

USING THE COCKPIT PLOTTER #61

The **Cockpit Plotter #61** is the latest advance in accurate, rapid plotting of courses, bearings or positions on maps or marine and aircraft charts.

The **Cockpit Plotter #61** can be used on all scales of charts or maps and even on charts that are folded with no compass rose visible. It can be used on small navigation stations or even on your lap in a yacht or aircraft cockpit.

- Plot a bearing, course or line of position
- Plot a reciprocal course or bearing
- Determine a direction: course or bearing
- Transfer a course or bearing (parallel ruler)
- Plot your position from 2 or 3 bearings
- Plot your position from horizontal sextant angles

THE INSTRUMENT:

Place the plotter in front of you with the *frosted side up* and the arrow headed away from you. With the frosted side up all printing will be legible. The 'Red' scale of numbers showing directions reads anti-clockwise and the *other* scale of numbers reads clockwise. There is a small hole at the centre of the plotter for quick positioning on the chart or map. The left and right edges are the *Ruler Edges*.

The use of this plotter is made easier by the use of a clear plastic ruler 7" to 12" in length (depending on the size of charts and navigation desk or table used).

The plotter can be used alone for plotting of courses, bearings, etc. or may be used with the ruler for extremely quick and accurate plotting of course and bearing lines and to transfer them to other locations on the chart. These instructions are based on the use of a ruler in conjunction with the plotter.

You may make notes or draw lines on the frosted side with a pencil for temporary use and erase them later.

FINDING A COURSE IS AS EASY AS 1-2-3

You are close to a buoy, pier or a previously plotted fix and **you need to know the course** to some destination:

1. Firmly hold a ruler on the chart with one edge between your present location and the destination.
2. Place the plotter, frosted side up, with either *Ruler Edge* against the ruler with the arrow (*red*) on the plotter pointed toward your destination.
3. Slide the plotter along the ruler until the centre hole of the plotter is on a printed meridian of longitude.

You now read the **true course** from the 'Red' scale of the plotter where the meridian of longitude intersects the *upper* edge of the plotter.

FINDING A COURSE – Example

(see Fig. 1)

Determine true course from Pt. Migley to Parker Reef:

1. Place straight edge between Pt. Migley and Parker Reef.
2. Slide ruler edge of plotter along straight edge so the boat is pointing in general direction from Migley to Parker and the centre hole of the plotter lies on any meridian of longitude.
3. Read true course on 'Red' scale of plotter at the intersection (similar to reading the compass on your boat).

Result: True Course is 255°

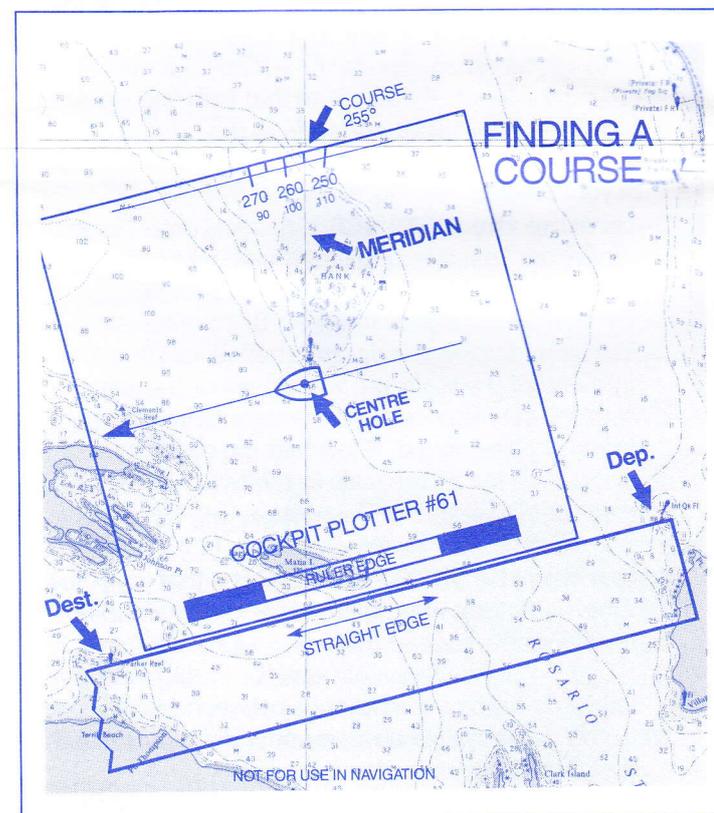


Fig. 1

PLOTTING A DR COURSE IS AS EASY AS 1-2-3

You are at a known position close to a buoy or previously plotted fix or DR and **you need to plot your DR course(s) and your DR position:**

1. Place the centre hole of the plotter on any meridian and rotate the plotter about the centre hole until your true course appears on the 'Red' scale of the plotter where the meridian intersects the *upper* edge of the plotter.
2. Move the plotter so that one *Ruler Edge* of the plotter touches the known position. *Maintain the orientation of the plotter* by sliding it along the ruler placed against any plotter edge.
3. Draw a line from the known position along the *Ruler Edge* of the plotter in the direction that the boat points.

You have plotted your DR course and position.

PLOTTING A DR COURSE – Example (see Fig. 2)

Plot a DR Course of 050° and the DR position 3 miles from Clements Reef.

(Assume: 30 minutes of travel at 6 knots)

1. Place plotter on any convenient meridian of longitude so that centre hole is on the meridian.
2. Rotate the plotter around a pencil until the course is read on the 'Red' scale at the meridian on the *upper* side of the plotter.
3. Slide the plotter along the straight edge until either ruler edge passes through the departure. Draw the course line along that ruler edge. Complete the plot in the traditional manner.

**Result: DR Lat 48° 48.6' N
Lo 122° 49.9' W**

PLOTTING A BEARING IS AS EASY AS 1-2-3

You need to plot a bearing that you have taken on a buoy or other aid to navigation:

1. Place the centre hole of the plotter on any meridian and rotate the plotter about the centre hole until your true bearing *toward* the aid appears on the 'Red' scale of the plotter where the meridian intersects the *upper* edge of the plotter.
2. Move the plotter so that one *Ruler Edge* of the plotter touches the aid. Maintain the orientation of the plotter by sliding it along the ruler placed against any plotter edge.
3. Draw a line toward the aid along the *Ruler Edge* of the plotter.

PLOTTING A POSITION (FIX) IS AS EASY AS 1-2-3

2-Bearing Fix:

1. Draw the bearing of one of the two objects on the chart per instructions "Plotting a bearing is as easy as 1-2-3".
2. Draw the bearing of the other of the two objects on the chart in a similar manner.
3. **Your FIX (position) is at the intersection of the two bearings (lines of position).**

PLOTTING A FIX – Example

(see Fig. 2)

Plot a FIX assuming:

- True bearing on Alden Bank F1 – 300°
- True bearing on Puffin I. Lt. – 230°

1. Place plotter centre hole on any meridian and rotate it until 300° on 'Red' scale is on meridian and the 'boat' is pointing in the direction of Alden Bank.
2. Slide plotter along straight edge until ruler edge of the plotter passes through Alden Bank buoy.
3. Draw the line of position (LOP) along this ruler edge.

Repeat the above operation for the true bearing on Puffin I. Light.

**Result: Fix Lat 48° 45.9' N
Lo 122° 46.5' W**

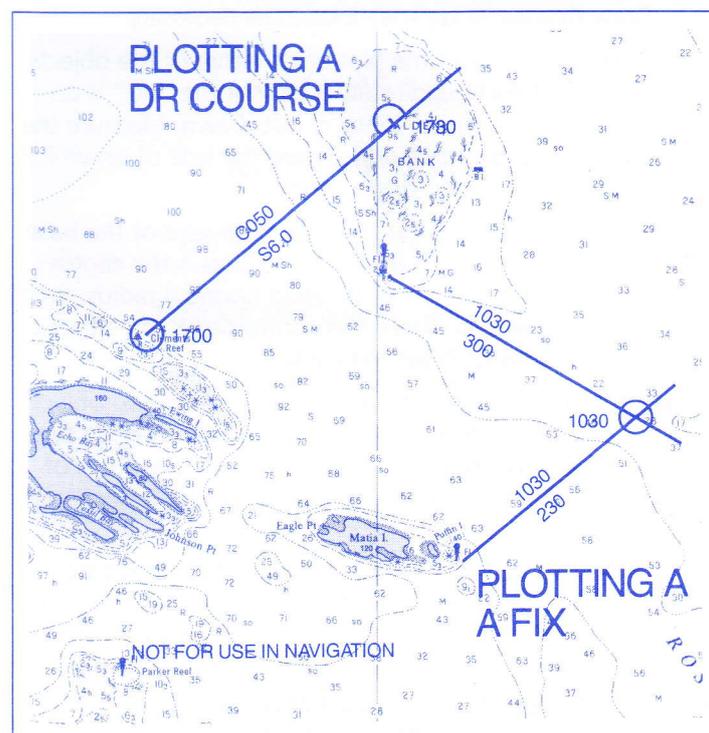


Fig. 2

POSITION PLOT BY SEXTANT ANGLES IS AS EASY AS 1-2-3

You see three objects which are identified on the chart and you **need to determine your position**. You measure the **horizontal sextant angle** between the object furthest to your right "R" and the middle object of the three "M". You also measure the horizontal sextant angle between the middle object "M" and the object furthest left "L".

1. Plot each of two circular lines of position in the same manner. See example below.
2. The intersection of the two circles (one of the two intersections) will be your fix position.
3. The correct intersection is known by inspection. Either you know which direction you are from the objects (in a general way) or you can determine which intersection it is by noting which object lies furthest toward your starboard (or port).

FIX BY SEXTANT ANGLES – Example (Fig. 3)

Plot a Fix from two Horizontal Sextant angles taken at 1422:

Rosenfeld Rock to Alden Point = 41°

Alden Point to Clements Reef = 67°

Subtract each of the horizontal sextant angles from 90° .

Rosenfeld/Alden = $90^\circ - 41^\circ = 49^\circ$

Alden/Clements = $90^\circ - 67^\circ = 23^\circ$

1. Place a straight edge between any two of the objects for which you have obtained the angle. e.g. Rosenfeld/Alden. You may or may not have one of the objects as a common object – the process is the same. Draw this line (base line). Extend as necessary.
2. Place the centre of the plotter on either of the objects (Rosenfeld Rock) and rotate it so that the 000° is on the line (or extension thereof) just drawn. Measure the angle (49°) from that line toward the side of on which you are located and draw a line.
3. Repeat this process at the Alden Bank end of the base line. The intersection of these two lines is the centre point of a circular line of position having a radius equal to the distance between this centre point and either of the two objects. Draw this circle.

Repeat the above entire process using the other two objects (Alden and Clements). **The intersection of the these two circles is your Fix.** In this case, you are generally north of the two objects; therefore the more northerly intersection is your Fix.

Alternatively, of course, if one of the objects (in this case Clements Reef) is to the left of the other objects, then you are at that location such that Clements Reef as viewed from your Fix will be to the left of the others.

Result: 1422 Fix Lat $48^\circ 49.4' N$
Lo $122^\circ 56.5' W$

Caution: It is best if the middle object of three is closer to you than the others. This will avoid a 'revolver' (an indeterminate position) resulting from both circles being coincidental.

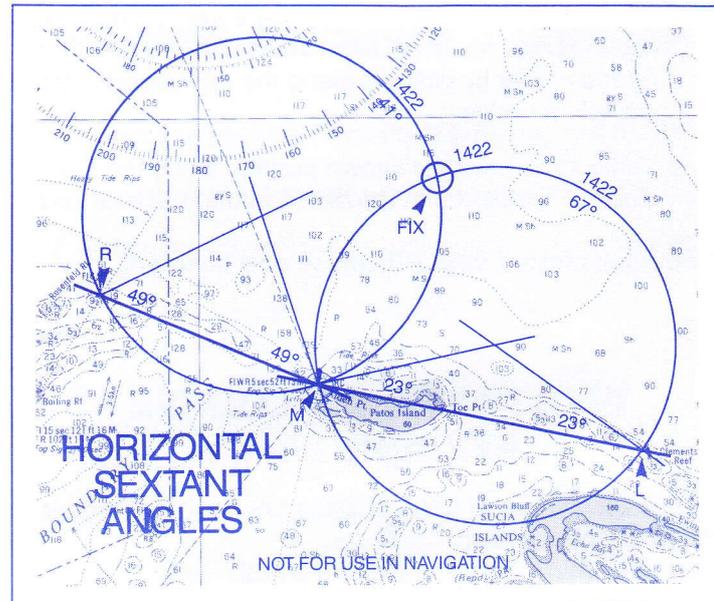


Fig. 3

POSITION PLOT BY SEXTANT ANGLES (Alternate method)

The following method is the equivalent to the traditional 'Three-Arm Protractor' method.

1. Pencil the Line of Sight (Horizontal Sextant) angles between the respective objects on the plotter as follows:
 - a) The line of sight toward the middle object "M" is represented by the line printed on the plotter which connects the centre hole and the arrow.
 - b) The line of sight toward the right hand object "R" is penciled in to connect the centre hole with the point on the 'Inner' scale which represents the horizontal sextant angle between "M" and "R".
 - c) The line of sight toward the left hand object "L" is penciled in to connect the centre hole with the point on the 'Red' Scale which represents the Horizontal Sextant angle between "M" and "L".
2. Move the plotter around on the chart so the three lines pass through the three respective charted objects.
3. **The centre hole is then at the location of your fix.**

Recommended reading for further information on **Bearings, Fixes and Plotting** as well as all aspects of recreational boating Navigation:

SMALL CRAFT PILOTING AND COASTAL NAVIGATION by A. E. Saunders and available from RTP Sales



Fig. 4

FOR SAFETY'S SAKE:

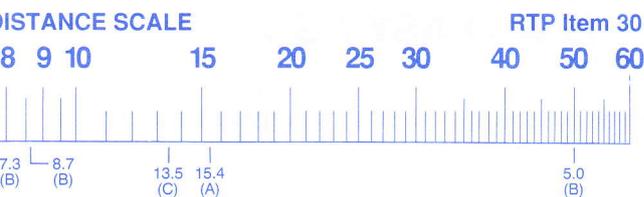
- Prudent Navigators DO NOT RELY ON ONLY ONE MEANS OF NAVIGATION. You are urged to get as much Boating education as possible. These COCKPIT PLOTTER #61 instructions are not meant to replace a navigation course or sound understanding of navigation! We highly recommend courses offered by Power Squadrons. In Canada, phone 1-800-268-3579 and, in the U.S.A., phone 919-821-0281 for information about courses in your area. IT COULD SAVE YOUR LIFE! Courses range from basic boating safety to celestial navigation for both Power and Sail.

SIMPLIFIED CALCULATOR for TIME, SPEED and DISTANCE AS EASY AS 1-2-3

NOTE: As in all logarithmic scales any number may be divided by 10 or multiplied by 10 in order to keep all entries and the answer on the scale. e.g. In example 1, the 1.8 location is also location of 18. On attached Fig. 4, the numerals in brackets refer to the appropriate examples.

Using the Logarithmic Time, Speed, and Distance Scale on the enclosed Ruler, you can readily determine your Time, Speed or Distance with a pair of dividers. No calculations or calculator required! Refer to Fig. 4 for examples.

- A. **Determine the TIME** in minutes Given that you know the Speed in knots and Distance in nautical miles.
Example: Given – Speed of vessel is 7 knots.
– Distance to travel is 18 miles.
- Span your dividers the distance between '60' at the right end of the scale and your speed of 7 knots.
 - With this set distance place the *left* point of the dividers on your distance of 18 (1.8) so that the other point of the dividers will fall on the scale to the *right* of it.
 - Read your TIME of 154 (15.4) minutes at the *right* point of your dividers. See Fig. 4.
- B. **Determine the DISTANCE** in nautical miles Given that you know the Speed in knots and Time in Minutes.
Example: Given – Speed of vessel is 5 knots.
– Time of travel is 87 minutes.
- Span your dividers the distance between '60' at the right end of the scale and your speed of 5 knots.
 - With this set distance place the *right* point of the dividers on the time of 87 so that the other point of the dividers will fall on the scale to the *left* of it.
 - Read your DISTANCE of 7.3 miles at the *left* point of your dividers. See Fig. 4.
- C. **Determine the SPEED** in knots Given that you know the Time in minutes and the Distance in nautical miles.
Example: Given – Time of travel is 135 minutes.
– Distance of travel is 16 miles.
- Span your dividers the distance between 16 (miles) at the *left* point of your dividers and 135 (minutes) at the *right* point of your dividers.
 - With this set distance place the *right* point of your dividers on '60' so that the other point of your dividers will fall on the scale to the *left* of it.
 - Read your SPEED of 7.1 knots at the *left* point of your dividers. See Fig. 4.



AS EASY AS 1-2-3

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