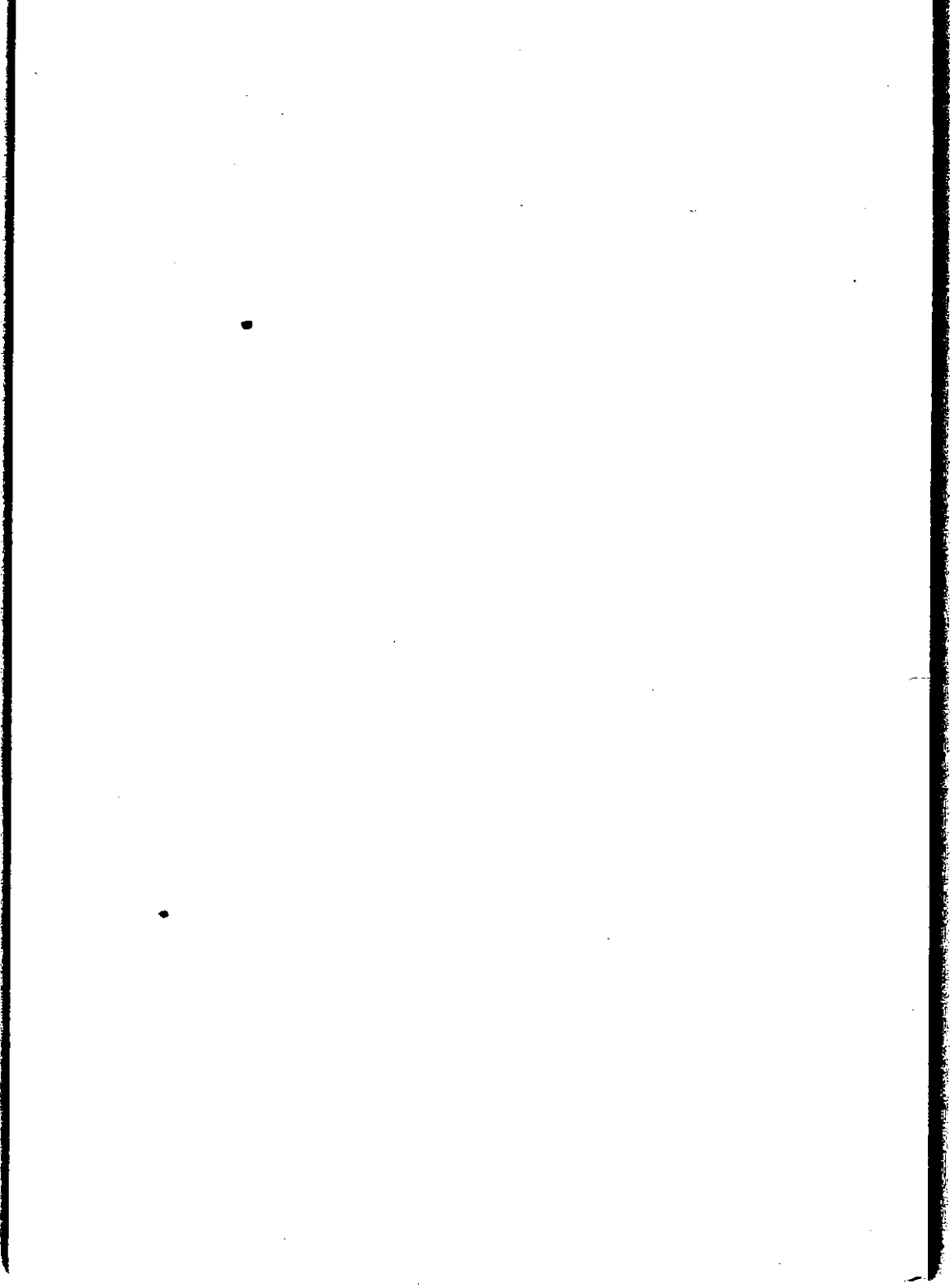


Operating
Instructions
(Issue 3)



THE DECCA DANAC SYSTEM
OPERATING INSTRUCTIONS

Issue 3

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Foreword

This handbook contains operating instructions for the Decca Navigator Danac airborne equipment.

Aircrew instruction on the operation of the equipment can be provided by The Decca Navigator Company Ltd.

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A technical description of the Danac system is given in a publication entitled "The Decca Navigator Danac System: Technical Notes".

Contents

	Page
Foreword	
1. Introduction	5
1. 1 General	5
1. 2 The Decca Navigator system	5
2. Equipment	9
2. 1 Mark 15 system	9
2. 2 Mark 19 system	9
3. Displays, controls and indicator lamps	10
3. 1 Display head Type 966	10
3. 2 Controller Type 9815	10
3. 3 Pushbutton functions	11
3. 4 Pushbutton lamp indications	13
3. 5 Zone identification	15
4. Operating procedures	16
4. 1 Setting-up	16
4. 2 Chart changing (OP mode)	17
4. 3 Chart changing (to an INT chart)	18
4. 4 Selecting OP manually	19
4. 5 Checking zones	19
4. 6 The LOOK AHEAD facility	20
4. 7 Summary of warning and pushbutton lamp indications	21
4. 8 Confidence checks	22
4. 9 Malfunction indications	23
4.10 Removal and replacement of chart roll	25
4.11 Danac chart conventions	26
5. Operation with Mark 19 receiver	29
5. 1 Controllers	29
5. 2 Receiver control functions	29
5. 3 Referencing	30
5. 4 The HOLD function	30
5. 5 Charts for Marks 15 and 19	30

Illustrations

Fig.		Page
1.	Four-station Decca chain showing zone patterns	6
2.	Zone identification	14
3.	Removal and replacement of chart roll	27
4.	Display head Type 966	31
5.	Controller Type 9815	31

THE DECCA DANAC SYSTEM

Operating Instructions

1. INTRODUCTION

1.1. General

Danac stands for Decca Area Navigation Airborne Computer. In this system, the position-fix information delivered by a Decca Navigator receiver is continuously presented, via the computer, on a Flight Log pictorial display.

The system is largely automatic, but permits the user to monitor all stages of operation. A basic principle is that the computer, during initial setting-up and under certain other conditions, requests the user to confirm that he accepts the displayed position of the aircraft. If the position is not acceptable he can adjust the display using the prescribed procedures.

1.2. The Decca Navigator System

Area coverage

Decca is a radio position-fixing system in which there is a free choice of route direction. The ground stations do not operate as beacons and the user aircraft are not confined to radials or other special tracks. The stations transmit low-frequency signals which can be received at all altitudes down to ground level. The signals are not screened by rising ground or by the earth's curvature and the service is used by ships and aircraft alike.

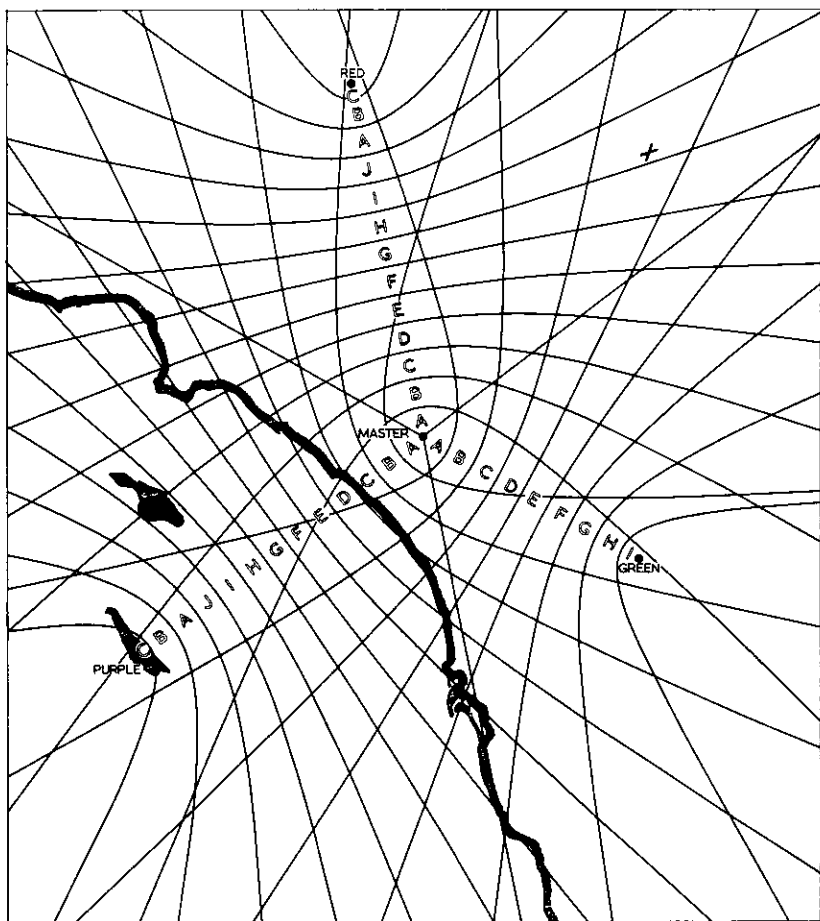


Fig. 1. Four-station Decca chain showing zone patterns

Cross at top right shows position displayed in Fig. 2

Position-fixing

Each chain of Decca stations comprises a central master station with three (or, in a few cases, two) outlying slaves. Signals from the master combine with those from each slave to produce a pattern of position lines of the hyperbolic form shown in Fig. 1. Theoretically there is an infinite number of position lines in a Decca pattern and the function of the receiver is to identify, at any instant, the line on which the aircraft is located in each pattern. The intersection of two such lines gives the position-fix; normally, the two lines cutting at the best angle are used and the computer rejects the third.

The basic function of the Danac computer is to convert the Decca position-fix into a pair of signals which drive the Flight Log chart and stylus so that the corresponding position is displayed. This is a continuous process and the stylus will record the track of the aircraft if the "write" facility is selected.

Decca zones

The slave stations are known as red, green and purple from the colour in which their respective patterns of position-lines are depicted on maps and on charts. On Danac Flight Log charts the patterns are designated in words and not in colours. Each pattern is divided into areas known as zones, denoted by letters as shown in Fig. 1. The lettering runs from A at the master end of the pattern to J, and the sequence repeats to cover the whole pattern. It will be seen that the direction in which the letters increase on a given chart depends upon where that chart is located with respect to the chain. Along the baselines between master and slaves the zones have a constant width of about six miles. The zone width expands to several times this distance in the outer coverage.

The Decca receiver drives a zone identification meter which operates independently of the computer and serves primarily as a cross-check. The meter operates automatically, every 20 seconds, and the readings show the letters for the red, green or purple zones in which the aircraft is located.

Decca lanes

When Danac is operated with the Mark 15 receiver, charts are used which do not show the "lanes" into which the zones can be sub-divided. With the Mark 19 receiver, certain charts may include lanes as well as zones, e.g. to provide for cross-checking against Decometer readings.

A zone contains 18, 24 or 30 green, red or purple lanes respectively and the lanes are numbered 30-47 (green), 0-23 (red), and 50-79 (purple). Accordingly, the zone markings on Danac charts sometimes include the lane number, e.g. A30, A0, A50, for green, red and purple.

Multipulse (MP)

Although Danac can work in a restricted mode with Decca chains of the early type (known as V or sometimes Mark V chains), of which a few remain in service, it is intended for use with MP chains. This term stands for the multipulse (also known as Mark 10) signals which the chain radiates every 20 seconds. The MP signals perform an automatic function in the receiver known as "notching" or automatic lane setting, with the object of resolving ambiguities that could otherwise permit the displayed position to be in error by some fraction of a zone, and also provide zone identification.

Chain selection

Selection of the correct Decca chain is automatic in the Danac system: when a Flight Log chart enters the viewing aperture, the Danac computer sets the receiver to the frequencies of the correct chain for that chart. The chain identity is, however, printed on each chart, using the standard code comprising a number from 1 to 10 followed by a letter from A to E.

2. EQUIPMENT

The Danac computer Type 9810B, together with its associated controller Type 9815 and display head Type 966, operates in conjunction with Decca Navigator receivers Mark 15 or Mark 19.

2.1. Mark 15 System

In addition to the three Danac units, the Mark 15 system has three further units:-

Antenna amplifier	Type 1995
Mark 15 receiver	Type 1901
Zone identification meter	Type 1956

2.2. Mark 19 System

The additional units of the Mark 19 system are:-

Antenna amplifier	Type 1995
Mark 19 receiver	Type 1904
Receiver controller	Type 8954
Decometers (red, green, purple)	Type 274
Lane identification meter	Type 275
Zone identification meter	Type 1956

Except for the final section, this handbook refers to the use of Danac with the Mark 15 receiver. Additional instructions covering its use with the Mark 19 receiver are given in Section 5.

3. DISPLAYS, CONTROLS AND INDICATOR LAMPS

3.1. Display head Type 966

The display head is illustrated at Fig. 4 (fold-out page at the end of this handbook). A stylus, located at the centre of a small black circle (the 'bug') indicates the position of the aircraft and records the track flown. The bug moves laterally across the charts which are assembled as a continuous strip, moving between spools at top and bottom of the unit. The display can be manually adjusted for chart selection, etc. by a slewing control in conjunction with pushbuttons. Removal and replacement of the chart roll are detailed in para. 4.10.

The system warning lamp, coloured amber, is located on the display head to the right of the chart. The lamp is normally out but can give a steady or flashing light as detailed in para. 4.9.1.

3.2. Controller Type 9815

The controller is illustrated at Fig. 5. Functions of controls and indicators are as follows.

ON switch. Connects computer and receiver to power supply in up position.

TEST-DIM-BRIL switch. TEST puts all pushbutton lamps on. DIM-BRIL give two-stage dimming.

WRITE switch. In off (left) position the stylus continues to display position but does not record the track.

Slew control. The edge of this control can be depressed at eight equally-spaced points. Pressing upper or lower edge moves the chart, left or right edge moves the bug and the four diagonal positions give combined movement of chart and bug.

Pushbuttons. The five buttons, labelled LOCK, INT, OP, SET, LOOK AHEAD, give the user full control over the receiver/computer system. For functions, see para. 3.3.

Pushbutton lamps. Each of the five buttons contains an indicator lamp. All lamps can show a steady indication, and the INT and OP lamps can also flash. For indications, see para. 3.4. OP and INT are white, the other three are amber.

3.3. Pushbutton functions

It should first be noted that Danac can operate in two alternative modes. The normal mode (OP) uses the MP signals which provide "notching" and zone identification; a reversionary mode (INT) suppresses both these facilities and is used under conditions in which they may be unreliable or when a chain not transmitting MP signals is selected. The INT mode is implemented automatically upon selection of a chart relating to a chain requiring that mode, or may be selected by pressing the INT button.

No button has to be held down. All buttons are not necessarily required on a given flight; often, only the OP button is used.

OP. Pressed to confirm the normal operating mode if the OP lamp is flashing, or to select that mode if the OP lamp is out.

INT. Pressed to confirm this mode if the INT lamp is flashing, or to select it if the INT lamp is out.

SET. Pressed before using the slew control, if it should be required to alter the displayed position when in either the OP or the INT mode. (Otherwise the bug would return to its previous position as soon as the slew control was released.)

LOOK AHEAD. Pressed before using slew control to bring into view any chart on the roll. Used when it is desired to inspect a particular chart, or to navigate on a chart other than the next in the sequence of the roll, or to remove the roll. In the LOOK AHEAD condition, the computer keeps track of the aircraft position; after a delay of 14-22 seconds following use of the slew control, it automatically cancels the condition and returns the bug to the aircraft's present position on the chart previously in use. The user can cancel manually before the delay expires by pressing the LOOK AHEAD button a second time, or can re-start the delay period by pressing the slew control.

LOCK. When the system warning lamp shows a steady indication, with either LOCK illuminated and OP flashing, or just INT flashing, and not otherwise, pressing LOCK puts the receiver into the fast-lock state in order to re-acquire the Decca signal(s). The button has two additional functions (a) and (b) below, but neither of these implements fast-lock so long as there is no warning indication.

- (a) If the user should decide to navigate on a chart brought into view by LOOK AHEAD and that chart is for a different combination of colours and/or a different chain from the chart in use, the computer must read in the data ("constants") for that chart and start the automatic setting up sequence: pressing LOCK causes it to do this. (If the new chart is for the same colours and chain as the old, it is selected by pressing OP.)

- (b) If the warning lamp lights while the OP lamp remains steady, so indicating a notch discrepancy between the receiver output and the computer/display, pressing LOCK will bring the computer/display into agreement with the receiver.

LOOK AHEAD - LOCK. During the automatic switching-on routine, the bug moves to a check point on the chart. Danac charts may have either one or two check points. If the bug does not go to the check point nearest the aircraft's present position, pressing LOOK AHEAD and LOCK buttons, in sequence, will cause the bug to move to the other (i.e. more suitable) check point.

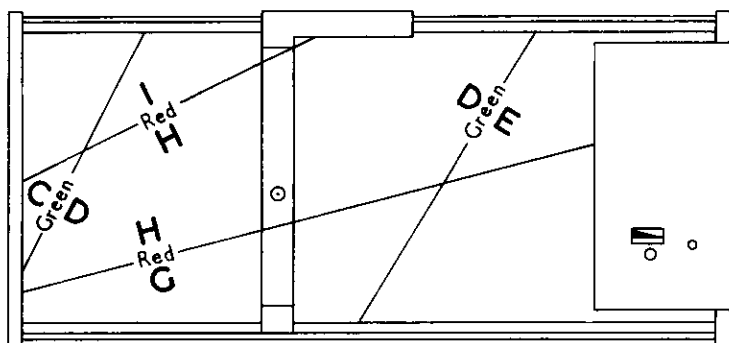
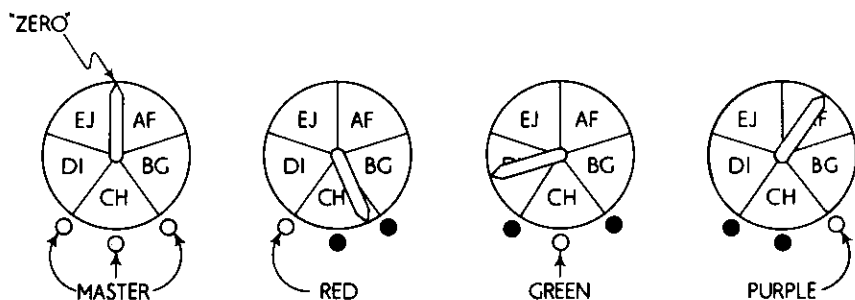
3.4. Pushbutton lamp indications

For checklist of pushbutton and system warning lamp indications, with corresponding user action, see para. 4.7. The pushbutton lamp indications are as follows:-

<u>Lamp</u>	<u>Flashing</u>	<u>Steady illumination</u>
OP (white)	Request to accept or adjust displayed position	Equipment working in normal (OP) mode
INT (white)	Request to accept or adjust displayed position	Equipment working in reversionary (INT) mode; no notching or zone ident.
SET (amber)	Does not flash	SET button has been pressed; computer can follow adjustments to display by slew control
LOOK AHEAD (amber)	Does not flash	LOOK AHEAD button has been pressed; display is disconnected from Decca receiver to allow inspection of any chart on the roll



User must know which five-zone group he is in, for each Decca pattern



Position correct for Red/Green readings above (see Fig 1)

Fig.2 Zone Identification

<u>Lamp</u>	<u>Flashing</u>	<u>Steady illumination</u>
LOCK Lamp (amber)	Does not flash	Receiver locking/notching in progress, either through computer command or through pressing LOCK. Pressing LOCK for other purposes produces no lamp indication (except when used with LOOK AHEAD, see para. 3.3).

White and amber. A white light on the controller indicates either that the equipment is working in a navigation mode (OP or INT), or, when flashing, that checking or confirmation by the user is required before implementing that mode. An amber light calls for, or results from, some specific action by the user (the LOCK lamp is an exception to this rule during automatic setting-up, when its indication is only informative).

Test illumination. As a visual check on the lamp system, the computer lights all five lamps simultaneously for 2-4 seconds at the start of the automatic sequence following switching on, and also whenever that sequence is re-started (e.g. when LOOK AHEAD is cleared by pressing LOCK). The test illumination also includes the system warning lamp and the lamp test button on the display head is not normally used with Danac. The lamps can be tested at will by selecting the left-hand position of the TEST-DIM-BRIL switch on the controller.

3.5. Zone identification (see Fig. 2)

The zone identification (Z.I.) meter indicates, in a sequence repeated every 20 seconds, the letters denoting the red, green and purple zones in which the receiver is located. The user is assumed to know which group of five zones he is in, for each pattern shown on the chart. The five-zone groups are labelled ABCDE or FGHIJ.

The Z.I. sequence has the order:

master - $2\frac{1}{2}$ s. - red - $2\frac{1}{2}$ s. - green - $2\frac{1}{2}$ s. - purple

The master and each slave signal last about $\frac{1}{2}$ s. The master reading is indicated by all three lamps on the meter lighting together, and the respective lamps signal the red, green and purple readings. With some chains the purple reading is repeated a second time at the end of the sequence.

The first (master) reading in the sequence should always be zero within $\pm \frac{1}{2}$ zone. If this tolerance is consistently exceeded there is a malfunction.

Zone identification is suppressed in the INT mode of operation.

4. OPERATING PROCEDURES

4.1. Setting up

To insert chart roll in display head, proceed as in para. 4.10.

If the required chart is already in the display aperture, switch ON and the automatic sequence (1) - (4) below will take place. If a chart other than the one required is displayed, switch ON, wait until LOCK lamp only is on, press LOOK AHEAD, slew bug to required chart, press LOCK and the sequence will follow from (1) as below.

- (1) All pushbutton lamps light.
Computer reads-in chart constants.
- (2) Bug moves to check point.
Receiver locking-in.

Note: To move bug to other check point (if there are two on the chart) press LOOK AHEAD, then LOCK.

- (3) Automatic lane setting ('notching').
- (4) Notching complete. Bug should take up aircraft's position.

Action by user

- (5) If bug position is correct, press OP.
- (6) If bug goes to wrong zone(s), press SET and correct with slew control. Then press OP. Press OP a second time to cancel the flashing OP light.

4.2. Chart changing (OP mode)

When bug reaches top or bottom of chart in use, it moves to next chart on roll automatically. To change manually to next chart on roll, e.g. if bug reaches one side of the present chart and stops, use slew control (without pressing SET) to put it on next chart. What follows depends on whether new chart involves (a) no change of chain or colours; (b) no chain change but a change of colour(s); (c) a chain change.

(a) Same chain, same colours

No action by user. Bug goes directly to aircraft's position on new chart. OP lamp remains lit (steady).

(b) Same chain, different colours

Under certain conditions bug will go directly to present position as in (a). OP lamp remains lit (steady) and user takes no action. If OP lamp reverts to flashing, however, the position that bug takes up may be one or more whole zone units in error. Check position against zone ident and/or external data. If bug position approved, press OP.

(c) Chain change

After the automatic sequence, bug takes up a position on new chart that may be one or more whole zone units in error. Check position as in (b).

To put bug in correct zones, press SET, use slew control and press OP to cancel the SET lamp indication. If bug position is then approved press OP again, OP lamp will change from flashing to steady.

4.3. Chart changing (to an INT chart)

Certain special charts, for fringe areas or for chains not radiating MP (multipulse) signals, automatically put the equipment into the INT mode when selected. The OP mode is thereby inhibited and cannot be selected. On changing to an INT chart, either automatically or manually (see para. 4.2), what follows depends on whether the new chart involves (a) no change of chain or colours; (b) no chain change but a change of colour; (c) a chain change.

(a) Same chain, same colours

No action by user. Bug goes directly to aircraft's position on new chart, provided that operation and displayed position were satisfactory on previous chart. INT lamp lights (steady).

(b) Same chain, different colours

Under certain conditions bug will go directly to present position as in (a), INT lamp will light (steady) and user takes no action. If INT lamp flashes, press SET, slew bug to best estimate of position, press INT once to clear SET lamp and again to confirm position (INT then changes from flashing to steady).

(c) Chain change

When receiver has locked, INT lamp flashes. Proceed as in (b).

Note: INT is a "dead reckoning" mode, automatic lane setting (and zone ident) is suppressed, hence accurate manual setting of bug is essential in (b) and (c) above.

4. 4. Selecting OP manually

To select OP when navigating in the INT mode (for example after entering good cover from a fringe area), press OP. Initially the OP lamp will flash but the INT lamp will remain on. If the display had previously been set exactly to the correct position, the OP lamp would change to steady illumination automatically, about 12 seconds after the start of the next ident. sequence, and the INT lamp would go out.

If the computer detects a discrepancy between the displayed position and the now correctly-notched receiver output, it will automatically reinstate INT after the 12-second delay. To regain the OP mode, press OP and then LOCK. The bug will then go to the updated position and the OP lamp will change to steady illumination. Check the display against zone identification or against external position data.

4. 5. Checking zones

From chart, note colours. These are normally the pairs red/green, green/purple, or red/purple, but in some cases red/green/purple. Ascertain, from approximate knowledge of position, which 5-zone group (ABCDE or FGHIJ) the aircraft is in, for each colour.

At start of zone ident. sequence, check that master reading is zero or within tolerance (para. 3. 5).

Read zone letters on zone ident. meter, on corresponding lamp signals.

Check that bug is in the zones indicated.

If successive readings show a consistent discrepancy between zone ident. and the bug's position in the zone patterns, proceed as follows:

Press SET.

Slew bug to estimated position.

(Bug will now take up exact position in the correct zones. On releasing slew control, SET lamp remains on and OP lamp will start flashing after a few seconds delay.)

Press OP.

4.6. The LOOK AHEAD facility

To inspect any chart on the roll other than the one in use, press LOOK AHEAD and use the slew control to bring desired chart into view. The system warning lamp flashes when LOOK AHEAD is pressed (see para. 4.9.1.(d)).

After a delay of 14-22 seconds, the computer automatically cancels the LOOK AHEAD condition and returns the bug to the aircraft's position on the chart previously in use. (To re-start the delay period before it is due to expire, press the slew control.)

To cancel manually, press LOOK AHEAD button a second time. When bug re-enters the chart previously in use, the LOOK AHEAD lamp goes out and the OP (or INT) lamp starts flashing. When bug has settled, the OP (or INT) lamp will normally give a steady indication, but will continue flashing if an "alarm" (i. e. low signal condition) occurred at any time during the use of LOOK AHEAD. If displayed position is approved, press to cancel flashing.

To navigate on a chart brought into view by LOOK AHEAD, the procedure depends on the new chart. If the new chart is for the same colours and the same chain as the old, press OP (or INT). If not, press LOCK: this initiates the

automatic sequence described under "Setting up" (para. 4.1).

To wind chart roll on to spool for removal, press LOOK AHEAD before using slew control. The last few inches of the roll must be wound on by hand, as the motor drive is automatically turned off to prevent de-spooling.

4.7. Summary of warning and pushbutton lamp indications

4.7.1. Test illumination

Immediately upon switching-on, observe that all pushbutton lamps and the system warning lamp light together for a few seconds.

To test bulbs/lamp circuits manually, select TEST position on controller.

(Note: All lamps light for a few seconds after clearing LOOK AHEAD by pressing LOCK, OP or INT.)

4.7.2. Malfunction or low-signal condition

<u>Indication</u>	<u>Action</u>
System warning lamp flashing rhythmically	Disregard displayed information (e.g. aircraft position may be beyond edge of chart).
System warning lamp on with OP lamp steady	If warning persists through several idents in a fringe area, select INT. To clear when entering good cover, press LOCK and check displayed position.
System warning lamp on with	
(a) LOCK lamp on & OP flashing rhythmically	Suspect displayed information; await condition 4.7.3 below. If warning persists, press LOCK and await 4.7.3.
(b) ^{or} INT flashing rhythmically	

4.7.3. Request to accept/adjust displayed position

<u>Indication</u>	<u>Action</u>
OP or INT lamp flashing rhythmically	If displayed position is approved, press OP (or INT). If flashing continues, check displayed position against zone identification (OP only, see 4.5) or external data.

4.7.4. Facility indications

LOCK, SET or LOOK AHEAD lamp (amber) on	Clear the corresponding facility after use. (LOCK lamp lights and clears during automatic setting-up sequence.)
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4.8. Confidence checks

Check point. As part of the automatic switching-on routine (para. 4.1) the bug takes up its position at a check point marked by a symbol comprising three converging arrows. Correct positioning of the bug at the check point requires the reading-in of the Decca co-ordinates of that point from the chart constants, the ensuing data processing, and the operation of the display servos, to be faultless, and thus forms a confidence check upon virtually the whole computer/display system. On charts with two check points, the other check point may be selected by pressing LOOK AHEAD, then LOCK (para. 3.3).

Confirmation by user. The computer program ensures that the pushbutton lamps cannot indicate (by steady illumination) that the equipment has adopted either of the two operational modes (OP or INT) without the user having previously confirmed, by pressing the appropriate button, that he accepted the position that the bug had taken up on the chart.

Pictorial display. At suitable intervals, the pilot should check the track recorded by the stylus against the aircraft's heading information and/or against other data external to the Decca system.

Zone identification. At the start of each sequence the zone identification meter should read zero. This reading indicates correct functioning of a major part of the receiver circuitry.

Lamp tests. At the start of the switching-on sequence, the system warning lamp and all five pushbutton lamps light, so checking the lamp systems. Also implemented manually by TEST switch.

4.9. Malfunction indications

4.9.1 System warning lamp

This lamp on the display head to the right of the viewing aperture, can give the following indications:-

(a) Momentary illumination.

Intermittent high noise level or marginal reception. May also occur during start of receiver locking.

(b) Steady illumination with (1) LOCK lamp on and OP flashing or (2) INT flashing.

Inadequate reception (i.e. the 'alarm' condition or a receiver malfunction. If an alarm occurs at any time during use of SET or LOOK AHEAD, even if only momentarily, the OP or INT lamp will indicate this by flashing when either mode is reselected. When this occurs, check displayed position against zone ident. or external data. Pressing OP or INT a second time cancels flashing.

(c) Steady illumination, with the OP lamp steady.

Discrepancy between displayed position and receiver output, e. g. through an imperfect notching signal. In good cover this clears automatically; if it persists in a fringe area, select INT.

When flying into good cover from a fringe area, discrepancy can be cleared by pressing OP and then LOCK, but check position as in (b). Note that when entering good cover from fringe cover on INT, the system warning lamp will not be on. If OP is pressed and there is a discrepancy between the bug position and the MP (notching or automatic lane-setting) signals, automatic reversion to INT will take place and there will be no system warning lamp indication.

(d) Flashing

Indicates a discrepancy between the display and the computer's position fix, e. g. through bug reaching limit of travel at either side or through a display malfunction. This indication also occurs in LOOK AHEAD condition (a deliberate discrepancy between computer and display).

4.9.2 Failure when manually setting display

If upon releasing the slew control the OP (or INT) lamp does not start flashing after a nominal delay period of 15 seconds (tolerance 11s-19s) the computer will re-read the constants and move the bug to the check point. This indicates a chart or computer fault, but correct operation may be obtainable on a second attempt (check 4.10.2 (18)).

4.9.3 Check point facility inoperative

Failure of the bug to go automatically to the check point on the chart, at start of setting-up, indicates a malfunction in the computer, the display head or the chart in use.

Note: To read-in the constants at the other end of the chart, press LOOK AHEAD, then LOCK. Bug will go to the other check point, see final para. 3.3.

4.9.4 Master zone identification reading outside tolerance

Consistent deviation of the pointer from the zero (top of scale) reading on the initial signal of the sequence, by more than plus/minus half a zone, indicates a receiver malfunction.

4.9.5 Abnormal pushbutton lamp indications

Three or more lamps steadily illuminated at the same time indicates a computer malfunction (except on automatic or manual lamp test, see final para. 3.4). If all pushbutton lamps are out, causes and action are as follows:-

<u>Causes</u>	<u>Action</u>
(a) Power failure	Check control box switch ON
(b) Fuse failure	Press TEST switch on control box. If lamps light, change 3.15A fuse. If not, change 10A fuse. (Fuses are located on front of computer unit.)
(c) Circuit breaker	Check circuit breaker
(d) System malfunction	Ground-check system.

4.10. Removal and replacement of chart roll (Fig. 3)

4.10.1 Removal

- (1) Press LOOK AHEAD
- (2) Slew the chart roll on to upper spool
- (3) Switch off.

- (4) Release top corner catches and lower cassette.
- (5) Lift cassette clear of bottom corner slots, lay cassette flat.
- (6) Manually wind loose chart on to top spool.
- (7) Slide catch forward.
- (8) Release ball locator.
- (9) Remove chart roll.

4.10.2 Replacement

- (10) Engage plain end of spool with driving pin of gear wheel.
- (11) Align black end of spool and close ball locator.
- (12) Pull out a length of chart and turn cassette over.
- (13) Slide cursor up to photocell housing.
- (14) Thread end of chart under cursor guides.
- (15) Pull chart through guides carefully and turn cassette over.
- (16) Fit chart into take up spool.
- (17) Wind loose chart on to spool until first or required chart is in view.

Replace cassette by reversing steps (4) (5).

- (18) Press cassette firmly home and relocate cursor drive in its slots.

4.11. Danac chart conventions

The symbols and navigational detail on Danac charts conform with the normal conventions adopted for aeronautical maps and charts. Special symbols and conventions are listed below.

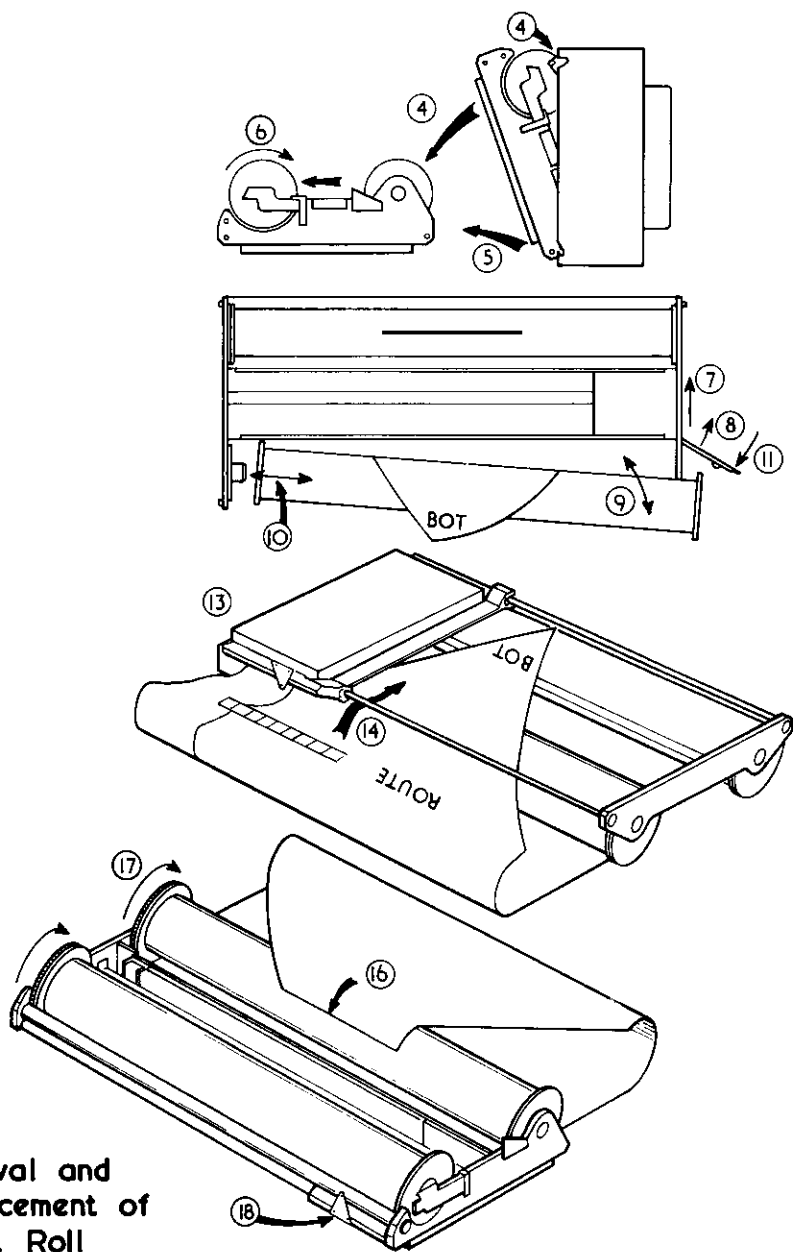


Fig.3
Removal and
Replacement of
Chart Roll

Chart designation

Danac chart numbers have the prefix D (or DH on charts specially prepared for helicopters) followed by the number, at the top and bottom left-hand corners of chart outside the boundary.

Chain number and patterns

These are marked in a form such as 5B RED GREEN, normally at top and bottom left-hand corners inside the chart boundary.

Lattice lines

The Decca lattice is normally printed in the form of zone boundary lines only. Each such line is labelled with the colour of the respective pattern and with letters denoting the zone on either side of the line.

Check point

The Danac check point is denoted by a dot with three converging arrows, labelled CHECK POINT. (Charts may have one check point or two.)

Overlapping charts

Where an area on a given chart is overlapped by another chart, this is indicated on the chart together with the number of the overlapping chart. When the overlapping chart is an "approach" chart (i.e. large scale) the overlap area is usually enclosed by a pecked coloured line.

Portion of chart not to be used

This is shown by white and stipple strips, slanted at 45 deg.

Decca accuracy contour

In charts covering the 'B' accuracy contour, this is shown by a line of dots labelled B CONTOUR.

5. OPERATION WITH RECEIVER MARK 19

5.1. Controllers

When operating in conjunction with Danac, the Mark 19 receiver controller Type 8954 is wholly inoperative and the panel illumination for this unit is suppressed, but if the Danac is switched off at controller Type 9815 (for example, when flying outside the coverage of the available charts or in the event of a failure of the Danac equipment), the receiver functions as a standard Mark 19 driving the Decometer displays. Operation is then as described in the publication entitled "The Decca Navigator Mark 19: Operating Instructions".

5.2. Receiver control functions

The instructions in the previous Sections apply to either type of Decca Navigator receiver (Mark 15 or 19) used with Danac. Mark 19, however, embodies two additional functions, designated REF and HOLD, which, in installations without Danac, are implemented from the receiver controller; in Danac installations, use is made of the Danac controls for these functions.

The LOCK and CHAIN (selector) functions of the Mark 19 controller are performed automatically by the Danac computer and the power supplies to the receiver are controlled by the Danac ON switch.

5.3. Referencing

To reference the Decometers and lane identification meter of the Mark 19, press SET and operate the TEST switch momentarily (the latter switch centralizes under spring loading) and then zero the meters. In this operation, the TEST switch starts a timer which maintains the reference condition for a period within the limits 9-15 seconds. Throughout this period, all five pushbutton lamps remain alight. By again operating TEST before expiry of the 9-15 seconds period, the reference state may be prolonged for a further such period. Expiry of the delay cancels the SET condition and starts the automatic setting-up routine (para. 4.1). The Flight Log display remains inoperative throughout the reference period.

5.4. The HOLD function

To prolong a given lane identification reading, press LOOK AHEAD and the TEST switch in succession. The HOLD function is then available for 14-22 seconds; throughout this period, the system warning lamp on the display head is illuminated. To re-start the 14-22 seconds' delay, press LOOK AHEAD and TEST in succession again. When the delay expires, the computer awaits and implements a notch sequence and the warning indication terminates.

5.5. Charts for Marks 15 and 19

Charts for use with the Mark 19 receiver differ from those for the Mark 15 and the two types of charts are not interchangeable. The receiver designation appears at the bottom left hand corner of the chart.

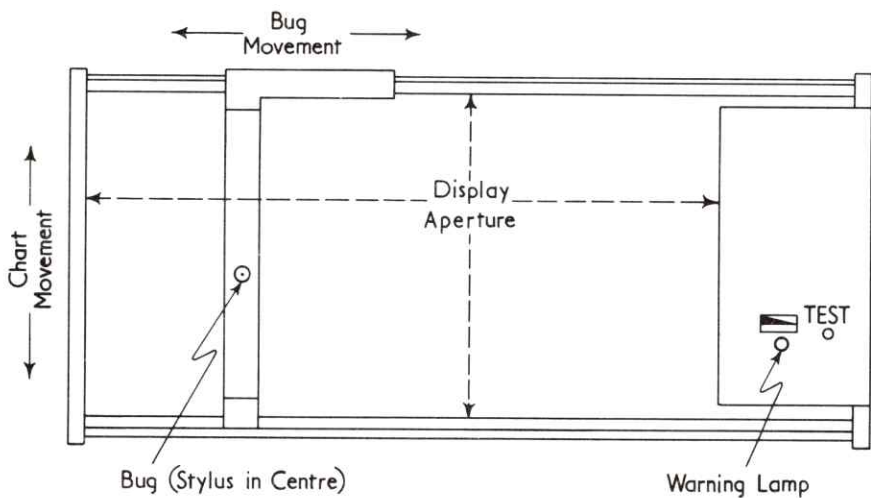


Fig.4 Display Head Type 966

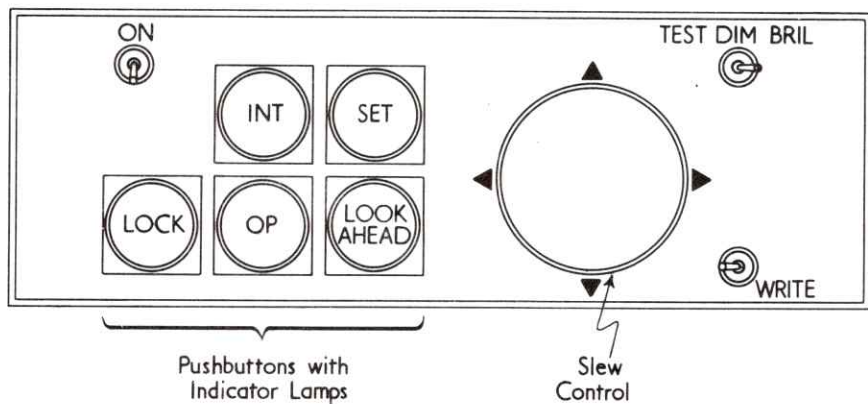


Fig.5 Controller Type 9815