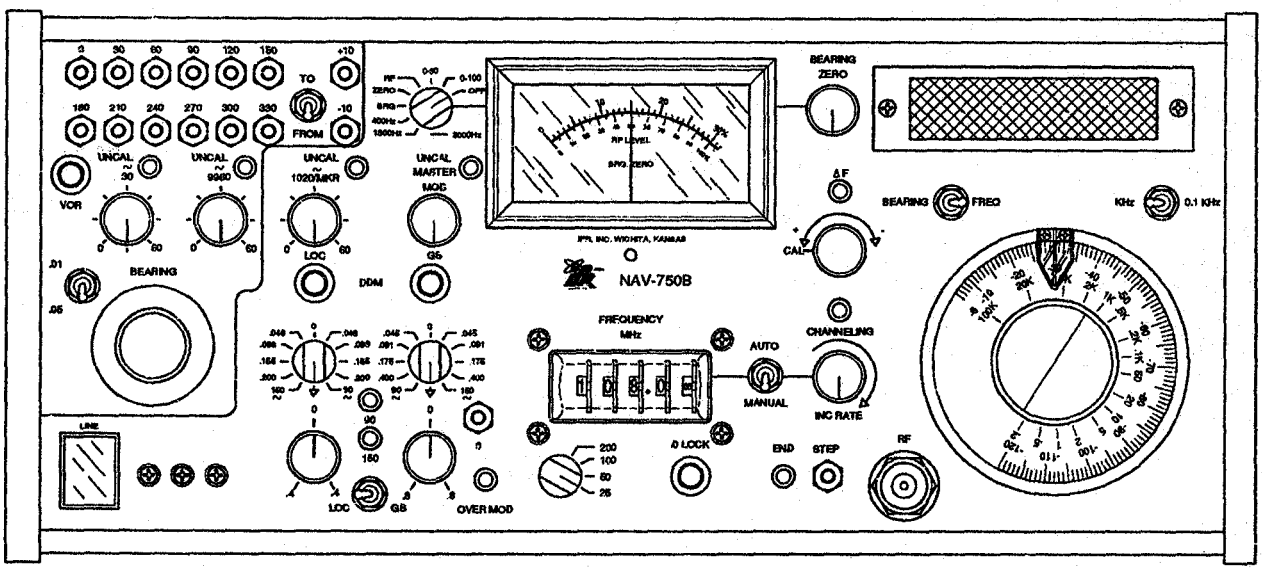
OPERATION/MAINTENANCE MANUAL

NAV-750B

VOR/LOC/COMM/G/S/MKR BENCH TEST SET



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OPERATION/MAINTENANCE MANUAL
NAV-750B

PUBLISHED BY
IFR SYSTEMS, INC.
Wichita, Kansas

WARNING

HIGH VOLTAGE EQUIPMENT

THIS EQUIPMENT CONTAINS CERTAIN CIRCUITS AND/OR COMPONENTS OF EXTREMELY HIGH VOLTAGE POTENTIALS, CAPABLE OF CAUSING SERIOUS BODILY INJURY OR DEATH. WHEN PERFORMING ANY OF THE PROCEDURES CONTAINED IN THIS MANUAL, HEED ALL APPLICABLE SAFETY PRECAUTIONS.

RESCUE OF SHOCK VICTIMS

1. DO NOT ATTEMPT TO PULL OR GRAB THE VICTIM.
2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER.
3. IF YOU CANNOT TURN OFF ELECTRICAL POWER, PUSH, PULL OR LIFT THE VICTIM TO SAFETY USING A WOODEN POLE, ROPE OR SOME OTHER DRY INSULATING MATERIAL.

FIRST AID

1. AS SOON AS VICTIM IS FREE OF CONTACT WITH SOURCE OF ELECTRICAL SHOCK, MOVE VICTIM A SHORT DISTANCE AWAY FROM SHOCK HAZARD.
2. CALL FOR DOCTOR AND/OR AMBULANCE, IMMEDIATELY.
3. IF BREATHING HAS STOPPED; ADMINISTER CARDIO-PULMONARY RESUSCITATION (CPR), AS NEEDED.
4. IF VICTIM IS BREATHING, ATTEMPT TO CONTROL ALL SERIOUS BLEEDING.
5. KEEP VICTIM WARM, QUIET AND FLAT ON HIS/HER BACK.

CAUTION: INTEGRATED CIRCUITS AND SOLID STATE DEVICES SUCH AS MOS FETS, ESPECIALLY CMOS TYPES, ARE SUSCEPTIBLE TO DAMAGE BY ELECTROSTATIC DISCHARGES RECEIVED FROM IMPROPER HANDLING, THE USE OF UNGROUNDED TOOLS, AND IMPROPER STORAGE AND PACKAGING. ANY MAINTENANCE TO THIS UNIT MUST BE PERFORMED WITH THE FOLLOWING PRECAUTIONS:

1. BEFORE USE IN A CIRCUIT, KEEP ALL LEADS SHORTED TOGETHER EITHER BY THE USE OF VENDOR-SUPPLIED SHORTING SPRINGS OR BY INSERTING LEADS INTO A CONDUCTIVE MATERIAL.

2. WHEN REMOVING DEVICES FROM THEIR CONTAINERS,GROUND THE HAND BEING USED WITH A CONDUCTIVE WRISTBAND.

3. TIPS OF SOLDERING IRONS AND/OR ANY TOOLS USED MUST BE GROUNDED.

4. DEVICES MUST NEVER BE INSERTED INTO NOR REMOVED FROM CIRCUITS WITH POWER ON.

5. PC BOARDS, WHEN TAKEN OUT OF THE SET, MUST BE LAID ON A GROUNDED CONDUCTIVE MAT OR STORED IN A CONDUCTIVE STORAGE BAG.

   NOTE: Remove any built-in power source, such as a battery, before laying PC Boards on a conductive mat or storing in a conductive bag.

6. PC BOARDS, IF BEING SHIPPED TO THE FACTORY FOR REPAIR, MUST BE PACKAGED IN A CONDUCTIVE BAG AND PLACED IN A WELL-CUSHIONED SHIPPING BAG.

CAUTION: THE USE OF SIGNAL GENERATORS FOR MAINTENANCE AND OTHER ACTIVITIES CAN BE A SOURCE OF ELECTROMAGNETIC INTERFERENCE TO AVIATION RECEIVERS, WHICH CAN CAUSE DISRUPTION AND INTERFERENCE TO AERONAUTICAL SERVICE OUT TO A DISTANCE OF SEVERAL MILES.

CAUTION: USERS OF THIS EQUIPMENT SHOULD SCRUTINIZE ANY OPERATION WHICH RESULTS IN RADIATION OF A SIGNAL (DIRECTLY OR INDIRECTLY) AND ENSURE COMPLIANCE WITH INSTRUCTIONS IN FAA CIRCULAR AC 170-6C, DATED FEBRUARY 19, 1981.

RECORD OF REVISIONS

REV NO.	ISSUE DATE	DATE INSERTED	BY	REV NO.	ISSUE DATE	DATE INSERTED	BY

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LIST OF EFFECTIVE PAGES

Chapter/Section/Subject	Page	Date
Title Page		Aug 1/88
Copyright Page		Aug 1/89
Warning Page		Aug 1/89
Caution Page		Aug 1/89
Record of Revisions Page		Aug 1/89
List of Effective Pages	1 thru 2	Aug 1/89
Table of Contents	1 thru 2	Aug 1/89
Introduction	1 thru 2	Aug 1/89
1-Table of Contents	1 thru 2	Aug 1/89
1-List of Illustrations	1 thru 2	Aug 1/89
1-List of Tables	1 thru 2	Aug 1/89
1-1-1	1 thru 4	Aug 1/89
1-2-1	1 thru 2	Aug 1/89
1-2-2	1 thru 14	Aug 1/89
1-2-3	1 thru 2	Aug 1/89
1-2-4	1 thru 44	Aug 1/89
1-3-1	1 thru 6	Aug 1/89
1-4-1	1 thru 2	Aug 1/89
1-5-1	1 thru 2	Aug 1/89
2-Table of Contents	1 thru 4	Aug 1/89
2-List of Illustrations	1 thru 2	Aug 1/89
2-List of Tables	1 thru 2	Aug 1/89
2-1-1	1 thru 4	Aug 1/89
2-2-1	1 thru 58	Aug 1/89
2-2-2	1 thru 52	Aug 1/89
2-2-3	1 thru 58	Aug 1/89
2-2-4	1 thru 26	Aug 1/89
APPENDIX A	1 thru 6	Aug 1/89
APPENDIX B	1 thru 2	Aug 1/89
APPENDIX C	1 thru 4	Aug 1/89
APPENDIX D	1 thru 2	Aug 1/89

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TABLE OF CONTENTS

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INTRODUCTION - NAV-750B TEST SET

This manual contains operating and maintenance instructions for the NAV-750B. It is strongly recommended that the operator be throughly familiar with Chapter 1 - Section 2 before attempting to perform any operating procedures and Chapter 2 - Section 2 before performing any testing or repairs.

This manual is divided into two chapters as follows:

CHAPTER 1 - OPERATION

- Section 1 - DESCRIPTION (physical and mechanical description of test set)
- Section 2 - OPERATION (installation; description of controls, connectors and indicators; performance evaluation; and general operating procedures)
- Section 3 - SPECIFICATIONS
- Section 4 - SHIPPING
- Section 5 - STORAGE

CHAPTER 2 - MAINTENANCE

- Section 1 - Servicing (routine maintenance)
- Section 2 - Troubleshooting (theory of operation; performance verification; calibration; PC boards and schematics)

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CHAPTER ONE

NAV-750B BENCH TEST SET

OPERATION MANUAL

TABLE OF CONTENTS

LIST OF ILLUSTRATIONS

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LIST OF TABLES

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SECTION 1 - DESCRIPTION

1. General Description and Capabilities

A. General Description

The NAV-750B bench test set is a precision simulator of VOR, ILS, (LOC and G/S), COMM and MKR BEACON ground stations.

The NAV-750B bench test set is completely self-contained and requires no additional equipment for NAV, ILS, Marker Beacon and COMM Receiver testing.

B. Functional Capabilities

(1) VOR

The VOR section of the NAV-750B provides pushbutton bearing selection for each 30° of Azimuth, as well as two pushbuttons which increase or decrease the generated bearing in 10° increments. The bearing may be varied in .01° or .05° increments with the bearing control. All VOR RF output levels may be varied with a calibrated output attenuator.

(2) LOC and G/S

The LOC and G/S sections of the NAV-750B use precision 90 and 150 Hz tone generators to provide accurately mixed tones for "on-course" and specific "off-course" signals. All LOC and G/S RF output levels may be varied with a calibrated output attenuator.

(3) COMM

The COMM receiver frequencies (118.000 to 156.000 MHz) are generated by an RF generator in 25 kHz steps. A 1020 Hz tone may be added. All the COMM receiver RF output levels may be varied with a calibrated output attenuator.

(4) RF Generator

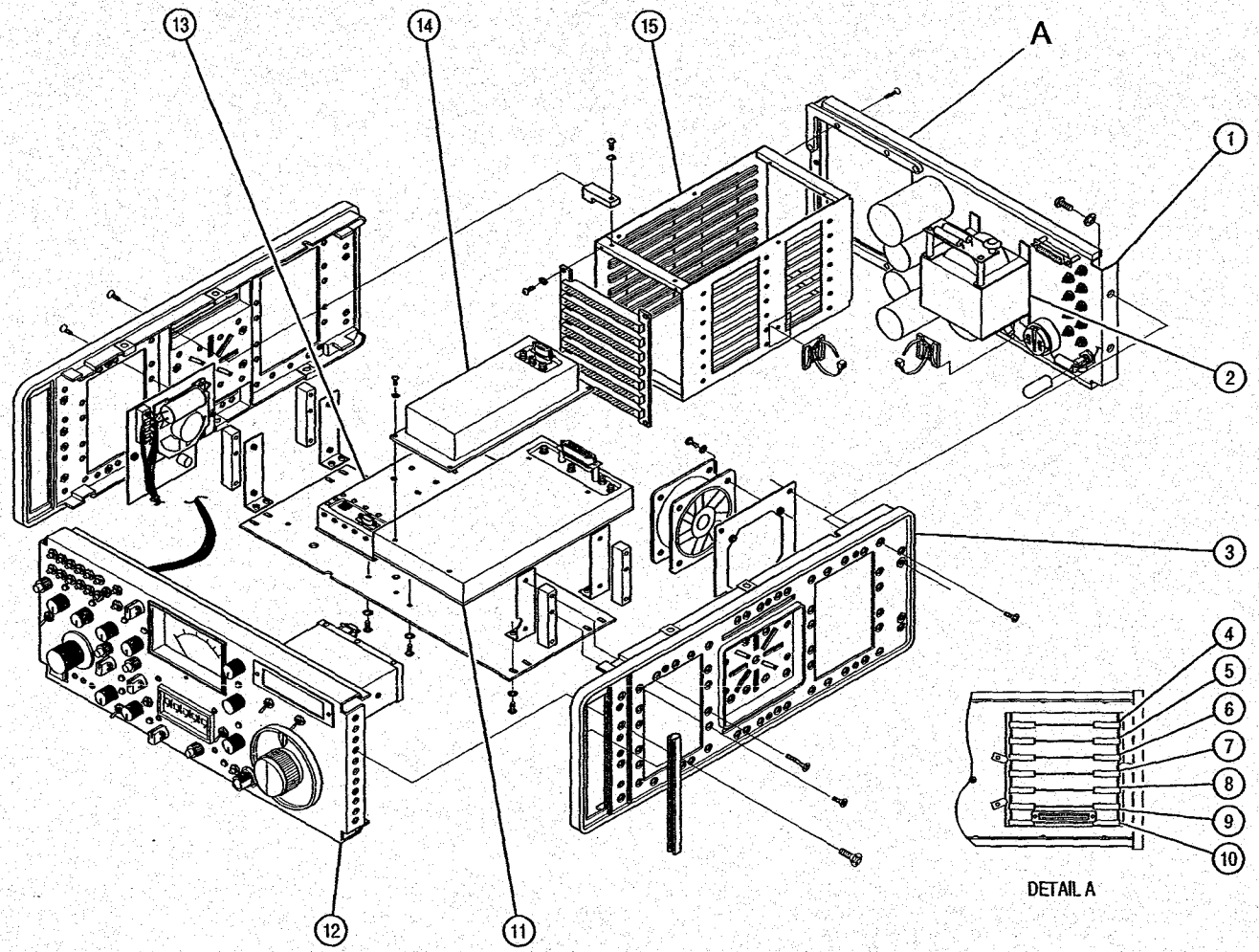
In all modes of operation, the RF generator is crystal controlled and phase-locked in 25 kHz steps. Automatic frequency stepping at a variable rate is provided, selectable in 25, 50, 100 or 200 kHz increments. In addition, a Variable Frequency control provides ± 30 kHz on MKR BEACON, ± 50 kHz on VOR, LOC and COMM, and ± 150 kHz on G/S frequencies.

(5) Marker Beacon

The NAV-750B simulates Inner, Middle and Outer Marker Beacon receivers. Marker Beacon RF output ranges from 70.000 to 79.000 MHz. The Marker Beacon RF output level is variable with a calibrated output attenuator.

C. NAV-750B Composite

Refer to 1-1-1, Figure 1 for NAV-750B Composite drawing with Module/PC Board identification.



ITEM	DESCRIPTION
1	REAR PANEL ASSEMBLY
2	POWER SUPPLY ASSEMBLY
3	SIDE PANEL
4	BEARING CHECK AND CORRECTOR PC BOARD
5	30 Hz SINE PC BOARD
6	TONE SUMMATION PC BOARD
7	BEARING LOGIC PC BOARD
8	LOCALIZER/BEARING CONTROL PC BOARD
9	FREQUENCY CONTROL PC BOARD
10	REMOTE CHANNELING PC BOARD
11	12.5 kHz PHASE LOCK ASSEMBLY
12	FRONT PANEL ASSEMBLY
13	MODULATOR/AMPLIFIER ASSEMBLY
14	NAV-750B OSCILLATOR ASSEMBLY
15	CARD CAGE

NAV-750B Composite
Figure 1

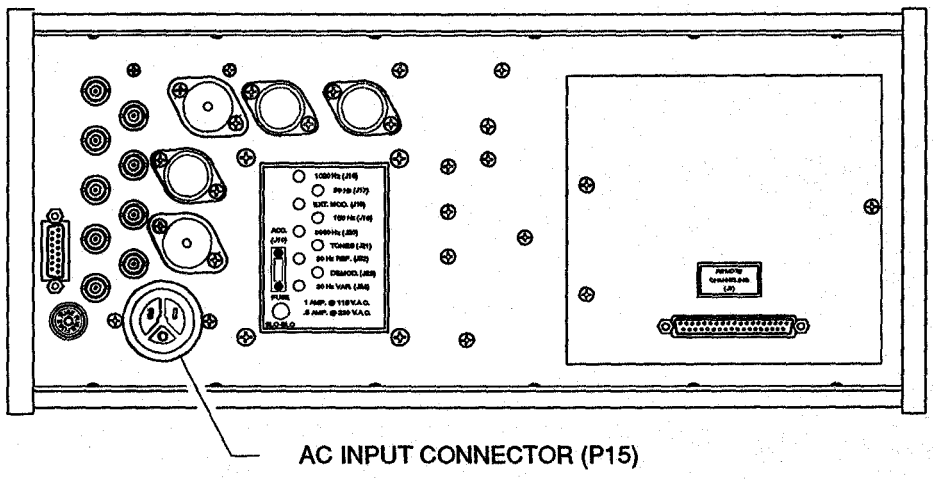
SECTION 2 - OPERATION

1. Installation

A. General

Installation of the NAV-750B is a simple procedure consisting of the following:

STEP	PROCEDURE
1.	Set NAV-750B into an operating position.
2.	Furnish electrical power to NAV-750B by connecting ac power cable from AC INPUT CONNECTOR to available power source (either 105 to 120 Vac or 220 to 250 Vac, 50 to 400 Hz).



AC Input Connector
Figure 2

B. Rack-Mount Installation

The NAV-750B is normally shipped from the factory with plastic feet installed for bench-top installation. Conversion from bench-top to rack-mount installation is possible by ordering the Rack-Mount Kit (IFR SYSTEMS, INC., Part Number 7001-7636-800). One kit per instrument is required for installation.

C. Safety Precautions

Listed are several important safety precautions which must be observed during installation and operation. IFR SYSTEMS, INC., assumes no liability for customer's failure to comply with any of the safety precautions outlined in this manual.

(1) Complying with Instructions

Operators should not attempt to operate the NAV-750B without reading and complying with all instructions contained in this manual. All procedures contained in this manual must be performed in exact sequence and manner described.

(2) Power Cord

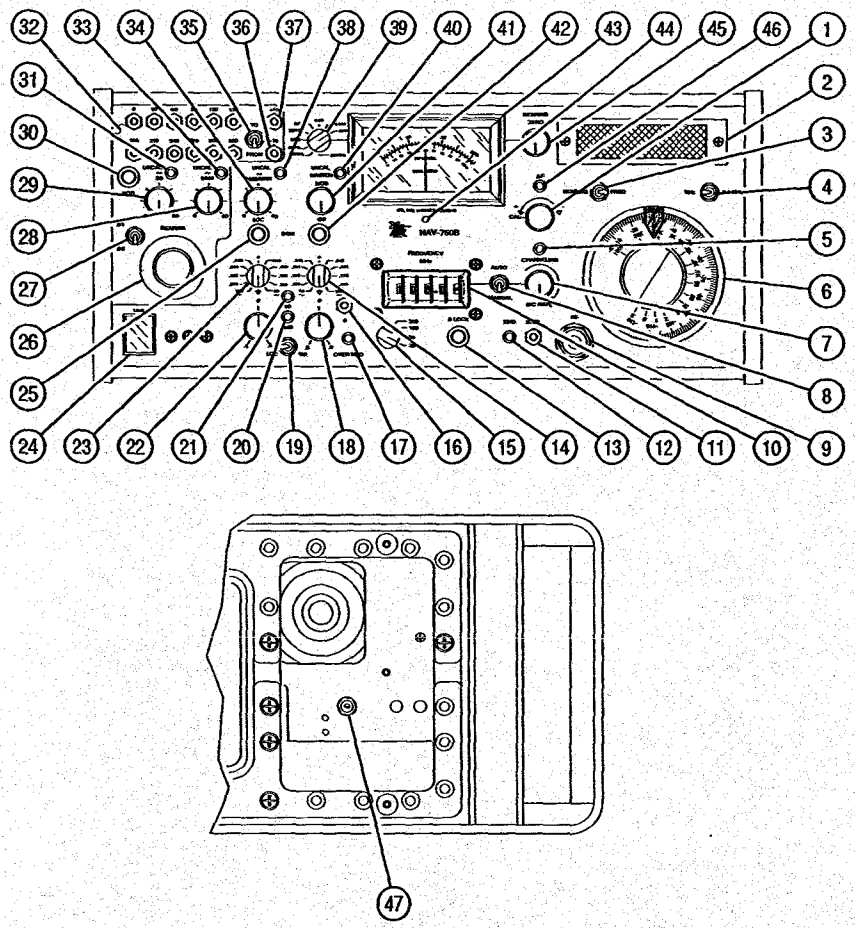
The power cord is equipped with a standard three-prong plug which must be connected to a properly grounded three-prong wall receptacle. The customer's responsibilities are:

(a) Have a qualified electrician check wall receptacle(s) for proper grounding.

(b) Replace any standard two-prong wall receptacle(s) with properly grounded three-prong receptacle(s).

WARNING: DUE TO POTENTIAL SAFETY HAZARDS, USE OF THREE-PRONG TO TWO-PRONG ADAPTOR PLUG IS NOT RECOMMENDED.

2. Description of Controls, Connectors and Indicators



NAV-750B Front and Side Panels
Figure 3

ITEM	CONTROL
1.	DELTA F CONTROL
2.	BEARING-FREQUENCY DISPLAY
3.	BEARING-FREQUENCY DISPLAY SWITCH
4.	FREQUENCY RESOLUTION SWITCH
5.	CHANNELING INDICATOR
6.	RF OUTPUT ATTENUATOR
7.	CHANNELING RATE CONTROL
8.	AUTO-MANUAL FREQUENCY CONTROL SWITCH
9.	RF OUTPUT CONNECTOR (J3)
10.	FREQUENCY SELECTOR SWITCHES
11.	MANUAL FREQUENCY STEP SWITCH
12.	END CHANNELING INDICATOR
13.	PHASE LOCK INDICATOR
14.	G/S DDM SELECTOR SWITCH
15.	CHANNELING FREQUENCY INCREMENT SWITCH
16.	90 Hz-150 Hz PHASE DEVIATION SWITCH
17.	OVERMODULATION INDICATOR
18.	G/S VARIABLE DDM CONTROL
19.	LOC-G/S FREQUENCY SELECT SWITCH
20.	150 Hz TONE OFF INDICATOR
21.	90 Hz TONE OFF INDICATOR
22.	LOC VARIABLE DDM CONTROL
23.	LOC DDM SELECTOR SWITCH
24.	AC POWER LINE SWITCH
25.	LOC MODE INDICATOR
26.	VARIABLE BEARING CONTROL
27.	VARIABLE BEARING SELECT SWITCH
28.	9960 Hz TONE MODULATION LEVEL CONTROL
29.	30 Hz TONE MODULATION LEVEL CONTROL
30.	VOR MODE INDICATOR
31.	30 Hz UNCAL INDICATOR
32.	VOR BEARING SELECT PUSHBUTTON SWITCHES
33.	9960 Hz UNCAL INDICATOR
34.	1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL
35.	TO-FROM BEARING SWITCH
36.	-10 DEGREE BEARING PUSHBUTTON SWITCH
37.	+10 DEGREE BEARING PUSHBUTTON SWITCH
38.	1020 Hz UNCAL INDICATOR
39.	METER FUNCTION AND TONE SELECTOR SWITCH
40.	MASTER MODULATION UNCAL INDICATOR
41.	MASTER MODULATION LEVEL CONTROL
42.	G/S MODE INDICATOR
43.	METER
44.	METER ADJUSTMENT SCREW
45.	BEARING ZERO ADJUST CONTROL
46.	DELTA F INDICATOR
47.	AUDIO LEVEL CONTROL

A. Front Panel (Refer to 2-2-2, Figure 3)

STEP	PROCEDURE

1. DELTA F CONTROL

   When in detent (fully ccw) position, there is no effect on the RF output frequency. When rotated cw, the RF output frequency is displayed as follows on BEARING-FREQUENCY DISPLAY (2):

   ± 30 kHz in 70.000 to 79.000 MHz range
   ± 50 kHz in 108.000 to 157.000 MHz range
   ± 150 kHz in 329.000 to 335.000 MHz range

2. BEARING-FREQUENCY DISPLAY

   Indicates the VOR bearing or generator output frequency.

3. BEARING-FREQUENCY DISPLAY SWITCH

   Selects either output frequency or VOR bearing information for display on BEARING-FREQUENCY DISPLAY (2).

4. FREQUENCY RESOLUTION SWITCH

   Selects readout of the display to indicate the output frequency to the nearest 1 kHz or 100 kHz.

5. CHANNELING INDICATOR

   Indicator is ON when the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) is set to AUTO.

6. RF OUTPUT ATTENUATOR

   Sets the RF output level to any value between -120 dBm and -6 dBm.

7. CHANNELING RATE CONTROL

   Sets desired channeling rate when the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) is set to AUTO. Maximum channeling rate is fully cw and fully ccw stops automatic channeling.

STEP PROCEDURE

8. AUTO-MANUAL FREQUENCY CONTROL SWITCH

   Selects AUTO or MANUAL channeling. The CHANNELING INDICATOR (5) is ON when set to AUTO.

9. RF OUTPUT CONNECTOR (J3)

   Provides RF to UUT. 50 Ω impedance.

10. FREQUENCY SELECTOR SWITCHES

    Sets the output frequency of the RF generator when AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) is set to MANUAL. When AUTO channeling is used, these switches set the starting frequency.

11. MANUAL FREQUENCY STEP SWITCH

    Used to advance the RF output one increment each time the switch is pressed. The AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) must be set to AUTO and the CHANNELING RATE CONTROL (7) set fully ccw.

12. END CHANNELING INDICATOR

    Indicator is ON when channeling reaches 117.950 MHz, 135.975 MHz or 157.950 MHz. Auto channeling will stop at these frequencies.

13. PHASE LOCK INDICATOR

    When ON, confirms RF generator is controlled by phase-lock system. When OFF, generator is out of frequency control.

14. G/S DDM SELECTOR SWITCH

    Provides precise G/S deviations in 0.045, 0.091, 0.175 and 0.400 DDM increments. Right rotation attenuates the 90 Hz tone which simulates "Aircraft Low" on G/S condition and causes the UUT G/S pointer movement to be UP. When positioned to either the 90 Hz or 150 Hz detents, only the selected tone is present and the other is OFF. In the downward position, the Variable DDM control is activated and G/S DDM may be continuously controlled from -0.8 to +0.8 DDM.

STEP PROCEDURE

15. CHANNELING FREQUENCY INCREMENT SWITCH

Provides four channel spacing choices for automatic channeling: 25 kHz, 50 kHz, 100 kHz and 200 kHz steps. Automatic channeling increases the output frequency in the selected frequency increment.

16. 90 Hz-150 Hz PHASE DEVIATION SWITCH

The phase relationship between the 90 Hz and 150 Hz LOC and G/S tones is normally fixed to within ± 0.1°.

NOTE: The term "phase relationship" refers to relative phase position of the 90 and 150 Hz tone signals every 1/30 second from a given time. The phase difference between the two tones is constantly changing, but their relative phase positions, for a given set of circuit constants, are the same every 1/30 second.

For testing purposes, the phase relationship can be varied by retarding the 150 Hz tone relative to the 90 Hz tone 5° for each degree of selected VOR bearing while the pushbutton switch is pressed.

EXAMPLE: Selecting 30° VOR bearing and pressing the 90 Hz-150 Hz PHASE DEVIATION SWITCH (16) will shift the phase relationship between the two tones 50°. When the VOR bearing is 12° and the 90 Hz-150 Hz PHASE DEVIATION SWITCH (16) is pressed, there is a 60° phase shift and the amplitude summation of the 90 Hz and 150 Hz tones is greatest.

17. OVERMODULATION INDICATOR

Indicator is ON when the RF carrier modulation level reaches 100%.

18. G/S VARIABLE DDM CONTROL

When the G/S DDM SELECTOR SWITCH (14) is pointing down, the G/S VARIABLE DDM CONTROL (18) is activated and can be turned left and right of center to obtain G/S deviation of ± 0.8 DDM.

STEP PROCEDURE

19. LOC-G/S FREQUENCY SELECT SWITCH

Provides immediate selection of the G/S frequency paired to the selected or displayed LOC frequency. In LOC position, and when a LOC frequency has been selected or channeled, the LOC mode and modulation will be selected. In the G/S position, the G/S mode and modulation will be selected if a LOC-G/S paired frequency is channeled.

20. 150 Hz TONE OFF INDICATOR

Indicator is ON when 150 Hz tone is OFF.

21. 90 Hz TONE OFF INDICATOR

Indicator is ON when 90 Hz tone is OFF.

22. LOC VARIABLE DDM CONTROL

When the LOC DDM SELECTOR SWITCH (23) is pointing down, the LOC VARIABLE DDM CONTROL (22) is activated and can be turned left and right of center to obtain LOC deviation of ± 0.4 DDM.

23. LOC DDM SELECTOR SWITCH

Provides precise LOC deviations in 0.046, 0.093, 0.155, and 0.200 DDM increments. Right rotation attenuates the 150 Hz tone which simulates "Aircraft Left" on LOC condition and causes the UUT LOC pointer movement to the right. When positioned to either the 90 Hz or 150 Hz detents, only the selected tone is present and the other is OFF. In the downward position, the Variable DDM control is activated and LOC DDM may be continuously controlled from -0.4 to +0.4 DDM.

24. AC POWER LINE SWITCH

Applies power to NAV-750B. Switch is illuminated when power is ON.

25. LOC MODE INDICATOR

Indicator is ON whenever the NAV-750B is in LOC mode of operation.

STEP PROCEDURE

26. VARIABLE BEARING CONTROL

Increases VOR bearing when rotated cw and decreases VOR bearing when rotated ccw. The bearing incremental change depends upon the position generated by the VARIABLE BEARING SELECT SWITCH (27).

27. VARIABLE BEARING SELECT SWITCH

Selects 0.01° or 0.05° incremental bearing changes generated by the VARIABLE BEARING CONTROL (26).

28. 9960 Hz TONE MODULATION LEVEL CONTROL

When set to UNCAL fully ccw (0), the 9960 Hz tone modulation level in the VOR mode is set to 30%. When rotating cw, the modulation level is varied from 0 to 60%.

29. 30 Hz TONE MODULATION LEVEL CONTROL

When set UNCAL fully ccw (0), the 30 Hz tone modulation level in the VOR mode is set to 30%. When rotating cw, the modulation level can be varied from 0 to 60%.

30. VOR MODE INDICATOR

Indicator is ON whenever the NAV-750B is in VOR mode of operation.

31. 30 Hz UNCAL INDICATOR

Indicator is ON whenever the 30 Hz TONE MODULATION LEVEL CONTROL (29) is not in the calibrated detent position.

STEP PROCEDURE

32. VOR BEARING SELECT PUSHBUTTON SWITCHES

BUTTON	RESULT
0	Sets VOR bearing to 0 Hz.
30	Sets VOR bearing to 30 Hz.
60	Sets VOR bearing to 60 Hz.
90	Sets VOR bearing to 90 Hz.
120	Sets VOR bearing to 120 Hz.
150	Sets VOR bearing to 150 Hz.
180	Sets VOR bearing to 180 Hz.
210	Sets VOR bearing to 210 Hz.
240	Sets VOR bearing to 240 Hz.
270	Sets VOR bearing to 270 Hz.
300	Sets VOR bearing to 300 Hz.
330	Sets VOR bearing to 330 Hz.

33. 9960 Hz UNCAL INDICATOR

Indicator is ON whenever 9960 Hz TONE MODULATION LEVEL CONTROL (28) is not in the calibrated detent position.

34. 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL

When rotated ccw into the calibrated detent position, the 1020 Hz tone is OFF in LOC and VOR modes and ON at 30% modulation level in COMM mode. On COMM, the tone may be deleted by setting the control to zero, and then varied for 0 to 60% modulation level. On VOR, the tone is added with cw rotation for modulation levels from 0 to 60%. When a MKR tone is selected while in MKR mode, the tone modulation level is automatically set to 95% with the tone modulation level control in the calibrated detent position. Out of the calibrated detent position, the control varies the modulation level from 0 to 98%.

35. TO-FROM BEARING SWITCH

Sets the phase relationship between 30 Hz REF and 30 Hz VAR tones to set the selected bearing to a TO or FROM bearing.

36. -10 DEGREE BEARING PUSHBUTTON SWITCH

When depressed, switch subtracts exactly 10° from VOR bearing.

STEP PROCEDURE

37. +10 DEGREE BEARING PUSHBUTTON SWITCH

When depressed, switch adds exactly 10° from VOR bearing.

38. 1020 Hz UNCAL INDICATOR

Indicator is ON whenever the 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL (34) is not in the calibrated detent position.

39. METER FUNCTION AND TONE SELECTOR SWITCH

Selects the METER (43) range and functions. In BRG and ZERO switch postions, the METER (43) indicates the accuracy of the VOR output. In RF position, the METER (43) indicates the RF level of the attenuator. The 0-30% and 0-100% positions are for monitoring or setting signal modulation levels.

NOTE: In the last clockwise position of the selector switch, the meter is inoperative with the terminals shorted. This position should be used to protect the meter from damage when the test set is being moved.

Selects the output frequency of the internal tone generator: 400 Hz, 1300 Hz or 3000 Hz.

NOTE: When a marker tone is selected, the METER (43) is automatically set to the 0-100% modulation range.

40. MASTER MODULATION UNCAL INDICATOR

Indicator is ON whenever the MASTER MODULATION LEVEL CONTROL (41) is not in the calibrated detent position.

41. MASTER MODULATION LEVEL CONTROL

When rotated cw and all other tone level controls are in the calibrated detent position, the tone modulation levels will vary from 0% to approximately twice the calibrated values or 100%, whichever is greater.

STEP PROCEDURE

42. G/S MODE INDICATOR

Indicator is ON whenever the NAV-750B is in G/S mode of operation.

43. METER

The indications as related to METER FUNCTION AND TONE SELECTOR SWITCH (39) positions are as follows:

A. BRG

Bearing deviation in 0.1° increments. The number 50 on the lower scale represents zero deviation. Each number to the left of 50 is -0.1° and each number to the right of 50 is +0.1°.

EXAMPLE: An indication at 20 is -0.3° deviation and 90 is +0.4° bearing deviation.

B. ZERO

The bearing check circuitry is set to zero using the Bearing Zero control.

C. RF

Monitors the RF level at the input of output attenuator.

D. 0-30

The top scale is used for modulation values ≤ 30%.

E. 0-100

The lower scale is used for modulation values ≤ 100%.

44. METER ADJUSTMENT SCREW

Mechanical zero adjustment for METER (43) when power to NAV-750B is OFF.

45. BEARING ZERO ADJUST CONTROL

Sets bearing check circuitry to zero as indicated by a center scale indication on the METER (43).

B. Rear Panel (Refer to 2-2-2, Figure 4)

STEP	PROCEDURE

48. REMOTE CHANNELING OUTPUT CONNECTOR (J8)

    Provides parallel BCD and ARINC 2 out of 5 code channeling information to remotely control a receiver to track the output frequency of the NAV-750B (refer to 2-2-4, Figure 6).

49. SUM-OF-TONES OUTPUT CONNECTOR (J21)

    Makes available the sum of all tones for the mode in use.

50. AC INPUT CONNECTOR (P15)

    AC power is applied to this connector.

    NOTE: For 230 Vac (50/60 Hz) operation, the primary windings of the power transformer must be rewired.

51. RF DEMOD OUTPUT CONNECTOR (J23)

    The demodulated RF output signal. The signal includes a dc offset of approximately 3.76 V.

52. AC LINE FUSE (F1)

    Fuse receptacle for ac power input; 1.0 Amps at 115 Vac or 0.5 Amps at 230 Vac.

53. 30 Hz VARIABLE TONE OUTPUT CONNECTOR (J24)

    30 Hz variable tone available for external use.

STEP PROCEDURE

54. ACCESSORY CONNECTOR (J10)

PIN	FUNCTION
1	+24V Regulated Output
2	+12V Regulated Output
3	+5V Regulated Output
4	GND
5	-12V Regulated Output
6	Remote Channeling Input
7	GND
8	GND for External Clock Select
9	External Bearing Clock Input
10	1020 Hz Tone Output
11	External Modulation Input
12	End of Channeling
13	N/C
14	N/C
15	N/C

55. 30 Hz REFERENCE TONE OUTPUT CONNECTOR (J22)

30 Hz reference tone available for external use.

56. 9960 Hz TONE OUTPUT CONNECTOR (J20)

9960 Hz tone available for external use.

57. 1020 Hz IDENT TONE OUTPUT CONNECTOR (J16)

1020 Hz tone available for external use.

58. EXTERNAL MODULATION INPUT CONNECTOR (J18)

External audio tones may be applied to this input to add modulation to any signal (Input Impedance: 1 kΩ nominal).

NOTE: The EXTERNAL MODULATION INPUT CONNECTOR (58) must be terminated with 100 Ω or less when not in use.

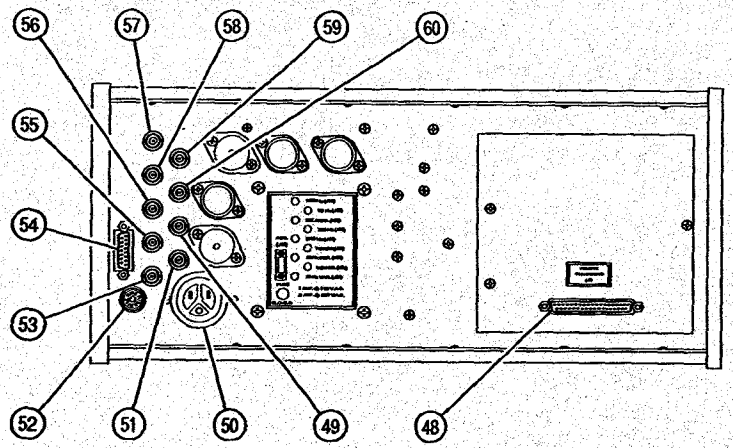
59. 90 Hz TONE OUTPUT CONNECTOR (J17)

90 Hz tone available for external use.

60. 150 Hz TONE OUTPUT CONNECTOR (J19)

150 Hz tone available for external use.

STEP	PROCEDURE
46.	DELTA F INDICATOR Indicator is ON whenever the DELTA F CONTROL (1) is not in the calibrated detent position.
47.	AUDIO LEVEL CONTROL Adjusts the audio level applied to the speaker. During channeling, when the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) is set to AUTO, a short tone burst indicates when the NAV-750B is advanced to a different frequency.



NAV-750B Rear Panel
Figure 4

ITEM	CONTROL
48.	REMOTE CHANNELING OUTPUT CONNECTOR (J8)
49.	SUM-OF-TONES OUTPUT CONNECTOR (J21)
50.	AC INPUT CONNECTOR (P15)
51.	RF DEMOD OUTPUT CONNECTOR (J23)
52.	AC LINE FUSE (F1)
53.	30 Hz VARIABLE TONE OUTPUT CONNECTOR (J24)
54.	ACCESSORY CONNECTOR (J10)
55.	30 Hz REFERENCE TONE OUTPUT CONNECTOR (J22)
56.	9960 Hz TONE OUTPUT CONNECTOR (J20)
57.	1020 Hz IDENT TONE OUTPUT CONNECTOR (J16)
58.	EXTERNAL MODULATION INPUT CONNECTOR (J18)
59.	90 Hz TONE OUTPUT CONNECTOR (J17)
60.	150 Hz TONE OUTPUT CONNECTOR (J19)

3. Performance Evaluation

A. General

This section contains a general performance check of the operating condition of the NAV-750B. If further testing is required, refer to 2-2-2 and 2-2-3 for Performance Verification and Calibration procedures.

B. Performance Evaluation Initial Control Settings

Refer to 1-2-2, Figure 3 for the location of the NAV-750B Front Panel controls.

CONTROL	SETTING
(1) DELTA F CONTROL	ccw
(3) BEARING-FREQUENCY DISPLAY SWITCH	BEARING
(4) FREQUENCY RESOLUTION SWITCH	kHz
(6) RF OUTPUT ATTENUATOR	-120
(7) CHANNELING RATE CONTROL	ccw
(8) AUTO-MANUAL FREQUENCY CONTROL SWITCH	MANUAL
(10) FREQUENCY SELECTOR SWITCHES	108.000
(14) G/S DDM SELECTOR SWITCH	0
(15) CHANNELING FREQUENCY INCREMENT SWITCH	25
(18) G/S VARIABLE DDM CONTROL	0
(19) LOC-G/S FREQUENCY SELECT SWITCH	LOC
(22) LOC VARIABLE DDM CONTROL	0
(23) LOC DDM SELECTOR SWITCH	0
(27) VARIABLE BEARING SELECT SWITCH	.01
(28) 9960 Hz TONE MODULATION LEVEL CONTROL	CAL
(29) 30 Hz TONE MODULATION LEVEL CONTROL	CAL
(34) 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL	CAL
(35) TO-FROM BEARING SWITCH	FROM
(39) METER FUNCTION AND TONE SELECTOR SWITCH	0-100
(41) MASTER MODULATION LEVEL CONTROL	CAL

C. Performance Evaluation Procedure

STEP	PROCEDURE
1.	Set METER FUNCTION AND TONE SELECTOR SWITCH (39) to ZERO and verify BEARING-FREQUENCY DISPLAY (2) is 0.00.
2.	Press 90 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and verify BEARING-FREQUENCY DISPLAY (2) is 90.00.
3.	Adjust BEARING ZERO ADJUST CONTROL (45) to center METER (43) needle.
4.	Set TO-FROM BEARING SWITCH (35) to TO.
5.	Set METER FUNCTION AND TONE SELECTOR SWITCH (39) to BRG and verify METER (43) indication remains at bearing zero (± 0.05°).
6.	Set TO-FROM BEARING SWITCH (35) to FROM and verify METER (43) indication returns to bearing zero (± 0.05°).
7.	Press 270 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and verify METER (43) indication returns to bearing zero (± 0.05°).
8.	Set TO-FROM BEARING SWITCH (35) to TO and verify METER (43) indication returns to bearing zero (± 0.05°).
9.	Set METER FUNCTION AND TONE SELECTOR SWITCH (39) to ZERO and verify METER (43) indication remains at bearing zero (± 0.05°).

4. General Operating Procedures

A. General

The following information is intended to supplement the user's test procedures relating to specific equipment and demonstrate the capability of the NAV-750B.

(1) Operating Modes and Tone Modulations

The NAV-750B operates in VOR, LOC, G/S, COMM and MKR BEACON modes. Each mode is chosen by selecting the appropriate carrier frequency. The Automatic Channeling feature allows receiver channeling in 25, 50, 100 or 200 kHz increments. While operating in the LOC mode, the appropriately paired G/S channel may be instantly selected by setting the LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S.

In VOR mode, the RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard VOR signal consisting of:

NOTE: 9960 Hz frequency is modulated at a deviation ratio of 16 by the 30 Hz Reference Tone.

Tone	% Modulation
30 Hz VAR	30%
9960 Hz	30%

In LOC mode, the RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard LOC signal consisting of:

Tone	% Modulation
90 Hz	20%
150 Hz	20%

In G/S mode, the RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a standard G/S signal consisting of:

Tone	% Modulation
90 Hz	40%
150 Hz	40%

In VOR, LOC, and G/S modes, the 1020 Hz IDENT tone may be added from 0 to 60% modulation by rotating the 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL (34) cw.

In COMM mode, the RF output is automatically modulated (with all modulation level controls set to calibrated detent position) with a 1020 Hz IDENT signal at 30%.

In MKR BEACON mode, the RF output is modulated at 95% by a MKR BEACON tone selected by the METER FUNCTION AND TONE SELECTOR SWITCH (39). When the METER FUNCTION AND TONE SELECTOR SWITCH (39) is not set to a MKR BEACON tone, the RF output (70.000 to 79.900 MHz) is automatically modulated with the 1020 Hz tone at 95%.

(2) Tones Available for Special Testing

On the Rear Panel, each of the modulating tones is available for use in specialized receiver section tests.

(3) Equipment Connections

Connections to a NAV-COMM receiver are shown in 1-2-4, Figure 5. Only the antenna lead needs to be connected if remote channeling is not used. For remote channeling pin out connections to REMOTE CHANNELING OUTPUT CONNECTOR (J8) (48), refer to 1-2-4, Figure 6. 1-2-4, Figure 6 also provides ARINC 2 out 5 code information available at the REMOTE CHANNELING OUTPUT CONNECTOR (J8) (48). The relay outputs provide ARINC 2/5 code and the transistors provide the parallel BCD code. A 37 position connector is supplied with the test set for use in constructing a remote channeling cable between the REMOTE CHANNELING OUTPUT CONNECTOR (J8) (48) and the UUT.

B. General Operating Procedures Initial Control Settings

Refer to 1-2-2, Figure 3 for the location of the NAV-750B Front Panel Controls.

CONTROL	SETTING
(1) DELTA F CONTROL	ccw
(3) BEARING-FREQUENCY DISPLAY SWITCH	BEARING
(4) FREQUENCY RESOLUTION SWITCH	kHz
(6) RF OUTPUT ATTENUATOR	-120
(7) CHANNELING RATE CONTROL	ccw
(8) AUTO-MANUAL FREQUENCY CONTROL SWITCH	MANUAL
(10) FREQUENCY SELECTOR SWITCHES	108.000
(14) G/S DDM SELECTOR SWITCH	0
(15) CHANNELING FREQUENCY INCREMENT SWITCH	25
(18) G/S VARIABLE DDM CONTROL	0
(19) LOC-G/S FREQUENCY SELECT SWITCH	LOC
(22) LOC VARIABLE DDM CONTROL	0
(23) LOC DDM SELECTOR SWITCH	0
(27) VARIABLE BEARING SELECT SWITCH	.01
(28) 9960 Hz TONE MODULATION LEVEL CONTROL	CAL
(29) 30 Hz TONE MODULATION LEVEL CONTROL	CAL
(34) 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL	CAL
(35) TO-FROM BEARING SWITCH	FROM
(39) METER FUNCTION AND TONE SELECTOR SWITCH	0-100
(41) MASTER MODULATION LEVEL CONTROL	CAL

C. NAV-750B Test Examples

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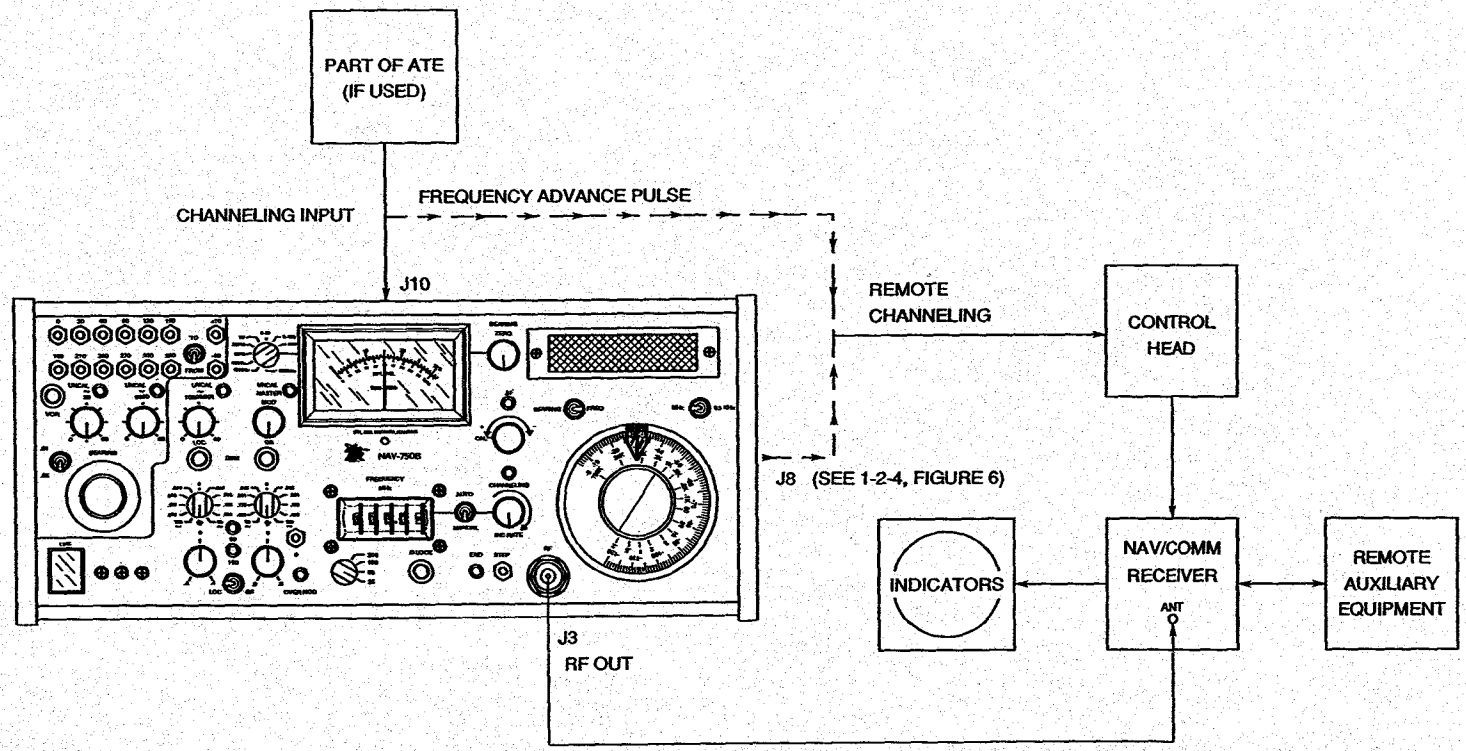
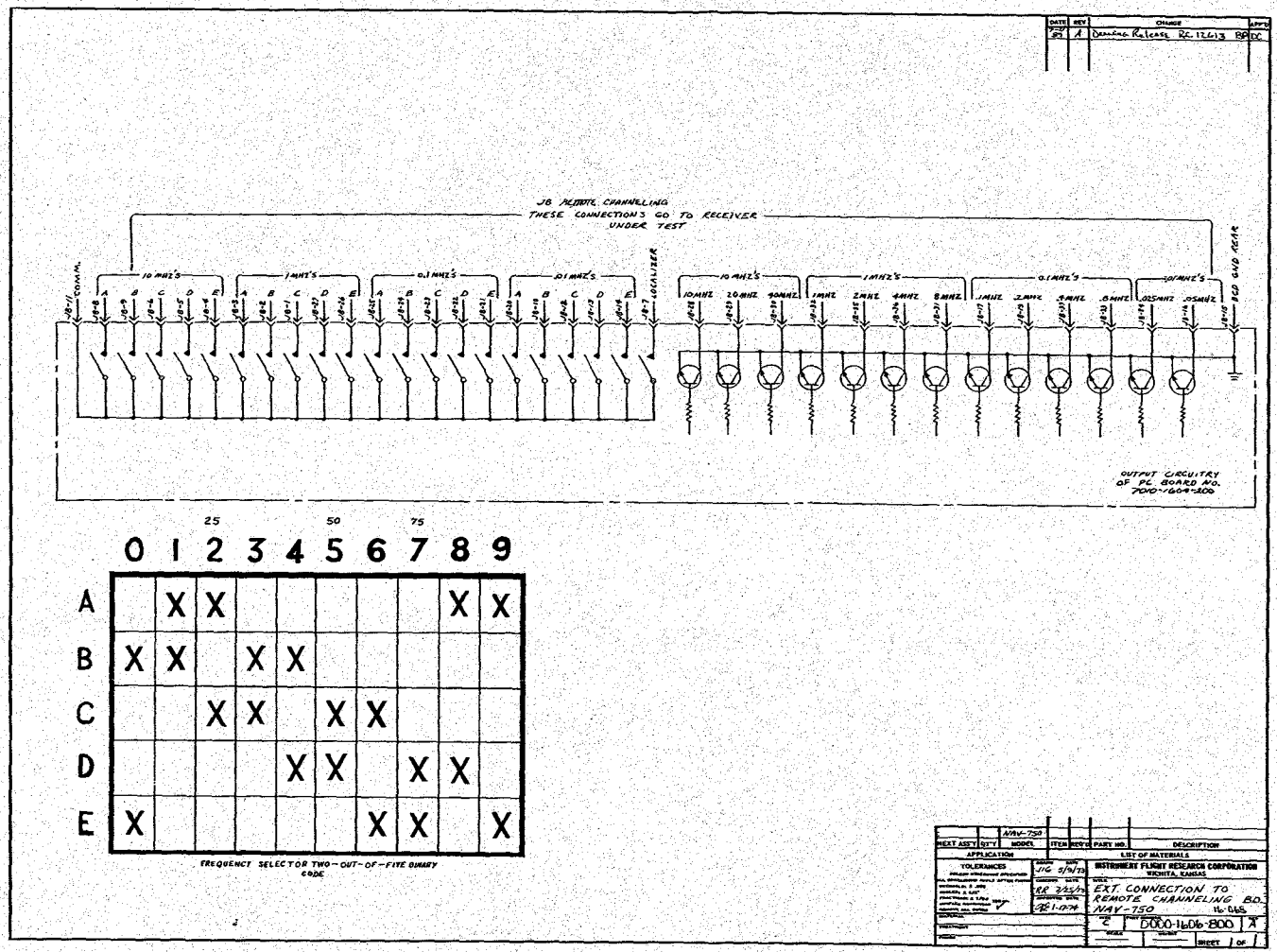


Connections for VOR/LOC/COMM/G/S Receiver Testing
Figure 5



Remote Channeling Pin Out Connections
Figure 6

(1) VOR Receiver Test Examples

(a) General

The NAV-750B automatically produces a standard VOR test signal, variable in RF level from -120 to -6 dBm (.22 to 112.000 µV into a 50 Ω load), whenever a VOR frequency is selected. The 30 Hz VAR tone percentage of modulation is varied from 0% to 50% with the 30 Hz TONE MODULATION LEVEL CONTROL (29) when rotated out of the calibrated detent position. The 9960 Hz Tone (frequency modulated with the 30 Hz REF tone) percentage of modulation is varied from 0% to 50% with the 9960 Hz TONE MODULATION LEVEL CONTROL (28) when rotated out of the calibrated detent position. The 1020 Hz IDENT tone is normally OFF in VOR and is added by rotating the 1020 Hz IDENT AND MKR BEACON TONE MODULATION LEVEL CONTROL (34) cw. The MASTER MODULATION LEVEL CONTROL (41) varies all tone percent modulation levels from 0% to 60% when rotated out of the calibrated detent position. VOR bearings are selected using the 12 VOR BEARING PUSHBUTTON SWITCHES (32), +10 DEGREE BEARING PUSHBUTTON SWITCH (37), -10 DEGREE BEARING PUSHBUTTON SWITCH (36) or VARIABLE BEARING CONTROL (26). The generated bearing is displayed when the BEARING-FREQUENCY SELECT SWITCH (3) is set to BEARING.

VOR Test Signal Definitions are as follows:

1 Standard VOR Test Signal

An RF VOR frequency, amplitude modulated simultaneously at 30% with a 9960 Hz subcarrier, which is frequency modulated at a deviation ratio of 16 by 30 Hz Reference phase tone, and a 30 Hz Variable phase tone at 30%, which is varied in phase with respect to the reference phase tone. The RF level of the Standard VOR Test Signal is 1000 µV.

2 Standard Centering Signal

A Standard VOR Test Signal in which the difference in phase between the reference and variable phase 30 Hz tones is equal to the setting of the UUT omni-bearing course selector.

3 Standard Deflection Signal

A Standard VOR Test Signal of 100 µV in which the difference in phase between the reference and variable phase 30 Hz tones is 10°, which produces an on-course CDI indication.

TEST EXAMPLE PAGE

(b) VOR Receiver System Bearing Accuracy Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the default control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -47.
2.	Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).
3.	Set omni-bearing selector to 0°.
4.	Verify CDI pointer is centered and ambiguity indicator indicates FROM.
5.	Set TO-FROM BEARING SWITCH (35) to TO.
6.	Verify ambiguity indicator indicates TO and CDI pointer is centered.
7.	Repeat Steps 2 thru 6 for each VOR BEARING SELECT PUSHBUTTON SWITCH (32).

(c) VOR Receiver Bearing Accuracy while Varying 30 Hz VAR Tone Modulation (± 5%) Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -47.
2.	Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).
3.	Set omni-bearing selector to 0°.
4.	Verify CDI pointer is centered and ambiguity indicator indicates FROM.
5.	Verify approximately 60% modulation indication on METER (43). Rotate 30 Hz TONE MODULATION LEVEL CONTROL (29) cw until METER (43) indicates 60% modulation.
6.	Rotate 30 Hz TONE MODULATION LEVEL CONTROL (29) ± 5%, by observing the METER (43) modulation indication for a ± 5% modulation change and record CDI pointer error resulting from 30 Hz TONE MODULATION LEVEL CONTROL (29) modulation change.
7.	Set TO-FROM BEARING SWITCH (35) to TO and repeat Step 6.
8.	Repeat Steps 2 thru 6 for each VOR BEARING SELECT PUSHBUTTON SWITCH (32).

(d) VOR Receiver Bearing Accuracy while Varying RF Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -47 and BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ.
2.	Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).
3.	Set omni-bearing selector to 0°.
4.	Verify CDI pointer is centered and ambiguity indicator indicates FROM.
5.	Rotate DELTA F CONTROL (1) cw to offset the carrier frequency between limits specified by the manufacturer and record resulting CDI pointer error.
6.	Set TO-FROM BEARING SWITCH (35) to TO and repeat Step 5.
7.	Repeat Steps 2 thru 6 for each VOR BEARING SELECT PUSHBUTTON SWITCH (32).

(e) VOR Receiver Accuracy while Varying RF Signal Level Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -47.
2.	Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).
3.	Set omni-bearing selector to 0°.
4.	Verify CDI pointer is centered and ambiguity indicator indicates FROM.
5.	Rotate RF OUTPUT ATTENUATOR (6) from -87 to -21 and record CDI pointer error.
6.	Set TO-FROM BEARING SWITCH (35) to TO and repeat Step 5.
7.	Repeat Steps 2 thru 6 for each VOR BEARING SELECT PUSHBUTTON SWITCH (32).

(f) VOR CDI Test Example

ACCESSORY EQUIPMENT: Stopwatch
Ruler

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE

CDI POINTER DEFLECTION SENSITIVITY TEST

1. Set RF OUTPUT ATTENUATOR (6) to -67.
2. Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).
3. Set omni-bearing selector to 0°.
4. Verify CDI pointer is centered and ambiguity indicator indicates FROM.
5. Press +10 DEGREE BEARING PUSHBUTTON SWITCH (37), verify METER (43) indicates 10° bearing increase and record CDI pointer deflection.
6. Vary RF OUTPUT ATTENUATOR (6) from -87 to -21 and record CDI pointer variation.
7. Press -10 DEGREE BEARING PUSHBUTTON SWITCH (36) twice, verify METER (43) indicates -20° bearing change and record CDI pointer deflection.
8. Repeat Step 7 and record CDI pointer variation.
9. Compare results in Steps 5, 7 and 8 with UUT manufacturer's specifications.

CDI POINTER RESPONSE TIME TEST

10. Set RF OUTPUT ATTENUATOR (6) to -67 and press +10 DEGREE BEARING SELECT PUSHBUTTON SWITCH (37) for an on-course CDI indication.

STEP	PROCEDURE

11. Press +10 DEGREE BEARING SELECT PUSHBUTTON SWITCH (37) and record, with stopwatch, the time required for the CDI pointer to deflect 70% of maximum deflection.

12. Press -10 DEGREE BEARING SELECT PUSHBUTTON SWITCH (36) for an on-course CDI indication and press -10 DEGREE BEARING SELECT PUSHBUTTON SWITCH (36) and record, with stopwatch, the time required for the CDI pointer to deflect 70% of maximum deflection.

13. Compare results in Steps 11 and 12 with manufacturer's specifications.

CDI POINTER LINEARITY TEST

14. Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and rotate VARIABLE BEARING CONTROL (26) for an on-course (FROM) CDI indication.

15. Rotate VARIABLE BEARING CONTROL (26) in 2° increments to 10° and record the CDI pointer 2° increments.

NOTE: Increments should be equal.

16. Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and rotate VARIABLE BEARING CONTROL (26) in 2° increments to 10° and record the CDI pointer 2° increments.

NOTE: Increments should be equal.

(g) CDI Ambiguity (TO-FROM) Indicator Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -47.
2.	Select test signal on NAV-750B which results in an on-course (FROM) CDI indication.
3.	Rotate VARIABLE BEARING CONTROL (26) ± 60° and verify CDI indication remains FROM.
4.	Set TO-FROM BEARING SWITCH (35) to TO, rotate VARIABLE BEARING CONTROL (26) ± 60° and verify CDI indication remains TO.
5.	Repeat Steps 2, 3 and 4 at various RF OUTPUT ATTENUATOR (6) settings between -87 and -21.

(h) CDI Alarm Signal (Warning Flag) Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -67.
	NORMAL SIGNAL
2.	Verify Alarm Signal (Warning Flag) is out of sight or OFF.
	NORMAL SIGNAL FLUCTUATING RF
3.	Rotate RF OUTPUT ATTENUATOR (6) from -87 to -21 and verify Alarm Signal (Warning Flag) is out of sight or OFF.
	SIGNAL ABSENT
4.	Set RF OUTPUT ATTENUATOR (6) to -112 and disconnect cable from RF OUTPUT CONNECTOR (J3) (9). Verify Alarm Signal (Warning Flag) is visible.
	MISSING 9960 Hz TONE
5.	Connect cable to RF OUTPUT CONNECTOR (J3) (9) and set RF OUTPUT ATTENUATOR (6) to -67. Verify Alarm Signal (Warning Flag) is out of sight or OFF.
6.	Set 9960 Hz TONE MODULATION LEVEL CONTROL (28) to UNCAL fully ccw (0) and verify Alarm Signal (Warning Flag) is visible.
7.	Rotate RF OUTPUT ATTENUATOR (6) from -87 to -21 and verify Alarm Signal (Warning Flag) remains visible.
	MISSING 30 Hz TONE
8.	Set 9960 Hz TONE MODULATION LEVEL CONTROL (28) to CAL.
9.	Set 30 Hz TONE MODULATION LEVEL CONTROL (29) to UNCAL fully ccw (0) and verify Alarm Signal (Warning Flag) is visible.

STEP PROCEDURE

10. Rotate RF OUTPUT ATTENUATOR (6) from -87 to -21 and verify Alarm Signal (Warning Flag) remains visible.

MARGINAL SIGNAL STRENGTH

11. Set 30 Hz TONE MODULATION LEVEL CONTROL (29) to CAL.

12. Set RF OUTPUT ATTENUATOR (6) to -67.

13. Set omni-bearing selector to 0 FROM.

14. Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32).

NOTE: If necessary, use VARIABLE BEARING CONTROL (26) to center CDI pointer.

15. Press +10 DEGREE BEARING PUSHBUTTON SWITCH (37) and verify CDI pointer is deflected for 10° course deviation. Record deviation.

16. Decrease RF OUTPUT ATTENUATOR (6) for 50% of CDI pointer deflection recorded in Step 15. Verify the Warning Flag begins to enter the alarm condition.

(i) VOR Receiver Sensitivity Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR CONTROL (6) to-67.
2.	Rotate VARIABLE BEARING CONTROL (26) for an on-course (FROM) CDI indication.
3.	Press +10 DEGREE BEARING PUSHBUTTON SWITCH (37) or -10 DEGREE BEARING SELECT PUSHBUTTON SWITCH (36) for Standard Deflection signal and verify METER (43) has changed 10° and CDI pointer is deflected appropriately (Standard Deflection).
4.	Rotate RF OUTPUT ATTENUATOR (6) until deflection of CDI pointer is 50% of Standard Deflection in Step 3.
5.	Refer to Appendix A to determine receiver sensitivity, using RF OUTPUT ATTENUATOR (6) setting in Step 4.
6.	Repeat Steps 4 and 5 for each VOR channel.

(2) Automatic Frequency Channeling Test Example

(a) General

The NAV-750B can automatically channel UP, in frequency only, a VHF NAV-COMM receiver. The frequency increment (25, 50, 100, and 200 kHz) is selected with the CHANNELING FREQUENCY INCREMENT SWITCH (15), according to NAV-COMM receiver channel spacing. Setting the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) to AUTO and rotating the CHANNELING RATE CONTROL (7) cw allows the operator to select a convenient channeling rate from 0 to a maximum of 4 advances per second. An audio tone announces each incremental advance and the BEARING-FREQUENCY DISPLAY (2) will indicate the RF output frequency if the BEARING-FREQUENCY DISPLAY SWITCH (3) is set to FREQ.

(b) NAV-COMM AUTO-Channeling Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

NOTE: The NAV-750B Auto-Channeling system is designed to stop automatically at 117.950, 135.975 and 157.950 MHz. To continue channeling when stopped at 117.950 and 135.975 MHz, set the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) to MANUAL and select the frequency of the next channel manually on the FREQUENCY SELECTOR SWITCHES (10). When the AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) is returned to AUTO, channeling will continue from the manually selected frequency.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ.
2.	Rotate CHANNELING RATE CONTROL (7) fully ccw.
3.	Set AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) to AUTO.

STEP	PROCEDURE

4. Rotate CHANNELING RATE CONTROL (7) cw to set desired channeling rate.

5. Verify output is appropriate for input signal at each channel.

   NOTE: Channeling can be stopped at any time by rotating CHANNELING RATE CONTROL (7) fully ccw.

(3) ILS LOC Receiver Test Examples

(a) General

In the LOC mode, when LOC MODE INDICATOR (25) is ON, the NAV-750B produces a variable RF output signal from -120 to -6 dBm in the 108.000 to 112.000 MHz band. The RF is modulated simultaneously with 90 Hz and 150 Hz tones at 20%. Specific depth of modulation relationships between these tones is available with the LOC DDM SELECTOR SWITCH (23). Continuously variable DDM control is available with the LOC VARIABLE DDM CONTROL (22). Right rotation of the LOC DDM SELECTOR SWITCH (23) or LOC VARIABLE DDM CONTROL (22) will result in right deflection of the CDI pointer and left deflection of the LOC DDM SELECTOR SWITCH (23) or LOC VARIABLE DDM CONTROL (22) will result in left deflection of the CDI pointer.

1 Standard Localizer Test Signal Definition

An RF carrier amplitude modulated simultaneously with 90 and 150 Hz tones so the sum of the separate modulation percentages equals 40% (± 2%).

2 Standard Localizer Centering Signal Definition

A Standard Localizer Test Signal in which the difference in depth of modulation (DDM) of the 90 and 150 Hz tones is < 0.002 (0.1 dB) and CDI pointer is centered.

3 Standard Localizer Deviation Signal Definition

A Standard Localizer Test Signal in which the difference in depth of modulation (DDM) of the 90 and 150 Hz tones is 0.093 (4 dB). In the case of indicators, in which the deflection from center to full scale is linear, standard deflection of the CDI pointer is 60% (90 μA) of full scale deflection.

4 Difference in Depth of Modulation (DDM) Definition

Difference in depth of modulation is the percentage modulation depth of the larger tone (90 or 150 Hz) minus the percentage modulation depth of the smaller tone divided by 100.

TEST EXAMPLE PAGE

(b) LOC Centering Accuracy Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -47 and FREQUENCY SELECTOR SWITCHES (10) to 108.100.
	STANDARD LOC CENTERING SIGNAL
2.	Center CDI LOC deviation pointer. Record any centering error or pointer deflection.
	CARRIER LEVEL VARIATION
3.	Rotate RF OUTPUT ATTENUATOR (6) from -73 to -27 and record centering error due to carrier level variation or pointer deflection.
	CARRIER FREQUENCY VARIATION
4.	Set RF OUTPUT ATTENUATOR (6) to -47.
5.	Rotate DELTA F CONTROL (1) ± 9 kHz and record CDI pointer variation.
6.	Repeat Step 5 for each LOC frequency.
7.	Set DELTA F CONTROL (1) to CAL.
	SIMULTANEOUS VARIATION OF 90 AND 150 Hz TONE MODULATION PERCENTAGES
8.	Rotate MASTER MODULATION LEVEL CONTROL (41) cw 4% above modulation indication on METER (43) and record centering error due to modulation variation or pointer deflection.
	VARIATION OF 90 AND 150 Hz TONE PHASE RELATIONSHIP (± 12 of COMMON 30 Hz SUBHARMONIC)
9.	Set G/S DDM SELECTOR SWITCH (14) to 150 and LOC DDM SELECTOR SWITCH (23) to 90.

STEP	PROCEDURE
10.	Verify METER (43) indicates 0% modulation.
11.	Rotate 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION LEVEL CONTROL (34) cw until METER (43) indicates 30% modulation.
12.	Set G/S DDM SELECTOR SWITCH (14) to 0 and LOC DDM SELECTOR SWITCH (23) to 0.
13.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to BEARING.
14.	Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and verify BEARING-FREQUENCY DISPLAY (2) is 0.00.
15.	Rotate VARIABLE BEARING CONTROL (26) cw until BEARING-FREQUENCY DISPLAY (2) is 12.00.
16.	Press 90 Hz-150 Hz PHASE DEVIATION SWITCH (16), record centering error and release 90 Hz-150 Hz PHASE DEVIATION SWITCH (16).
17.	Record centering error, due to tone phase shift, in pointer deflection.
18.	Rotate VARIABLE BEARING CONTROL (26) ccw until BEARING-FREQUENCY DISPLAY (2) is 348.00.
19.	Press 90 Hz-150 Hz PHASE DEVIATION SWITCH (16), record centering error and release 90 Hz-150 Hz PHASE DEVIATION SWITCH (16).
20.	Record centering error, due to tone phase shift, in pointer deflections.

(c) LOC CDI Deflection AGC Characteristics and Deflection Balance Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set FREQUENCY SELECTOR SWITCHES (10) to 108.100 and RF OUTPUT ATTENUATOR (6) to -47.
2.	Set LOC DDM SELECTOR SWITCH (23) to Left 0.155 and verify CDI pointer deflection is Left full scale.
3.	Set LOC DDM SELECTOR SWITCH (23) to Right 0.155 and verify CDI pointer deflection is Right full scale.
4.	Set LOC DDM SELECTOR SWITCH (23) to 0 and verify CDI pointer is centered.
5.	Set LOC DDM SELECTOR SWITCH (23) to Left 0.093 and verify CDI pointer is Left Standard Deflection (60% of full scale).
6.	Rotate RF OUTPUT ATTENUATOR (6) from -73 to -27 and record effect of RF level variation on CDI pointer deflection.
7.	Set LOC DDM SELECTOR SWITCH (23) to Right 0.093 and verify CDI pointer is Right Standard Deflection (60% of full scale).
8.	Rotate RF OUTPUT ATTENUATOR (6) from -73 to -27 and record effect of RF level variation on CDI pointer deflection.

(d) LOC RF Sensitivity Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ. RF OUTPUT ATTENUATOR (6) to -47 and FREQUENCY SELECTOR SWITCHES (10) to 108.100
2.	Verify CDI pointer is centered.
3.	Set LOC DDM SELECTOR SWITCH (23) to Left (or Right) 0.093 DDM and verify CDI pointer is deflected 60% of full scale (Standard Deflection).
4.	Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer deflection is 60% of Standard Deflection.
5.	Refer to Appendix A to determine LOC RF sensitivity.
6.	Repeat Steps 4 and 5 for each LOC channel.

(e) LOC Warning Signal Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE

1. Set (3) BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -67 and FREQUENCY SELECTOR SWITCHES (10) to 108.100.

   NORMAL SIGNAL

2. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

   NORMAL SIGNAL FLUCTUATING RF

3. Rotate RF OUTPUT ATTENUATOR (6) from -77 to -27 and verify Alarm Signal (Warning Flag) is out of sight or OFF.

   RF SIGNAL ABSENT

4. Set RF OUTPUT ATTENUATOR (6) to -112 and disconnect cable from RF OUTPUT CONNECTOR (J3) (22). Verify Alarm Signal (Warning Flag) is visible.

   MISSING 90 Hz OR 150 Hz TONES

5. Connect cable to RF OUTPUT CONNECTOR (J3) (9) and set RF OUTPUT ATTENUATOR (6) to -67. Verify Alarm Signal (Warning Flag) is out of sight or OFF.

6. Set G/S DDM SELECTOR SWITCH (14) to 150 Hz and verify Alarm Signal (Warning Flag) is visible.

7. Set G/S DDM SELECTOR SWITCH (14) to 90 Hz and verify Alarm Signal (Warning Flag) is visible.

STEP	PROCEDURE

MISSING 90 AND 150 Hz TONES

8. Set LOC DDM SELECTOR SWITCH (23) to 150 Hz and G/S DDM SELECTOR SWITCH (14) to 90 Hz. Verify Alarm Signal (Warning Flag) is visible.

MARGINAL LOC SIGNAL STRENGTH

9. Set RF OUTPUT ATTENUATOR (6) to -47, G/S DDM SELECTOR SWITCH (14) to 0 and LOC DDM SELECTOR SWITCH (23) to 0.093.

10. Verify CDI pointer is at Standard Deflection (60% of full scale).

11. Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer is deflected 50% of Standard Deflection and verify Alarm Signal (Warning Flag) is visible.

(f) ILS LOC Course Deviation Indication Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE

1. Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -47 and FREQUENCY SELECTOR SWITCHES (10) to 108.100.

2. Verify CDI LOC pointer is centered.

CDI LOC DEFLECTION RESPONSE (0.155 DDM)

3. Set LOC DDM SELECTOR SWITCH (23) to Left 0.155 and verify CDI pointer reaches 67% of full scale deflection within 2 seconds and then stops at full scale. Verify pointer overshoot does not exceed 5% of full scale deflection.

4. Set LOC DDM SELECTOR SWITCH (23) to Right 0.155 and verify CDI pointer reaches 67% of full scale deflection within 2 seconds and then stops at full scale. Verify pointer overshoot does not exceed 5% of full scale deflection.

CDI LOC DEFLECTION (0.200 DDM)

5. Set LOC DDM SELECTOR SWITCH (23) to Right 0.200 and verify pointer deflection does not decrease from full scale.

6. Set LOC DDM SELECTOR SWITCH (23) to Left 0.200 and verify pointer deflection does not decrease from full scale.

CDI LOC REFLECTION (0.093 DDM)

7. Set LOC DDM SELECTOR SWITCH (23) to Left 0.093 and verify pointer deflection is Left Standard.

8. Set LOC DDM SELECTOR SWITCH (23) to Right 0.093 and verify pointer deflection is Right Standard.

STEP	PROCEDURE

CDI LOC DEFLECTION (0.046 DDM)

9. Set LOC DDM SELECTOR SWITCH (23) to Right 0.046 and verify pointer deflection is Right Half Standard.

10. Set LOC DDM SELECTOR SWITCH (23) to Left 0.046 and verify pointer deflection is Left Half Standard.

11. Set LOC DDM SELECTOR SWITCH (23) to 0 and verify pointer is centered.

(4) G/S System Test Examples

(a) General

The NAV-750B automatically provides a standard Glide Slope signal, variable in RF level from -120 to -6 dBm (in the 330 MHz band) (.224 to 112,000 µV into a 50 Ω load) whenever a G/S frequency is selected. The G/S frequency may be selected with the FREQUENCY SELECTOR SWITCHES (10) or by setting the LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S. When operating in the LOC mode, the LOC-G/S FREQUENCY SELECT SWITCH (19) automatically provides the paired G/S frequency for the selected LOC channel. As in LOC mode, the RF is modulated with 90 Hz and 150 Hz tones. Tone Modulation is 40% for each tone. Specific depth of modulation relationships between these tones is available with G/S DDM SELECTOR SWITCH (14) Left and Right positions which correspond to Down and Up CDI G/S pointer deflections.

1 Standard G/S Test Signal Definition

An RF signal carrier amplitude modulated simultaneously with 90 and 150 Hz tones, each modulated at 40%.

2 Standard Glide Slope Centering Signal Definition

A Standard G/S Test Signal in which the depth of modulation of 90 Hz and 150 Hz tones is equal (< 0.002 DDM).

3 Standard Glide Slope Deviation Signal Definition

A Standard G/S signal Test Signal in which the difference in the depth of modulation of 90 Hz and 150 Hz tones is 0.091 DDM.

4 Difference in Depth of Modulation (DDM) Definition

Difference in Depth of Modulation (DDM) is the percentage modulation depth of the larger tone (90 or 150 Hz) minus the percentage modulation depth of the smaller tone, divided by 100.

TEST EXAMPLE PAGE

(b) G/S Centering Accuracy Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -50, FREQUENCY SELECTOR SWITCHES (10) to 108.100 and LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S.
2.	Verify BEARING-FREQUENCY DISPLAY (2) indicates 334.700.
	STANDARD G/S CENTERING SIGNAL
3.	Verify CDI G/S deviation pointer is centered and record centering error.
	CARRIER LEVEL VARIATION
4.	Rotate RF OUTPUT ATTENUATOR (6) from -67 to -27 and record centering error due to carrier level variation.
	CARRIER FREQUENCY VARIATION
5.	Set RF OUTPUT ATTENUATOR (6) to -50.
6.	Rotate DELTA F CONTROL (1) ± 21 kHz and record maximum G/S pointer centering error due to carrier frequency variation.
7.	Repeat Step 6 for each G/S channel (refer to 1-2-4, Table 1).
8.	Set DELTA F CONTROL (1) to CAL.
	SIMULTANEOUS VARIATION OF 90 AND 150 Hz TONE MODULATION PERCENTAGES
9.	Rotate MASTER MODULATION LEVEL CONTROL (41) 5% from METER (43) indication and record centering error due to modulation variation.

LOC	G/S	LOC	G/S
108.10	334.70	110.10	334.40
108.15	334.55	110.15	334.25
108.30	334.10	110.30	334.00
108.35	333.95	110.35	334.85
108.50	329.90	110.50	329.60
108.55	329.75	110.55	329.45
108.70	330.50	110.70	330.20
108.75	330.35	110.75	330.05
108.90	329.30	110.90	330.80
108.95	329.15	110.95	330.65
109.10	331.40	111.10	331.70
109.15	331.25	111.15	331.55
109.30	332.00	111.30	332.30
109.35	331.85	111.35	332.15
109.50	332.60	111.50	332.90
109.55	332.45	111.55	332.75
109.70	333.20	111.70	333.50
109.75	333.05	111.75	333.35
109.90	333.80	111.90	331.10
109.95	333.65	111.95	330.90

G/S Frequencies
Table 1

STEP	PROCEDURE

VARIATION OF 90 AND 150 Hz TONE PHASE RELATIONSHIP

10. Set BEARING-FREQUENCY DISPLAY SWITCH (3) to BEARING.

11. Press 0 VOR BEARING SELECT PUSHBUTTON SWITCH (32) and verify BEARING-FREQUENCY DISPLAY (2) is 0.00.

12. Rotate VARIABLE BEARING CONTROL (26) cw until BEARING-FREQUENCY DISPLAY (2) is 12.00.

13. Press 90 Hz-150 Hz PHASE DEVIATION SWITCH (16), record centering error due to tone phase shift and release 90 Hz-150 Hz PHASE DEVIATION SWITCH (16)

14. Rotate VARIABLE BEARING CONTROL (26) ccw until BEARING-FREQUENCY DISPLAY (2) is 348.00.

15. Press 90 Hz-150 Hz PHASE DEVIATION SWITCH (16), record centering error due to tone phase shift and release 90 Hz-150 Hz PHASE DEVIATION SWITCH (16).

(c) G/S CDI Deflection AGC Characteristics and Deflection Balance Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -50, FREQUENCY SELECTOR SWITCHES (10) to 108.100 and LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S.
2.	Verify CDI G/S pointer is centered.
3.	Set G/S DDM SELECTOR SWITCH (14) to Left (or Right) 0.091 and verify G/S pointer is deflected 52% of full scale deflection (Standard Deflection).
4.	Rotate RF OUTPUT ATTENUATOR (6) until CDI G/S pointer deflection is 60% of Standard Deflection.
5.	Refer to Appendix A to determine G/S RF sensitivity.
6.	Repeat Steps 4 and 5 for each G/S channel (refer to 1-2-4, Table 1).

(d) G/S Warning Signal Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -50, FREQUENCY SELECTOR SWITCHES (10) to 108.100 and LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S.
2.	Verify Alarm signal (Warning Flag) is out of sight or OFF and G/S pointer is centered.
	NORMAL SIGNAL, FLUCTUATING RF
3.	Rotate RF OUTPUT ATTENUATOR (6) from -67 to -17 and verify Alarm Signal (Warning Flag) is out of sight or OFF.
	RF SIGNAL ABSENT
4.	Set RF OUTPUT ATTENUATOR (6) to -112 and disconnect cable from RF OUTPUT CONNECTOR (J3) (9). Verify Alarm Signal (Warning Flag) is visible.
	MISSING 90 Hz OR 150 Hz TONES
5.	Connect cable to RF OUTPUT CONNECTOR (J3) (9) and set RF OUTPUT ATTENUATOR (6) to -50. Verify Alarm Signal (Warning Flag) is out of sight or OFF.
6.	Set LOC DDM SELECTOR SWITCH (23) to 150 Hz and verify Alarm Signal (Warning Flag) is visible.
7.	Set LOC DDM SELECTOR SWITCH (23) to 90 Hz and verify Alarm Signal (Warning Flag) is visible.

STEP	PROCEDURE

MISSING 90 AND 150 Hz TONES

8. Set G/S DDM SELECTOR SWITCH (14) to 150 Hz and LOC DDM SELECTOR SWITCH (23) to 90 Hz. Verify Alarm Signal (Warning Flag) is visible.

MARGINAL G/S SIGNAL STRENGTH

9. Set (6) RF OUTPUT ATTENUATOR (6) to -50, G/S DDM SELECTOR SWITCH (14) to 0.091 and LOC DDM SELECTOR SWITCH (23) to 0

10. Verify CDI pointer is at Standard Deflection (52% of full scale).

11. Rotate RF OUTPUT ATTENUATOR (6) until CDI pointer is deflected 50% of Standard Deflection and verify Alarm Signal (Warning Flag) is visible.

(e) CDI G/S Deviation Indication Test Example

ACCESSORY EQUIPMENT: None

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set BEARING-FREQUENCY DISPLAY SWITCH (3) to FREQ, RF OUTPUT ATTENUATOR (6) to -50, FREQUENCY SELECTOR SWITCHES (10) to 108.100 and LOC-G/S FREQUENCY SELECT SWITCH (19) to G/S.
2.	Verify CDI LOC pointer is centered.
	CDI G/S DEFLECTION RESPONSE (0.175 DDM)
3.	Set G/S DDM SELECTOR SWITCH (14) to Left 0.175 and verify CDI pointer reaches 67% of full scale deflection within 0.6 seconds and then stops at full scale. Verify pointer overshoot does not exceed 2% of full scale deflection.
4.	Set G/S DDM SELECTOR SWITCH (14) to Right 0.175 and verify CDI pointer reaches 67% of full scale deflection within 0.6 seconds and then stops at full scale. Verify pointer overshoot does not exceed 2% of full scale deflection.
	CDI G/S DEFLECTION (0.200 DDM)
5.	Set G/S DDM SELECTOR SWITCH (14) to Right 0.400 and verify pointer deflection does not decrease from Up full scale.
6.	Set G/S DDM SELECTOR SWITCH (14) to Left 0.400 and verify pointer deflection does not decrease from Down full scale.
	CDI G/S REFLECTION (0.091 DDM)
7.	Set G/S DDM SELECTOR SWITCH (14) to Left 0.091 and verify pointer deflection is Down Left Standard.
8.	Set G/S DDM SELECTOR SWITCH (14) to Right 0.091 and verify pointer deflection is Up Right Standard.

STEP	PROCEDURE

CDI G/S DEFLECTION (0.045 DDM)

9. Set G/S DDM SELECTOR SWITCH (14) to Right 0.045 and verify pointer deflection is Up Right Half Standard.

10. Set G/S DDM SELECTOR SWITCH (14) to Left 0.045 and verify pointer deflection is Down Left Half Standard.

11. Set G/S DDM SELECTOR SWITCH (14) to 0 and verify pointer is centered.

(5) COMM Receiver Test Example

(a) General

The NAV-750B provides a 1020 Hz signal at 30% modulation on COMM frequencies. Channel spacing is 25, 50, 100, and 200 kHz. Any channel is selectable with the FREQUENCY SELECTOR SWITCHES (10). The EXTERNAL MODULATION INPUT CONNECTOR (J18) (58) allows signals other than the 1020 Hz, automatically provided, to be applied to the RF output. When other signals are used, the 1020 Hz tone is eliminated by turning the 1020 Hz IDENT TONE AND MKR BEACON TONE MODULATION CONTROL (34) fully ccw out of the calibrated detent position. The modulation level of the external modulation input signal is adjusted with the MASTER MODULATION LEVEL CONTROL (41) from 0 to maximum modulation as indicated on the METER (43)
% modulation scale.

(b) COMM Receiver Channel Gain Test Example

ACCESSORY EQUIPMENT: Distortion Analyzer

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set RF OUTPUT ATTENUATOR (6) to -81.
	COMM CHANNEL GAIN TEST
2.	Set CHANNELING FREQUENCY INCREMENT SWITCH (15) to 25, CHANNELING RATE CONTROL (7) fully ccw and AUTO-MANUAL FREQUENCY CONTROL SWITCH (8) to AUTO. Adjust CHANNELING RATE CONTROL (7) for the desired rate.
3.	Verify each COMM channel output is not less than manufacturer's specified output.
	COMM CHANNEL SENSITIVITY
4.	Rotate RF OUTPUT ATTENUATOR (6) until the signal plus noise-to-noise ratio is 6 dB and verify RF level does not exceed 5 μV (-93 dBm) for each COMM channel.

STEP	PROCEDURE

AVC CHARACTERISTICS

5. Rotate RF OUTPUT ATTENUATOR (6) from 10 µV (-87 dBm) to 20,000 µV (-21 dBm) and verify audio output does not vary more than 10 dB at input levels of 10, 100, 1000, 3000, 10,000 and 20,000 µV for each COMM channel.

(6) MKR BEACON Receiver Test Example

(a) General

The NAV-750B is capable of testing MKR BEACON receivers operating on 75.000 MHz. The NAV-750B provides a tuning range from 70.000 to 79.900 MHz. Tones of 1020, 400, 1300 and 3000 Hz, modulated at 95%, are selectable with the METER FUNCTION AND TONE SELECTOR SWITCH (39. EXTERNAL MODULATION INPUT CONNECTOR (J18) (58) allows external modulation and the MASTER MODULATION LEVEL CONTROL (41) sets the modulation level.

(b) MRKER BEACON Receiver Selectivity Test

ACCESSORY EQUIPMENT: Distortion Analyzer

NOTE: This procedure is based upon the NAV-750B set to the initial control settings in 1-2-4B.

STEP	PROCEDURE
1.	Set FREQUENCY SELECTOR SWITCHES (10) to 75.000 and METER FUNCTION AND TONE SELECTOR SWITCH (39) to 400.
2.	Rotate DELTA F CONTROL (1) and determine frequencies where output is at least 40 dBc.
3.	Rotate DELTA F CONTROL (1) and determine frequency span where output is down < 6 dBc.
	AGC CHARACTERISTICS
4.	Rotate RF OUTPUT ATTENUATOR (6) from lamp threshold input power to 50,000 µV (-13 dBm) and verify Audio level is ≤ 10 dB.
	THREE LAMP OPERATION
5.	Set RF OUTPUT ATTENUATOR (6) to -112.
6.	Rotate RF OUTPUT ATTENUATOR (6) until Blue Marker Beacon Lamp (outer MKR) is illuminated.

STEP	PROCEDURE

7. Set RF OUTPUT ATTENUATOR (6) to -112 and METER FUNCTION AND TONE SELECTOR SWITCH (39) to 1300.

8. Rotate RF OUTPUT ATTENUATOR (6) until Amber Marker Beacon Lamp (middle MKR) is illuminated.

9. Set RF OUTPUT ATTENUATOR (6) to -112 and METER FUNCTION AND TONE SELECTOR SWITCH (12) to 3000.

10. Rotate RF OUTPUT ATTENUATOR (6) until White Marker Beacon Lamp (inner MKR) is illuminated.

SECTION 3 - SPECIFICATIONS

1. General

Following are the specifications for the NAV-750B VOR/LOC/COMM/G/S and MKR BEACON Test Set:

NOTE: Specifications and features are subject to change without notice.

A. RF Power Out:

Accuracy:	± 1.5 dBm from -6 to -50 dBm ± 2.5 dBm from -50 to -120 dBm
Leakage:	< 3 µV at 334.700 MHz, 1 µV at 108.000 MHz induced in a two-turn, one inch diameter (#20 gauge wire) loop, measured one inch away from any surface and into a 50 Ω receiver.

B. Internal Temperature Controlled Crystal Oscillator (TCXO):

Accuracy:	< ± 1 PPM at 15° to 35° C < ± 3 PPM at 10° to 45° C (After calibration at 25° C)
Aging:	< ± 2 PPM/Year

C. Clock Oscillator (2.16 MHz):

Accuracy:	± 0.02%

D. Modulation:

AM Depth:	VOR:	0% to 98%
	LOC:	0% to 98%
	COMM:	0% to 98%
	G/S:	0% to 93%
	MKR:	0% to 98%

NOTE: 0-100 Meter scale is selected for G/S and MKR tones. All other tones are measured on 0-30% scale.

NOTE: All values are for the single-tone modulation of the indicated frequency. MKR tones maximum modulation depth capability is at least 60% from 70.000 to 74.000 MHz.

NOTE: All values are measured at the RF Output Connector.

MODULATION FREQUENCY	RF RANGE	ACCEPTABLE MODULATION LEVEL (ABSOLUTE)
30 Hz	VOR	30% (± 1.2%)
9960 Hz	VOR	30% (± 1.2%)
90 Hz	LOC	20% (± 0.8%)
150 Hz	LOC	20% (± 0.8%)
90 Hz	G/S	40% (± 1.6%)
150 Hz	G/S	40% (± 1.6%)
1020 Hz	COMM	30% (± 1.2%)
400 Hz	MKR	95% (± 2.85%)
1300 Hz	MKR	95% (± 2.85%)
3000 Hz	MKR	95% (± 2.85%)

E. Tones:

Distortion:

9960 Hz:	1.5% MAX
30 Hz REF:	0.5% MAX
30 Hz VAR:	0.5% MAX
1020 Hz REF:	0.5% MAX
90 Hz:	0.4% MAX
150 Hz:	0.4% MAX
400 Hz:	0.7% MAX
1300 Hz:	0.7% MAX
3000 Hz:	0.7% MAX

Frequencies:

90 Hz:	± 0.2%
150 Hz:	± 0.2%
30 Hz REF:	± 0.2%
30 Hz VAR:	± 0.2%
9960 Hz:	Phase-locked to 30 Hz REF tone
1020 Hz:	± 0.5%
400 Hz:	± 0.7%
1300 Hz:	± 0.7%
3000 Hz:	± 0.7%

NOTE: The 90 Hz, 150 Hz, 30 Hz REF and 30 Hz VAR tones are derived from the 2.16 MHz crystal oscillator and the tones reflect the accuracy of the oscillator.

NOTE: Tone distortion should increase no more than 0.2% at the RF DEMOD Connector.

F. DDM Accuracy:

NOTE: Composite Audio Error is .001 DDM + .02% DDM setting.

NOTE: Composite Modulation Error is .001 DDM + 4% DDM setting.

DDM SETTING	COMPOSITE AUDIO ERROR (DDM)	COMPOSITE MODULATION ERROR (DDM)
(LOC) .046	.00101	.00283
(LOC) .093	.00102	.00370
(LOC) .155	.00103	.00720
(LOC) .200	.00104	.00900
(G/S) .045	.00101	.00280
(G/S) .091	.00102	.00464
(G/S) .175	.00104	.00800
(G/S) .400	.00104	.01700

G. VOR Section:

Bearing Selection: Twelve preset bearings - 30° each. Additional +10° and -10° steps from any bearing selected. Variable Bearing Control provides continuous bearing adjustment in 0.01° or 0.05° steps.

Bearing Accuracy: ± 0.05° on all bearings.

Bearing Monitor: By independent counter. Displays bearing to 0.01° resolution.

VOR Tones: 30 Hz REF and 30 Hz VAR tones are derived from 2.16 MHz crystal oscillator. 9960 Hz tone is frequency locked to the 2.16 MHz crystal oscillator.

IDENT Tone: 1020 Hz tone may be added from 0 to 60% modulation.

H. LOC Section:

Deviation: ± 0.046 DDM, ± 0.093 DDM, ± 0.155 DDM, ± 0.200 DDM and continuously adjustable ± 0.4 DDM. One tone may be deleted while the other is at 20%.

Centering Accuracy:	± 0.001 DDM (± 0.85 µA)
Tones:	90 Hz and 150 Hz tones are phase-locked to ± 0.1° or phase variable at five times the angle selected by the VOR bearing selector. 1020 Hz tone may be added.

I. G/S Section:

Deviation:	± 0.045 DDM, ± 0.091 DDM, ± 0.175 DDM, ± 0.400 DDM and continuously adjustable ± 0.8 DDM. One tone may be deleted while the other is at 40%.
Centering Accuracy:	± 0.001 DDM (± 1.0 µA)
Tones:	90 Hz and 150 Hz tones are phase-locked to ± 0.1° or phase variable at five times the angle selected by the VOR bearing selector. 1020 Hz tone may be added.

J. COMM Section:

Modulation:	1020 Hz, 400 Hz, 1300 Hz and 3000 Hz tones 0- 60% AM for audio tests. External modulation may be added.

K. MKR BEACON Section:

Tones:	1020 Hz, 400 Hz, 1300 Hz and 3000 Hz.
Modulation:	Selectable at 95% (± 3%) modulation in CAL. Variable 0-98% in UNCAL.

L. RF Generator:

Frequency Range:	70.000 to 79.900 MHz, 108.000 to 156.000 MHz and 329.000 to 335.000 MHz in 25 kHz increments.

Frequency Selection:	Manually by thumbwheel switch. Automatically up only at a variable rate in 25, 50, 100 or 200 kHz increments. Auto channeling stops at 117.950 MHz and 137.975 MHz. External channeling may be added.
Variable Frequency:	± 50 kHz minimum at 108.000 to 156.000 MHz and ± 150 kHz minimum from 329.000 to 335.000 MHz. Generator remains phase-locked at all fixed and variable frequencies.
Frequency Accuracy:	Controlled by oven crystal to 0.0001%.
Frequency Monitor:	By independent counter to 1 kHz or 0.1 kHz resolution. Counter time base of ± 0.0001%.
Remote Function:	Frequency in use fed to NAV-750B as 2 out of 5 channeling and parallel BCD. Remote channeling follows manual or auto selection.
Modulation Selection:	Automatic by frequency selected. VOR modulation applied if on any VOR frequency. LOC modulation applied if on any LOC frequency. G/S modulation applied if on any G/S frequency. Tone frequency selectable for MKR operation.

M. External Modulation:

NOTE: External modulation may be added to any signal through External Modulation Input Connector (J18). When not in use, External Modulation Connector must be terminated with 100 Ω or less.

Impedance (J18):	1 kΩ Nominal
Sensitivity:	9.1 V P-P (± 0.6 V) = 90% (Master Modulation Level Control set to CAL.)

N. DEMOD Output:

Impedance (J23):	For any signal at a rear panel connector (J23). Minimum resistance is 1 kΩ.
dc Voltage:	3.75 V (± 0.3 V)
ac Voltage:	2.72 V (± 0.2 V) = 100% Modulation

O. General Characteristics:

Power Requirements:	105 to 120 Vac or 220 to 250 Vac, 50 to 400 Hz. Cooling fan is 50/60 Hz only. Optional DC Cooling Fan available for 400 Hz operation.
Power Consumption:	250 W Maximum, 110 W Nominal

SECTION 4 - SHIPPING

1. General

The following information applies to shipping and repacking procedures for the NAV-750B.

A. Shipping Information

IFR test sets returned to factory for calibration, service or repair must be repackaged and shipped subject to the following conditions:

(1) Do not return any products to factory without first receiving authorization from IFR Customer Service Department.

CONTACT: Customer Service Dept.

IFR SYSTEMS, INC.
10200 West York Street
Wichita, Kansas 67215

Telephone: (800)-835-2350
TWX: 910-741-6952

(2) All test sets must be tagged with:

(a) Owner's identification and address.

(b) Nature of service or repair required.

(c) Model No.

(d) Serial No.

(3) Sets must be repackaged in original shipping containers using IFR packing molds.If original shipping containers and materials are not available, contact IFR Customer Service Dept. for shipping instructions.

(4) All freight costs on non-warranty shipments are assumed by customer. (See "Warranty Packet" for freight charge policy on warranty claims.)

B. Repacking Procedure (Refer to 1-4-1, Figure 1)

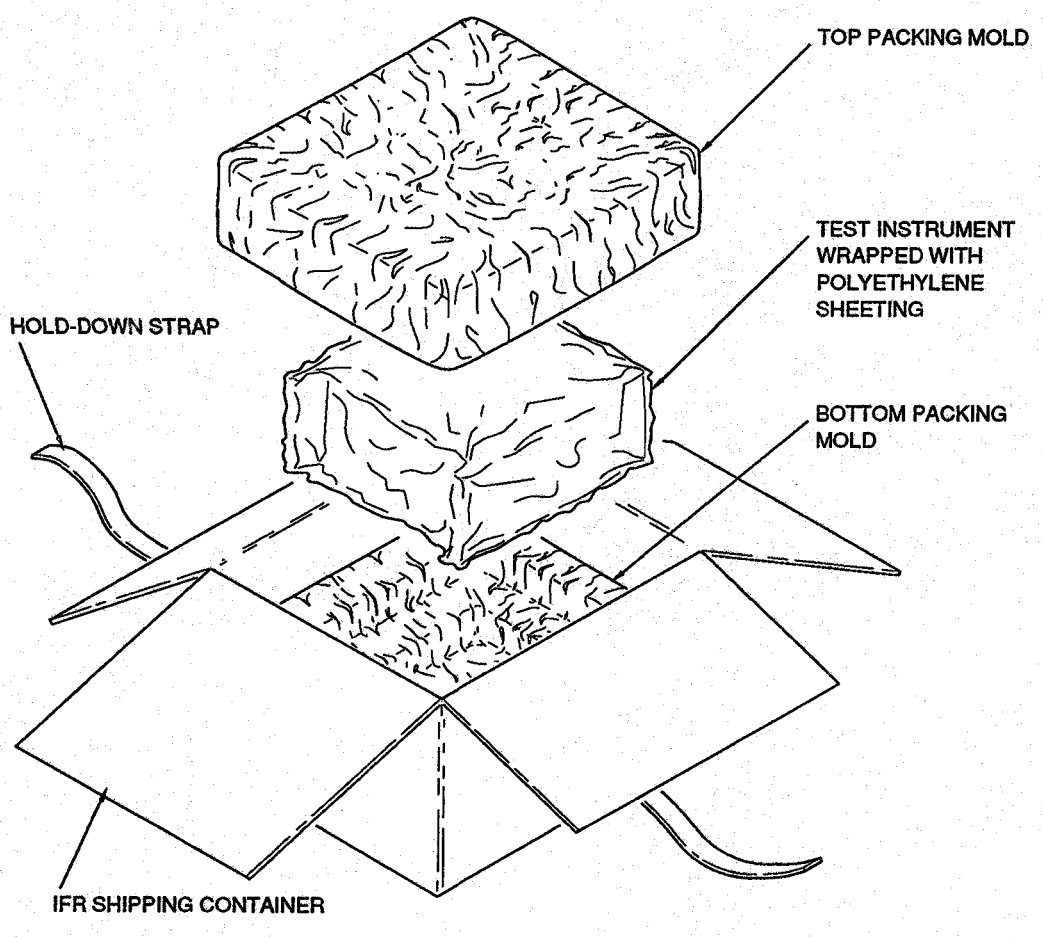
(1) Make sure bottom packing mold is seated on floor of shipping container.

(2) Carefully wrap test set with polyethylene sheeting to protect finish.

(3) Place test set into shipping container, making sure set is securely seated in bottom packing mold.

(4) Place top packing mold over top of set and press down until mold rests solidly on bottom packing mold.

(5) Close shipping container lids and seal with shipping tape or an industrial stapler. Tie all sides of container with break resistant rope, twine or equivalent.



Repacking Procedure
Figure 1

SECTION 5 - STORAGE

1. General

The following storage precautions should be accomplished whenever the test set is stored for extended periods:

A. Disconnect the Test Set from any electrical power source.

B. Disconnect and store the ac power cable and other accessories with the Test Set.

C. Cover the Test Set to prevent dust and debris from covering and entering the Test Set.

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