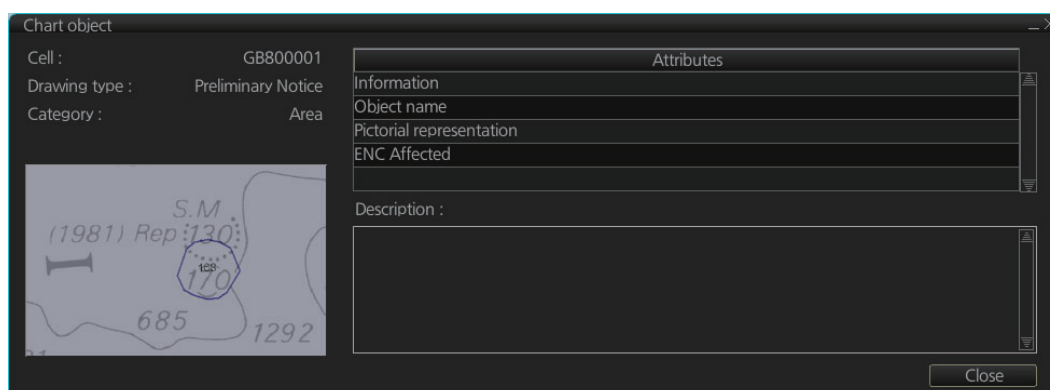
9.5.4 How to find AIO chart object information

Do the following to find chart object information contained in the AIO.

1. Right click a red hatched area in the chart area, then select [Pick Report] to show the [Select Object] dialog box.



2. Click [Preliminary Notice] in the dialog box to show the [Chart object] dialog box.



The [Chart object] dialog box shows the following information:

- Cell (name)
- Drawing type (Preliminary Notice, Temporary Notice)
- Category (AIO)
- Positional accuracy
- Quality of position

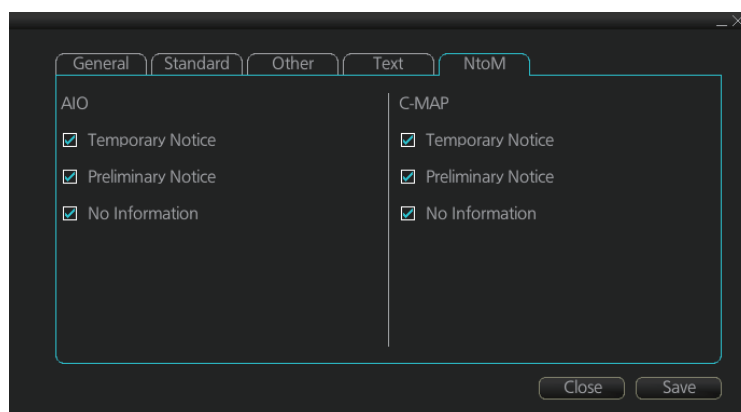
- The preview box provides a scaled-down image of the area selected. Click the image to enlarge it.
- The [Attribute] window shows the attributes for the AIO area selected. To find information about an attribute, click it to show its information in the [Description] box.
Information: Description of area (for example, danger area).
Object name: Object name (number)
Textual description: Full text of the Notice to Mariners (NtoM)
ENC affected: ENC affected by the NtoM
Included in updates: Date this item was updated ([Preliminary Notice] items only)
- [All INFO] checkbox: Check the box to show [Source indication] at the bottom of the [Attribute] window. (The [All INFO] box becomes unselectable when checked.)

Note: The [Attributes] window of the [Chart Object] dialog box changes according to the settings for [Attributes Display] in the [Basic Settings] menu (see section 8.3.2).

9.5.5 How to select the information to display

Select what type of notices to display as follows:

1. Click the [DISP], [SET] and [Chart DISP] buttons on the InstantAccess bar™.
2. Click the [NtoM] tab.



3. In the [AIO] window, check or uncheck items as appropriate.
4. Click the [Save] button to save settings then click the [Close] button to close the menu.

9. VECTOR (S57) CHARTS

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10. C-MAP CHARTS

Your chart system has the capability of using and displaying the latest C-MAP world-wide vector chart database. These charts are fully compliant with the latest IHO S-57 3.1 specifications.

In order to prepare the system for use with the C-MAP database, there are a number of things that must be done.

The descriptions in this chapter apply to the C-MAP charts. (This system does not support CM-93/2 charts.)

10.1 How to Register the System at C-MAP

Your system has the capability to use the C-MAP database. To do so an eToken (supplied by C-MAP) must be connected to the system. The eToken provides the system with a unique System ID that enables C-MAP to issue correct licenses. The actual System ID can be found on the eToken itself, on the back of the installation CD box or on a sticker placed on the equipment. This ID must be provided on all chart orders, by e-mail (license.marine@c-map.com).

10.2 How to Order Charts

A chart order may be sent together with system registration as described above. It is essential that the required information be sent to C-MAP when ordering charts for a system. C-MAP issues order forms specifying the information that is required, and contains vital information that will allow C-MAP to monitor and maintain your licenses throughout the lifetime of the system.

For details on how to order charts see the C-MAP official website (<http://www.c-map.com/>).

10.3 How to Apply for Licenses

Once the order has been received at C-MAP, a license will be generated and transmitted back to the operator. This may be in the form of a single alphanumeric string (16 characters), or in the form of a file called PASSWORD.USR. Once this license has been received it should be input using the License Administrator software designed and supplied by the chart manufacturer. There are two types of licenses, purchase and subscription. Purchase licenses are valid indefinitely while subscription licenses need to be renewed every 12 months from the start of the subscription. Failure to renew a subscription will result in the charts becoming unavailable.

10.4 Troubleshooting

If you are having problems installing your software or charts please check the following before contacting C-MAP:

- Check that the charts are available, with the chart management function.
- Check that the license is correctly installed, with the license function.

Contact Information: For information please call you're nearest C-MAP Office or contact C-MAP. E-mail: technical.marine@c-map.com

10.5 Chart Display

10.5.1 Introduction

The two type of C-MAP charts can be displayed together. These charts have the priority order shown below.

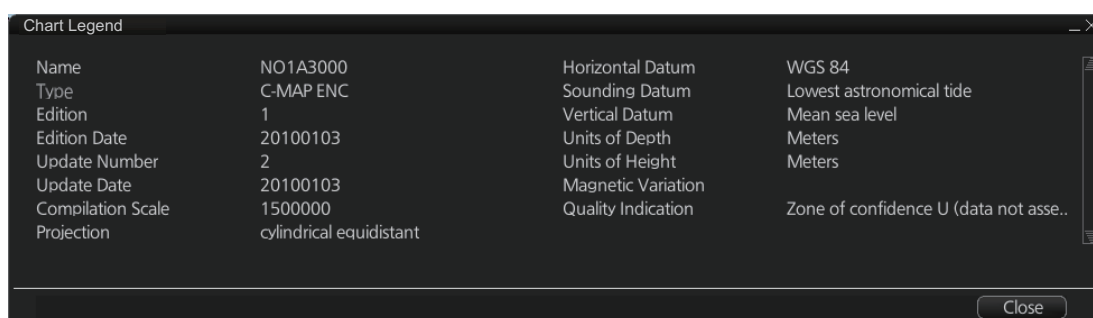
- 1) C-MAP ENC
- 2) C-MAP PROFESSIONAL+

If the same navigational purpose charts are available over an area, priority is as shown above. Areas where ENC is not available C-MAP ENC charts are shown. Where C-MAP PROFESSIONAL+ are available, C-MAP PROFESSIONAL+ charts are displayed.

The [Chart Legend] dialog box provides various information about the C-MAP chart currently displayed. The information can be displayed two ways:

- For current position: Click the [TM/CU Reset] button while in the Voyage navigation mode then click the [Chart INFO] button on the InstantAccess bar™ followed by the [Chart Legend] button.
- For a specific location: Put the cursor on the location then right-click and select [Chart Legend].

To close the dialog box, click the [Close] button.



Name: Name of chart.

Type: Type of chart.

Edition: Edition number of the chart.

Edition Date: Date the edition was published.

Update Number: Update number

Update Date: Date of update

Compilation Scale: The scale of the original paper chart is shown here.

Projection: Projection of current chart.

Horizontal Datum: Horizontal datum used with current chart.

Sounding Datum: Datum used to create sounding data.

Vertical Datum: Vertical datum used with current chart.

Units of Depth: Unit of depth used with current chart.

Units of Height: Unit of measurement used to measure height of objects above sea level.

Magnetic Variation: Amount of magnetic variation. A positive value indicates a change in an easterly direction and a negative value indicates a change in a westerly direction.

Quality Indication: Quantitative estimate of the accuracy of chart features, given by the chart producer.

10.6 Permanent Warnings

Permanent warnings help you keep the C-MAP up-to-date and these are shown at the bottom of the screen. Permanent warnings appear if the system detects a condition that may cause a chart to be not up-to-date.

Message	Meaning, Remedy
[C-MAP]: Database not up to date	Database is not up to date. Update the data base.
[C-MAP]: No connection to eToken	eToken dongle is not connected (inside the Processor Unit) or the eToken has not been initialized. If the dongle is connected, open the [License] dialog box, click the [C-MAP] tab, then click the [C-MAP Setup] and [OK] buttons to initialize the eToken.
[C-MAP]: permits have expired	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.
No connection to dongle.	Dongle not connected. Connect dongle.
Permit expired (SSE 25): XXXXXXXX (Chart name replaces Xs.)	You have an expired permit for a chart. Remove the chart or renew subscription for the permit.

10.7 Notice to Mariners (NM)

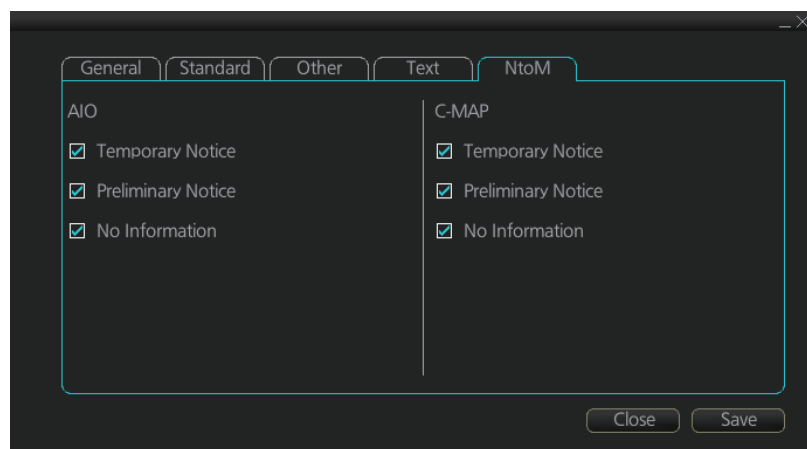
The NM has been developed to ensure mariners can simply view the information they need - in addition to the standard chart - to navigate safely and compliantly. By clearly showing where important Temporary or Preliminary changes may impact a voyage, the NM will give seafarers the same consistent picture of the maritime environment on their charts as they have always had.

The display and operation methods for NM is essentially the same as AIO. See section 9.5 for details.

How to select the NM information to display

Select what type of notices to display as follows:

1. Click the [DISP], [SET] and [Chart DISP] buttons on the InstantAccess bar™.
2. Click the [NtoM] tab.

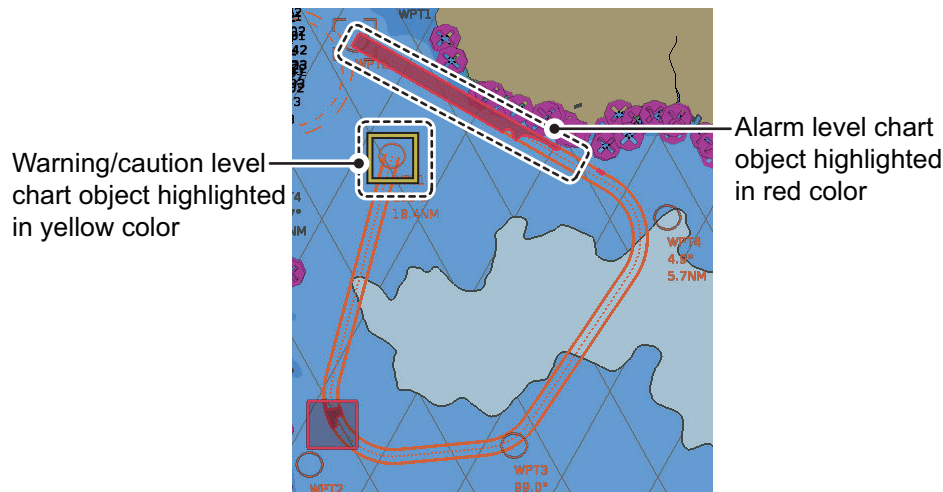


3. In the [C-MAP] window, check the items to display.
4. Click the [Save] button to save settings then click the [Close] button to close the menu.

11. CHART ALERTS

The chart radar can detect areas where the depth is less than the safety contour or detect an area where a specified condition exists. If prediction of own ship movement goes across a safety contour or an area where a specified condition exists, the system does the following:

- Highlights alarm level alert objects in red (route checked in route planning, and route navigation)
- Highlights warning and caution level alert objects in yellow (route checked in route planning, and route navigation)
- Provides visual alerts in the [Alert] box for alarm, warning and caution level alert objects (route navigation)
- Sounds an aural alarm for alarm or warning alert objects (route navigation)



For this function, the chart radar utilizes the chart database (S57 charts) stored on the SSD in SENC format. **Note that the chart radar calculates dangerous areas using the largest scale chart available, which may not be the visualized chart.**

You can select objects that are included for calculation of danger area (for example, restricted areas). A dialog box lists the various areas that activate danger warnings.

You can also define your own safe area by creating a user chart area. The system can utilize these areas when calculating chart alerts.

- The system can check the following for you:
 - Predicted movement area of own ship
 - Planned route with an easy to use locator function to find dangerous areas
- The system will highlight the following for you
 - Dangerous areas inside predicted movement area of the own ship
 - Dangerous areas inside your monitored route
 - Dangerous areas inside your planned route

11.1 Chart Alerts

Official S57 chart material contains depth contours that can be used for calculation of chart alerts. A chart database also includes different types of objects that the operator can use for chart alerts. The procedure for setting chart alerts is outlined below.

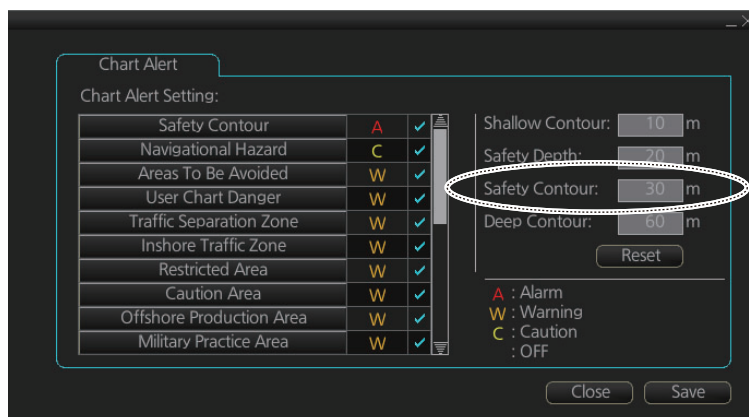
1. Select suitable safety contour for your own ship. See subsection 11.1.1 for how to set the safety contour.
2. In the Voyage planning mode, define a new route or select an existing one. Make a chart alert calculation of the route if there are indications of danger areas in the route. Modify your route if necessary and do the chart alert calculation again. To modify an existing route see section 12.5.
3. Select route as monitored route.
4. Set the look-ahead area for your own ship (see section 11.2).

The system is now ready for chart alert calculation of monitored route and estimated own ship position.

11.1.1 How to set safety contour

Select safety contour suitable for the own ship.

1. Click the [DISP], [SET] and [Chart Alert] buttons on the InstantAccess bar™ to show the [Chart Alert] page.



2. Enter desired depth at [Safety Contour] then click the [Save] button.

Any safety contours on the chart are highlighted with a thick gray line.

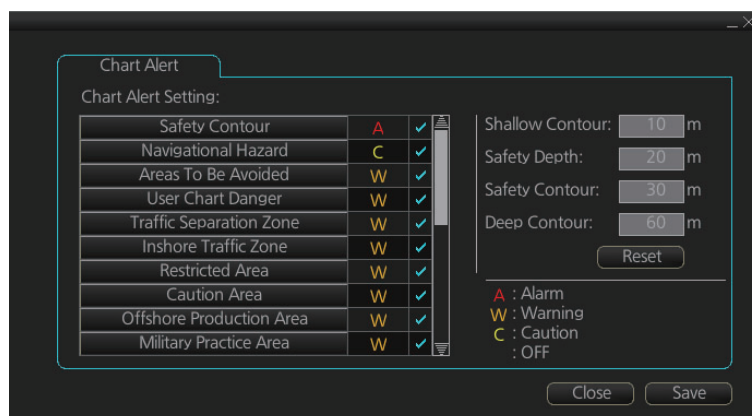
Note 1: The safety contour is not a new depth contour created by this unit - it is the highlight and activation of an existing contour line already present on the chart.

Note 2: If the chart does not contain chosen depth contour, the system will automatically choose next deeper contour.

11.1.2 Chart object related settings

When using the Look-ahead function or monitoring a route, you can set up the method in which to report chart alerts and also show/hide chart highlights.

1. Click the [DISP], [SET] and [Chart Alert] buttons on the InstantAccess bar™ to show the [Chart Alert] page.



2. Click a letter indication to select the type of alert, warning or caution, to receive for the given chart object. [Safety Contours] is fixed to "A" (Alarm).
 - **W**: Warning, visual and aural alerts
 - **C**: Caution, visual alert only
 - **No display** (OFF): No alert notification. Available with objects other than [No Vector Chart].
3. Click the box to the right of the letter indication to show a check mark and show the chart highlight. Click the box again to remove the check in the box and hide the highlight.
 Highlights are colored according to alert priority:
 - **A** (Alarm): Red color highlight
 - **W** (Warning) and **C** (Caution): Yellow color highlight
4. Click the [Save] button to finish.

Note 1: C-MAP PROFESSIONAL+ charts may take several minutes to identify danger areas.

Note 2: The Type of Alert setting must be the same for all connected FMD-3xxx/FAR-3xxx.

List of areas

There are areas that the chart radar detects and provides the audible alert and/or visual alert if the estimated own ship position, or planned or monitored route, crosses the area defined on the [Chart Alert] page. You can select from the following areas:

- Safety Contour
- Navigational Hazard
- Areas To Be Avoided
- User Chart Danger
- Traffic Separation Zone
- Inshore Traffic Zone
- Restricted Area
- Caution Area
- Offshore Production Area
- Military Practice Area
- Seaplane Landing Area
- Submarine Transit Lane
- Anchorage Area
- Marine Farm/Aqua Culture
- PSSA Area
- No Vector Chart
- Too Many Dangers
- UKC Limit
- Sounding UKC Limit
- Non-official ENC
- Not Up-to-date
- Permit Expired

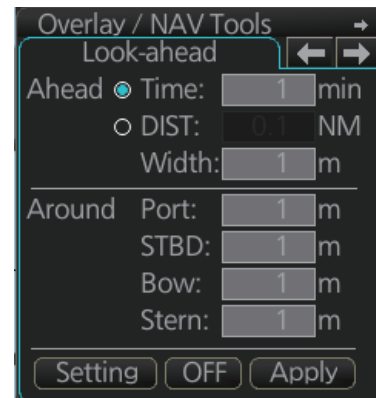
11.2 How to Activate Own Ship Look-ahead Area

Calculation of own ship predicted movement area is done using a check area about own ship position. Set the look-ahead area as follows:

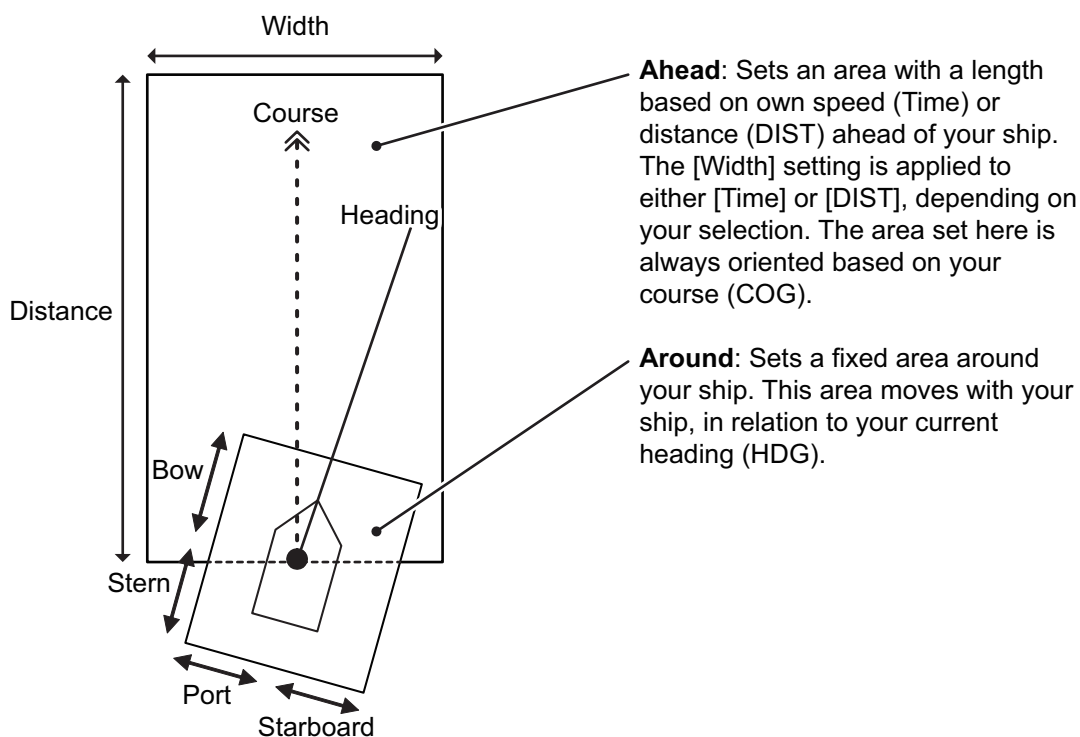
1. Select the [Look-ahead] page from the [Overlay/NAV Tools] box.

Note 1: The [ON]/[OFF] button may not be shown depending on installation setting.

Note 2: When Back-up ECDIS mode is active, the [ON]/[OFF] button is hidden and look-ahead is fixed at [ON].



2. Set the ahead time or distance and ahead width, referring to the figure below. Also, set the "Around" figures: port, starboard, bow and stern check distance. The reference point is the conning position (CCRP).



3. To select the objects to use in chart alerts, click the [Chart Alert] button and see subsection 11.1.2.

When an object set from the [Chart Alert] menu enters a set area, an alert is generated in the following manner:

- Alarm or Warning level alerts: Alert message and aural alert are generated.
- Caution level alerts: Alert message is generated (no aural alert).

Objects or areas that generate an alert are shown in the following manner. (Alarms: red highlight, Warnings/Cautions: yellow outline)

- Individual objects: The object is highlighted in red or outlined in yellow.
- Area objects: If the area object is larger than the look-ahead area, the look-ahead area is highlighted in red or outlined in yellow. If the area object is smaller than the look-ahead area, the area object is highlighted in red or outlined in yellow.

11.3 Route Planning

The system will calculate chart alerts using user-defined channel limit for routes. Danger areas are shown highlighted if safety contour or user-chosen chart alert areas are crossed by the planned route. For more information on route planning, see chapter 12.

Note: If your voyage is going to take a long time or you are planning it much earlier than it is to take place, use the Display date and Update Review dates corresponding to the dates you are going to sail (see section 9.2.2).

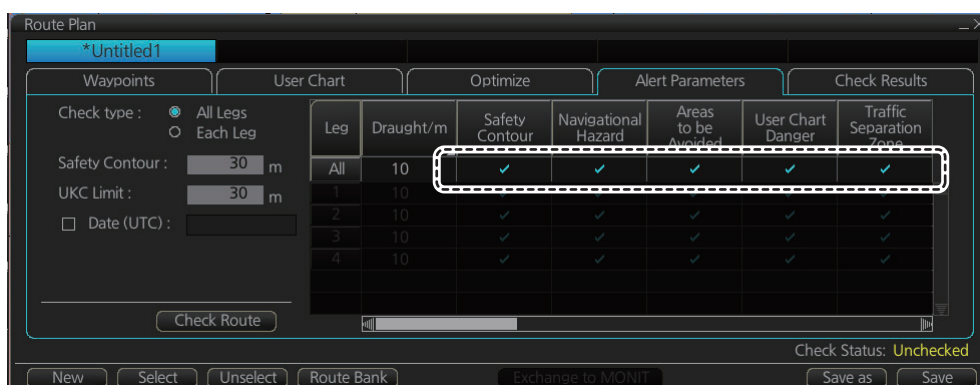
11

11.3.1 Chart alerts for route planning

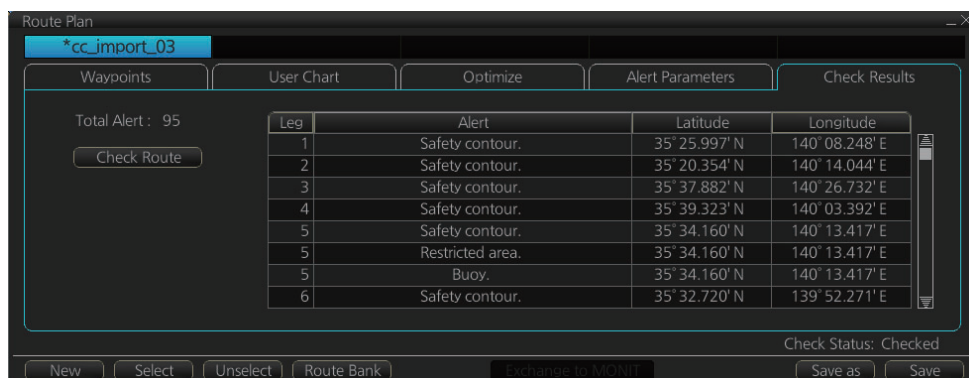
You can generate a list of chart alerts that are crossed by the planned route. This can be done as follows:

1. Enter safety contour you want to use.
2. Plan a route; define waypoints and other necessary information. See chapter 12 for route planning.
3. Select dangerous objects to be monitored during route monitoring, on the [Alert Parameters] page in the [Route Plan] dialog box, shown below. Click the box below each object to show or hide the check mark.

When the route is checked, alert objects with a check mark which have their alert activated are highlighted on the chart display. Alert objects with no check mark are not highlighted.



4. Click the [Check Route] button to generate a list of chart alerts. The results appear on the [Check Results] page.



The figure above shows the alerts to be monitored. If there are alerts included in the planned route, check alerts leg by leg, or check alerts by using category of alert.

11. CHART ALERTS

Note: When alerts are unchecked at step 3 in the above procedure, one or more of the following messages appear in the permanent warning box.

- [Safety Contour] unchecked: "Indication of crossing safety contour if Off. (in planning)"
- [Navigational Hazard] unchecked: "Indication of navigational hazards is Off. (in planning)"
- Other alerts unchecked: "Indication of some prohibited areas or areas with special conditions is Off. (in planning)"

12. ROUTES

12.1 Route Planning Overview

A route plan defines the navigation plan from starting point to the final destination. The plan includes:

- A route plan defines the navigation plan from starting point to the final destination. The plan includes:
- Route name
 - Name, latitude and longitude of each waypoint
 - Radius of turn circle at each waypoint
 - Safe channel limits
 - Chart alarm calculation based on channel limits against chart database and user chart danger
 - UKC calculation
 - Deadband width, nominal deadband width used for the chart operating modes with moderate accuracy and economical sailing behavior
 - Minimum and maximum speed for each leg
 - The navigation method (rhumb line, great circle)
 - Fuel saving
 - ETD from each waypoint
 - ETA to each waypoint
 - Ship and environmental condition affecting the ship speed calculation
 - Name of the user chart to use during route navigation together with the planned route
 - Name of the Notes to use during route navigation together with this planned route, in the user chart dialog box

Using the above-mentioned data, the system calculates speed, course and length for each leg, ETAs for each waypoint, fuel consumption and WOP. It also calculates safe water areas based on user-defined channel limits. The calculated data is displayed in tabular form, which can be printed as a documented route plan and also stored in a file for later use.

Main functions of route planning are:

- Define waypoints (maximum of 1,000 waypoints per route)
- Define turnings for each waypoint
- Define channel limits for each leg (a leg is the line connected between two waypoints). The channel limits are used to detect chart alerts when you are planning or monitoring your route.
- Define the speed for each leg
- Calculation for ETD and ETA
- Calculation for most economical sailing

Note 1: If you have small scale chart(s) on display having the whole eastern/western (0-180°E/0-180°W) hemisphere and a part of the other hemisphere on display, there is a limitation to display a route. To avoid this, set chart center so that the whole eastern/western hemisphere is not on the display. A maximum of five routes can be edited simultaneously.

Note 2: If a planned route's Safety Margin or Channel Limit contains excessive land masses, the chart radar may freeze during a route check. If this occurs, reset the chart

radar, then adjust the Channel Limit and Safety Margin settings in the Route Plan dialog box's Waypoints so that land mass is not included in the route.

12.2 Main Menu for Route Planning

The main parameters for the route planning are:

- Latitude and longitude of the waypoint
- Channel limits to the waypoint
- Turning radius of the waypoint
- Maximum speed limit and planned speed for each leg

There are two phases for a route: Route Plan and Route Monitor. Route plan is used for planning the route and route monitor is used to control a route for monitoring.

To complete route planning, do the following.

1. Create a new route or select an existing one. See section 12.4.
2. Modify your route if necessary. See section 12.5.
3. Make chart alert (safe water) calculation. See section 12.4.5.
4. Optimize your route. See section 12.8.

12.3 How Route Data is Synced

Route data can be shared between this unit and other like units (FMD-3xxx, FAR-3xxx), through the LAN. A minimum of two units is required. Turn on all units beforehand to enable syncing. The sync source (master unit) is automatically assigned by the system when each unit is powered. The sync source unit is determined as follows:

For configurations with two units

The unit with the larger IP address is assigned as a sync source.

For configurations with three or more units

Among the first booted unit and the second booted unit, the unit with the larger IP address is assigned as a sync source. If the sync source unit is turned off, the sync source unit is switched to the one with the largest IP address among the other booted units.

The IP address increases in the following order, with "CRA" being the largest;

- ECD001 < ECD002 < ... < ECD016 < CRAD001 < CRA002 < ... < CRA016

Be aware that if a unit is turned off, some user chart data may be deleted. Two examples are shown below.

Using ECD001 and CRA001

This example assumes that ECD001 and CRA001 are connected in the same network.

1. CRA001 is off; ECD001 is powered and a route is created at ECD001.
Route data is not transferred to ECD001 because the CRA001 is turned off.

2. CRA001 is turned on.

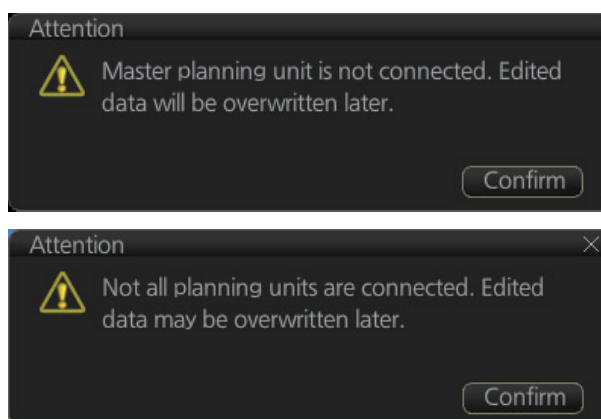
As the IP address of the CRA001 (192.168.31.31) is larger than the ECD001 (192.168.31.1), the CRA is assigned as the sync source and ECD001's route data created at step 1 is deleted.

Using ECD001, ECD002 and CRA001

This example assumes that ECD001, ECD002 and CRA001 are connected in the same network.

1. ECD001/002 are both turned off; CRA001 is powered and a route is created on CRA001.
Route data is not transferred to ECD001/002 because both ECD001/ECD002 are turned off.
2. CRA001 is turned off.
3. First, turn both ECD001/002 on. Secondly, turn the CRA001 on.
Among the first booted ECD001 and ECD002, ECD002 assigned as a sync source, because the ECD002's IP address is larger than ECD001. Also, CRA001's route data created at step 1 is deleted.

If the operator clicks the PLAN button on the Status bar when one or more units (including the master unit) is turned off, one of the following messages appears.



Turn all units in the same network on, then plan or edit the route as required.

12.4 How to Create a New Route

To make a complete route for a voyage, do the following:

1. Click the [PLAN] button on the Status bar to activate the Voyage planning mode.
2. On the InstantAccess bar™, click the [Planning] button followed by the [Route] button to open the [Route Plan] dialog box.
3. Click the [New] button.



Note: When accessing the database is failed after pressing the [New] button, the message "Database access failure occurred. You can make a route but cannot save it." appears. Contact your dealer in this case.

4. Use the cursor to select a position for the first waypoint then push the left mouse button. A waypoint mark appears on the position selected, and the latitude and longitude of the position, etc. are entered into the [Route Plan] dialog box. After entering a waypoint, edit Name, Steering mode ([Rhumbline] or [Greatcircle]), Radius*, XTD limit, Plan SPD*, Safe SPD, Margin, PL1/2 and Local Time as appropriate in the [Route Plan] dialog box, using the keyboard on the Control Unit or the software keyboard. (*: Editable for waypoint 2 and thereafter only.)

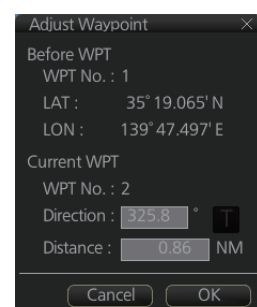
For how edit the details, see section 1.12.3 and section 1.12.4.

Note 1: A guide box that shows the range and bearing between waypoints as you drag the cursor is available. You can show or hide the box with the [Guide Box] button on the InstantAccess bar™. Click the button to show its background color in light-blue and display the guide box.

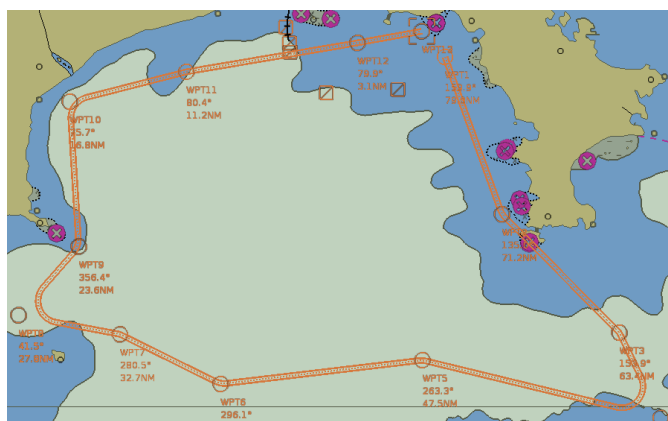


Note 2: The bearing and range of the waypoint can be adjusted as shown below.

- 1) In the [Route Plan] dialog box, right click the bearing or the distance of the waypoint to change.
- 2) Select [Adjust Position] to show the [Adjust Waypoint] context menu shown right.
- 3) Enter value at [Direction] or [Distance], then click the [OK] button.



5. Repeat step 4 to enter other waypoints.
6. After you enter the final waypoint, right-click the display area to show the context-sensitive menu then select [Finish].
7. Click the [Save] button.
8. Enter a name (max. 63 alphanumeric characters) for the route, using the keyboard on the Control Unit or software keyboard. Do NOT use the following symbols.
 $\backslash$, /, ?, " , * , < , > , : , |
9. Click the [OK] button.
10. Use the [Alert Parameters] page to define the safety contour and other specified conditions for checking the route. Click a "block" under a check item to highlight the areas. Also, input value for [Draught/m]. A parameter for [Draught/m] can also be assigned globally to all legs from the context-sensitive menu. See section 12.4.4 for how to use the [Alert Parameters] page.
11. Use the [Check Route] button on the [Alert Parameters] page to detect areas where the depth is less than the safety contour or where specified conditions exist. The results appear on the [Check Results] page. This system can examine chart database against planned route to make a list of alerts where a route crosses a safety contour or specified areas used in chart alerts.
12. Use the [User Chart] page to link, de-link a user chart(s) with the route. See section 12.4.2.
13. Use the [Optimize] page to enter parameters for route optimization. See section 12.4.3.



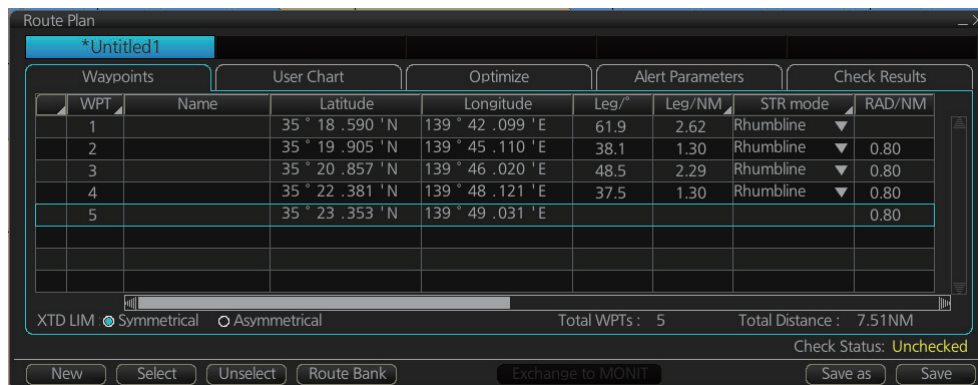
How to use the Undo feature

The Undo feature, available when creating a route and a user chart, can be accessed from the [UNDO] button on the InstantAccess bar™. In route creation the feature is used with waypoint and text input as follows:

Waypoint input: Delete last-entered waypoint.

Text input: Erase last-entered character or character string.

12.4.1 How to use the Waypoints page



The following fields and boxes can be found in the [Waypoints] page. Scroll the list rightward to see hidden items.

[WPT]: Each waypoint has a number.

[Name]: You can name each waypoint.

[Latitude]: WPTs latitude coordinate is displayed in WGS-84 datum.

[Longitude]: WPTs longitude coordinate is displayed in WGS-84 datum.

[Leg/°]: Bearing of leg (True: reference to North)

[Leg/NM]: Length of leg (nm). Edit the indication of leg to show as follows;

- 1) Right-click the column title [Leg/NM].
- 2) Select the contents to show.
 - [Each]: Shows the distance of each leg.
 - [Total]: Shows the total cumulative distance from leg to leg.
 - [Remain]: Shows the distance remaining from leg to leg.

Note: These settings are reflected to [Leg/NM] in the [Waypoints] page of the [Monitor Information] dialog box.

[STR Mode]: Define steering mode for each leg - rhumb line or great circle. Click to select [Rhumblin] or [Greatcircle].

[RAD/NM]: Define turning radius for each waypoint. To change a radius, put the cursor in this column to show up and down arrows. Click the arrows to set the radius.

[ROT°/min]: [ROT°/min] changes with the [RAD/NM] setting. [ROT°/min] displays the ROT per minute according to the set value of the route information. If this value exceeds the maximum ROT (initial value: 60.0°/min), a dangerous turn will occur. The values of [RAD/NM], [ROT°/min] and [Plan SPD] appear in yellow to alert you. In this case, check the values for [RAD/NM] and ship speed, and make necessary adjustments to affect a safe turn.

[XTD Limit/m]: This value changes with the setting of [RAD/NM], and shows the turning range of the ship per minute according to the information set in route information. If the value exceeds the maximum turning rate (initial value 60.0°/minute) the turn is judged to be dangerous. To indicate this, the setting is shown in yellow. When this occurs, check the [RAD/NM] setting, ship's speed, etc. to prevent a dangerous turn.

[Plan SPD]: Define planned speed to use with a leg.

[Safe SPD]: Define maximum speed to safely navigate a leg.

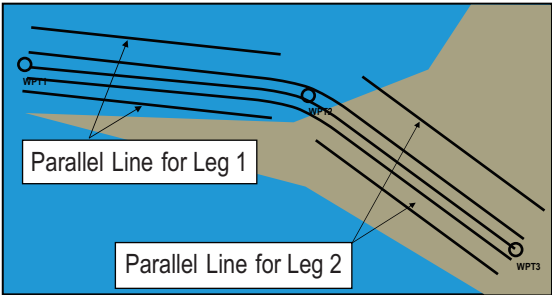
[Margin/m]: Define extension for channel to be checked against selected alerts.

[PL 1/m, PL 2/m]: One or two sets of parallel lines, colored orange, can be drawn on a route. Set the distance (in meters) to offset the lines from the route, from -99999 to 99999. Parallel lines allow the navigator to maintain a given distance away from hazards. See the illustration below.

[XTD LIM]: Define channel limits.

- [Symmetrical]: Define channel limit for each leg.
- [Asymmetrical]: Define channel limit for port, starboard side for each leg, at [CH Port/m], [CH STBD/m], respectively.

[Local Time]: Define the local time at which the waypoint is passed.



Note: You can select the route information data to display on the [Waypoints] page with the context-sensitive menu. Right-click an item from [WPT] to [PL 2/m] then select [Edit Columns] to show the context-sensitive menu. Check or uncheck items as appropriate then click the [OK] button.



12.4.2 How to use the User Chart page

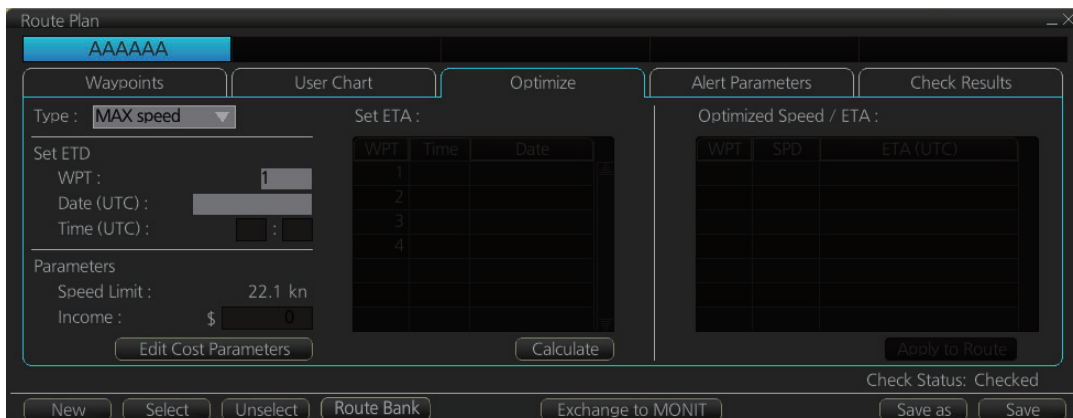
The [User Chart] page lets you link user charts to routes. To link a user chart, click the box to the left of the user chart name in the [Stored User Chart] list to show a checkmark. Click the [<<] button to copy that name to the [Linked User Chart] list. To de-link a user chart, click the box to the left of the user chart name in the [Linked User Chart] list then click the [>>] button to erase the name. The contents of each user chart are shown in the [Contents] window.



- [Linked User Chart]: List of user charts linked with selected route.
- [Stored User Chart]: List of stored user charts.
- [<<] button: Link a stored used chart. Check the chart in the [Stored User Chart] list then click this button. The user chart name is then copied to the [Linked User Chart] list.
- [>>] button: Click to remove selected (checkmarked) user chart from the [Linked User Chart] list.
- [Contents]: Lists the objects saved to the user chart selected.

12.4.3 How to use the Optimize page

After all waypoints are inserted and you have made safe water calculation, you can optimize your route, on the [Optimize] page. If not selected, then optimization will be done automatically with max. speed. If you want do optimization with a specific strategy, see section 12.8 for how to optimize a route.



[Type]: Select optimization strategy: maximum speed, time table, maximum profit, or minimum cost.

[Set ETD]: Set date, time and waypoint to start from.

[Parameters]: Set the parameters for optimization, speed limit and income (max profit).

[Edit Cost Parameters] button: Enter fuel consumption figures. See section 21.3.

[Set ETA]: For the type [Time table], set the date and time that you want to arrive at the waypoint selected.

[Optimized Speed/ETA]: The optimized speed for the date and time entered at [Set ETA] appears here, after clicking the [Calculate] button.

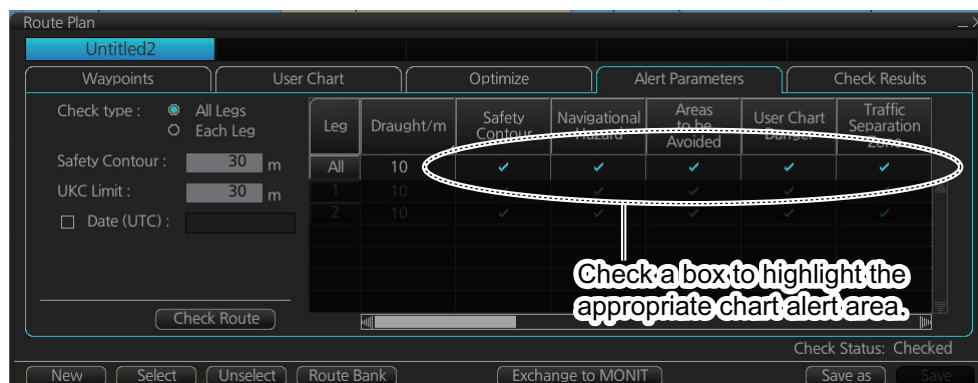
[Calculate] button: Click to calculate optimization.

[Apply to Route] button: Apply the calculations on the [Optimize] page to the route.

12.4.4 How to use the Alert Parameters page

The [Alert Parameters] page sets the alert conditions to use when checking a route. Put a “W” for an item to highlight on the chart. ([Safety Contour] is fixed to “A” (Alarm). If you do not require the highlight display for an item, put a “C” for that object. The relevant alerts (Alarm, Warning, Caution) are shown in the [Check Results] page.

You can select the safety contour and chart alerts used to check the safety of the route. This allows you to check the safety with conditions different from those selected n for system use. This is useful when making a route for different loading or sailing conditions.



Item	Description	Item	Description
Check type	Check how to apply the alerts, to every leg or individual leg. (Only [Draught] can be applied to every leg.)	Caution Area	Caution area
Safety Contour	Set the safety contour (in meters).	Offshore Production Area	Offshore production area
UKC Limit	Set UKC limit.	Military Practice Area	Military practice area
Date (UTC)	A chart may have date-dependent features. Enter the actual data of embarkation to know date-dependent features.	Seaplane Landing Area	Seaplane landing area
Check Route button	Check route for safe navigation. The results are shown the [Check Results] page.	Submarine Transit Lane	Submarine transit lane
Draught/m	Ship's draught	Anchorage Area	Anchorage area
Safety Contour	Safety contour	Marine Farm Aquaculture	Marine farm aquaculture
Navigational Hazard	Navigational hazard.	PSSA Area	Particularly Sensitive Sea Area
Areas to be Avoided	Areas to be avoided	No Vector Chart	No vector chart for area
User Chart Danger	User chart danger area	Too Many Dangers	Too many dangers area
Traffic Separation Zone	Traffic separation zone	UKC Limit	Under keel clearance limit.
Inshore Traffic Zone	Inshore traffic zone	Sounding UKC Limit	Under keel clearance limit.
Restricted Area	Restricted area	Non-official ENC	No official ENC data
Permit Expired	Permit for chart has expired.	Not Up-to-date	Chart not up to date.

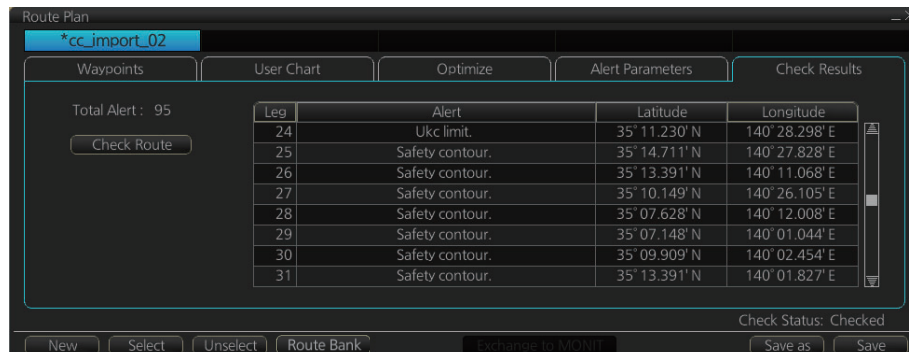
Context sensitive menus

A context-sensitive menu for setting the draught is available on the [Alert Parameters] page. Right-click [Draught/m] to show the menu. [Set "ALL" setting to all legs] applies the draught value of [Check type: All Legs] to all legs. [Clear setting] restores previous settings for each leg.

Set "ALL" setting to all legs
Clear setting

12.4.5 How to use the Check Results page

The [Check Results] page allows you to make safe water calculation for your route. Click the [Check Route] button to do the check. After the button is operated, the alert type and latitude and longitude position of the alert appear for applicable legs on the route.



Note 1: In order to display charts with correct updated situation, always use current date during your voyage. If your voyage lasts more than one week, set current date at least once per week during your voyage.

Note 2: A route check can take longer with C-MAP charts. Wait until the completion of the check.

Note 3: When a chart is installed or updated, use the [Check Route] button on the [Alert Parameters] page to re-check all routes before starting any voyage. If a route which has not been checked is selected for a voyage, the error message "Route check is not done in PLAN mode." appears at the bottom of the monitor page.

12.5 How to Modify an Existing Route

Note: If the route is protected, it cannot be overwritten even if the existing route is modified. You must unprotect the route (see page 12-24) before doing any modification.

12.5.1 How to change waypoint position

To change position of a waypoint you have the following choices:

- Drag and drop waypoint using the left button.
- Enter latitude and longitude on the [Waypoints] page in the [Route Plan] dialog box.

How to drag and drop waypoint to new position

1. Put the cursor on the route waypoint to move then push the right button to show the context-sensitive menu.
2. Select [Edit].
3. Press and hold down the left button while rolling the trackball to move the cursor to a desired position. Release the button when the cursor is at the desired position. Right-click the display area to show the context-sensitive menu then select [Finish].

How to change latitude and longitude from the Waypoints page

1. Show the [Waypoints] page.
2. Put the cursor on the digit to change in the Latitude or Longitude field.
3. Enter position from the Control Unit's keyboard, or spin the scrollwheel.

12.5.2 How to change other waypoint data

Other data of a waypoint, such as name, steering mode, turning radius, min/max speed, can be edited from the [Waypoints] page. Select the route to edit and open the [Waypoints] page. Put the cursor on a desired field and spin the scrollwheel to change data. (Push the left button to change steering mode.)

12.5.3 How to add a new waypoint at the end of a route**How to add a new waypoint at the end of a route from the electronic chart area**

1. Put the cursor on the current last waypoint of the route.
2. Right-click the display area to show the context-sensitive menu then click [Edit].
3. Put the cursor to the new location for the last waypoint then push the left button.
4. Right-click, then click [Finish].

How to add a new waypoint at the end of a route from the Waypoints page

Open the [Waypoints] page then right-click the last waypoint. Select [Insert after]. A waypoint is added at the end of the list. Edit the Latitude, Longitude, etc. as necessary.

12.5.4 How to insert a waypoint**How to insert a waypoint between waypoints from the electronic chart area**

1. Put the cursor anywhere on the route where you want to insert a waypoint.
2. Right-click to show the context-sensitive menu then click [Edit].
3. Put the cursor on the leg where you want to insert a waypoint.
4. Right-click, then click [Insert WPT].
5. Right-click, then click [Finish].

How to insert a waypoint from the Waypoints page

Open the [Waypoints] page then right-click the waypoint to process. Select [Insert After] or [Insert Before] as appropriate. A waypoint is added after or before the waypoint selected. Edit the Latitude, Longitude, etc. as necessary.

12.5.5 How to delete a waypoint**How to delete a waypoint from the electronic chart area**

Put the cursor on the waypoint to delete. Push the right button to show the context-sensitive menu then select [Edit] followed by [Delete WPT].

How to delete a waypoint from the Waypoints page

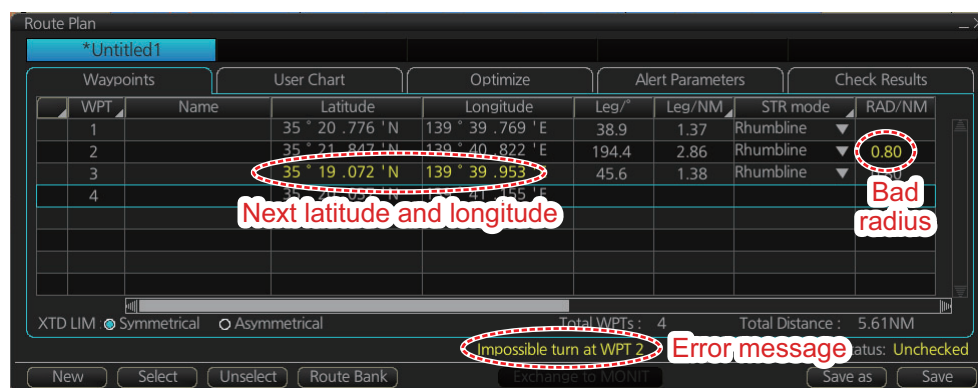
Open the [Waypoints] page. Right-click the waypoint you want to delete then select [Delete WPT].

12.5.6 Geometry check of route

When you add a new waypoint, modify a waypoint or change other waypoint data, the geometry check may reveal problems with the route. The problem(s) are indicated in yellow and an appropriate message appears, also in yellow, on the [Waypoint] page. Refer to the descriptions in this section for the geometry check error messages and the remedies necessary to fix the route.

“Impossible turn at WPT XX” (XX=WPT no.)

The error message, next longitude and latitude and/or a turn radius appear in yellow.

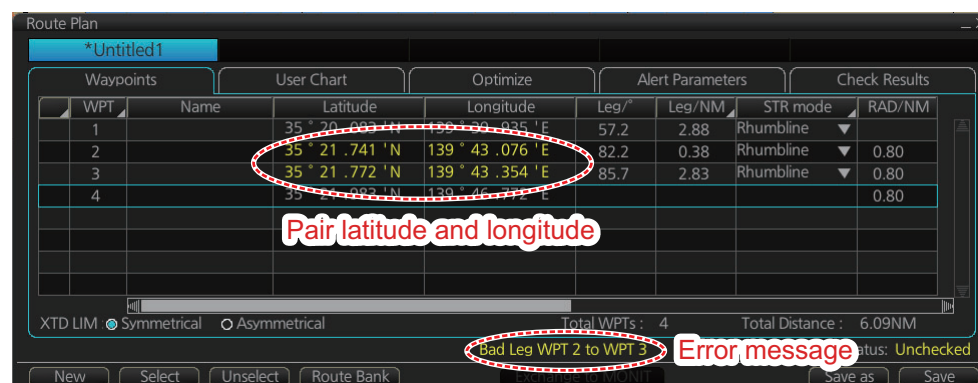


This means that the geometry of route makes it impossible for the ship to accomplish a turn. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Decrease the turn radius of the waypoint.
- Change latitude and longitude position of the waypoint or one of its neighbors.

“Bad Leg WPT XX to WPT XX” (XX=WPT no.)

The error message and a pair longitude and latitude appear in yellow.

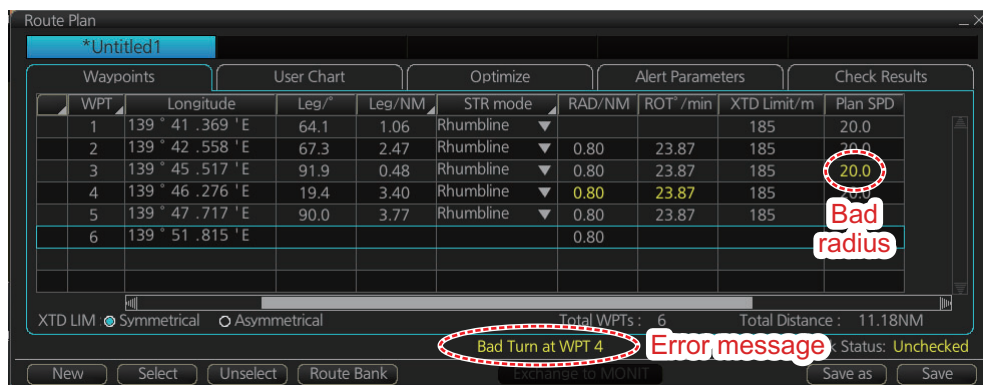


This means that the length of a leg is too short to accomplish a turn. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Change latitude and longitude position of the waypoint or one of its neighbors.

“Bad Turn at WPT XX” (XX=WPT no.)

The error message, turn radius and planned SPD indication (not shown in the figure below) appear in yellow.



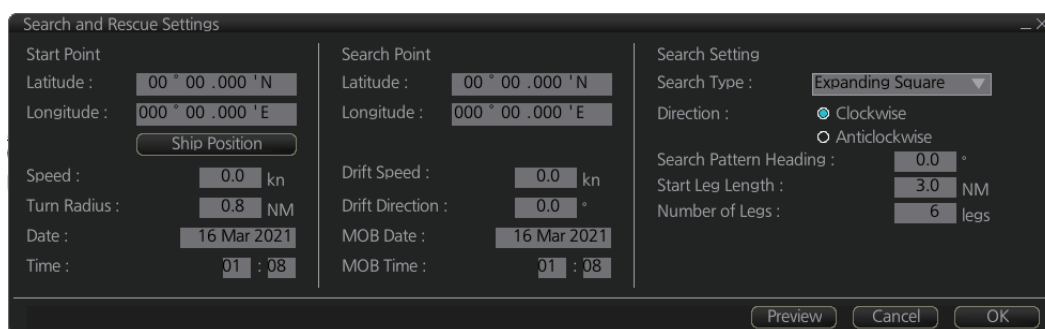
This means that the turn cannot be accomplished because the calculated ROT exceeds the MAX ROT. Typically, it is sufficient if you do the following, on the [Waypoints] page.

- Increase the turn radius of the waypoint.
- Decrease the planned SPD.

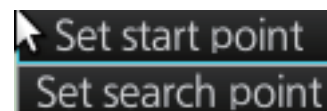
12.6 SAR Operations

The SAR feature facilitates search and rescue operations for MOB.

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. Click the [Planning] and [Route] buttons on the InstantAccess bar™ to show the [Route Plan] dialog box then click the [SAR] button.

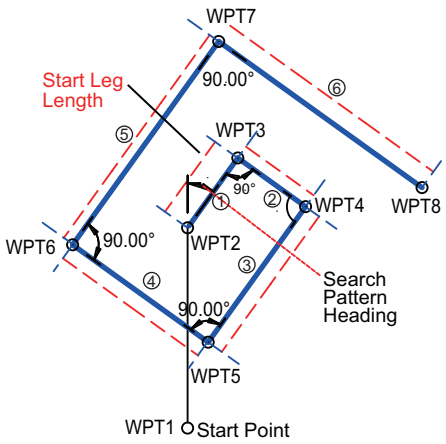
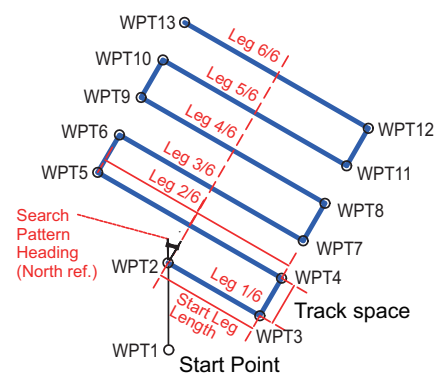


3. Enter your start point. To enter current position, click the [Ship Position] button. (The start point can also be entered directly on the screen. Put the cursor on the start point, right-click the chart to show the context-sensitive menu shown right then click [Set start point].)
4. Enter your ship's speed and turn radius, current UTC date and time.
5. At [Search Point], enter the estimated position of the object to search. (The search point can also be entered directly on the screen. Put the cursor on the search point, right-click the chart to show the context-sensitive menu shown at step 3 then click [Set search point].)



12. ROUTES

6. Enter drift speed, drift direction, and the UTC date and time of the estimated position.
7. At the [Search Setting] window, select and set the search type, referring to the following table.

Search type	Options	Sample pattern
[Expanding square]	Search Setting Search Type : Expanding square Direction : ☒ Clockwise ☐ Anticlockwise Search Pattern Heading : 0.0 ° Start Leg Length : 0.1 NM Number of Legs : 1 legs [Direction]: Set the direction to start the search, [Clockwise] or [Anticlockwise]. [Search Pattern Heading]: See the right figure. [Start Leg Length]: Enter the start leg length. [Number of Legs]: Enter the number of legs to use. Starting at the probable location of the target, the search vessels expand outward in concentric squares.	
[Parallel tracks]	Search Setting Search Type : Parallel tracks Direction : ☒ Clockwise ☐ Anticlockwise Search Pattern Heading : 0.0 ° Start Leg Length : 0.1 NM Track Space : 0.1 NM Number of Legs : 1 legs [Direction]: Select the direction to start the search, [Clockwise] or [Anticlockwise]. [Search Pattern Heading]: See the right figure. [Start Leg Length]: Enter the start leg length. [Track Space]: Enter the length of the short legs in the route. [Number of Legs]: Enter the number of legs to use. The parallel tracks pattern is usually the first pattern used in undertaking a search operation, since it assumes that the object to be searched.	

Search type	Options	Sample pattern
[Sector search]	Search Setting Search Type : Sector search Direction : ☒ Clockwise ☐ Anticlockwise Search Pattern Heading : 0.0 Search Radius : 0.1 NM Number of Sectors : 1 [Direction]: Select the direction to start the search, [Clockwise] or [Anticlockwise]. [Search Pattern Heading]: See the right figure. [Search Radius]: Enter the search radius (in NM). [Number of Sectors]: Enter the number of sectors to use. The sector search is used when the position of the body is known accurately and the search has to be done over a small area. It is normally carried out in the area, where the casualty or the object has been sighted.	

12

8. Click the [Preview] button. You can check the temporary search route in the display format specified by the current setting value and search type.
9. Click the [OK] button. The [Route Plan] dialog box appears and the system draws the search and rescue route on the screen according to the search and rescue settings.
10. To follow the route, click the [Exchange to MONIT] button.

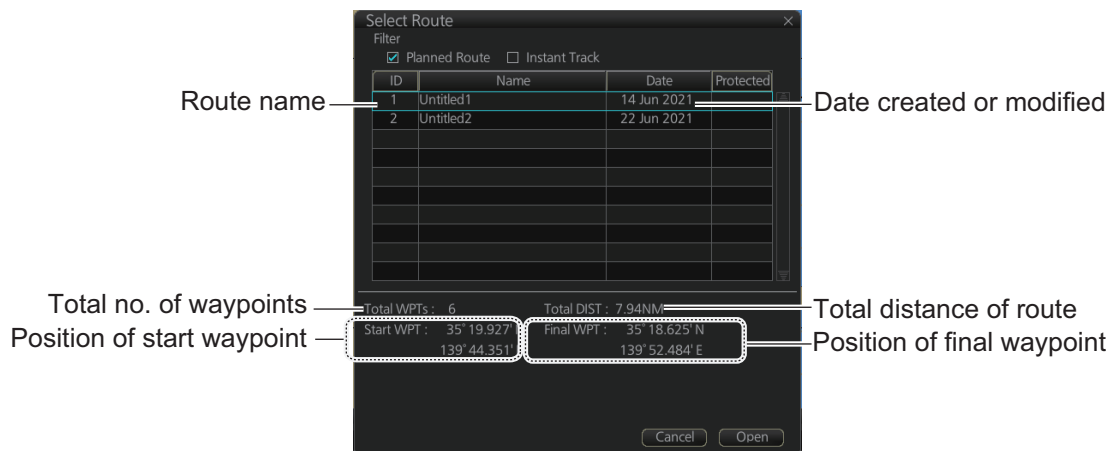
Note: To monitor the route the following conditions must be met:

 - The route must have at least two waypoints.
 - The route must have no impossible turns.
 - The route must have no bad turns.
 - The route must have no bad legs.
 - The route must have been checked.
11. Click the [Save] button, then enter a name (max. 63 alphanumeric characters) for the route, using the keyboard on the Control Unit or software keyboard. Do NOT use the following symbols.
 \, /, ?, ", *, <, >, :, |
12. Click the [OK] button to finish.

If necessary you can drag waypoints to new position, like with an ordinary route.

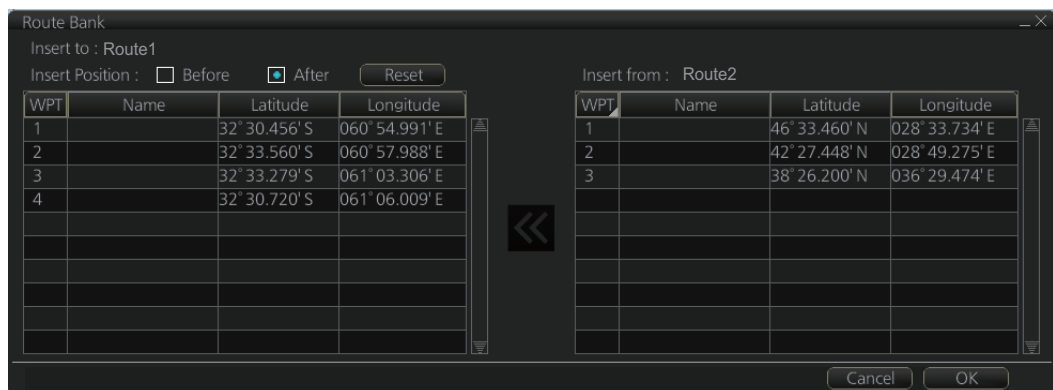
12.7 Route Bank

The route bank stores all the routes you have created. To show the route bank, in the Voyage planning mode, select [Planning], [Plan] to show [Route Plan] dialog box, then click the [Route Bank] button.



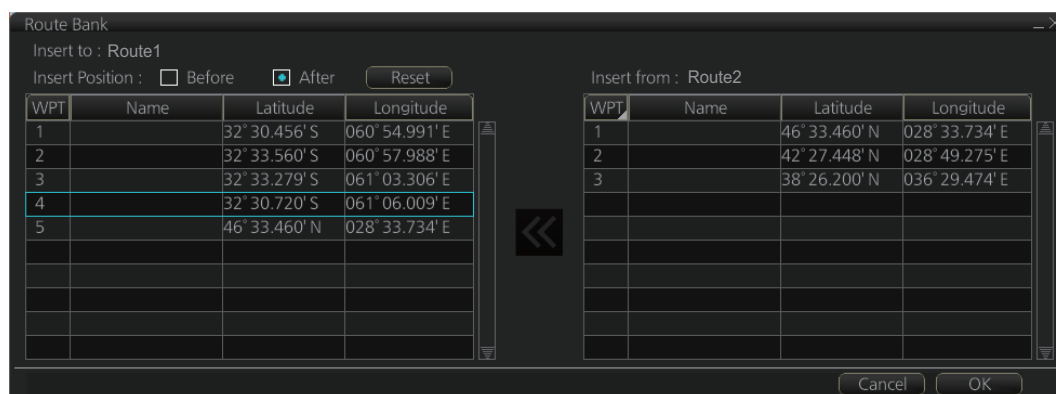
In the Voyage planning mode, the waypoints of a route can be inserted into the route currently selected.

1. Show the dialog box shown above.
2. Select the route for which you want to copy its waypoint(s) in the active route. For example, select Route2.
3. Click the [Open] button.



4. At [Insert Position], select where you want to insert waypoints into the active route, [Before] or [After] the waypoint selected in the next step. The [Reset] button restores the route to the original condition.
5. In the left-hand column set the cursor on the waypoint where to insert waypoints from the inactive route.
6. At the right-hand column, select the waypoint(s) to add to the active route. A context-sensitive menu is available by right-clicking [WPT] in the inactive route. The options available are [Select All], [Deselect All] and [Reverse] (reverse the order of the waypoints in the inactive route).

- Click the [$\ll$] button to insert the waypoint(s) from the inactive route to the active route. In the example below, WPT1 of the inactive route is inserted at the end of the active route, becoming its waypoint 5.



- Click the [OK] button to finish.

12.8 Route Optimization

12.8.1 Available route optimization strategies

After all waypoints are inserted, the route is optimized from the [Optimize] page in the [Route Plan] dialog box. If no optimization strategy is selected, the optimization is done with "max. speed," defined in ship parameters. Optimization calculates all parameters for route steering (course and distance between two waypoints, maneuvering start point, WOP, etc.). There are four methods for optimization:

[MAX speed]: This calculation uses the maximum speed defined in the ship parameters (see section 21.1) to generate ETA.

[Time table]: Calculates the speed required in order to arrive at destination at required ETA. Maximum speed is never exceeded. The user enters ETD and ETA to calculate speed to use. If, the user-entered ETA is earlier than that found with the Max. Speed calculation, the Max. speed -calculated ETA will be indicated below the Time Table ETA calculation figure. The calculated speed is shown on the [Route Information] box as [Plan Speed].

[MAX profit]: Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the most profitable speed (highest profit per time unit).

[MIN cost]: Based on ETD, this calculation takes in account the fuel cost and the fixed cost of the ship and calculates the speed that gives the minimum total cost. You need to set [Cost Parameters] beforehand to use this feature.

12.8.2 How to optimize a route

You can define Estimated Time of Departure (ETD), desired number of waypoints and Estimated Time of Arrival (ETA) on the [Optimize] page in the [Route Plan] dialog box to optimize your route.

1. Click the [Optimize] tab to open the [Optimize] page.

Route Plan

AAAAAA

Waypoints User Chart Optimize Alert Parameters Check Results

Type : MAX speed

Set ETA :

Set ETD

WPT : 1

Date (UTC) :

Time (UTC) :

Parameters

Speed Limit : 22.1 kn

Income : \$ 0

Edit Cost Parameters Clear All Calculate

Optimized Speed / ETA :

WPT SPD ETA (UTC)

Apply to Route

Check Status: Checked

New Select Unselect Route Bank Exchange to MONIT Save as Save

2. At [Type], click the drop-down list to select desired optimization strategy, referring to subsection 12.8.1 "Available route optimization strategies".

3. Do the following:

- 1) At the [Set ETD] window, enter starting WPT and date and time of departure. To enter the date, click the gray box to the right of the [Date (UTC):] indication. The [Set date] window, shown right, appears. Click the applicable date in the calendar if you are going to depart during the current month, or click the applicable arrow on the month/year button to select a different date. Click the [OK] button to save the ETA and close the window.

Set date

Today (UTC) : 22 Aug 2011

Aug 2011

Mon	Tue	Wed	Thu	Fri	Sat	Sun
1	2	3	4	5	6	7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28
29	30	31				

Cancel OK

- 2) At the [Waypoints] window in the [Route Plan] dialog box, enter the maximum speed to use. For the Type [MAX profit], enter [Income] value. If necessary, click the [Edit Cost Parameters] button to enter fuel consumption values.

Cost Parameters

Cost

Hour : 0 \$/hr

Heavy Fuel Oil : 0 \$/ton

Diesel Oil : 0 \$/ton

Fuel Consumption

Speed kn	Heavy Fuel Oil ton/hr	Diesel Oil ton/hr
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000
0.0	0.000	0.000

Close Save

- 3) For [Time table], the [Set ETA] window appears. Set the ETA to use for each waypoint. To enter the Time and Date, click the [Date] window to show the [Set date] window. Click the appropriate date. The date entered appears in the [Set ETA] window.

WPT	Time	Date
1		
2		
3		
4		

4. Click the [Calculate] button to calculate optimal route. The [Optimized Speed/ETA] dialog box shows the results of the calculation.

WPT	SPD	ETA(UTC)
2	15.0	22:17 11 Apr 2012
3	15.0	22:35 11 Apr 2012
4	15.0	22:47 11 Apr 2012

5. To apply the information to the route, click the [Apply to Route] button.
 6. To save all optimization settings, click the [Save] button.
 Note that the ETA used in route reports is the first-entered ETA.

12.8.3 How to plan a speed profile

A speed profile is defined by general max. speed and optimization types. These values are given while planning a route. You can define speed limit and optimize type in the [Optimize] page of the [Route Plan] dialog box and in the [Waypoints] page you can give planned and max. speed for each leg. The table below demonstrate how different optimize types and speed limits influence speed.

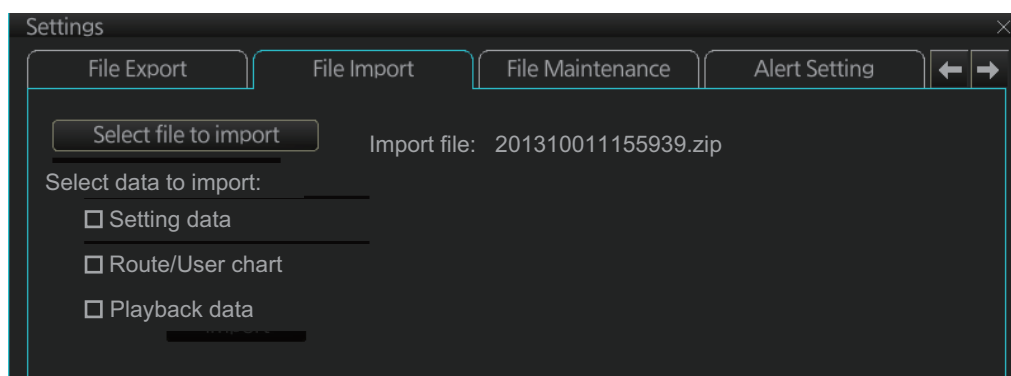
WPT	MIN cost	MAX profit	Time table	MAX speed
1	4.8	10.9	10.0	10
2	4.8	12.9	15.0	15
3	4.8	12.9	16.2	20
4	4.8	12.9	16.2	20
5	6.0	12.9	15.0	15
6	6.0	12.9	16.2	20
7	4.8	12.9	16.2	20
8	4.8	12.9	16.2	20
9	6.0	12.9	16.2	17
10	4.8	8.0	8.0	8

12.9 How to Import Routes

12.9.1 How to import route data created on other units

You can import a route created on other units (FMD-3xxx, FAR-3xxx).

1. Set the USB flash memory that contains the route data to import in the USB port on the Control Unit.
2. Click the  button on the Status bar and select [Settings]. The confirmation message appears.
3. Click the [OK] button.
4. Click the [File Import] tab.

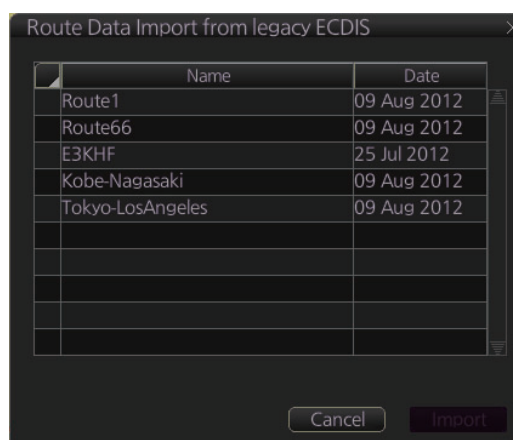


5. Click the [Select file to import] button to select the file to import.
6. Check the data to import, at [Select data to import].
7. Click the [Import] button.

12.9.2 How to import FEA-2x07 route data

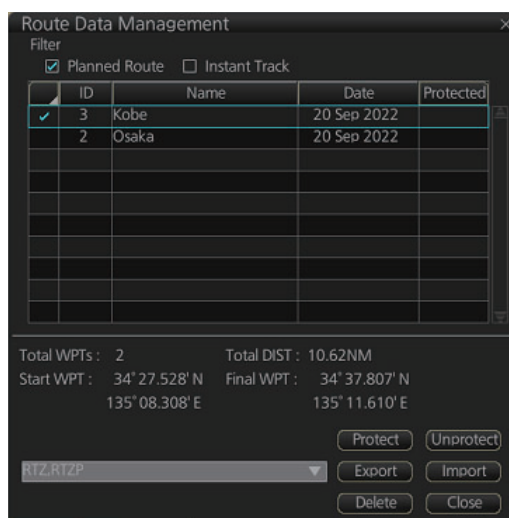
Routes created at an ECDIS FEA-2x07 can easily be imported to this unit. Copy the routes to a folder in a USB flash memory then follow this procedure. Note that FEA-2x05-created routes cannot be imported.

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data], [Data Import] and [Route] buttons to show the [SELECT DIRECTORY] dialog box.
4. Select the folder that contains the route(s) to be imported then click the [OK] button.
5. Check the route(s) to import then click the [Import] button.



12.9.3 How to import RTZ, CSV, ASCII format route data

1. Set the USB flash memory to the USB port on the Control Unit.



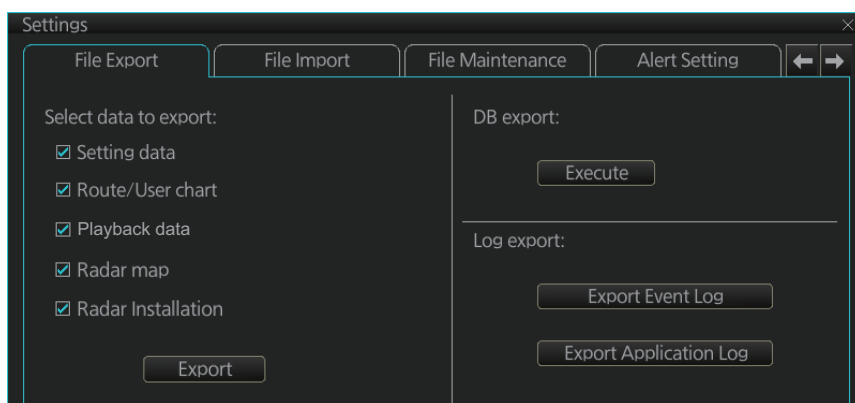
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data], [Route] and [Route Data Management] buttons to show the [Route Data Management] dialog box.
4. At the drop-down list, select the import format. The choices are
 [RTZ, RTZP]: route data, RTZ is XML format, RTZP is compressed XML format.
 [FEA-2x07]: route data, ECDIS FEA-2x07 format
 [CSV Position]: waypoint position data, CSV format
 [ASCII WPT Name Position]: waypoint name, position order, ASCII format
 [ASCII Full]: all route data, ASCII format
 [ASCII Full (Support Asymmetrical XTD Limit)]: asymmetrical channel limit support, ASCII format
 [CSV Route Sheet]: route data, CSV format
 [RTE Format]: route data, RTE format
5. Click the [Import] button.
6. Select the file to import then click the [Open] button.
7. Click the [Close] button to close the dialog box.

12.10 How to Export Route Data

12.10.1 How to export route data created on this unit

You can export route data to share the data with other FMD-3xxx or FAR-3xxx units.

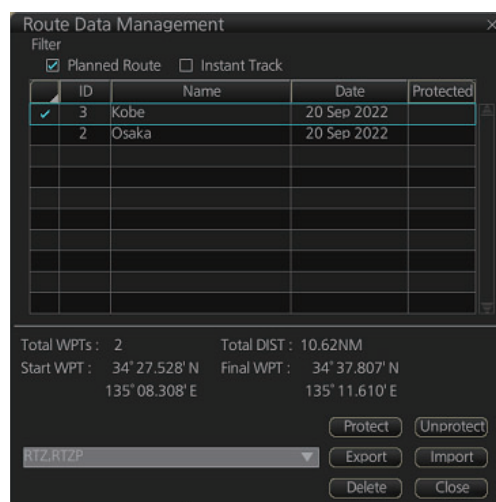
1. Set a USB flash memory in the USB port on the Control Unit.
2. Click the  button on the Status bar and select [Settings]. The confirmation message appears.
3. Click the [OK] button.
4. Click the [File Export] tab.



5. At [Select data to export], check only [Route/User chart].
6. Click the [Export] button to save the data to the USB flash memory.

12.10.2 How to export route data in RTZ, CSV, ASCII format

1. Set the USB flash memory to the USB port on the Control Unit.
2. Activate the Voyage planning mode.
3. On the InstantAccess bar™, click the [Manage Data], [Route] and [Route Data Management] buttons to show the [Route Data Management] dialog box.
4. At the drop-down list, select the import format. The choices are
 [RTZ, RTZP]: route data, RTZ is XML format, RTZP is compressed XML format.
 [CSV Position]: waypoint position data, CSV format
 [ASCII WPT Name Position]: waypoint name, position order, ASCII format
 [ASCII Full]: all route data, ASCII format
 [ASCII Full (Support Asymmetrical XTD Limit)]: Asymmetrical channel limit support, ASCII format



Note: When route transfer is enabled [Route transfer (LAN)] appears in the drop-down list, but is not selectable (see section 12.14).

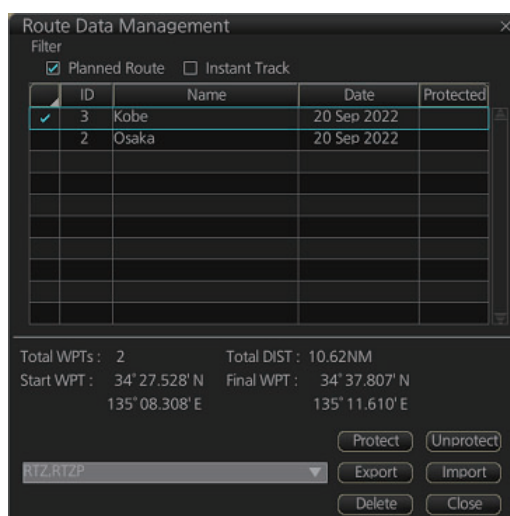
5. Check the route(s) to export then click the [Export] button.

6. Select the destination to save the exported data.
7. Click the [OK] button.
8. Click the [Close] button to close the dialog box.

12.11 How to Delete Routes

Note: If the route is protected, it cannot be deleted. You must unprotect the route (see page 12-24) before deleting it.

1. Click the [PLAN] button on the Status bar to get into the Planning navigation mode.
2. Click the [Manage Data] button on the InstantAccess bar™ followed by the [Route] button.



3. Put a checkmark in the check box to the left of the route name.
4. Click the [Delete] button. The confirmation message appears.
5. Click the [OK] button.
6. Click the [Close] button to close the dialog box.

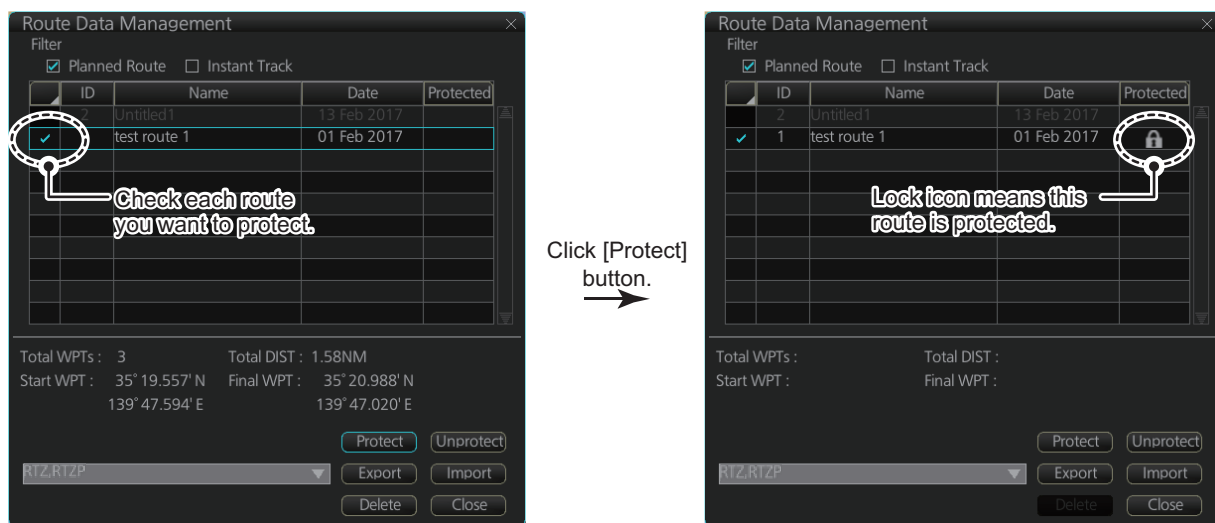
12.12 How to Protect Routes

You can protect your routes, preventing accidental deletion. To protect one or more routes, do the following:

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. Click the [Manage Data] button on the InstantAccess bar™, followed by the [Route] button to show the [Route Data Management] dialog box.
3. Click the column to the left of the route(s) you wants to protect, then click [Protect].
4. Click [Protect].

The selected route(s) are now protected and the locked icon appears in the [Protected] column. The locked icon also appears in the [Select Route] dialog box, [Select User Chart] dialog box*, and the [User Chart Data Management] dialog box.

* When user chart is linked to a route.



5. Click the [Close] button.

To remove protection:

Follow the above procedure and select [Unprotect] at step 4 to remove protection for the selected routes. The locked icon is then erased.

12.13 How to Transfer Routes

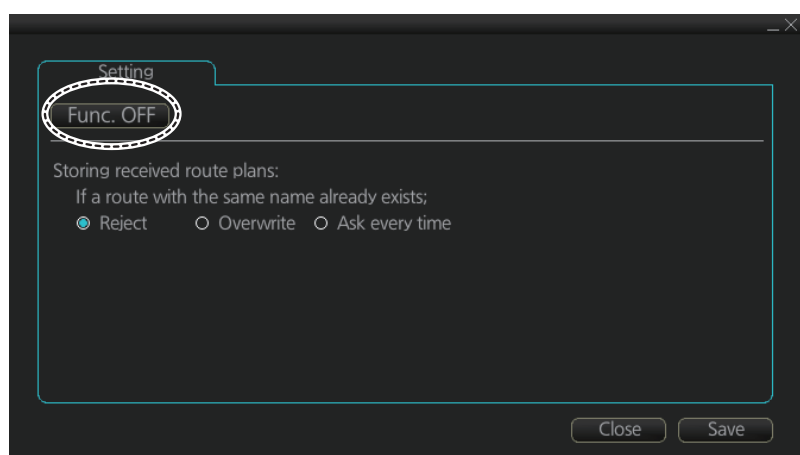
The route transfer feature lets you send and receive route data (RRT sentence) among the units connected in the LAN. Information about transmitted and received route data is stored in the route transfer log (see section 19.6).

Note: This feature is not available with our FAR-2xx7 or FAR-2xx8 series radars. When you start monitoring a route, the route will be automatically sent to the radar connected in the network, regardless of the setting of this function.

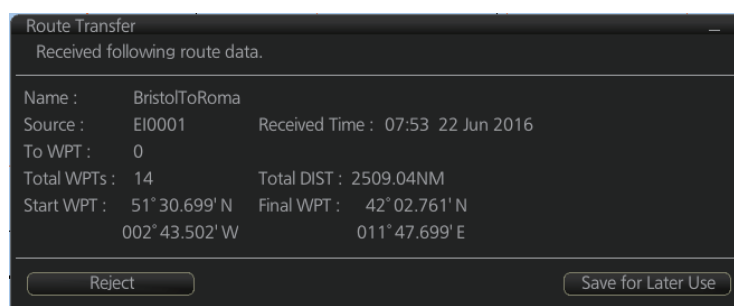
12.13.1 How to turn route transfer on/off

To turn the route transfer feature on or off, do the following:

1. Open the menu, then click [Route] and [Route Transfer] to show the following dialog box.

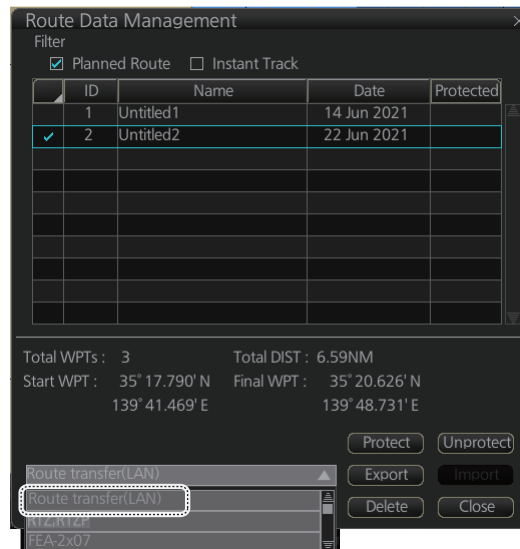


2. Click the function button (circled in the figure above) to change its label to read [Func ON] (route transfer is enabled) or [Func. OFF] (route transfer is disabled) as required.
When route transfer is enabled, the following functions are also enabled:
 - Send/receive monitored routes
 - Send/received planned routes
3. Use the radio buttons to select what to do when receiving route data having the same name as existing route data - [Reject], [Overwrite], [Ask every time].
 - [Reject]: Don't save received route data. When route data is being received, a pop-up message informs you that the data will not be saved.
 - [Overwrite]: Previously existing route data is written over. No notification of the overwriting is given.
 - [Ask every time]: The [Route Transfer] dialog box appears. Click applicable button, referring to the description below.



12. ROUTES

- [Reject]: Route data is not saved.
 - [Save for later use]: Route data is saved. (You can write over existing route data or save received route data under a new name.)
4. Click the Save button to save your settings, then click the close button to finish and close the window.
- With route transfer selected to ON, the option [Route Transfer (LAN)] is added to the drop down list box in the [Route Data Management] dialog box.



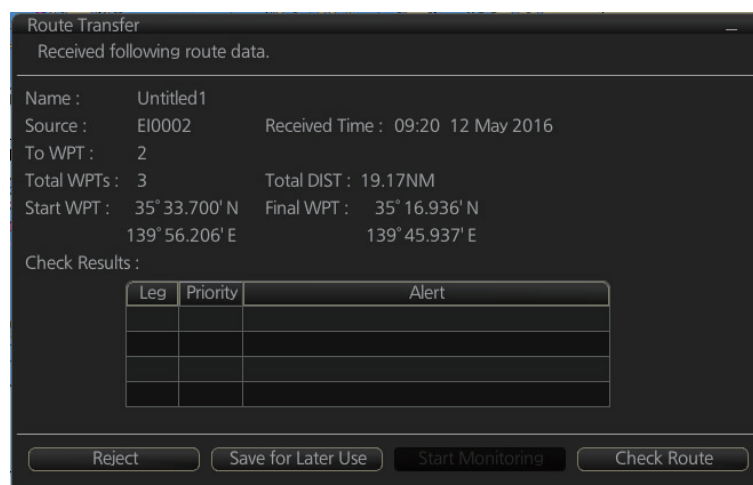
12.13.2 How to send and receive monitored routes

Sending monitored routes

The ECDIS mode sends the route data for a route which is selected for monitoring to other equipment with the ECDIS mode enabled and connected to the same network. This is done automatically when route transfer is enabled and route monitoring is initiated.

Receiving monitored routes

When a route is received from another unit with the ECDIS mode enabled and on the same network, the [Route Transfer] window appears.



Select the appropriate handling for the received route from the buttons at the base of the [Route Transfer] window.

- [Reject]: Route data is not saved.
- [Save for later use]: Route data is saved. (You can write over existing route data or save received route data under a new name.)
- [Start Monitoring]: Moves the received route to the Route Monitor. This button is not selectable until the route is checked.
- [Check Route]: Check route for safe navigation. The results are shown the [Check Results] page. After the check is complete, the [Start Monitoring] button becomes selectable.

12.13.3 How to send and receive planned routes

12

Sending a planned route

You can send a planned route to other units with the ECDIS mode enabled and in the same network.

1. Click the [PLAN] button on the Status bar to get into the Voyage planning mode.
2. On the InstantAccess bar™, click the [Manage Data] and [Route] buttons to show the [Route Data Management] dialog box.
3. Place a check in the box to left of the route(s) to transfer, then select Route transfer (LAN) from the drop-down box.
4. Select [Export].
The selected route(s) are transferred to the units with the ECDIS mode enabled and connected to the same network.

Note: If route transfer fails, the message "No response of route transfer. Please try again route transfer." appears. Check connections, then retry the above procedure.

Receiving a planned route

When a planned route is received with same name as an existing route, it is handled in the manner set at step 3 of section 12.13.1.

For all other received routes, the system automatically saves the route.

12.14 Reports

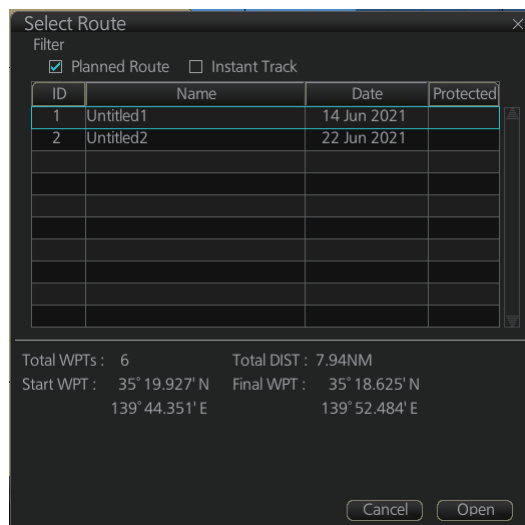
This chart radar generates reports for waypoints in the selected route. If connected to a printer, reports can be printed by clicking the [Print Text] button. To output the report as a PDF file click the [Export Text]. Text in reports can be searched with the [Find] button.

To generate a report, do the following:

1. Click the [PLAN] button on the Status bar to go to the Voyage planning mode.
2. Click the [Report] button followed by the [Route] button.



3. Click applicable “report” button - [WPT], [Full WPT] or [Passage] to show the following dialog box.

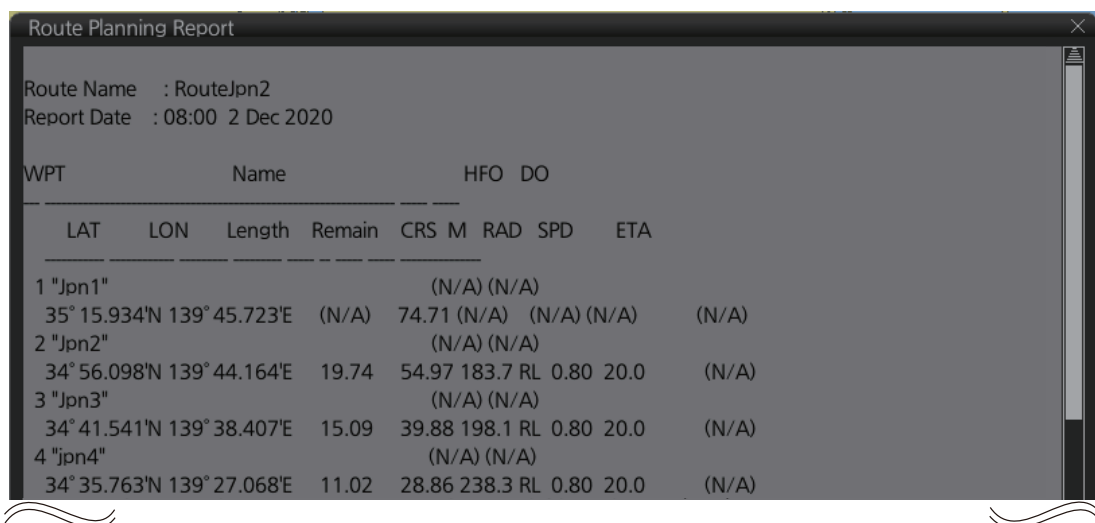


4. Select the appropriate route then click the [Open] button to show the selected report. See the next several pages for examples.

WPT table report

The WPT report contains the following information:

- Route name
- Date of report
- Waypoint no.
- Length of waypoint
- Distance remaining in route
- Position in latitude and longitude
- Planned courses and steering methods (RL (RhumbLine), GC (GreatCircle))
- Turning radius
- Planned speeds
- Estimated times of arrival (ETA)
- ETD from waypoint 1 (start point)
- ETA to waypoint "x" (final waypoint)
- Total length of route
- Estimated time required to run route using planned speeds and courses



The screenshot shows a window titled "Route Planning Report" with a close button (X) in the top right corner. Below the title bar, the following information is displayed:

Route Name : RouteJpn2
Report Date : 08:00 2 Dec 2020

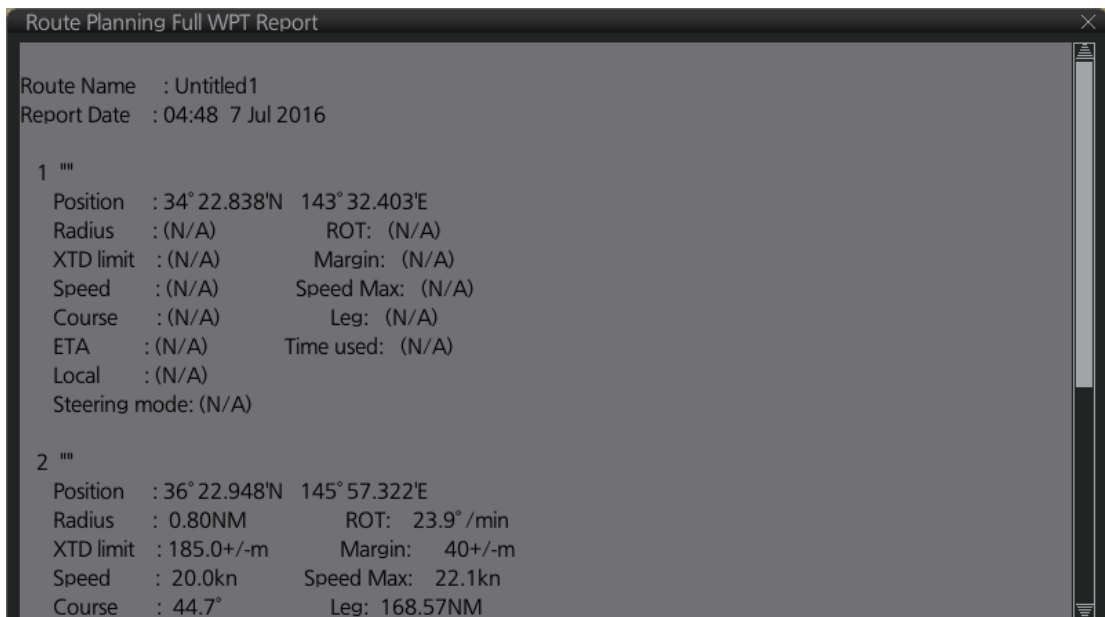
The main content is a table with the following columns: WPT, Name, LAT, LON, Length, Remain, HFO, DO, CRS, M, RAD, SPD, and ETA. The table contains four rows of data for waypoints 1 through 4.

WPT	Name	LAT	LON	Length	Remain	HFO	DO	CRS	M	RAD	SPD	ETA
1 "Jpn1"		35° 15.934'N	139° 45.723'E	(N/A)	(N/A)	74.71	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)
2 "Jpn2"		34° 56.098'N	139° 44.164'E	19.74		54.97	183.7	RL	0.80	20.0		(N/A)
3 "Jpn3"		34° 41.541'N	139° 38.407'E	15.09		39.88	198.1	RL	0.80	20.0		(N/A)
4 "Jpn4"		34° 35.763'N	139° 27.068'E	11.02		28.86	238.3	RL	0.80	20.0		(N/A)

Full WPT report

You can generate a full waypoint report for the route selected. The report includes the following for each waypoint.

- Route name
- Date of report
- Waypoint no.
- Position in latitude and longitude
- Planned radius
- XTD (Channel) limit (If set individually, port and starboard channel limits are separated with a diagonal.)
- Planned speed
- Planned course
- ETA
- Time difference from UTC
- Steering mode (rhumb line or great circle) to each waypoint
- ROT
- Margin for channel limit
- Speed Max
- Leg length
- Time used

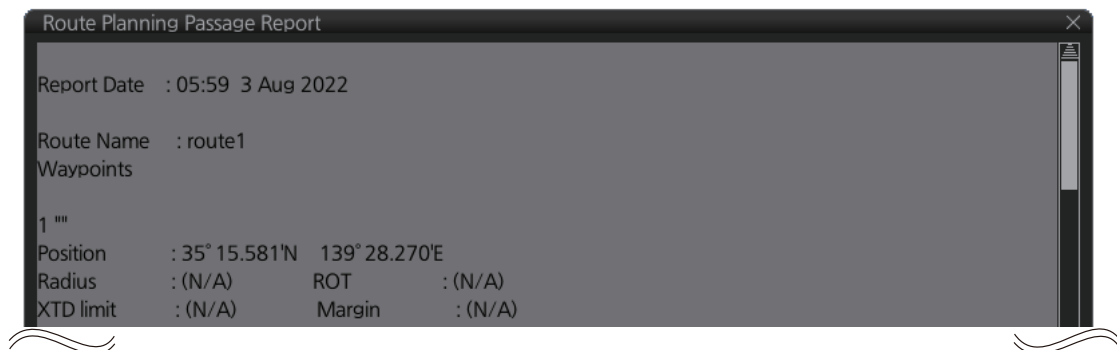


Passage plan report

The passage plan report generates waypoint information for each waypoint in the route selected.

- Route name
- Date of report
- Waypoint no.
- Position in latitude and longitude
- Length
- Cumulative length
- Planned course
- Steering method (RL or GC)
- Name of waypoint

12



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13. USER CHARTS

13.1 Introduction

User charts are overlays that the user creates to indicate safety-related objects and areas. They can be displayed on both the radar display and the electronic chart. These charts are intended for pointing out safety-related items like position of important navigation marks, safe area for the ship, etc. User charts areas can be used to activate alerts and indications based on user-defined danger symbols, lines and areas. When route or own ship estimated position is going to cross a user chart symbol, line or area that is defined as a dangerous one, an alert or indication is generated by the system. See the chapter on chart alerts.

A user chart consists of various objects (points, lines, text, symbols, etc.) danger points, and text. The table show number of points available for each chart item.

Item	Specifications (XML v1.1/v1.2/v1.3)
Amount of display objects	• 1-5 files. • A maximum of 100,000 points can be entered into five files. A circle counts as one point; a square is 4 points. (There is no limit to the number of input points for each file.)
Amount of danger points	• 1-5 files. • A maximum of 100,000 points can be entered into five files. However, if the number of points exceeds 10,000, the load on the system will increase, so a warning will be displayed when the file is read, which will slow down the process. (There is no limit to the number of input points for each file.)
Amount of text	• 1-5 files. • A maximum of 10,000 points can be entered into five files. (There is no limit to the number of input points for each file.)

The user chart is displayed on the radar display and its position and shape is based on the ship's actual position. When own ship is moving in the area covered by the user chart, the elements of the user chart are superimposed on the radar, with a maximum of 80 of the nearest elements displayed.

13.1.1 Objects of user charts

Below is a description of the objects used in a user chart.

- **Tidal:** There are two types of tidsals, current and predicted.
- **Line:** You can define four different types of lines. Lines can be used in chart alert calculation and/or display on the radar:
 - **Navigation lines:** Displayed on both the radar display and the chart display. Navigation lines are reference lines for coast line.
 - **Coast line:** Displayed on both the radar and the chart display. Coastal line is usually a well-defined (by chart digitizer) multi-segment line showing the coastline. The user is able to create this type of line in case there is no suitable chart available over desired area in S57 format.

- **Depth contour:** Displayed on both the radar and chart display. Depth line shows the chosen depth levels. The user is able to create this type of line in case there is no suitable chart available over desired area in or S57 format.
- **Route line:** Displayed on both the radar display and the chart display. Route lines are zones for anchoring, traffic separation lines, etc.
- **Clearing line:** A clearing line is used to define a line which a vessel can sail to avoid navigational hazards. A clearing line can be of the NMT (Not More Than) or NLT (Not Less Than) type. Displayed on the chart display only.
- **Area:** The operator can define closed areas, which the system can use to detect safe water areas. If route or estimated ship position is going to cross the area, the system generates a warning to the user. These areas can be used to specify safe areas as defined by the master or by the policy of the ship's owner. They are always available regardless of the type of chart material used.
- **Circle:** The operator can define an area with a circle, which can define a location to avoid. If route or estimated ship position is going to cross the area, the system generates a warning to the user. These areas can be used to specify safe areas as defined by the master or by the policy of the ship's owner. They are always available regardless of the type of chart material used.
- **Label:** There are six types of labels. A "point" (i) is mainly used to denote position of objects, such as buoys, light houses, fixed targets, wrecks, etc. Points can be used in chart alert calculation. A "label" provides user-entered text to show on the display.

13.2 How User Charts are Synced

User chart data can be shared between this unit and other like units (FMD-3xxx or FAR-3xxx), through the LAN. A minimum of two units is required. Turn on all units beforehand to enable syncing. The sync source (master unit) is automatically assigned by the system when each unit is powered. The sync source unit is determined as follows:

For configurations with two units

The unit with the larger IP address is assigned as a sync source.

For configurations with three or more units

Among the first booted unit and the second booted unit, the unit with the larger IP address is assigned as a sync source. If the sync source unit is turned off, the sync source unit is switched to the one with the largest IP address among the other booted units.

The IP address increases in the following order, with "CRA" being the largest;

- ECD001 < ECD002 < ... < ECD016 < CRAD001 < CRA002 < ... < CRA016

Be aware that if a unit is turned off, some user chart data may be deleted. Two examples are shown below.

Using ECD001 and CRA001

This example assumes that ECD001 and CRA001 are connected in the same network.

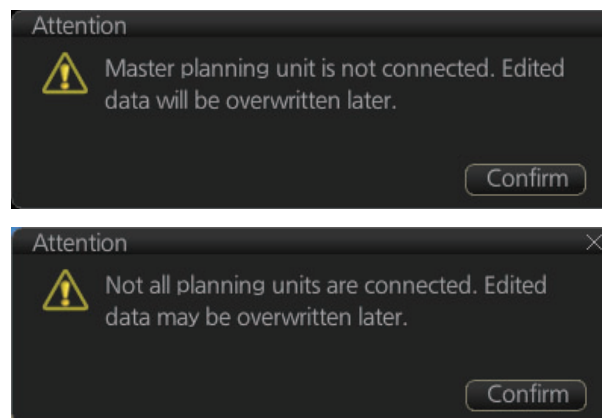
1. CRA001 is off; ECD001 is powered and a user chart is created at ECD001.
User chart data is not transferred to ECD001 because the CRA001 is turned off.
2. CRA001 is turned on.
As the IP address of the CRA001 (192.168.31.31) is larger than the ECD001 (192.168.31.1), the CRA is assigned as the sync source and ECD001's user chart data created at step 1 is deleted.

Using ECD001, ECD002 and CRA001

This example assumes that ECD001, ECD002 and CRA001 are connected in the same network.

1. ECD001/002 are both turned off; CRA001 is powered and a user chart is created on CRA001.
User chart data is not transferred to ECD001/002 because both ECD001/ECD002 are turned off.
2. CRA001 is turned off.
3. First, turn both ECD001/002 on. Secondly, turn the CRA001 on.
Among the first booted ECD001 and ECD002, ECD002 assigned as a sync source, because the ECD002's IP address is larger than ECD001. Also, CRA001's user chart data created at step 1 is deleted.

If the operator clicks the PLAN button on the Status bar when one or more units (including the master unit) is turned off, one of the following messages appears.



Turn all units in the same network on, then plan or edit the user chart as required.

13.3 How to Create a User Chart

You can create and modify a user chart in the Voyage planning mode.

To make a complete user chart, do the following:

1. Click the [PLAN] button on the Status bar to go to the Voyage planning mode.
2. Click the [Planning] and [User Chart] buttons on the InstantAccess bar™ to show the user chart palette and the [User Chart] dialog box.