

FURUNO

OPERATOR'S MANUAL

RADAR VIDEO PLOTTER

MODEL RP-15



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SAFETY INSTRUCTIONS

"**DANGER**", "**WARNING**" and "**CAUTION**" notices appear throughout this manual. It is the responsibility of the operator and the installer of the equipment to read, understand and follow these notices. If you have any questions regarding these safety instructions, please contact a FURUNO agent or dealer.

The level of risk appearing in the notices is defined as follows:



DANGER

This notice indicates a potentially hazardous situation which, if not avoided, will result in death or serious injury.



WARNING

This notice indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION

This notice indicates a potentially hazardous situation which, if not avoided, could result in minor or moderate injury, or property damage.

Safety Instructions for the Operator

CAUTION

Always maintain a watch while underway.

This plotter is intended for use as an aid to navigation. It is not meant to replace the navigator or the human eye.

Never rely on a single navigation aid to navigate a vessel, for the safety of crew and vessel.

Always check data against other sources to verify the reliability of the data.

The radar must always be optimally tuned, especially when the auto plotter is in use.

This will ensure that required targets will not be lost or unwanted targets such as sea returns and noise will not be acquired and tracked.

The following items affect calculation accuracy:

- echo intensity
- radar transmission pulsewidth
- radar bearing error
- gyrocompass error
- own vessel or other vessel course change

Data for CPA, TCPA, etc. are approximations. Any data obtained from this auto plotter should be used prudently.

Safety Instructions for the Installer

DANGER



Do not work inside the equipment unless totally familiar with electrical circuits.

Hazardous voltage which will cause death or serious injury exists inside the equipment.

WARNING



Turn off the power at the mains switchboard before beginning the installation. Post a sign near the switch to indicate it should not be turned on while the equipment is being installed.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

TABLE OF CONTENTS

OPERATION

1. Overview

1.1 Control Description	1
1.2 Selecting Displays	2
1.3 Selecting Presentation Mode	2
1.4 Operating the Cursor	2
1.5 Shifting the Display	2
1.6 Selecting Chart Scale	2
1.7 Function Availability	2
1.8 Menu Operation	3
1.9 Interpreting the Display Icons	3
1.10 Hiding/Showing the Grid	3

2. Card Drives and the Chart Card

2.1 Displaying a Chart	4
2.2 Selecting a Chart Feature as Screen Center	4
2.3 Chart Problems?	4
2.4 Chart-related Icons	5
2.5 Showing/Hiding Chart Features	5

3. Marks, Lines

3.1 Entering Marks	5
3.2 Entering the MOB Mark	5
3.3 Entering the Origin Mark	6
3.4 Entering Lines	6
3.5 Deleting Marks, Lines	6
3.6 Showing/Hiding Marks, Lines	6

4. Track

4.1 Stopping/Starting Track Plotting	7
4.2 Changing the Plot Interval	7
4.3 Smoothing	8
4.4 Showing/Hiding Own Ship's Track	8
4.5 Showing/Hiding Other Ship's Track	8

5. Alarms

5.1 Setting the Alarms	8
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6. Corrections

6.1 Correcting Chart Position	9
6.2 Correcting Bearing	10

7. Waypoint Operations

7.1 Entering Waypoints	10
7.2 Showing/Hiding Waypoints	11
7.3 Deleting Waypoints	11

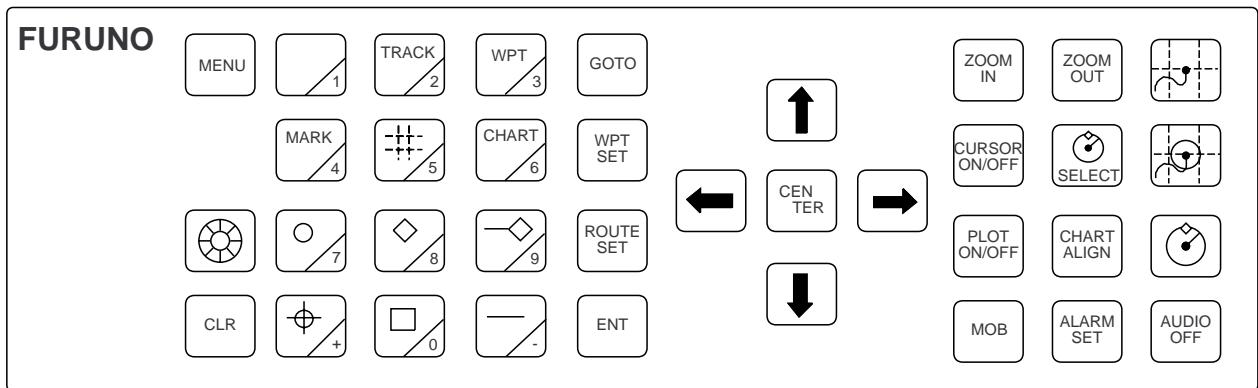
8. Destination Waypoint	
8.1 Setting a Destination Waypoint	12
8.2 Cancelling Destination Waypoint	12
9. Route Navigation	
9.1 Creating Routes	13
9.2 Following a Route	14
9.3 Skipping Route Waypoints	15
9.4 Cancelling Route Navigation	15
9.5 Deleting Routes	15
10. Memory, Memory Card Operations	
10.1 Selecting Card Slot	16
10.2 Saving Data to a Memory Card	16
10.3 Playing Back Memory Cards	17
10.4 Deleting Memory Card Files	17
10.5 Loading Memory Cards	18
10.6 Apportioning the Memory	18
10.7 Deleting Memory Contents	18
11. Other Functions	
11.1 Initial Setting Menu	19
11.2 Miscellaneous Menu	19
12. Self-test	20
13. Menu Tree	21
INSTALLATION	22
SPECIFICATIONS	25

OPERATION

1. Overview

The RP-15 mainly consists of a keyboard and the RP-15 Board, which is mounted in the display unit of the FR-1500 MARK2 and FR-8001 Series Radars.

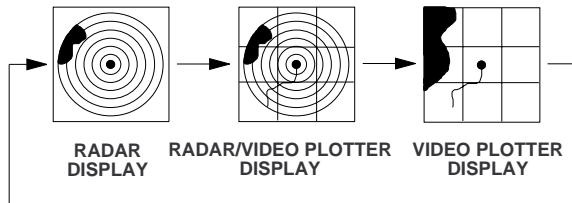
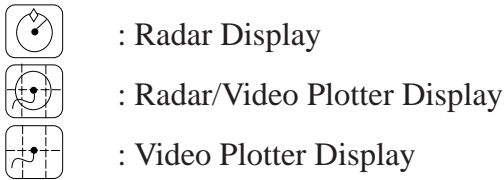
1.1 Control Description



Control	Function	Control	Function
MENU	Displays/erases the menu.	ROUTE SET	Displays/erases the route menu.
[TRACK/2]	Shows/hides own track.	PLOT ON/OFF	Stops/resumes track plotting.
[WPT/3]	Shows/hides waypoint marks.	CHART ALIGN	Displays/erases "Position Correction" menu.
GOTO	Sets/cancels destination.	CLR	Clears an entire line of data; delete marks.
ZOOM IN, ZOOM OUT	Select chart scale.	ENT	Terminates data entry.
[MARK/4]	Shows/hides marks and lines.	MOB	Enters MOB mark.
[CHART/6]	Displays/erases "Coast Line Setting" menu.	ALARM SET	Engages/disengages aural alarm.
WPT SET	Displays/erases the waypoint menu.	AUDIO OFF	Silences aural alarm.
CURSOR ON/OFF	Turns cursor on/off.		Select a display (video plotter, radar/video plotter, radar).
SELECT	Selects presentation mode.	Mark/numeric keys	Enter marks, lines, numeric data.
	Adjusts screen brilliance (four levels).	Arrow keys	Shift picture and cursor.
		CENTER	Centers own ship mark and cursor.

1.2 Selecting Displays

The following keys select display mode.



Note: Radar/Video Plotter Display requires gyrocompass signal.

1.3 Selecting Presentation Mode

With gyrocompass

Five presentation modes are available by the [SELECT] key: head-up, cursor gyro, course-up, north-up, and true-motion. (North-up, cursor gyro, course-up and true motion require heading signal input.) Each time the key is pressed, if heading is input to the radar, the display and the display mode indication at the top left corner of the display change in the sequence of HU, CG*, CU, NU and TM. If there is no heading signal input, the display mode is always HU and the [SELECT] key is inoperative; it emits several beeps when pressed. (* for FR-1500 Mark2)

No gyrocompass

- Radar display is HU only.
- Video plotter display can toggle between NU and TM.

1.4 Operating the Cursor

Turning the cursor on/off

Each press of [CURSOR ON/OFF] turns the cursor on or off.

Shifting the cursor

With the cursor on, operate the trackball or the

arrow keys to shift the cursor.

Note: The cursor is always displayed on the radar display mode.

1.5 Shifting the Display

The display can be shifted, when the cursor is off, by the trackball or arrow keys. The display shifts in the direction of trackball rotation or arrow key pressed.

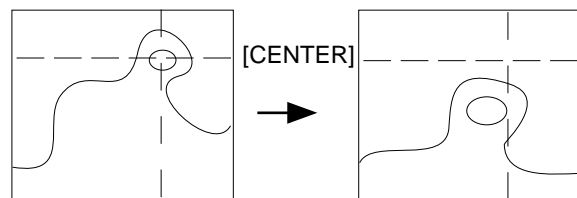
Returning own ship mark to screen center

In the Video Plotter or Radar/Video Plotter mode, press [CENTER].

Selecting screen center by cursor position

In normal usage your ship is at the screen center. If you want to select a land feature as the screen center, for example;

1. Display the cursor (if it is not already displayed) by pressing [CURSOR ON/OFF].
2. Operate the trackball to place cursor on position desired.
3. Press [CENTER].



1.6 Selecting Chart Scale

The chart scale can be adjusted with the [ZOOM IN] and [ZOOM OUT] keys. Note that a larger range in essence shrinks the picture, and a smaller range "blows up" the picture. With a smaller range, you may find that the track appears in tiers.

1.7 Function Availability

With connection of the RP-15 the zoom function is not available in the TM mode or when own position is not centered.

1.8 Menu Operation

Many functions are carried out through the main menu which consists of nine menus. This section provides basic menu operating procedure.

Selecting options on menus

1. Press [MENU] to display the main menu.

Menu
1. Save Data 2. Display Card Data 3. Load Data 4. Delete Memory 5. Apportion Memory 6. Plot Interval 7. Initial Setting 8. Miscellaneous 9. Test
Press numeric key to select item.

2. Press appropriate numeric key to display menu desired. For example, press [7] to display the Initial Setting menu.

7. Initial Setting
Smoothing = 00 (0-15) External Event = Off On Time Difference = - 09:00
Moving cursor: Arrow key
Register: ENT Escape: MENU


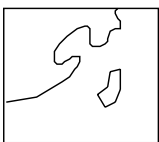

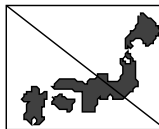
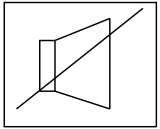
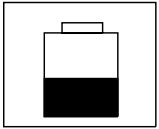
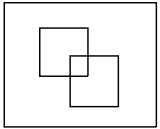
3. Press arrow keys to select item and option.
4. Press [ENT] to register your selection.
5. Press [MENU] to escape.

Entering numeric data on menus

Press appropriate numeric key. To clear entire line of numeric data, press [CLR].

1.9 Interpreting the Display Icons

Various icons appear at the bottom of the display to alert the operator. The table below explains the meaning of the icons. (The radar display shows only the "alarm violation" icon.)

 <p>Chart properly displayed.</p>	 <p>Chart overenlarged.</p>
 <p>Track plotting turned off (track hold).</p>	 <p>Chart overenlarged or wrong chart.</p>
 <p>Alarm violation. Icon disappears when alarm is disengaged or cause of alarm is removed.</p>	 <p>Low voltage of memory card battery or battery on GDC Board; have battery replaced at earliest convenience.</p>
 <p>Chart position offset applied on Position Correction menu.</p>	

1.10 Hiding/Showing the Grid

Press [5].

2. Card Drives and the Chart Card

Card drives

The card drives are behind the door at the left-hand side of the display unit.

Inserting the chart card

Insert a chart card label side left.

2.1 Displaying a Chart

Follow the procedure below to display a chart with the power turned on.

1. Press [MENU] and [1].
2. Press [9] to select Card Slot Select.
3. Operate arrow keys to choose Left or Right.
4. Press [ENT].
5. Open the card slot door.
6. Insert a chart card label side leftward in the slot selected at step 3.
7. Press [ZOOM IN]/[ZOOM OUT] keys to display chart.

Ejecting the chart card

The eject buttons are arranged as follows: Left slot, upper button; Right slot, lower button.

⚠ CAUTION

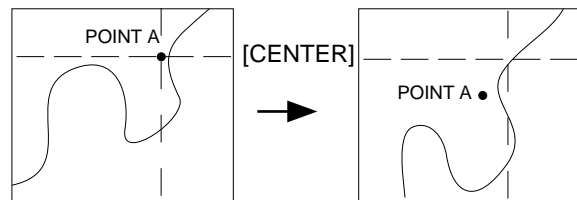
The chart card (and the memory card) must be handled with care.

- Keep them away from direct sunlight, heat sources, and active gases.
- Keep cards away from water and chemicals.
- Keep the connector free of foreign material.
- Do not drop the cards.

2.2 Selecting a Chart Feature as Screen Center

You can select a chart feature as the screen center. If you want to make point A in the figure at the top of the next column the screen center, for example, do the following.

1. Press [ZOOM IN]/[ZOOM OUT] to display point A.
2. Operate the trackball (cursor on) to place the cursor intersection on point A.
3. Press [CENTER].






2.3 Chart Problems?

Problem	Remedy
Chart does not disappear after removing card.	Press [ZOOM IN]/[ZOOM OUT].
Card inserted but chart does not appear.	Press [ZOOM IN]/[ZOOM OUT].
Small island or object is not filled in (it is hollow).	Press [ZOOM IN]/[ZOOM OUT].
Part of land on video plotter display is hollow.	Shift display.

Note: Land areas on a chart may be hollow if the chart is overenlarged. Further, land appearance depends on the setting of Land Density in the Coast Line menu, described in section 2.6.

2.4 Chart-related Icons

You can check chart status by the chart icon at the bottom of the display. The display shows three different icons to alert you to chart status. These are as follows.

Icon	Meaning
	Proper card is not inserted or chart scale is too small (chart is overenlarged). Press [ZOOM IN] to adjust chart scale.
	Chart scale is too large. Press [ZOOM OUT] to adjust chart scale. This icon appears only with FURUNO charts.
	Suitable chart scale is selected.

2.5 Showing/Hiding Chart Features

This section describes how to hide/show chart features.

1. Press [CHART/6] to display the Coast Line menu.

Coast Line Data Set		
Coast Line	= Off	On
Land Density	= Off	On
Place Name	= Off	On
Lighthouse	= Off	On
Depth Contour	= Off	On

Moving cursor: Arrow key
Escape: MENU

2. Select item and option desired by arrow keys.

Note: Land Density fills in (on) or hollows (off) land.

3. Press the [ENT] key.
4. Press [MENU] to escape.

3. Marks, Lines

A total 6,000 marks and lines can be stored. When the mark/line memory is full, no marks or lines can be entered. In this case erase unnecessary marks or lines.

3.1 Entering Marks

You can inscribe marks on the display to denote important locations. Three marks are available: circle, diamond and square.

Entering marks by cursor

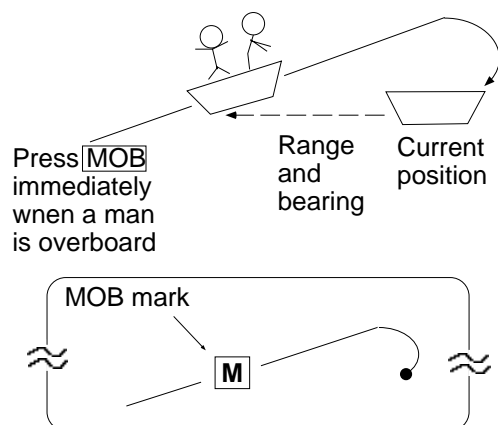
1. Place cursor on latitude and longitude position desired for mark.
2. Press mark key desired. To inscribe a diamond, for example, press [8].

Entering marks at own ship's position

1. Turn off the cursor by pressing [CURSOR ON/OFF].
2. Press mark key desired. To inscribe a square, for example, press [0].

3.2 Entering the MOB Mark

The [MOB] (Man OverBoard) key functions to mark man overboard position. Press the [MOB] key to mark point of man overboard.



3.3 Entering the Origin Mark

The origin mark (\oplus) is used to find the range and bearing from the cursor to a target. To place an origin mark, operate the trackball to place cursor where desired and then press the [+] key. The distance from the cursor to the origin mark appears at the right-hand side of the display.

3.4 Entering Lines

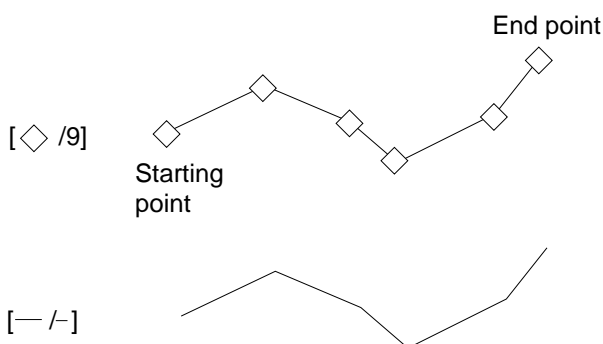
Connecting lines with marks

Lines with marks can be entered on the display. This feature is useful for constructing your own charts.

1. Press [8].
2. Operate the trackball to place the cursor where to enter mark.
3. Press [9].
4. Repeat steps 2 and 3 to enter another point.

Entering lines only

1. Press [—].
2. Operate the trackball to place the cursor where to enter starting point of line.
3. Press [—].
4. Repeat steps 2 and 3 to enter another point.



3.5 Deleting Marks, Lines

Deleting individual marks (including MOB and origin marks)

1. Operate the trackball to place the cursor on the mark you want to delete.
2. Press [CLR].

Note 1: If a mark cannot be erased, there may be several marks superimposed on one another. In this case, press [CLR] several times.

Note 2: Marks played back from a memory card cannot be erased.

Deleting individual lines

Operate the trackball to place the cursor on the starting or end point of mark you want to erase and press [CLR]. If you select the intersection of two lines both lines will be erased.

3.6 Showing/Hiding Marks, Lines

Press [MARK/4].

4. Track

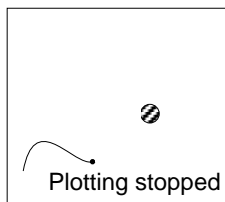
4.1 Stopping/Starting Track Plotting

Why stop track plotting?

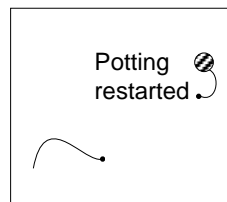
When your ship is at anchor or returning to port you probably will not need to plot (or save) the track. You can stop plotting the track, to conserve the track memory, by actuating the "HOLD" function. The track is neither plotted nor saved, thereby conserving the track memory.

Stopping track plotting

Press [PLOT ON/OFF]. "H" appears on the display when track is not being plotted.



a) No track plotted while track plotting is stopped.



b) Track is plotted upon restarting of track plotting.

Restarting track plotting

Press [PLOT ON/OFF] to erase the "H" icon. The track points where track plotting was stopped and restarted are not connected.

4.2 Changing the Plot Interval

The plot interval determines how the track will be reconstructed on the display and track storage time.

How the track is drawn

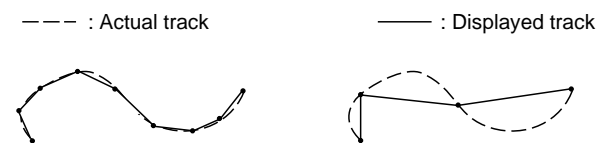
The "quality" of the track displayed largely depends on the plot interval setting, smoothing rate, etc.

In drawing the track, first the ship's position fed from the navigation aid is stored into this unit's memory at an interval of time or distance selected by the operator. This interval of time or distance is called the "Plot Interval" and it is selected considering the ship's speed, the

chart scale, etc. If a shorter interval is selected, a reconstructed course line is provided with better accuracy, but total storage time of the track is reduced.

Plot interval and track reconstruction

Obviously there is a trade off between smooth reconstruction of the track and plot storage time: The shorter the interval the smoother the reconstruction but storage time is reduced. The following figure compares plot interval and track reconstruction.



Plot interval by time or distance

The plot interval can be selected by "Time" or "Distance". If the plot interval is selected by distance, you will not use up memory points when the boat is anchored.

Setting plot interval

1. Press [MENU].
2. Press [6] to select Plot Interval.

6. Plot Interval	
Plot Mode	=Time Dist
Plot Time	=00M00S
Plot Distance	= 0.00 nm
Display TGT Track	=No Yes
Moving cursor: Arrow key	
Changing value: Numeric key	
Register: ENT	
Escape: MENU	

3. Select Plot Mode.
4. Select "Time" or "Dist" on the Plot Mode line.
5. Select "Plot Time" or "Plot Distance".
6. Enter plot interval desired by pressing numeric keys.
7. Press [ENT].

4.3 Smoothing

Even when the vessel is sailing in a straight line track shown on the display looks irregular. This is due signal variation of the external navaid. You can compensate for this irregularity with smoothing.

The higher the smoothing factor, the less irregularity, however the slower the position update becomes. In the following figure, the track shown by the broken line has a time delay more than the one shown by the dot-dash line, because of higher smoothing factor.

A smoothing factor between 00 and 15 is available. 00 provides no smoothing.

4.4 Showing/Hiding Own Ship's Track

Press [TRACK/2].

4.5 Showing/Hiding Other Ship's Track

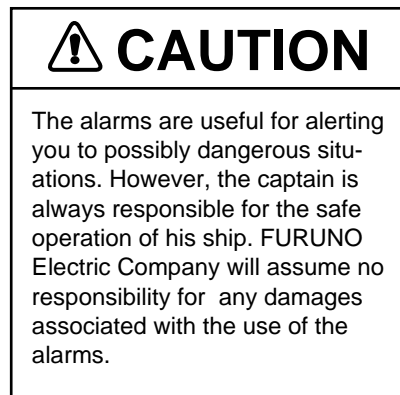
1. Press [MENU].
2. Press [6] to select Plot Interval.
3. Press arrow keys to choose "Display TGT Track".
4. Press arrow keys to choose Yes or No.
5. Press [ENT].
6. Press [MENU] to erase the menu.

5. Alarms

There are four conditions that can trigger aural and visual alarms in this unit:

- **Arrival alarm:** Alerts you when own ship nears a waypoint.
- **Anchor Watch alarm:** Alarms released when own ship is moving when it should be at rest.
- **Cross-track Error (XTE) alarm:** Warns you when own ship is off its intended course.
- **Border alarm:** Alerts you when own ship is nearing an area which you do not want to approach

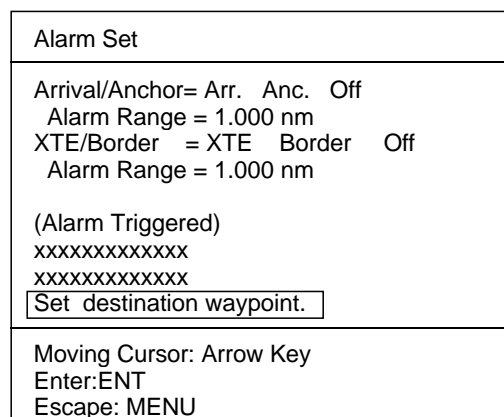
Two alarms can be actuated. When an alarm setting is breached the aural alarm sounds and the alarm icon (🔊) appears at the bottom right-hand corner of the display.



5.1 Setting the Alarms

Before setting an alarm, set destination waypoint.

1. Press [ALARM SET] to display the Alarm menu.



2. Press arrow keys to select alarm desired.

3. Press arrow keys to select Alarm Range.
4. Enter alarm range with numeric keys.
5. Press [ENT].
6. Press [MENU].

Silencing the aural alarm

Press [AUDIO OFF].

Disabling the alarm

Select OFF on ALARM menu.

What alarm(s) is sounding?

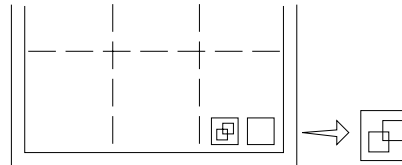
When more than one alarm is active and the alarm sounds, you can see which alarm is sounding by pressing [ALARM SET].

6. Corrections

6.1 Correcting Chart Position

There may be some instances where the chart latitude and longitude position are off by some seconds. You can compensate for this error by applying an offset to chart position.

When you apply an offset to chart position, the chart offset icon appears at the bottom right-hand corner on the display.



Max correction value: 60 minutes

1. Press [CHART ALIGN]. The following menu appears.

Position Correction		
Position Corr. =	No	Yes
Delta L/L Entry		
Bearing Corr. =	No	Manu. Auto
Manual Entry		
Delta L/L	: 00.000'N	00.000'E
Manual	: 000.0°W	
Auto	: 000.0°E	
Move cursor by using arrow key and press ENT. Escape: MENU		

2. Operate arrow keys to select Yes on the Position Corr. line.
3. Press [ENT].
4. Operate the arrow keys to select Delta L/L Entry.
5. Press [ENT]. The following message appears.

Shift chart data by using trackball. and press ENT. (L/L= 00.000'N 00.000'E) Escape: MENU
--

6. Operate trackball to align chart with radar picture.
7. Press [ENT].
8. Press [MENU].

6.2 Correcting Bearing

Chart position can also be corrected by bearing in case of magnetic compass connection. This can be done automatically or manually. This feature is useful when no coastline is displayed; that is, vessel is in mid ocean.

1. Press [CHART ALIGN].
2. Operate arrow keys to select No, Manu, or Auto.
3. Press [ENT]. For Manual, press [ENT], select Manual Entry and press [ENT]. The following message appears.

Rotate chart data by using EBL knob, and press ENT. (=000.0°W) Escape: MENU
--

4. Rotate VRM or EBL knob to align chart with radar picture.
5. Press [ENT].
6. Press [MENU].

Note: You can not select "Auto" in case of gyrocompass connection.

Canceling the correction

1. Press [CHART ALIGN].
2. Operate arrow keys to select "No" at Position Corr. or Bearing Corr..
3. Press [ENT].
4. Press [MENU].

7. Waypoint Operations

What is a waypoint?

In navigation terminology, a particular location is known as a "waypoint", whether it be a starting point, a destination point or an intermediate point on a voyage.

7.1 Entering Waypoints

Waypoints may be entered

- by the cursor
- at own ship's position
- through the waypoint list

Entering waypoints by the cursor

1. Press [WPT SET]. The following menu appears.

MODE = Cursor OS pos. List WPT No. = _ _ (IN use)

Enter WPT no. in 2 digits, designate WPT position by using cursor, and press ENT.

2. Operate arrow keys to select Cursor.
3. Press [ENT] to select WPT No.
4. Enter waypoint number if desired. See NOTE 2. To enter waypoint number 07, for example, enter 0 and 7.

Note 1: If the waypoint number is already used, "already used" appears to alert you. You can enter new number by pressing [CLR], or overwrite the waypoint by going to step 5.

Note 2: You can register a waypoint without entering waypoint number, in which case the unit automatically registers the waypoint in the youngest, unused waypoint.

5. Operate the trackball to place cursor on position desired.
6. Press [ENT].
7. Press [WPT SET] or [MENU] to erase the menu.

Entering waypoints at own ship's position

1. Press [WPT SET].
2. Operate arrow keys to select OS pos.
3. Press [↓] to select WPT No.
4. Enter waypoint number if desired. See NOTE 2 in left column.
5. Press [ENT].
6. Press [WPT SET] to erase the menu.

Entering waypoints through the waypoint list

1. Press [WPT SET].
2. Operate arrow keys to select LIST.
3. Press [ENT].

(Waypoint List)			
No.	Lat/Long.		Comment
01	00°00.000'N	000°00.000'E	ABCDEFGHIJK
02	00°00.000'N	000°00.000'E	9876543210
03	--°--'---'N	--°--'---'E	-----
04	--°--'---'N	--°--'---'E	-----
05	--°--'---'N	--°--'---'E	-----
06	--°--'---'N	--°--'---'E	-----
07	--°--'---'N	--°--'---'E	-----
08	--°--'---'N	--°--'---'E	-----
09	--°--'---'N	--°--'---'E	-----
10	--°--'---'N	--°--'---'E	-----
Enter Lat/Long. N, E : +, S, W : - Delete: CLR Enter : ↓, Escape : MENU			
Move Cursor by using trackball and press ENT.			

4. Operate arrow keys to select waypoint number.
5. Enter latitude and longitude.

Note: The [+] and [-] keys serve to change coordinate:

[+] key: Change coordinate to North or East.
 [-] key: Change coordinate to South or West.

Entering comments for waypoints

You may enter comments for waypoints on the waypoint list. The comment can consist of up to 10 alphanumeric characters.

1. Press arrow keys to set data input cursor on the line desired in the comments window.
2. Operate the trackball to circumscribe character and press [ENT].

Note: If you enter a wrong character, set the data input cursor on wrong character and then enter correct character.

3. Repeat step 2 to complete comment.
4. Select OK and press [ENT] to finish.

7.2 Showing/Hiding Waypoints

Press [WPT/3].

7.3 Deleting Waypoints

Deleting waypoints by the cursor

1. Operate the trackball to place the cursor on the waypoint you want to delete.
2. Press [CLR].

Deleting waypoints through the waypoint list

1. Press [WPT SET].
2. Operate arrow keys to select List.
3. Select waypoint number you want to delete.
4. Press [CLR].
5. To delete another waypoint, repeat steps 3 and 4.
6. Press [ENT].

8. Destination Waypoint

A destination waypoint is the simplest piece of information necessary to guide you to a destination, in the shortest route possible.

You can set a destination waypoint by

- cursor
- waypoint number
- route number

8.1 Setting a Destination Waypoint

Setting destination waypoint by cursor

1. Press [GOTO] to display the GOTO menu.

Destination = Set Cancel Mode= Cursor WPT Route no
Move cursor by using arrow key and press ENT. Escape: MENU

2. Press arrow keys to select Cursor.
3. The following message appears.

Move +cursor to desired position and press +key. To delete wpt, press - key. Repeat above steps and press ENT to conclude.
--

4. Operate the trackball to place cursor on position desired for destination waypoint.
5. Press [+]. To clear selection, press [-].
6. Press [ENT].
7. Press [GOTO].

Setting destination waypoint by waypoint number(s)

1. Press [GOTO] to display the GOTO menu.
2. Operate arrow keys to select WPT.
3. The following display appears.

Dest. Set		
WPT NOS. =02		
<pre> +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ +-+ </pre>		
(WAYPOINT LIST)		
NO.		COMMENT
↑		
01	00°00.000'N 000°00.000'E	ABCDEFGHIJK
02	00°00.000'N 000°00.000'E	9876543210
03	--°--'---'N --°--'---'E	-----
10	--°--'---'N --°--'---'E	-----
99	--°--'---'N --°--'---'E	-----
↓		
Select WPT and press + key. To cancel, press - key. Repeat above steps and press ENT to conclude.		

4. Operate the arrow keys to select the waypoint no. desired.
 5. Press [+] to enter waypoint. If you enter wrong number, press [-].
- Note:** You can also enter waypoint no. by pressing numeric keys.
6. Press [ENT].
 7. Press [GOTO].

8.2 Cancelling Destination Waypoint

Once you arrive at your destination you probably won't need the destination waypoint. You can cancel it by one of three methods.

Cancelling destination waypoint through the menu

1. Press [GOTO] to display the GOTO menu.

Destination = Set Cancel Mode= Cursor WPT Route No
Move cursor by using arrow key and press ENT. ESCAPE: MENU

2. Operate the arrow keys to select Cancel.
3. Press [ENT].


Cancelling destination waypoint by key input

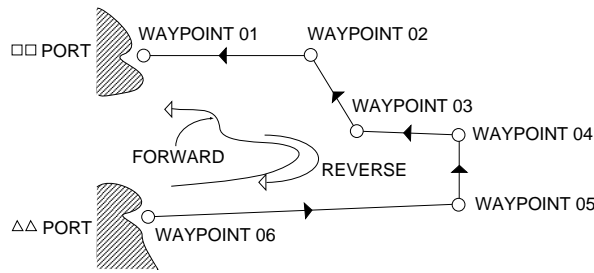
Method 1: Press [GOTO], [CLR] and [ENT].
 Method 2: Press [GOTO], [0] and [ENT].

9. Route Navigation

What is a route?

In many cases a trip from one place to another involves several course changes, requiring a series of route points (waypoints) which you navigate to, one after another.

The sequence of waypoints leading to the ultimate destination is called a **route**. The RP-15 can automatically advance to the next waypoint on a route, so you do not have to change the destination waypoint repeatedly. The figure below shows an example of a route between two ports, involving six waypoints. The waypoint set is shown by .



ROUTE: 01 (△△ PORT/□□ PORT)

Transit Order	Waypoint
1	WPT 06
2	WPT 05
3	WPT 04
4	WPT 03
5	WPT 02
6	WPT 01

Route storage capacity

You can store up to 10 routes. A route may contain up to 30 waypoints.

9.1 Creating Routes

You can create routes three ways:

- by cursor
- by waypoints
- through the route list

Creating routes by the cursor

1. Press [ROUTE SET].
2. Select Cursor.
3. Operate the arrow keys to select route number desired.
4. Press [ENT]. The following message appears.

Move +cursor to desired position and press + key.
To delete wpt, press - key.
Repeat above steps and press ENT to conclude.

5. Place cursor on location desired and press [+]. To delete waypoint, press [-].
6. Repeat step 6 to complete the route.
7. Press [ENT].
8. Press [ROUTE SET] to finish.

Creating routes by waypoints

1. Press [ROUTE SET].
2. Select Wpt no.
3. Press arrow keys to select route number desired.
4. Press [ENT].

Reg. Route (no.01 (in use))

Waypoint List
↑

No.		Comment
01	00°00.000'N 000°00.000'E	ABCDEFGHIJK
02	00°00.000'N 000°00.000'E	9876543210
03	__°__'__"N __°__'__"E	-----
10	__°__'__"N __°__'__"E	-----
99	__°__'__"N __°__'__"E	-----

Select WPT and press + key.
To cancel, press - key.
Repeat above steps and press ENT to conclude.

5. Select waypoint number. Select waypoints by order they will be traversed; not by waypoint number order.

6. Press [+] to register.

Note: You can also input waypoint by pressing numeric keys

7. Press [ENT].

8. Press [ROUTE SET] to finish.

Creating routes through the route list

1. Press [ROUTE SET].

2. Operate arrow keys to select List.

Mode = Cursor WPT no. List			
Speed for TTG = 10.0kt			
(Route List)			
No.	Pts	Total	TTG
01	30	1234.56nm	12345.6H (in use)
02	5	2345.67nm	12345.6H
09	0	0.00nm	_____H
10	0	0.00nm	_____H
Select mode and route no. by using arrow key. Enter : ENT Delete: CLR Escape: MENU			

3. Press arrow keys to select route number.

4. Press [ENT].

5. Press arrow keys to select the route number desired.

Route (no. 01) (in use)			
	WPT	SKIP	Distance TTG
↑	01	--	yes
	02	--	2345.67nm 12345.6H
	03	--	-----nm -----H
	04	--	2345.67nm 12345.6H
	05	--	2345.67nm 12345.6H
	06	--	-----nm -----H
	07	--	-----nm -----H
	08	--	-----nm -----H
	09	--	-----nm -----H
	10	--	-----nm -----H
↓			
Move cursor and enter wpt no.			
Skip : -, No skip : + Delete : CLR Conclude: ENT Escape :MENU			

6. The cursor is at waypoint 01. Enter route waypoint number in order they will be traversed: not waypoint numerical order and press [ENT].

7. The cursor shifts to the SKIP column. This column lets you temporarily skip waypoints in a route. To skip waypoint, press [-] key. To follow waypoint press [+] key.

8. Press [ENT].

9. Repeat steps 6 and 7 to complete route.

10. Press [ROUTE SET] to erase the menu.

Calculation of TTG

The TTG to waypoints is calculated according to speed entered as follows:

1. Press [ROUTE SET].
2. Press [↓] to select SPEED FOR TTG.
3. Enter speed and press [ENT].

9.2 Following a Route

1. Press [GOTO].

2. Operate arrow keys to select Route no.

3. Press [ENT] to display the route list.

Dest. Set			
Route nos. = __			
FWD/REV	=	Forward	Reverse
(Route List)			
No.	Pts	Total	TTG
01	30	1234.56nm	12345.6H (in use)
02	5	2345.67nm	12345.6H
03	0	*999.99nm	*9999.9H
04			
05			
06			
07			
08			
09			
10	0	0.00nm	_____H
Select route and press + key. To cancel selection, press - key. Press ENT to conclude.			

4. Operate arrow keys to select route number.

5. Press [+] to enter. If you enter wrong number, press [-].

Note: You can also enter the route no. by pressing numeric keys.

6. Operate arrow keys to select FORWARD or REVERSE, the direction in which to traverse the waypoints.
7. Press [ENT].
8. Press [GOTO] to finish.

⚠ CAUTION

The route planing function is a very useful and beneficial function to have available. However, the ability to switch waypoints automatically during a voyage can lead to some very dangerous situations. The use of any navigational aid requires constant exercise of common sense and caution.

1. Press [ROUTE SET].
2. Operate arrow keys to select List.
3. Press arrow keys to select route number.
4. Press [ENT].
5. Press arrow keys to place the cursor on the waypoint you want to deselect.
6. Place the cursor in SKIP column corresponding to waypoint selected in step 5.
7. Press [—/—].

9.4 Cancelling Route Navigation

Press [GOTO], [CLR] (or [0]) and [ENT].

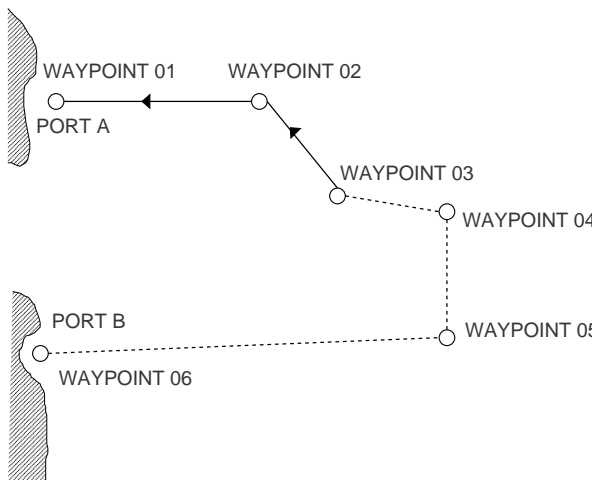
9.5 Deleting Routes

1. Press [ROUTE SET].
2. Press arrow keys to select route number.
3. Press [CLR].
4. Press [ENT].

9.3 Skipping Route Waypoints

A route waypoint may be deselected temporarily on the list. Using the following figure for example, you would want to temporarily deselect route waypoints 04, 05 and 06, since your ship is to traverse the route in the order of route waypoints 03, 02 and 01.

The temporarily deselected route waypoint may be restored at any time by selecting the waypoint to restore and pressing [—/—].



10. Memory, Memory Card Operations

10.1 Selecting Card Slot

1. Press [MENU].
2. Press [1].
3. Press [9] to select Card Slot Select.

1-9. Card Slot Select
Card Slot Select =Left Right
Move cursor by using arrow key and press ENT. Escape: MENU

4. Operate arrow keys to choose Left or Right.
5. Press [ENT].

Note 1: Insert a chart card label side left.

Note 2: The eject buttons are arranged as follows:

Left slot: Upper button
Right slot: Lower button

10.2 Saving Data to a Memory Card

What the memory card can store

You may save data to a memory (RAM) card for storage and later replay. The memory card provides storage for the following:

- Track (own and other)
- Marks/lines (including user-made charts), and
- Waypoints (including routes).

Formatting a memory card

Before you can save information to a memory card you must prepare its surface by formatting it. Formatting is a routine procedure you must perform on new cards before you can use them with this unit. You have to initialize them only once. You can format cards you've used before, however, in which case all prior information on them is erased.

1. Press [MENU] [1].

1. Save Data (R/L Slot)
1. Mark • Line 2. WPT • Route 3. Track (Own Ship) 4. Track (Targets) 5. Initial Setting 6. 7. Delete Card Data 8. Format 9. Card Slot Select
Press numeric key to select item.

2. Press [8] to select FORMAT.
3. Press [ENT]. If the card contains data the following message appears.

Card data will be deleted, Format? Yes: ENT No: MENU
--

4. Press [ENT].

"FORMATTING" appears on the display during formatting. "FORMATTING COMPLETED" appears upon completion of formatting. If the card could not be formatted, "Formatting Failed" appears.

Saving data to memory card

1. Place a formatted memory card in active card slot, label leftward.
2. Press [MENU] [1].
3. Select the item to save;
 - [1] Mark/Line
 - [2] WPT/Route
 - [3] Track (own)
 - [4] Track (other)

The cursor should be on 00 "NEW FILE". This will save data to a new file. You may save data to an existing file name, in which case all previous data on that file will be deleted.

- Assign a file name. The file name may contain up to 32 alphanumeric characters.

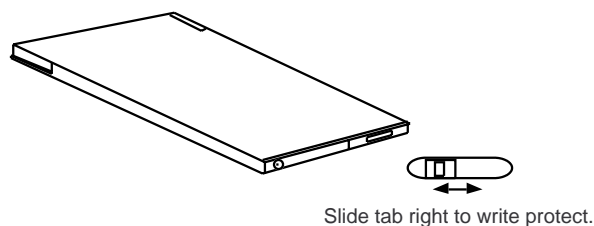
アイウエオ	カキクケコ	サシスセソ	タチツテト	ナニヌネノ
ハヒフヘホ	マミムメモ	ヤユヨ ()	ラリルレロ	ワヲン”
ABCDE	FGHIJ	KLMNO	PQRST	UVWXY
Z, \, !, ?	/ ' = # _	12345	67890	
abcde	fghij	klmno	pqrst	uvwxy
z	アイウエオ	ヤユヨ		

File name example

If you want to enter file name "FURUNO 1", for example, follow the procedure below.

- Place the cursor on "F" by operating the trackball.
 - Press [ENT].
 - Place the cursor on "U".
 - Press [ENT].
 - Enter the characters "R", "U", "N", and "O" and "1" as you did "F" and "U".
 - Place the cursor on "OK".
- Press [ENT]. Then,
 - "SAVING" appears on the display during recording
 - "SAVING COMPLETED" appears upon completion of saving.

Note: The memory card contains a write-protection tab which prevents overwriting of information stored on the card. This prevents accidental erasure of important information. To write protect a memory card, set the write-protection tab rightward as shown in following figure.



10.3 Playing Back Memory Cards

Up to eight files can be played back on the display. Note that marks and track currently displayed are not erased.

- Insert a memory card into active card slot.
- Press [MENU] to display the menu.
- Press [2] to select Display Card Data.

2. Display Card Data		(L Slot)	
00	1234567890123456	(27-MAR-1995)	Disp yes
	7890123456789012	MARK 1234	
02	ABCDEFGHIJKLMN	OP(27-MAR-1995)	no
		TRACK 1234	
06			
(Total no. of files= xx)			
Move cursor: arrow key			
Display : +			
Not display: -			
Register : ENT			
Escape: MENU			

- Press arrow keys to place the cursor on the file you want to display.
 - Press [+] to display "yes".
- Note:** If you select more than eight files to "Display yes", place cursor on unnecessary file and press [-] to display "no".
- Press [ENT].
 - Press [MENU] to erase the menu.

10.4 Deleting Memory Card Files

- Press [MENU] [1] [7] to select Delete Card Data.
- Select file to delete.
- Press [ENT].
- Press [MENU] to finish.

10.5 Loading Memory Cards

It is recommended that this feature be used exclusively for editing card contents.

1. Press [MENU].
2. Press [3] to select Load Data.
3. Select the item you want to playback.
4. Select file.
5. Press [ENT].
6. Press [MENU] to erase the menu.

10.6 Apportioning the Memory

The memory stores a total of 6,000 points of track and marks, and can be apportioned as desired. The default memory setting is 3,000 points each of track and marks.

Note: When the memory apportion setting is changed, all track and marks are erased, even if the previous apportion setting is reentered.

1. Press [MENU].
2. Press [5] to select Apportion Memory.

5. Apportion Memory
Track Memory =3000 pts (Max 6000 pts)
Current Apportion Track: 3000 pts Mark: 3000 pts
CAUTION: Changing memory apportion deletes tracks and marks in memory.
Enter points of track memory, follow by ENT. (Mark Mem. = 6000 -Track Mem.) Escape: MENU

3. Enter no. of points of track to store.
4. Press [ENT].

10.7 Deleting Memory Contents

1. Press [MENU].
2. Press [4] to select Delete Memory.

4. Delete Memory
Delete All Marks = No Yes Own Track = No 30% 50% 80% All Target Track = No 30% 50% 80% All
Mark in use =1234/2000 Own Track in use =1234/4000 TGT Track in use =1234/2000
Move Cursor by using arrow key and press ENT. Escape: MENU

3. Select item to delete; marks, own track, a target mark. For track, select percentage to delete. The following message appears.

Delete?
Yes: ENT No: MENU

4. Press [ENT].

Note: Percentage of item to be deleted is calculated based on the memory capacity set for that item, not the number of items stored. For example, the number of marks used is 500 and the mark memory setting is 2,000 marks. Then, if you were to delete marks by 50%, all marks would be deleted. Check the memory display at the bottom of the menu before deleting data, to ensure important information will not be lost.

11. Other Functions

11.1 Initial Setting Menu

1. Press [MENU].
2. Press [7] to select Initial Setting.

7. Initial Setting	
Smoothing	= 00 (0–15)
External Event	= Off On
Time Difference	= - 09:00
Moving cursor: Arrow key	
Register: ENT	
Escape: MENU	

3. Operate arrow keys to select the item and option desired.
4. Press [ENT].
5. Press [MENU] to finish.

Smoothing

This function smooths out uneven plotting of the trackline plotting due to navaid signal variation. For further details, see page 8.

External Event

Event marks input by a navaid can be shown/hidden on the screen.

Time Difference

Navaid output uses UTC time (world standard time). If you would rather display local time, enter time difference between UTC and local time. If local time is earlier than UTC time enter a minus sign before entering time difference.

11.2 Miscellaneous Menu

1. Press [MENU].
2. Press [8] to select Miscellaneous.

8. Miscellaneous	
Pos. Sensor	=Navaid Manual
Own Ship Pos.	= 00°00.000'N
	= 000°00.000'E
Display All Card Data	
Delete Data (TRK MRK WPT RTE)	
All Delete	
Moving cursor: Arrow key	
Register: ENT	
Escape: MENU	

3. Operate arrow keys to select the item and option desired.
4. Press [ENT].
5. Press [MENU] to finish.

Pos. Sensor

Position data may be input automatically (by navaid) or manually. For manual input, select Manual and enter position.

Display All Card Data

Displays the entire contents of a chart card.

Delete Data

Deletes all track, marks and routes from internal memory.

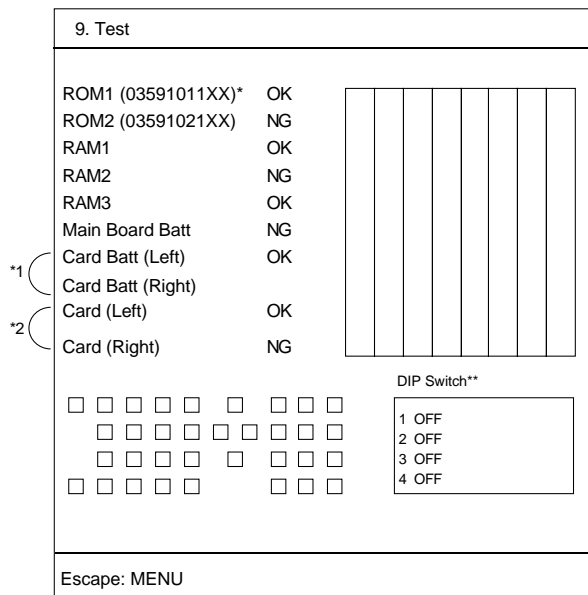
All Delete

Deletes all internal memories and restores default settings.

12. Self-test

The RP-15 has a self-test facility which checks it for proper operation.

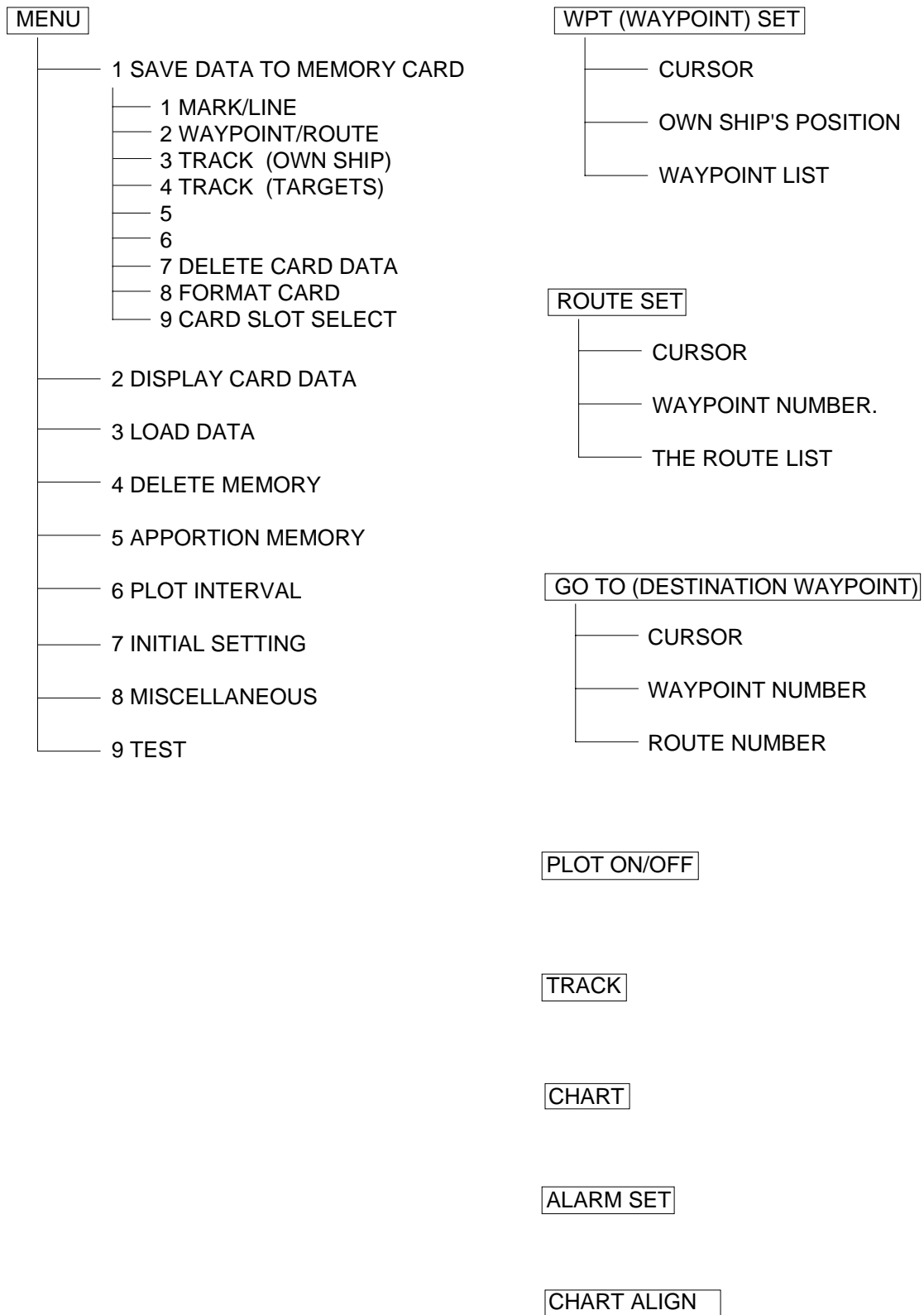
1. Press [MENU].
2. Press [9] to select Test. The test starts automatically.
 - The RP-15 checks ROMs, RAMs, batteries and card drives for proper operation, and displays the results as OK or NG (No Good).
 - The test pattern displays eight levels of monochrome display.
 - The small squares at the bottom of the display are for testing keys on the control panel. Press a key and its corresponding square on the screen is highlighted, indicating the key is functioning properly.
 - DIP switch settings are shown at the bottom right side of the display.
3. Press [MENU] to escape.



*1: Blank when card battery is low or card is inserted.

*2: Ng when card is write protected, no card is inserted, or chart card is inserted.

13. Menu Tree



INSTALLATION

This section describes how to install the RP-15. The installation mainly consists of replacement of ROMs, installation of RP Board and connection of keyboard and navigation equipment. For outline drawings see page 24.

Name	Type	Code no.	Remarks
Video Plotter Kit	RP-15-2E	000-086-480	For FR-1500 MARK2 Series
	RP-15-3E	000-086-482	For FR-8001 Series

Contents of the Video Plotter Kit

	Name	Type	Qty	Remarks
1	Display Modification Kit	RP-15-2E	1 set	For FR-1500 MARK2 Series
		RP-15-3E		For FR-8001 Series
	RP Board	03P9166	1	
	NX-XH Connector	03-1799(4-4P)	1	For power supply
	Plotter Sticker	03-134-9106-0	1	
	Pan Head Screw A	M3x8	6	For fixing RP Board
	Spacer	SQ-10	6	"
	Cable Tie	VJR-3	1	
	Cable Assy.	HIFC6-68D-AA-24-HS	1	
	Cable Clamp	CK-05H	2	
	ROM for SPU Board	ARP-15-2 ARP-15-3	1 set	For FR-1500 MARK2 Series FR-8001 Series
2	Installation Materials	CP03-15400	1 set	
	Tapping Screw	M4X16	4	
	XH Connector	03-1796 (5P)	2	For onnection of navaid
	Keyboard Mounting Plate	03-024-9108-0	1	
3	Keyboard	RP-15-E	1	

Installation Procedure

1) Replace ROMs

Replace ROMs U16 and U57 on the SPU Board (03P9159) in the radar as follows:

FR-1500 Mark 2: U16 (03590771xx)
U57 (03590781xx)

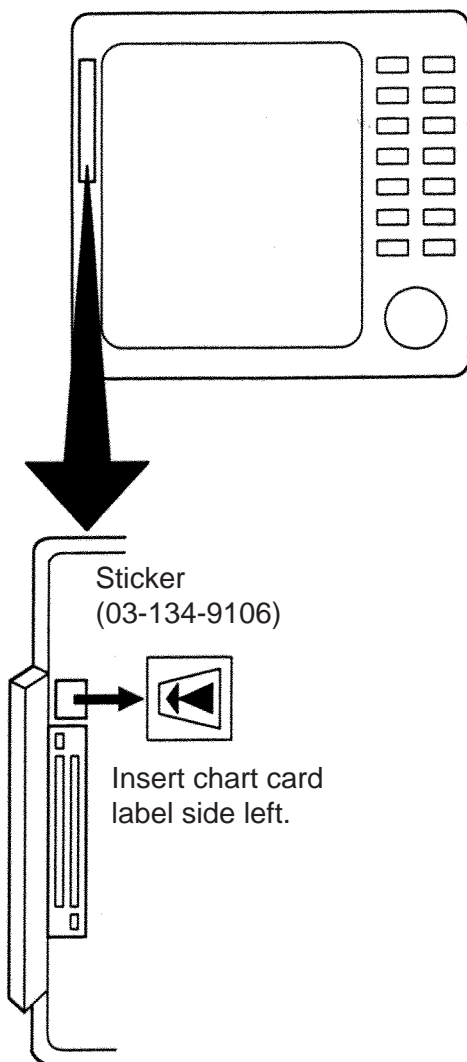
FR-8001 Series: U16 (03590991xx)
U57 (03591001xx)

Note: The RP-15 related picture may not be visible depending on ROM version no. This is because the default RP-15 picture brilliance setting is "0". If this is the case, adjust the RP-15 picture brilliance in the BRILL menu on the radar.

2) Install RP Board

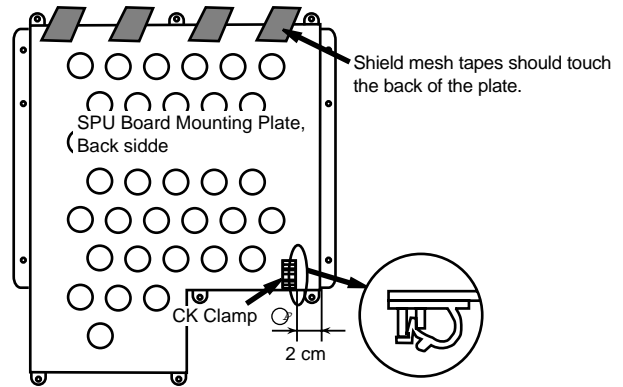
Fix the RP Board on the left-hand side of the display with spacers and screws (supplied).

Attach arrow sticker (03-134-9106-0, 2 pcs., one a spare).

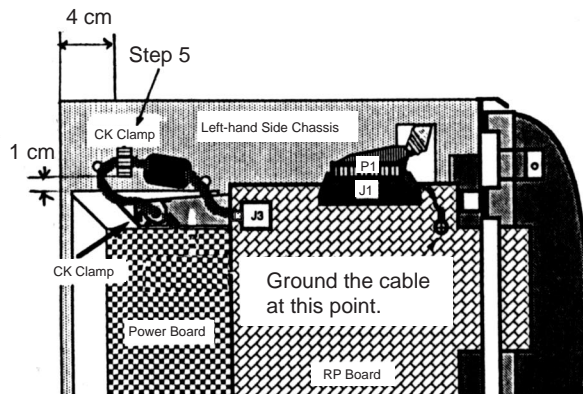
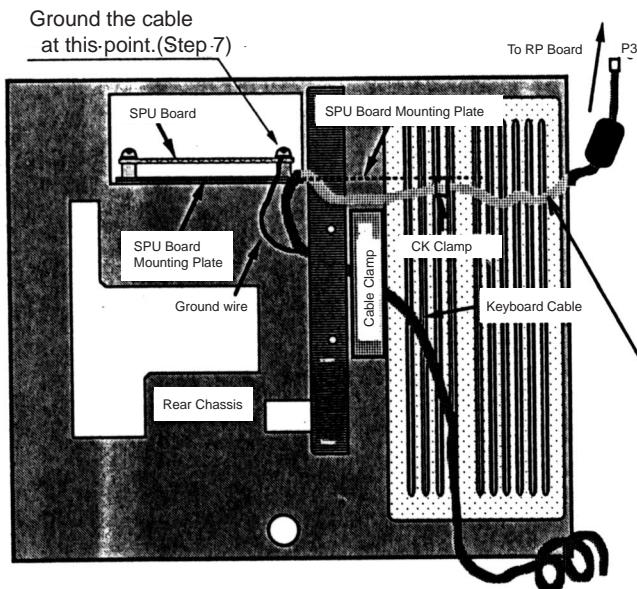


3) Routing Keyboard Cable

1. Remove the display unit cover.
2. Remove the rear chassis cover.
3. Unfasten the screws securing the SPU Board mounting plate.
4. Attach a CK clamp at the back of the SPU Board mounting plate. See figure below.



5. Attach a CK clamp at the left-hand side chassis.
6. Pass the keyboard cable through the cable clamp on the rear chassis, run it under the SPU Board mounting plate, and pull it through the hole on the left-hand side chassis. Fix the cable with CK clamps. (Make sure that the shield mesh tapes touch the SPU Board mounting plate. If they touch the SPU Board, short circuit will result.)



Route the cable beneath the SPU Board mounting plate.

From Keyboard

7. Ground the keyboard cable by using a screw securing SPU Board.

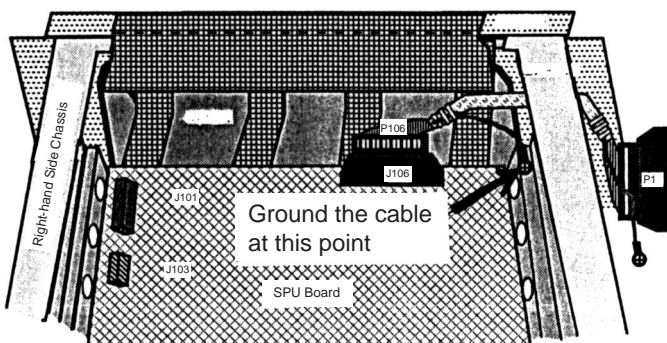
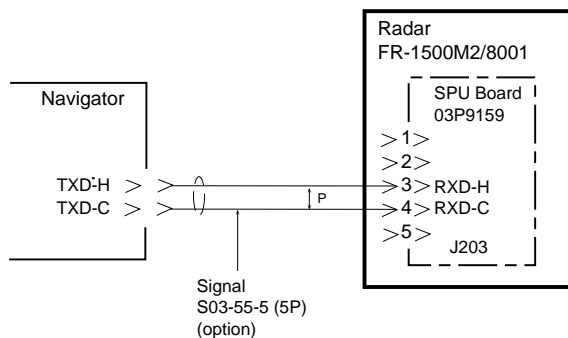
4) Interconnection between SPU and RP Boards

The RP Board is connected to the SPU Board by using the cable supplied. The cable must be grounded at both ends by using the screws securing both the SPU Board mounting plate and the RP Board.

Make sure the cable screen does not touch the SPU Board to prevent short circuit.

6) Connect navigation equipment

Connect the navigation equipment, which provides NMEA 0183 (Ver. 1.5) data output, to the radar display unit as shown in the figure below.



5) Connect keyboard

Connect the keyboard to J3 on RP Board. Secure the ground wire with screw fixing the SPU Board.

SPECIFICATIONS

Display

15-inch rectangular monochrome CRT

Display Mode

Radar, Radar/Video Plotter, Video Plotter

Presentation Mode

Head-up, Cursor gyro*, Course-up, North-up, True Motion
(for FR-1500 MARK2 series)

Display Range

0.125/0.25/0.5/0.75/1/1.5/2/3/4/6/8/12/16/24/
36/48/72/96 (Maximum range depends upon
specification of radar.)

Projection

Mercator

Usable Area

85° latitude or below (70° or below with
FURUNO's land filled chart)

Electronic Chart Card

ROM card

Track

Memory capacity

Own ship: 6,000 points of track and
marks, apportionable
Other ship's track: 2,000 points

Recording interval

Own ship: Time (0 to 60 min.), or Distance
(0 to 9.99 nm)
Other ship: OFF/15sec/30sec/1min/2min/
3min/6min/10min/12min

Marks

Diamond with line, line, diamond, square and
circle

Data Display

Speed, course, water temperature, depth, date,
Own ship's position (L/L or Loran C TD),
cursor position (L/L or range/bearing), range
and bearing to waypoint, range and bearing
from origin mark to cursor

Waypoint

Capacity: 100 points
Entry method: Cursor, own ship's position,
L/L, Waypoint list

Route

Capacity: 10 routes, 30 points/route
Entry method: Cursor, waypoint no., route
list

Destination

Cursor, waypoint no., route no.

Alarm

Arrival/Anchor, Cross track error/Border

Position Correction

Delta L/L entry, Bearing correction

Memory Card Contents

Mark, waypoint, route, track, initial settings

NMEA Input Data

Input	Receive sentence
Date	ZDA
True Heading	HDT>VHW
Magnetic Heading	HDM>VHW
Waypoint	RMB>BWC>BWR
Own Ship Position	RMA>RMC>GLL

NMEA output for Auto pilot

AAM, BOD, VTG, XTE

INDEX

A

Alarms 8

B

Bearing offset 10

C

Chart cards

chart feature as screen center 4

chart scale 2

correcting chart position 9

displaying 4

displaying all data 19

ejecting 4

showing/hiding chart features 5

Comments for waypoints 11

Control description 1

Corrections

bearing 10

cancelling 10

chart position 9

Cursor operations 2

D

Delete

lines 6

marks 6

memory 18

memory card files 17

routes 15

waypoints by cursor 11

waypoints through the waypoint list 11

Destination waypoint

cancelling 12

setting by cursor 12

setting by waypoint number 12

Display selection 2

E

Enter

lines 6

marks (all types) 5

waypoints at own ship's position 11

waypoints by cursor 10

waypoints through the waypoint list 11

External event mark

showing/hiding 19

F

Formatting memory cards 16

G

Grid

showing/hiding 3

I

Icons

chart 5

display 3

Initial settings menu 19

Installation 22

L

Lines

connecting lines with marks 6

deleting 6

entering 6

showing/hiding 6

Loading memory cards 18

M

Marks

deleting 6

entering at own ship's position 5

entering by cursor 5

entering MOB mark 5

entering origin mark 6

showing/hiding 6

Memory

apportioning 18

deleting 18

Memory cards

deleting files 17

formatting 16

loading 18

playing back 17

saving data to 16

Menu operation 3

Menu tree 21

Miscellaneous menu 19

MOB mark 5

N

Navaid selection 19

O

Origin mark 6

P

Plot interval 7

Presentation mode 2

R

Routes

- cancelling route navigation 15
- creating by waypoints 13
- creating through the route list 14
- deleting 15
- entering by cursor 13
- following (route navigation) 14
- skipping waypoints 15

S

- Self-test 20
- Smoothing 8

T

- Time difference (using local time) 19

Track

- plot interval 7
- showing/hiding own, other 8
- smoothing 8
- stopping/starting track plotting 7

W

Waypoints

- cancelling destination waypoint 12
- deleting by cursor 11
- deleting through the waypoint list 11
- entering comments 11
- entering at own ship's position 11
- entering by cursor 10
- entering through the waypoint list 11
- setting destination waypoint by cursor 12
- setting destination waypoint by waypoint number 12
- showing/hiding 11