

NUCLEUS 2 DISPLAYS – OPERATING INSTRUCTIONS

Introduction

The NUCLEUS Display facilities are all selected by three pushbuttons and a trackerball, which controls the movement of a screen cursor.

Trackerball, Cursor and Pushbuttons

The trackerball is used to position the cursor near to, or on, the function to be activated and to change parameters once a function is activated.

The cursor is shown as a marker (+) inside the radar display area and an arrow (↑) outside the radar display area. When a function is activated, by pushbutton selection, the cursor is repositioned on the selected function (inside the radar display area) as a box (□).

Pushbuttons are used to activate/select a particular function. On-screen guidance as to which button to press is given in the Press button Selection Boxes located in the lower centre portion of the display.

When a function is activated (e.g. Range/Rings) the Pushbutton Selection box displays similar data to that in the pop-down (information) boxes which appear below the selected function box. Alternatively a red box appears on the display containing the legend.

A facility, which has been previously activated, such as EBL, is reselected by positioning the cursor in close proximity to the required facility and pressing the centre pushbutton.

Power ON/OFF and Screen Illumination

The display is switched on by the ON/OFF switch, located on the left-hand front of the display console. The adjustment of Day/Night brilliance, contrast, levels and Audio alarm levels are available upon selection of the CRT box, displayed in the bottom right-hand of the screen. At any time, pressing all 3 pushbuttons simultaneously increases the CRT brilliance and contrast.

Degauss

Colour tones on raster type displays may be adversely affected by changing magnetic fields. If the colour is degrading, press the DEGAUSS pushbutton, located on the right-hand front of the display console, to restore the display to normal.

Colours

Display Colours

The display colours are divided into three main groups as follows:

- inside and Outside the Radar circle;
- inside the Radar circle only;
- the Radar colours.

Inside and Outside the Radar Circle

The colours used Inside and Outside the RADAR circle are:

- Grey/Blue – Screen Background;
- Red – Warnings;
- Green – Cursor/Measure;
- Navy Blue – Box background;
- Grey – Pop-down box background;
- Cyan – Bearing scale, bottom/right box outline & pop-down box outline;
- Royal Blue – Highlight box;
- White – Text & top/left outline of box.

Inside the Radar Circle Only

The colours used Inside the Radar circle only are:

- Blue – Radar background;
- Red -Way Points, Electronic Bearing Line 2 & Variable Range Marker 2;
- Green – Heading Line, Electronic Bearing Line 1 & Variable Range Marker;
- Dark Grey – Cal rings;
- Yellow;
- Cyan – Ownship Vector;
- Magenta – Plots;
- White.

The Radar Colours

The colours used for Radar returns are:

- Sepia – Dim (weak) or for Tracking Gate;
- Ochre – Medium or for ARPA Guard Ring;
- Yellow – Strong;
- Dark Grey – Old trails;
- Medium Grey – Medium trails;
- Light Grey – New trails.

Day/Night Operation

The Background colour of the Display Screen and Radar Circle change to Black when Night operation is selected. All other colours are darkened.

Functions

See Fig. 14.

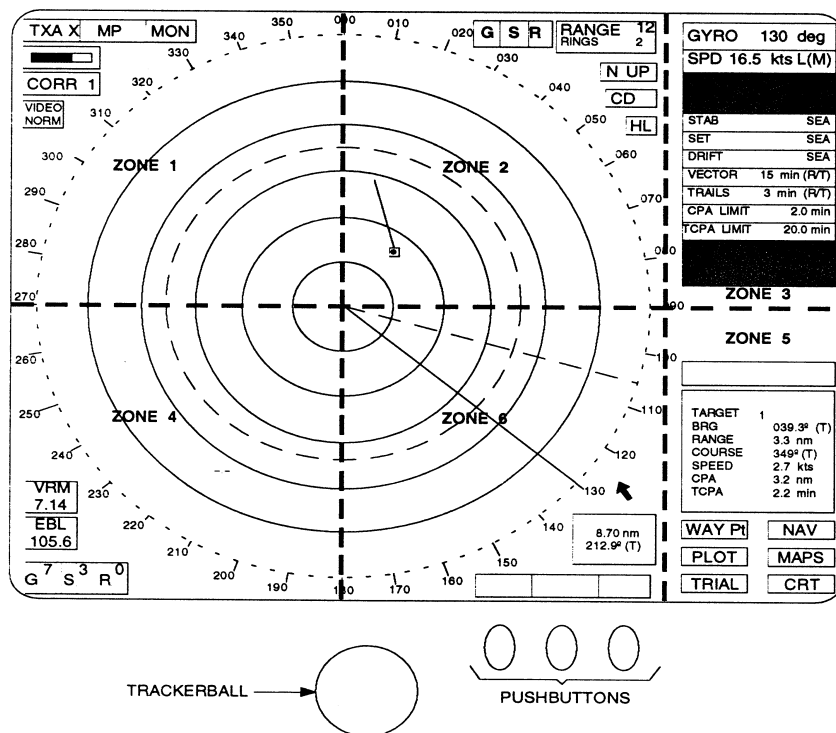


Fig. 14 Display zones

Zone 1 – Radar System

- Standby, Run;
- Selection of the Radar System;
- Short, Medium, Long Pulse;
- Tuning of the selected Radar & Performance Monitor;
- Correlation & Interference Rejection;
- Enhancement of Radar Signals & Sector Scan.

Zone 2 – Screen Mode of Operation

- Range and Rings;
- Relative Motion;
- True Motion (Optional);
- Centre Mode Display (Optional);
- North Up;
- Course Up;
- Head Up;
- Heading Line.

Note: An Offcentre Facility is also selectable.

Zone 3 – Ownship and Plotting Parameters

- Ownship Parameters;
- Plotting Parameters;
- Trail Parameters.

Zone 4 – VRM, EBL and Signal Controls

- Variable Range Marker;
- Electronic Bearing Line;
- Gain Setting;
- Sea Setting;
- Rain Setting.

Zone 5 – Data and Menus

- Target Data Information;
- Menus for CRT Facilities, MAPS, TRAIL and PLOT.

Zone 6 – Cursor Control and Mode

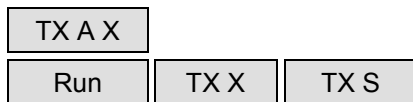
- Pushbutton Selection;
- Cursor Readout Mode.

ZONE 1 – Radar System

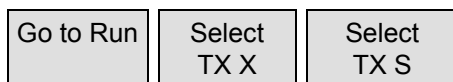
Radar System a Standby/Run

Function

Run



The screen contains a set of instruction boxes as follows:

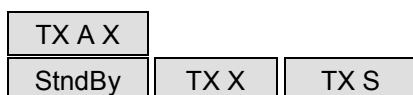


The selected radar information is displayed on the screen and all functions are available for selection.

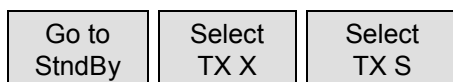
Standby

To change the operational state of the system from Run to Standby, highlight the TX box and press the left pushbutton.

The screen contains a set of instruction boxes as follows:



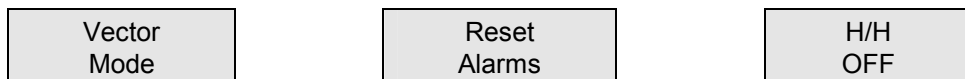
The display reverts to the standby condition, no radar is displayed.



Cursor Positioning and Initial Pushbutton Facilities after Selecting RUN

The cursor defaults to a particular position and the initial Pushbutton Selection is different depending upon whether GO TO RUN is selected after switching the system ON or selecting RUN, for the second time, via the standby screen.

If the cursor is outside the radar circle, after 30 seconds of trackerball/pushbutton inactivity, the cursor defaults to the park position (set on installation) and the pushbutton selection boxes show:



After selecting GO TO RUN from the standby screen, the cursor is positioned in the centre of the radar circle and the pushbutton selection boxes show:



Short Pulse/Medium Pulse/Long Pulse (Master Only)

Function

The following pulse lengths are automatically activated, for the master radar only, when the following range scales are selected:

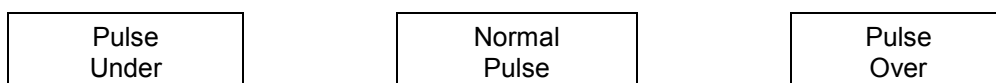
- Short Pulse (SP) – 0.25nm to 1.5nm ranges;
- Medium Pulse (MP) – 3nm to 24nm ranges;
- Long Pulse (LP) – 48nm and 96nm ranges.

Note: An underide & override facility exists to manually change the pulse length from the standard setting set in the Default menu, refer to the front of the handbook.

Selection

To select a pulse length setting:

- highlight the SP/MP/LP box, a pop-down box displays the options that may be selected for that specific range (i.e. for the 3nm range the box displays SP/MP/LP and the pushbutton selection box duplicates the pop-down box);
- the pushbutton selection box for the 3nm range, allows the standard selection of medium pulse to be changed to either short or long pulse, and displays:



- press the appropriate pushbutton.

Note:

1. If SLAVE Radars are selected the SP/MP/LP box reads SLAVE (no change of Pulse Length is possible).
2. If the Pulse Length is not normal for the range selected, the SP/LP/MP box is outlined in Red, indicating that underide or override is in use.
3. If the Pulse Length is changed downwards i.e. long to medium, the Trails are automatically cleared.

Video Correlation & Interference Rejection

Function

Signal correlation is used to reduce radar interference (CORR 1) and to reduce clutter (CORR 2). Three levels of correlation are available:

- CORR 0 – Correlation is switched off, returns are displayed as raw radar;
- CORR 1 – The Interference Rejection facility only is switched ON. Consecutive transmissions are compared and only signals present on both transmissions are painted. Interference from other radars is suppressed and Receiver noise reduced;
- CORR 2 – Signal correlation reduces random clutter returns and preserves radar signals that correlate (are present) for two successive scans of the antenna. Targets that do not paint consistently are displayed at the medium echo colour if one scan is missed, at the weak echo colour if two paints are missed and not at all if more than two scans are missed. Interference Rejection is also switched ON. Receiver noise is further reduced.

Note: If CORR2 is selected on short pulse and/or a low range scale, the CORR2 box outline flashes. This is to warn the user that small targets with a fast relative speed may not correlate and therefore may be suppressed to a lower level paint.

Selection

To select Video Correlation and/or Interference Rejection, carry out the following:

- highlight the CORR box; 0,1,2 pop-down boxes are displayed beneath;
 - press the appropriate pushbutton for the correlation and/or the interference rejection required.
- a. CORR 0=Scan to Scan Correlation and Interference Rejection OFF.
 - b. CORR 1=Interference Rejection ON only.
 - c. CORR 2=Scan to Scan Correlation and Interference Rejection ON.

Note: Fast ships generate high relative target speeds that reduces target correlation. A faster scanner should be fitted to improve the target update rate.

A target that stays in the same position, or overlaps on two consecutive scans correlates (Target A). A target with high relative speed on a low range scale that does not overlap on two consecutive scans paints at a lower intensity level (Target B). A longer pulse length improves correlation, but close targets moving at a high tangential speed may still not correlate.

Tuning

Function

Allows manual tuning of the Radar Receiver (MASTER Radars Only). The Tune function is not available and is not shown on Slave displays and has only limited effect on systems with Automatic Frequency Control.

Selection

To manually tune the RADAR, carry out the following:

- highlight the TUNE box;
- to tune the RADAR, hold down any pushbutton, a red control bar appears beneath the green tune bar showing the position of the control;
- move the trackerball in the East/West axis to optimise the tuning, the red control bar moves from side to side as the tuning is changed. The green tune bar shows maximum when the RADAR is on tune. Release the pushbutton.

Note: To ensure that the AFC function in the Receiver operates correctly, the red TUNE control bar indication is to be set to mid position. If the AFC has failed to operate on manual tuning, selection is achieved by adjusting the trackerball east/west movement for optimum “Tune” bar indication.

To Detune, to Display SART Responses Only

To detune the Receiver, to display SART responses only, carry out Sub-paragraphs 35(1), (2), (3) but move the trackerball to achieve minimum on the green tune bar.

Boost

Function

Boost enhances radar signals by stretching the size of strong video signal returns (in range). The facility may only be selected on the 6nm or greater range scales. To reduce clutter enhancement, targets within 1.5nm of ownship are not boosted.

Selection

To select the Boost function, carry out the following:

- highlight the VIDEO NORM (BOOST) box; the pop-down box reads BOOST;
- select by pressing any pushbutton.

Note: In excessive sea clutter or precipitation, Boost may reduce target visibility. A combination of longer pulse length, adjusting SEA/RAIN and CORR 2 produces better target visibility.

ZONE 2 – Screen Mode of Operation

Range & Rings

Function

1. Range.

The displayed range may be changed from 0.25nm to 96nm in fixed range steps, 0.25nm, 0.5nm, 0.75nm and then doubling up to 96nm.

2. Rings.

Range rings may be displayed for each range selected, scaled according to the range in use. Three rings are displayed on the 0.75nm range, five on the 0.25nm and 0.5nm ranges and six on the 1.5nm to 96nm ranges.

Range Selection

To change the displayed range, listed below, carry out the following:

- highlight the RANGE/RINGS box; pop-down boxes are displayed beneath the RANGE/RINGS box;
- press the pushbuttons, left for down and right for up, until the required range is displayed in the RANGBRINGS box.

Note: The range is incremented in steps; 0.25nm, 0.5nm, 0.75nm, 1.5nm, 3.0nm, 6.0nm(normal default value), 12.0nm, 24nm, 48nm and 96nm.

<u>Range Scale</u>	<u>Range Ring Separation</u>	<u>No. of Rings</u>
0.25	0.05	5
0.5	0.1	5
0.75	0.25	3
1.5	0.25	6
3.0	0.5	6
6.0	1.0	6
12.0	2.0	6
24.0	4.0	6
48.0	8.0	6
96.0	16.0	6

Rings Selection

To turn RINGS ON/OFF (number displayed is dependent on range selected) carry out the following:

Select RANGE/RINGS as above and then press the centre pushbutton (the pushbutton acts as a switch i.e. ON or OFF).

PPI Modes & Presentation

Function

The following PPI Mode selections are available for display types:

Modes

- Relative Motion;
- True Motion.

Presentation

- Head Up;
- North Up;
- Course Up.

Note: In all modes and presentations, the Heading Line (HL) indicates the heading of ownship.

Relative Motion

The display is in a Relative Motion mode with the PPI positioned in the centre of the radar screen area, or to any offset position. All targets move relative to ownships course and speed. Targets have relative past trails, but ownship has no trail.

If ownship changes course or yaws, target direction changes by the same angle. Any target on a collision course is on a constant bearing with a decreasing range. Targets appearing stationary are on a parallel course in the same direction and travelling at the same speed as ownship.

True Motion

The display is in a True Motion mode with ownship positioned offcentre and moves in a direction of the Heading Line (HL) at a true speed, nominally through the centre of the display. All targets move on screen with true courses, speed and target trails.

Ownship course changes do not affect target directions, but the HL reflects the change in course. Any targets on a collision course are on a constant bearing with a decreasing range. As in Relative Motion, ownship may be moved by trackerball when Offset by using the trackerball, selecting ownship, moving the cursor and pressing offset.

Head Up

This display always presents a Relative Motion PPI picture aligned so that the Ship's Head, as indicated by the HL, is 0 degrees on the bearing scale. When ownship changes course the PPI rotates by an equal, and opposite amount, to that of the Ship's Head.

While on a steady course, stationary targets move towards the lower part of the screen at an equivalent rate to ownship's speed. Targets that have the same course and speed as L ownship appear stationary. All other targets move with a speed and direction determined by a resultant of own and ownship's movement.

Note: Head Up is not available in True Motion.

North Up

North Up is a compass stabilised presentation that may be selected in Relative Motion, True Motion modes. The PPI picture is aligned so that north is always at the top of the screen (000 degrees bearing scale). The HL indicates ownship's heading.

In Relative Motion, ownship is at a fixed position on the screen, centred or offcentred, and target movements are relative to ownship's course and speed. Targets on a parallel course and at the same speed appear as stationary, while fixed targets produce trails, which represent the reciprocal of own ship's ground track.

Course Up

Course Up is a compass stabilised presentation, available in all modes, with the ship's heading aligned to 000 degrees on the bearing scale at the time that the mode is selected. Subsequent alterations in course result in the HL deviating from 000 degrees, but the picture does not rotate. The ship's HL is course stabilised such that if ownship yaws, targets maintain direction. The ship's HL may be updated at any time by further selecting Course Up, whereby the picture realigns on the new heading.

Relative Motion/True Motion/Centred Display Mode Selection

To select Relative Motion, True Motion carry out the following:

- highlight the RM/TM box; RM/TM pop-down boxes are displayed beneath;
- press the appropriate pushbutton.

North Up/CourseUp/Head Up Selection

To select North, Course or Head Up, carry out the following:

- highlight the N/C/H UP box; N UP/C UP/H UP pop-down boxes are displayed beneath;
- press the appropriate pushbutton.

Offcentre

Function

The Offcentre facility enables the operator to offset the Radar picture in any direction up to 70% (except on the 96nm range). The offcentre may be used in any PPI mode; Relative or True Motion or Centred Display.

Selection

To select the offcentre facility; first ensure that no other function is selected, then carry out the following:

- position the cursor at the Radar origin;
- press the centre pushbutton, a highlighted box appears just above the pushbutton selection box, indicating:

CENTRE
SELECTED

- the pushbutton selection box displays the following:

RESET
CANCEL
OFFSET

- to CANCEL the function, press the centre pushbutton;
- to Offset the Radar origin position the cursor, using the trackerball, at the required location and press the right-hand pushbutton;
- pressing the left-hand pushbutton, RESET, moves the Radar origin to the centre of the screen in Relative Motion or Centred Display modes and to the maximum “Look Ahead” position in True Motion mode.

ZONE 3 – Ownship and Plotting Parameters

Ownship, Plotting and Trail Data

Function – Gyro

The Gyro heading is normally manually set to the reading taken from the ship’s Gyro Repeater.

Selection – Gyro

To change the Gyro Compass reading:

- highlight the GYRO box;
- press and hold down simultaneously the left and right pushbuttons, adjust the reading by moving the trackerball in the North/South axis. At the correct setting, release the two pushbuttons.

Function – Speed

The normal displayed speed is ship’s speed taken from one of two sources; ownship’s LOG or manually (MAN) input speeds. A single axis log or manual speed input will give speed relative to sea. A doppler log (X-Y axis) will give speed over the sea bed.

Selection – Speed

To change the Speed (Manual):

- highlight the SPD box; the pop-down box reads Log, Man, Dop (if Doppler connected, Blank if Doppler not connected).

Note: If speed is ownship LOG, press centre pushbutton to select Manual.

- press and hold down the centre pushbutton, adjust the speed by moving the trackerball in the North/South axis.

To change the Speed input (Doppler):

- press the right-hand pushbutton to select Doppler;
- if speed input is always Doppler Log save this setting in the “Default Settings”, refer to Commissioning Section.

Note: SPD box has annotation W or G to indicate Water or Ground speed.

Function – Stabilisation

Sea Stabilisation

Sea stabilisation gives the correct heading and speed through the water. No set and drift information is used (no drift or set/rate). It provides an excellent display for Coastal Navigation, Pilotage and Anti Collision. The true trails of targets give an indication of their apparent true motion.

A single axis log (or manual speed input) and gyro; provide sensor data for the stabilisation.

Ground Stabilisation

The correct heading and log speed of ownship are fed in, together with an input from tide, rate and direction.

A known stationary target (i.e. land fixed target) appears to move in an opposite direction to that of the set current. The tide set (drift direction) can be adjusted to ground stabilise the targets.

Note: A known stationary target should not show any movement providing there is no error in the ground stabilisation.

The tide or drift set and rate provide an additional vector, which when added to ship's movement in water, generates a vector representing Course Made Good (CMG) and Speed Made Good (SMG).

The display can be ground stabilised by interfacing to a position fixing equipment (e.g. GPS*) or by a dual axis Doppler Log, or by manual drift input or on ARPA displays, using a fixed target. Not possible in BSH-Version.

The ground stabilised True Motion display can be very useful for pilotage, when it is important to know ownship's and other ships' courses made good over ground in relation to land. buoys and beacons.

Note:

1. Course Made Good and Speed Made Good boxes are for information only.
2. If the external position fixing system no longer sends information, then display automatically reverts to SEA Stabilisation (not possible in BSH-Version).

Selection – Stabilisation

The Stabilisation Input may be selected as follows:

- position the cursor, using the trackerball, inside the STAB box, the box is now highlighted and the pop-down box reads Sea, Man, Extrn*.

Note: Reads Extrn, GPS, LORAN or DECCA dependent on NAV System source. (Note possible in BSH-Version).

- select the required input by pressing the appropriate pushbutton.

Note:

1. If Sea is selected then CMG and SMG boxes have – in the information boxes, as NO drift is set.
2. If Doppler Log and Sea Stabilisation are selected CMG, SMG, Set and Drift numbers are shown in the information boxes.

Function – Drift Inputs

Set (Manual)

Provided to counteract the effects of tide and wind, and entered by manually input SET.

Drift (Manual)

Provided to counteract the effects of tide and wind, and entered by manually input DRIFT.

Selection – Drift Inputs

To adjust the Manual drift inputs, Set and Drift:

- highlight the SET or DRIFT box as required;
- press and hold down any pushbutton, adjust the parameter by moving the trackerball in the North/South axis.

Note: If EXT (GPS, BECCA, LORAN etc.) is selected the parameters are automatically updated (not possible in BSH-Version).

Function

1. Trails.

The previous track of targets (either True or Relative) are displayed as trails. The length of the trails may be changed (i.e. three minutes is the normal default value) or may be switched OFF.

2. Vector.

The vector indicates the predicted direction and speed of the tracked targets (either True or Relative). The vector is shown as a solid line, proportional to the speed of the target (i.e. with a 15 minute vector selected, a target speed of 12kts produces a vector line length of three miles). The vector may be also be shown in reverse mode i.e. True vector in Relative Motion or Relative vector in True motion.

3. Closest Point of Approach Limit.

This function warns the operator that a target is approaching within the designated area and that evasive action is to be taken. The CPA limit is selected and then adjusted to suit the manoeuvrability of the Ship and the prevailing conditions.

Note: He alarm only activates if both the CPA and TCPA limits are equalled or broken.

Time to Closest Point of Approach Limit

This function provides a warning to the operator that a target may, within a certain time, cause possible danger if avoiding action is not taken. The TCPA may be selected and then adjusted as for the CPA.

Note: The alarm only activates if both the CPA and TCPA limits are equalled or broken.

Selection

The following parameters are adjusted in a similar manner by selecting the appropriate box and then holding down the left-hand pushbutton and moving the trackerball North/South until the new parameter is reached.

Vectors (VECT min(R or T))	1min to 30min, in steps of 1 minute
Trails (TRAILS min(R or T))	0.75, 1.5, 3 to 99min in 3min steps
Closest Point of Approach (CPA LIM nm)	0.1nm to 6nm, in 0.1nm steps
Time for Closest Point of Approach (TCPA LIM min)	1min to 60min, in 1min steps

With VECTOR selected, pressing the centre pushbutton changes the mode i.e. R to T or T to R. The right pushbutton returns the vector time to its previous setting. If the centre pushbutton is held down for more than 2 seconds the R or T mode is permanently selected and the VECTOR box is outlined in red. The warning box immediately appears on release of the pushbutton to inform the operator that the vector mode is reversed i.e. True vector is displayed in Relative Motion and vice versa. To revert to normal vectors press the centre pushbutton (note that the red outline is removed).

Note: If the “Motion” mode is changed, the Vector mode automatically reverts to normal operation.

With TRAILS selected, pressing the centre pushbutton switches the trails ON/ OFF. The right pushbutton clears all trails.

With either CPA or TCPA selected, the centre pushbutton sets the minimum limit and the right pushbutton the maximum limit.

Note:

1. If no change is made within 30 seconds, the system is deactivated and the cursor is placed in the default position.
2. LAT and LONG boxes are for information only.

Cursor Readout about Mode

Function

To select the information mode when the cursor is inside the Radar circle.

Selection

To change the type of cursor information:

- highlight the “Cursor Readout Mode” box; the pop-down boxes read R/B, TCPA;
- the Pushbutton Selection box displays:

Range/
Bearing

Time
To CPA

- select the required information.

Note: TCPA is the time taken for the ship to reach the closest point of approach, assuming that the ship’s speed is maintained and that it maintains its present course.

8.70 nm 212.9° (TM)

The Cursor Readout Mode box displays the following if No Navigation System is Present:

8.70 nm 212.9° (TM) 054°37.65 N 010°14.67 W

Measure

To measure the distance and bearing between two points inside the radar circle (the first point must NOT be a selected function):

- position the cursor at the first point;
- press and hold down the centre pushbutton and move the cursor to the second point. The Cursor Readout box displays the distance and bearing relative to the first point;
- the Cursor Readout box returns to normal when the centre pushbutton is released.

ZONE 4 – VRM, EBL, AXD SIGXAL Controls

Variable Range Marker

Function

The Variable Range Markers (VRM1 and VRM2) are used to measure the ranges of targets from ownship. When selected, the VRMs are displayed as circles – Green for VRM1 and Red for VRM2, the diameters of which are altered by use of the trackerball. The range of the last selected VRM is displayed in a box, outlined in Green for VRM1 or Red for VRM2, located in the lower left-hand corner of the screen.

Selection

To initially select a Variable Range Marker (VRM) facility, carry out the following:

- highlight the VRM box;
- press any pushbutton;
- the VRM function (VRM1 or VRM2) is now selected and the trackerball is repositioned as a box on the VRM at centre range of the selected range;
- to set the VRM, initially set the 50% of the range in use, to the desired range use the trackerball in the required axis. The range read-out is displayed within the VRM box and is in nautical miles for all ranges;
- to deselect the VRM facility, once the required setting is achieved, press the centre pushbutton;
- if both VRM1 and VRM2 are switched ON, pressing the centre pushbutton displays the range of the other VRM i.e. if outline of VRM box is Green (VRM1) the range for VRM2 is displayed;

VRM 1 ON/OFF

Display VRM

VRM 2 ON/OFF

- to switch OFF the VRM facility, position the cursor inside the VRM box (the VRM box is highlighted) and press any pushbutton.

Note: To reselect the VRM facility, once activated, position the cursor near to the VRM and press the centre pushbutton.

Electronic Bearing Line

Function

The Electronic Bearing Lines (EBL1 or EBL2) are used to measure the bearings of targets from ownship, either in True or Relative mode. When selected, the EBLs are displayed as lines, Green for EBL1 and Red for EBL2, originating from ownship to the outer edge of the Radar display. The lines are rotated by use of the trackerball and the bearing is displayed in a L box, outlined in Green for EBL1 and Red for EBL2, located in the lower left-hand corner of the screen. (Refer to NAV MENU for details regarding the Curved EBL.

Mobile EBL (offset EBL)

The EBLs may be offset and used to measure the bearings of targets from a point on the screen other than ownship.

Dual Movement of the VRM/EBL

The VRM and EBL may be selected to move simultaneously to enable the combined measurement of range and bearing of an echo from ownship. If the EBL is offset, the facility is used to measure the distance and bearing of one target with respect to another.

EBL Selection

The Electronic Bearing Line (EBL) facility, only requires to be selected once, to select an EBL carry out the following:

Highlight the EBL box, press any pushbutton.

The pushbutton selection box displays the following:



- the EBL function is now selected;
- to align an EBL on the required bearing, initially set on the heading line, use the trackerball. The bearing of the last selected EBL is displayed within the EBL box.

Note: A plot may still be entered (with EBL centred) by pressing the left-hand pushbutton, positioning the cursor over the plot and pressing the left-hand pushbutton again.

- if both EBL1 and EBL2 are switched ON, pressing the centre pushbutton displays the bearing of the other EBL i.e. if outline of EBL box is Green (EBL1) the bearing for EBL2 is displayed;
- to deselect the EBL facility, once the required bearing is achieved, press the centre pushbutton;
- to switch OFF the EBL facility, position the cursor inside the EBL box (the EBL box is highlighted) and then press any pushbutton.

Note: For RESELECT THE EBL FACILITY, ONCE ACTIVATED, Position The Cursor Near To The EBL And Press The Centre Pushbutton.

Mobile EBL Selection

To use the Mobile EBL, place the trackerball near to the EBL, press the centre pushbutton and then press the right hand pushbutton selecting Mobile EBL, the following may then be carried out:

- the origin of the EBL is automatically positioned on the cursor symbol within the display and the trackerball may then be used to offset the EBL;
- pressing the right-hand pushbutton fixes the EBL in the trackerball position (the EBL legend changes to EBL0) and allows free movement of the cursor, with the EBL still selected;
- pressing the right hand pushbutton again reselects Mobile EBL;
- to return to normal EBL press the left hand pushbutton which puts the EBL origin at the centre of the display and deselects the EBL;
- to deselect the Mobile EBL, press the centre pushbutton.

Dual Movement of the VRM/EBL (Centred on Ownship)

The dual movement of the VRM and EBL is possible as follows:

- position the cursor over the intersection of the VRM/EBL (strobe marker, only displayed when both VRM/EBL activated) and press the centre pushbutton;
- the VRM/EBL may now be moved by using the trackerball;
- to deselect the dual movement, once the required range and bearing is achieved, press the centre pushbutton.

Dual Movement of the VRM/EBL (OFFSET)

This facility is used to measure the distance between two targets/points.

If the EBL is offset, a strobe marks the relative position of the VRM, the following facility is then available:

- position the cursor over the strobe marker;
- use the trackerball to move the EBL, note that the VRM moves in relation to the strobe marker;
- to deselect the facility, press the centre pushbutton.

Gain, Sea, Rain

Function

When Gain, Sea or Rain adjustments are made, care is to be taken as maladjustment of the settings may result in the loss of weak or close range targets.

Gain

The Gain adjustment sets the signal threshold of Radar signals displayed on the screen. The GAIN is to be advanced until an even "speckled" background is just visible on the screen, with the "Correlator" switched OFF (CORR 0).

If the setting is too high, a poor quality picture masked by excessive noise results; if set too low, it results in a loss of weak targets and a reduction in the detection range.

In conditions of high precipitation (rain, hail or snow) a reduction of the GAIN level reduces clutter and produces a clearer picture.

The GAIN level may be set from 0 (low) to 9 (high), with a typical operational level of between 6 and 8.

ATTENTION!

Do not set too high a level as excess noise on the screen degrades the picture quality.

Sea (STC)

The SEA (STC) is a manual adjustment that reduces sea clutter returns. Maximum attenuation takes place at zero range, decreasing until no reduction of signals or clutter occurs at a maximum range of about 6 miles.

Advancing the SEA setting progressively reduces the near range clutter. The SEA level may be set from 0 (min) to 9 (max) with a typical operational level of 3 to 5 (medium pulse). Less SEA is to be applied on short pulse, more on long pulse. Always set the SEA (STC) level with “Correlation” OFF or on CORR 1 (CORR 2 causes a delay before the adjustment becomes visible).

The correct setting for SEA under any given weather condition is only obtained by experience. If a setting is too high, it may result in the loss of close range targets. NEVER set the SEA control to clear ALL clutter, but leave a light speckle of sea returns to indicate optimum sensitivity within the clutter field. Reduction of the remaining clutter may be reduced by using the “Correlator” in the CORR 2 mode (scan to scan correlation).

ATTENTION!

When not in use the SEA clutter control is always to be set to 0.

Note:

1. Pulse length affects the setting, i.e. a shorter pulse length requires a lower setting.
2. Set to provide a compromise between reducing sea clutter and retaining targets.

Sea (Auto)

The AUTO facility provides the automatic suppression of clutter. Radar signals are smoothed to generate a dynamic threshold to ride over the clutter returns, yet preserve valid target signals. The AUTO level may be finely adjusted with the GAIN level.

The AUTO mode operates efficiently in open sea and in estuaries, though some land detail may be suppressed (leading edges are preserved). RACON responses may be reduced, but at least part of the response is normally visible.

The AUTO facility may be used with CORR 2 to further reduce clutter.

Rain (FTC)

The RAIN adjustment reduces clutter from rain, snow and hail. The function uses the received radar signals to produce a threshold reference level. The RAIN control moves the threshold reference level so as to apply more or less attenuation to the radar signal.

The RAIN facility also provides attenuation of sea clutter, though RACON responses are likely to be suppressed. The RAIN level may be set from 0 (min to 9 max) with typical operating level of 3 to 5.

ATTENTION!

When not in use the RAIN control is always to be set to 0.

The RAIN setting is to be adjusted to preserve small targets. It is often beneficial to reduce the GAIN setting slightly to optimise target detection in high precipitation.

The use of S-Band radar is advantageous in very high precipitation conditions.

Note: The RAIN facility also improves short range resolution.

Selection

To set or change the Gain, Sea or Rain settings, carry out the following:

- highlight either of the G/S/R boxes, located at the lower left-hand or top right-hand of the display;
- press and hold down the appropriate pushbutton, left for GAIN, centre for SEA or right for RAIN. Move the trackerball, in the North/South axis, until the required setting is achieved and then release the pushbutton. Rapid movement of the trackerball, when reducing the Gain or increasing the Sea/ Rain settings, clears the Trails.

Note: The selected box (G/S/R) changes from Blue to Black for identification.

- to deselect the G/S/R facility, move the cursor away from the G/S/R box.

Auto Sea Clutter

To set the SEA function to Auto (A):

- select the SEA facility as above and then rapidly rotate the trackerball in the South axis until "A" appears in the box. Note that target trails are cleared as AUTO is selected; this is to remove clutter build up in the trails;
- to deselect Auto, rapidly rotate the trackerball in the North axis.

Heading Line**Function**

This function allows temporary removal of the Heading Line (HL) and all graphics from the Radar display. The operator is then presented with a clear picture to enable targets to be more visible, particularly those on the HL or other screen graphics.

Selection

To suppress the Heading Line, carry out the following:

- highlight the HL box;
- press and hold down any pushbutton to remove all graphics from the display i.e. Heading Line, maps, rings, etc.

Note: All radar signals remain displayed.

- release the pushbutton to return the display to normal.

E-PLOT 3 Plotting Controls

Note: A warning box is displayed for 5 seconds if, after the selection of BSH Type Approval, a target is not updated for 5 minutes. The message in the red box warns that the target is to be deleted in 1 minute.

To plot a single target and obtain target data proceed as follows:

- position the cursor over the target, press the ENTER PLOT pushbutton (left-hand) a plot symbol [•] appears over the target position. Release the ENTER PLOT pushbutton;
- target data, other than Range and Bearing, are not available until the initial plot has been updated. The equipment accepts an update after a minimum time of 1 second;
- to update the plot, accurately position the cursor over the [•] symbol of the target, press the SELECT pushbutton (centre), the [•] symbol flashes to acknowledge selection. Now reposition the cursor over the present position of the target and press the ENTER PLOT pushbutton, a vector is generated representative of the target course and speed. Release the ENTER PLOT pushbutton.

Note: Vectors are relative if in the Relative Motion mode and true if in the True Motion mode.

- further plots on the target are made by repeating sub-paragraph (3) above. The previous plot symbols and vector flash to acknowledge selection. Reposition the cursor over the present target position and press ENTER PLOT, the previous vector disappears and a new vector is generated;
- if the vector deviates from the target track, reposition the cursor to select the target and press the ENTER PLOT pushbutton;
- every two minutes the older plot symbols are depicted by smaller plot symbols, the sixth plot entered automatically deletes the oldest and smallest plot so that each target has a vector, vector footprint and four past position plots;
- to display target data, position the cursor on or near to the vector origin and press the SELECT pushbutton. The plot symbols and vector flash, target data is displayed in the TARGET box on the right-hand side of the screen.

Note: Following the selection of SELECT or TARGET DATA, the target vector and plot symbols will flash. Careful selection of the pushbutton functions is advised as the options are: CANCEL ENTRY, ENTER PLOT or DELETE PLOT.

- the vector presentation mode may be reversed by pressing and holding the VECTOR MODE pushbutton, to display true vectors when the equipment is in the Relative Motion or Centred Display mode and relative vectors when the equipment is in the True Motion mode.

Note: Releasing the VECTOR MODE pushbutton allows the vectors to return to the normal mode.

Any change between Relative or True Motion and Head Up or North Up does not result in any loss of plots. Vectors and History correspond to the motion selected.

Plotting Additional Targets

Up to 20 targets may be plotted on the display at the same time. When selected and plotted targets are numerically labelled (on demand only) for ease of recognition. To plot additional targets first ensure that no other target, map line or symbol are selected, then proceed as follows:

- position the cursor over the initial target and press the ENTER PLOT pushbutton, a plot symbol [•] appears over the target position;
- position the cursor over the 2nd target, press the ENTER PLOT, a plot symbol [•] appears over the 2nd target position. Move the cursor to the next target.

Note:

1. When two or more targets are close to one another, careful selection of the correct plot is required.
2. If difficulty is experienced, and the wrong plot is selected, position the cursor over the symbol for the correct plot and press the SELECT pushbutton, the symbol/vector flashes. Now move the cursor over the new position of the target, press the ENTER PLOT pushbutton, the new vector is now generated.

Deleting Plots

To delete plots proceed as follows:

- targets selected in error may be deselected provided the ENTER PLOT has not been pressed. Press the SELECT pushbutton to correct the error;
- the vector and past positions of any one target may be deleted by positioning the cursor on the vector origin, pressing the SELECT pushbutton and then pressing the DELETE pushbutton.

Vector Time

The default or initial value of vectors is 15 minutes (divided into three minute intervals). The length of the vector is proportional to the length of the target, e.g. target speed of 12 knots=vector length of three nautical miles.

The vector time may be changed between 1 and 30 minutes by selecting the VECTOR function and then operating the trackerball in the vertical plane to increase or decrease the time shown next to VECTOR in the pop-down box. Press the centre pushbutton to confirm the change.

Note: ARPA Plotting is described in **Chapter 3**.

ZONE 5 – Data and Menus

Target Data

Function

Data concerning a selected target may be displayed in the TARGET box. The data for plotted targets using E-PLOT 3 is as follows:

- Target Number (automatically allocated);
- Bearing (True or Relative);
- Range;
- Course & Speed (True);
- Closest Point of Approach (CPA) & Time to Closest Point of Approach (TCPA) or Bow Crossing Range (BCR) & Bow Crossing Time (BCT).

E-PLOT 3 tracking is available out to the maximum range of 96nm.

Selection

To display data in the TARGET box, carry out the following:

- position the cursor over the selected target to be tracked and press the centre pushbutton (Select).

The elapsed time is calculated between successive target returns and a vector generated on the display to represent the projected course and speed of the target.

Target information appears in the TARGET box as follows:

TARGET 1		Target Number
BEARING	056° (T)	Bearing ((T) or (R))
RANGE	3.3 nm	Range in nautical miles
COURSE	349° (T)	Course in degrees
SPEED	2.7 kts	Speed in knots
CPA or BCR	3.2 nm	Closest Point of Approach (nautical miles) or Bow Crossing Range
TCPA or BCT	2.2 min	Time of Closest Point of Approach (minutes) or Bow Crossing Time

To cancel a target, carry out the following:

- position the cursor close to the selected target and press the centre pushbutton, then press the right-hand pushbutton.

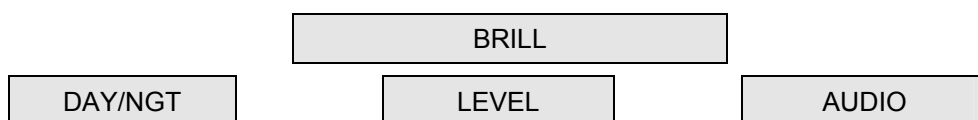
CRT Menu

Selection

To select the CRT Facility menu proceed as follows:

- highlight the CRT box. Press any pushbutton;
- the Menu boxes are replaced with function selection boxes. CRT Facilities Menu shown below:

Contrast and Brilliance Adjustment



To adjust either the contrast or brilliance:

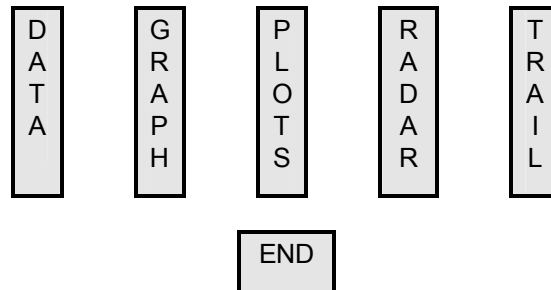
- position the cursor in the appropriate box, the box is now highlighted;
- press and hold down any pushbutton while moving the trackerball in the East/West axis.

Note: To increase Contrast and Brilliance, without entering CRT Menu, simultaneously press and hold down all three pushbuttons.

Levels

To alter the levels:

- highlight the LEVEL box;
- press any pushbutton, the CRT Facilities menu is replaced with function selection boxes as shown:



- highlight the appropriate box;
- press and hold down any pushbutton and then move the trackerball in the North/South axis to set the level as required;
- to exit the Levels menu and return to the CRT Facilities menu, highlight the END box and press any pushbutton;
- to exit the CRT menu move the cursor inside the radar circle.

Day/Night Selection

To select day or night illumination:

- highlight the DAY/NGT box;
- press any pushbutton to select either Day/Night.

Audio

To select the Audio facility (for Alarms):

- highlight the AUDIO box;
- press any pushbutton to change the Audio ON/OFF.

Menu Deselection

To deselect the CRT menu, position the cursor in the radar circle.

Plot Menu

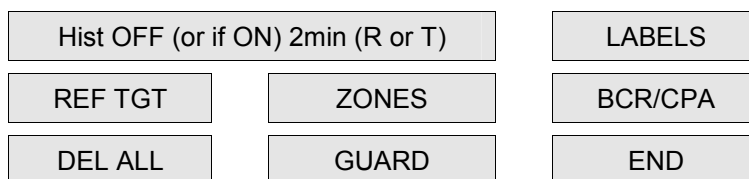
Function

Provides a selection of functions; History ON/OFF, i.e. when “ON” shows previous four plot positions; Guard ring functions i.e. switching ON/OFF and setting Variable ring range and bearing; Deleting all plots and Selecting Bow Crossing Range (BCR) or Closest Point of Approach (CPA), and Labels allowing up to twenty targets to be labelled numerically. The menu also contains END to EXIT the PLOT menu.

Selection

To select the Plot menu, carry out the following:

- highlight the PLOT box and press any pushbutton. The Plot menu boxes appear in the lower right-hand corner of the screen as shown below (6000R & T):



- to change the ON/OFF state of the History facility, highlight the [HISTORY] box and press any pushbutton;
- to operate the Reference Target function, select a target on the Radar screen, highlight the REF TGT box, the Pushbutton Selection box displays: Fix, Unfix. Press the appropriate pushbutton to Fix (Unfix) the selected target. An “F” appears on the selected target and the Drift Input changes to “Fixed Target”;
- to delete all plots, Highlight the DEL ALL box. Press any pushbutton to delete all plots. Warning box displayed; PRESS ANY KEY TO CONFIRM;
- to change Target Data information as follows:
 - highlight the BCR/CPA box;
 - press any pushbutton to change the state of selection:
 - CPA/TCPA is replaced with
 - BCR/BCT readings in the ranges of -99.9 to+99.9 nm
 - 99.9 to+99.9min
- to enable the Labels facility: position the cursor over the LABELS box and operate any pushbutton. The box outline highlights in red – the LABELS facility is enabled. To disable this facility position the cursor over the LABELS box and operate any pushbutton;
- to leave the Plot menu, highlight the END box and press any pushbutton.

Guard Zones

Two Guard Zone rings are available, one a Fixed Ring and the other a Variable Ring, each ring is preset to 0.5nm or 1.0nm wide. The guard zones operate by directly “Searching” the screen for targets inside the zones. When in use, the following points are to be remembered:

- radar Controls GAIN/SEA/RAIN, Correlation, Pulse Lengths and Video Enhance affect the amount of video on the screen and may be used to enhance the “Searching” of the zones;
- if the range in use is less than the guard zones range then the zones do not operate until the range is increased;
- the Operator must note that “WHAT HE SEES ON THE SCREEN IS WHAT THE GUARD ZONES SEE”.

Fixed Ring

The Fixed Ring guard zone is preset between 4.0nm and 4.5nm.

To activate the Fixed and Variable Ring guard zones, select the function in the PLOT menu, the Fixed Ring guard zone appears on the screen at 4.0nm to 4.5nm, scaled to the range in use.

Note:

1. Subsequent operation of the pushbutton turns the Fixed Ring guard zone off and the guard zone ring disappears from the screen.
2. Targets are acquired and tracked with a symbol when the Guard Zone is activated, further tracking is to be carried out manually by means of SELECT and ENTER PLOT for each acquired symbol on 5000 & 6000R&T displays.

Variable Ring

Activation of the Variable Ring guard zone is automatic when the Fixed guard ring is turned on. The Variable Ring guard zone appears on the screen at the default initialisation range of 6nm to 6.5nm, scaled to the range in use.

The Variable Ring guard zone may be positioned to any range from 5nm out to 96nm.

To change the Variable guard ring range, move the trackerball to anywhere on the ring (not at the ends) and press the SELECT pushbutton. Movement of the trackerball then changes the range. Pressing SELECT again fixes the new range.

Ring Limits

The port and starboard bearing limits of both the Fixed and Variable guard zones default to 45° relative to ownships heading line.

To change the bearing limits, carry out the following:

- select the PLOT menu and Guard function;
- move the trackerball to the either end of the Variable guard ring (i.e. port or starboard) and press the SELECT pushbutton;
- move the trackerball to increase or decrease the angle. Minimum port limit 5° Maximum starboard limit 180° from ship's head;
- press SELECT pushbutton to enter the new value;
- to de-activate the Variable guard ring press SELECT, position the trackerball anywhere on the ring and then press the right-hand pushbutton.

Trial Menu

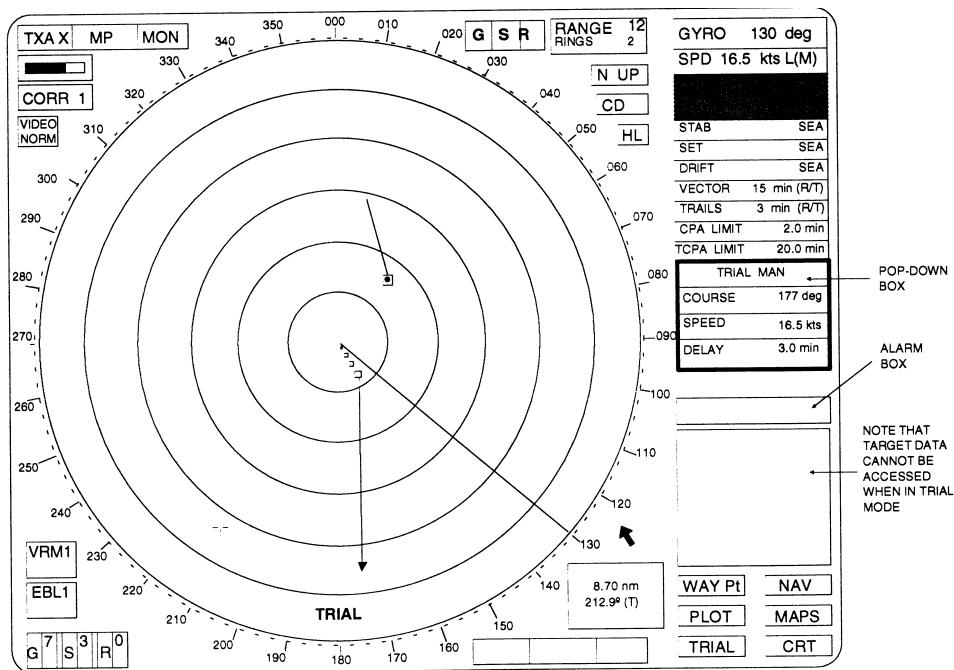


Fig. 15 Example of Trial Manoeuvre Screen

Function

Provides a graphic display of the consequences of an intended change of course or speed of ownship to be assessed in advance, or avoiding action be planned, when a potential collision exists.

Selection

ATTENTION!

Before selecting the trial manoeuvre function, target vectors should be set to relative so that the results of an intended course/speed change may be assessed more accurately.

To select the Trial Manoeuvre menu, carry out the following:

- highlight the TRIAL box and press any pushbutton;
- the CPA/TCPA boxes are replaced as shown below.

TRIAL MANOEUVRE

COURSE kts	} For Information Only
SPEED DEG	
DELAY min	

- the cursor is automatically placed in the TRIAL MANOEUVRE box and the pop-up boxes and the Pushbutton Selection box [3] contain the following:

Adjust Course	Adjust Speed	Adjust Delay	} ARPA Only

- after selecting GO TO RUN from the standby screen, the cursor is positioned;

- if the course/speed/delay requires adjustment, the implications of the changes can be viewed quickly on the display as other target vectors show their new directions relative to ownship.

Note: The delay (ARPA) provides a means of delaying the result of the Trial/Manoeuvre for the stipulated period.

- to adjust the course, speed or delay, press the appropriate pushbutton and move the trackerball until the required figure is obtained;
- to exit the Trial Manoeuvre facility, highlight the TRIAL box and press any pushbutton. For True Motion the Trial Manoeuvre facility may be exited by moving the cursor, using the trackerball, to the radar circle.

Note: The Trial Manoeuvre facility times out as set by the delay.

NAV Menu

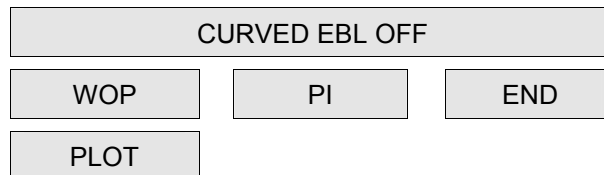
Function

The NAV (Navigation) menu provides access to the following facilities:

- Curved EBL on/off (not available in this simulator version);
- Wheel over Points – WOP (not available in this simulator version);
- Parallel Index – PI;
- Plot;
- CRT – to adjust daytime/nocturnal brilliance, contrast, light and acoustic alarm levels.

Selection

To select the navigation menu, position the cursor over the [NAV] box and operate any of the pushbuttons. The following option boxes are displayed:



Curved EBL

Function

An Electronic Bearing Line that graphically displays the rate of turn/radius of turn that the vessel will take to effect a new course. The turn shown will include the ship's forwarding distance.

Selection

To enable the Curved EBL, position the cursor over the [CURVED EBL] box and press any of the three control buttons.

To set the Radius of Turn or Rate of Turn, position the cursor over the required box, press any of the buttons and while maintaining pressure on the button rotate the trackerball. Refer to the Commissioning Chapter for the Curved EBL (EBL 2) setup.

Wheel Over Point

Function

To mark the point at which the wheel is turned, in order to monitor the vessel's progress around a controlled turn.

Selection

As soon as the autopilot has been commanded to turn onto the new course, position the cursor over the VYOP box and press any of the control buttons. As the button is pressed the EBL becomes sea stabilised and progress of the vessel around the turn can be monitored by comparing the preset position with the curved EBL lines. The WOP function is automatically cancelled when the gyro heading is within 3 degrees of the curved EBL bearing. It can also be cancelled any time by pressing the WOP O function again. The WOP box is highlighted in red when active.

Parallel Index

Function

To enable the operator to use Parallel Lines (P.I.) as an aid to entering hazardous areas (e.g. estuary), the system provides four independent lines.

Selection

To select a P.I.:

Highlight the PI box, the following appears in the Pushbutton Selection box:

- press the left-hand pushbutton a single dotted line appears on the display with the cursor in mid position on the line. The Cursor Readout box reads the range of the line to ownship and the relative direction of the line;
- movement of the trackerball adjusts the range only, pressing the centre pushbutton deselects the cursor from the line;
- pressing and holding down the left-hand pushbutton allows adjustment of the bearing only. Releasing the pushbutton deselects the cursor from the line;
- to select a second line, highlight the PI box, the following appears in the Pushbutton Selection box;
- press the left-hand pushbutton a second single dotted line, parallel to the first line, appears on the display with the cursor in mid position on the second line. Movement of the second line is independent of the first line but is controlled in the same manner as the first line;
- four lines are selectable, each line selected appears on the display parallel to the last produced line. Each line is independent;
- selecting a line and pressing the right-hand pushbutton deletes that line.

Plot

The Plot facility is exactly the same as that described earlier in this chapter, it is duplicated in the NAV menu for operator convenience.

MAP Menu

Map and Waypoint Positioning – the facility is provided to display both maps and waypoints in one of two projections: True or Relative. The operator is to ensure that the projection mode for both maps and waypoints is set as required prior to using this facility.

Function

Maps are either created by drawing, using the Scratch Pad Facility, or optionally (if fitted) loaded via the Map Directory from the Nav Card. Relative maps are used as Navigation lines. True maps are effectively used for highlighting features taken from the navigation charts ie navigation buoys, lighthouses and depth contours.

Note: When creating a new map ensure that the correct type of map, True or Relative, is selected for the application required. Map types cannot be changed once saved.

Three possible feature types are available for each map:

- 1. Lines
 - 2. Circles
 - 3. Symbols – a selection of 16 Symbols may be placed in one of four colours.
- } lines and circles may be drawn in one of four colors and one of four styles.

Selection

To select the Maps function proceed as follows:

- 1. Highlight the MAPS box; press any pushbutton.

Note: If a Navigation Card is not installed the Maps Directory box shows:

NO NAV CARD

- 2. The Menu boxes are replaced with a Map Directory box, refer to Fig. below.
- 3. To draw a new map, follow the instructions under “Creating a New Map”.
- 4. To display a previously saved map, follow the instructions under “Loading a Map”.

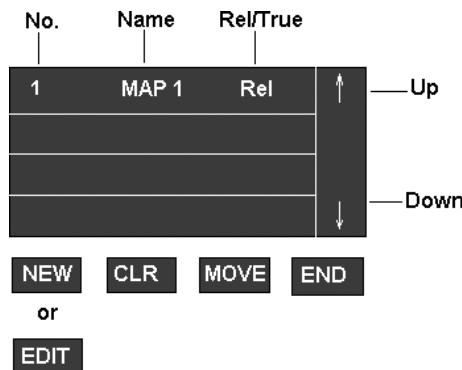


Fig. 16 Map Directory Box

Note: May only MOVE True Maps. If the map is moved the box is outlined in Red.

- 5. The Pushbutton Selection box displays:

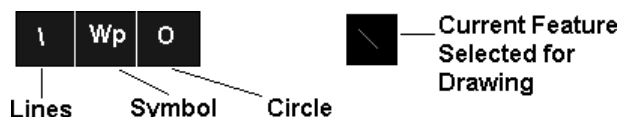


Fig. 17 Load Map

Creating a New Map

To create a map, carry out the following:

1. Position the cursor, using the trackerball, in the NEW box. The Pushbutton Selection box allows selection of a True or Relative map, irrespective of the motion mode selected.
2. The map edit mode shown below now appears, this is the only mode that allows selection and alteration to map features:



Line Drawing

1. If the Current Feature selected is not the Type, Style or Colour required, position the cursor in the Lines box. The Pushbutton Selection box allows selection of Line Style (centre pushbutton) and colour (right pushbutton). The left-hand pushbutton is used to select the type of Line.
2. Selection of the Line style produces the following menu, position the cursor on the required selection and press any pushbutton.



3. Select the Colour, by pressing the right-hand pushbutton, the following menu appears, position the cursor on the required colour and press any pushbutton:

Note: If a feature is to be placed at a designated Lat/Long coordinate, select the CURSOR function box and change to LAT/LONG. Place the feature at the required Radar display position using the Lat/Long readout.

4. Move the cursor into the Radar display drawing area and press the left-hand pushbutton to start the line.
5. Using the trackerball, draw the line in the direction required until the required distance is reached, press the right-hand pushbutton to complete the line.

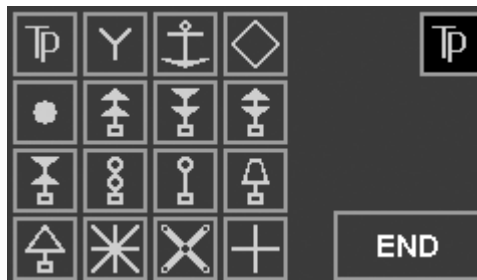
Note: If a series of connected lines is to be drawn, press the left-hand pushbutton to end the previous line and to start the new line.

6. To change the line types and colours repeat Sub-paragraphs 1 to 5.

Symbol Placement

To place a Symbol:

1. If the Current Feature selected is not the Type, Style or Colour required, position the cursor in the Symbol box. The Pushbutton Selection box allows selection of Symbol Style (centre pushbutton) and colour (right pushbutton). The left pushbutton is used to restore the previously selected Symbol Type.
2. Selection of the Symbol style produces the following menu, position the cursor on the required selection and press any pushbutton.



3. Symbol colours are selected in the same way as for Lines.

Note: If a feature is to be placed at a designated Lat/Long coordinate, select the CURSOR function box and change to LAT/LONG. Place the feature at the required Radar display position using the Lat/Long readout.

4. Using the trackerball, position the Symbol in the required position and press the left-hand pushbutton.
5. If the symbol is incorrectly positioned, reselect the symbol by positioning the cursor over the symbol and pressing the centre pushbutton. To delete the selected symbol press the right-hand pushbutton.

Drawing a Circle

To draw a circle:

1. If the Current Feature selected is not the Type, Style or Colour required, position the cursor in the Circle box. The Pushbutton Selection box allows selection of Circle Style (centre pushbutton) and colour (right pushbutton). The left pushbutton is used to restore the previously selected Circle Type.
2. Selection of the Circle style produces the following menu, position the cursor on the required selection and press any pushbutton.



3. Circle colours are selected in the same way as for Lines.

Note: If a feature is to be placed at a designated Lat/Long coordinate, select the CURSOR function box and change to LAT/LONG. Place the feature at the required Radar display position using the Lat/Long readout.

4. Move the cursor into the Radar display drawing area and press the left-hand pushbutton to start the Circle.

5. Using the trackerball, draw the circle to the required size, press the left-hand pushbutton to complete the circle.
6. To delete the circle, select by positioning the cursor on the outside of the circle and press the centre pushbutton and then the right-hand pushbutton.

Loading a Map

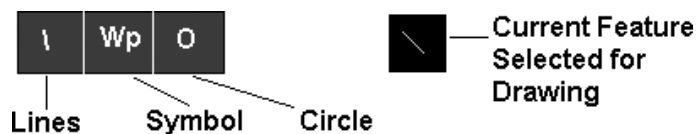
To load a map proceed as follows:

1. Scroll the map selection by positioning the cursor on the Up or Down arrow (located on the right-hand side of the Map Directory box) and then press and hold down any pushbutton and rotate in North/South axis until the required map appears.
2. Position the cursor inside the Map Directory box on the map required, the map is now highlighted, and then press the left-hand pushbutton.
3. The map is automatically loaded and displayed on screen and may be edited. The highlighted map colour now changes to indicate the selected map.
4. To return to normal operation, position the cursor using the trackerball, in the END box or simply move the cursor into the radar circle.

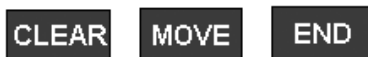
Editing a Map

To edit a map proceed as follows:

1. Position the cursor in the EDIT box and press any pushbutton.
2. The Directory box changes to the following:



** May only MOVE True Maps*



3. Position the cursor in the function required, the function is highlighted and displayed in the Selected Function box.
4. The Pushbutton Selection box now displays:



Note: The left-hand pushbutton selection box reflects the function selected ie Line, Symbol (e.g. Waypoint), Circle.

5. Select the required feature by pressing the appropriate pushbutton:
 - SELECT LINE – to draw lines on the map;
 - SELECT SYMBOL – to place a symbol eg waypoint on the Map;
 - SELECT CIRCLE – to draw circles on the Map;
 - CHANGE STYLE – allows different symbols (16) to be drawn on the Map, or changes type of line or circle ie solid, dashed or dotted;
 - SELECT COLOUR – when selected the Directory shows the different colours available for each function selected. The colour selected is also shown in the Selected Function box.

6. The following facilities are also available:
 - move – allows the map to be moved around the screen, eg to correct for GPS positioning errors. Position the cursor in the MOVE box, the box is highlighted. Press and hold down any pushbutton and move the map to the new location by using the trackerball;
 - clear – clears the screen of the selected map (reload if required again). Position the cursor in the CLEAR box, the box is highlighted, press any pushbutton.

7. When all editing is completed, position the cursor in the END box and press any pushbutton. The Directory reappears.

Saving a Map

Position the cursor, using the trackerball, on the MAP No under which the map is to be saved. Press the centre pushbutton to save the map, the following warning box is displayed:

SAVING MAP

Note: If the Map is already in the Directory, the warning box displays the message
CLICK AGAIN NOW TO CONFIRM ACTION.

Deleting a Map

Position the cursor, using the trackerball, on the MAP No to be deleted. Press the right-hand pushbutton, the map is now deleted.

CRT Menu

The CRT Menu is exactly the same as that described earlier in this chapter, it is duplicated in the NAV menu for operator convenience.