1. MCDU Controls

The radio tuning function is operated using a subset of the controls available on the MCDU, shown in Figure 31.

- **NEXT and PREV Function Keys** - NEXT and PREV function keys move to adjacent pages where more than one page of the same title is used
- **RADIO Function Key** - The RADIO function key activates the radio tuning function and displays the RADIO 1/2 page,
- **Tuning Knob** - The tuning knob is used to dial in frequencies or other numeric values.

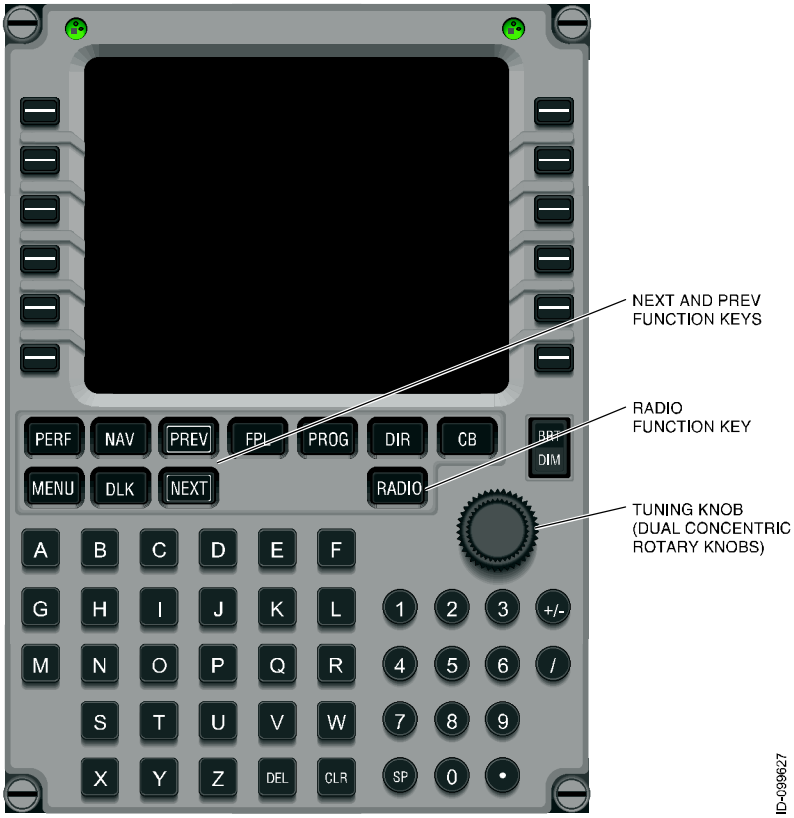


Figure 31

2. Page Organization

The radio tuning function is accessed via the RADIO function key on the MCDU, which displays the RADIO 1/2 page. All other pages are accessed from RADIO 1/2 using the line select keys or the NEXT and PREV function keys, shown in Figure 32.

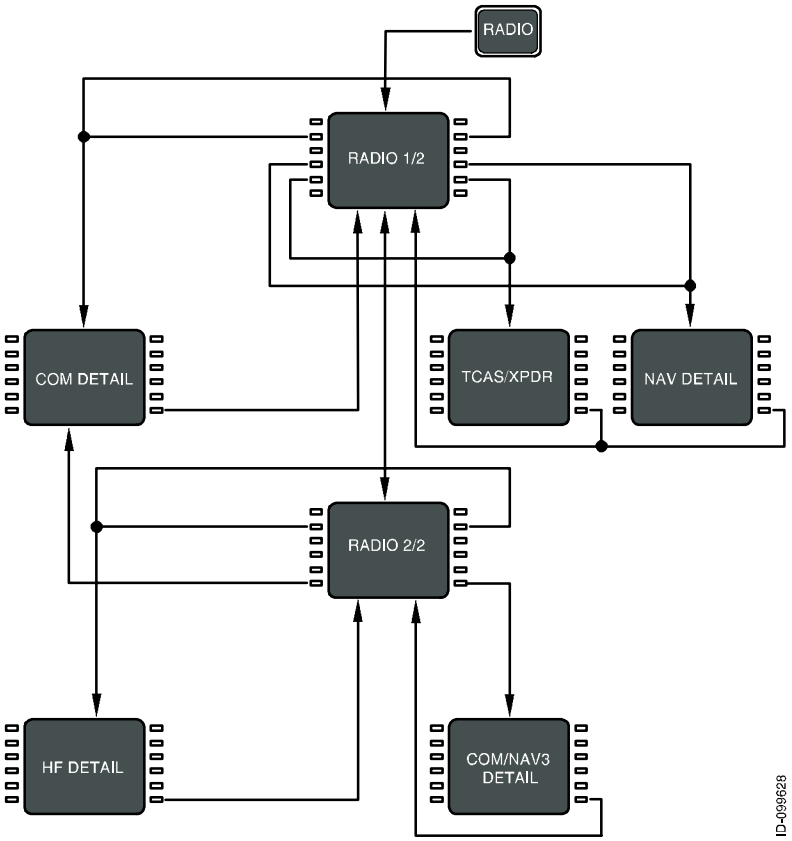


Figure 32

Movement between the RADIO 1/2 and RADIO 2/2 pages is done with the NEXT and PREV function keys, while access to the COM DETAIL, TCAS/XPDR, and NAV DETAIL pages is via line select keys from RADIO 1/2 and access to the HF DETAIL, MLS DETAIL, and ADF DETAIL pages are via line select keys from RADIO 2/2.

3. MCDU Tuning Description

All of the pages that correspond to a particular radio type (e.g., VHF communications or ADF) are arranged as shown in Figures 33, 34, and 35, and typically consist of a details page along with two memory pages. The details pages allow the specific features of each radio to be configured and provide access to the memory pages associated with each radio type.

Figure 34 shows the pages associated with the VHF communications radios.

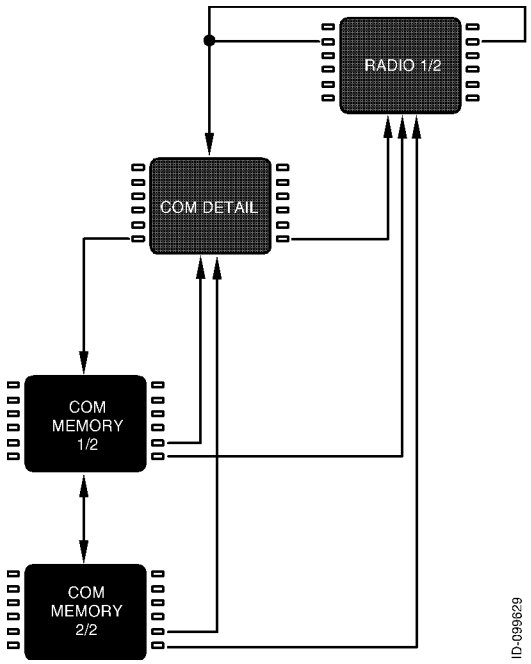


Figure 33

Figure 34 shows the pages associated with the VHF navigation radios.

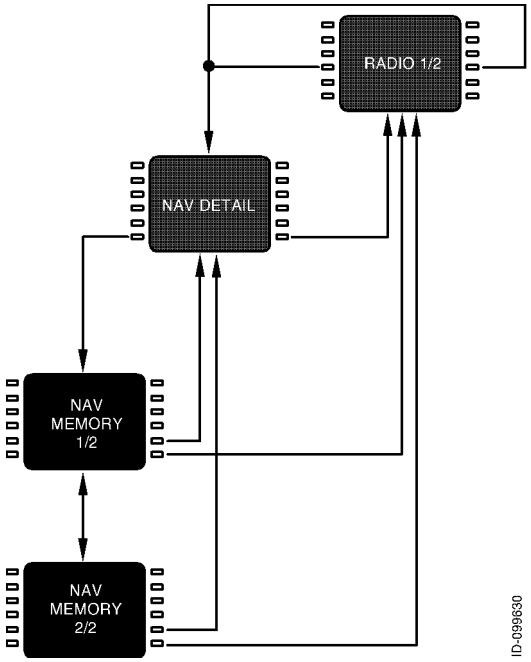


Figure 34

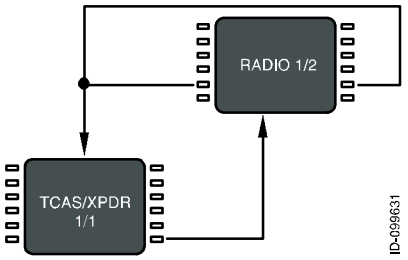


Figure 35 shows the pages associated with the TCAS/transponder subsystem

Figure 35

Figure 36 shows the arrangement of pages associated with the high-frequency (HF) communications radios.

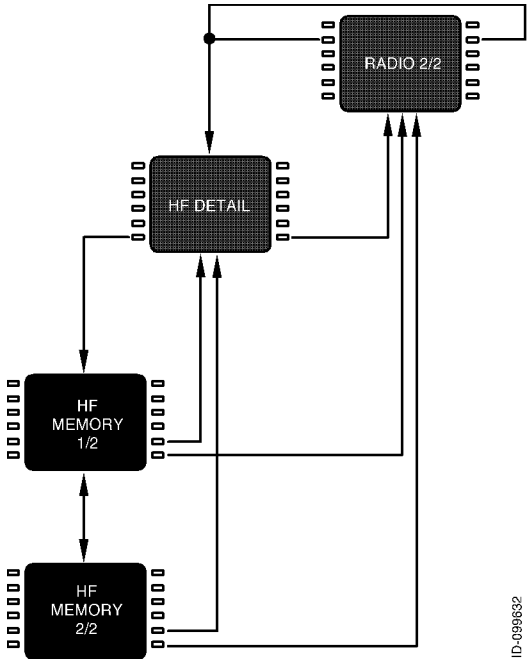


Figure 36

Figure 37 shows the page associated with the automatic direction finder (ADF).

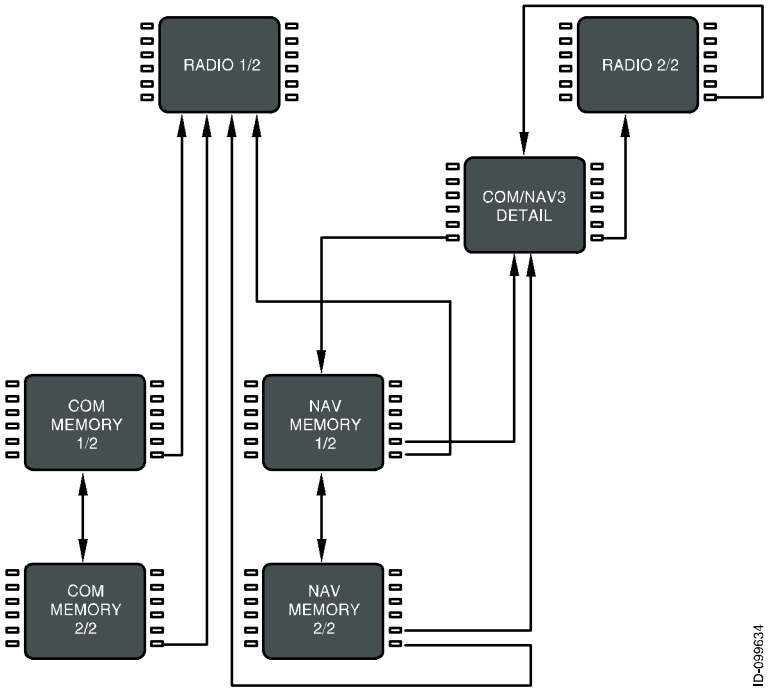


Figure 37

Figure 38 shows the pages associated with the Microwave Landing System (MLS) receiver.

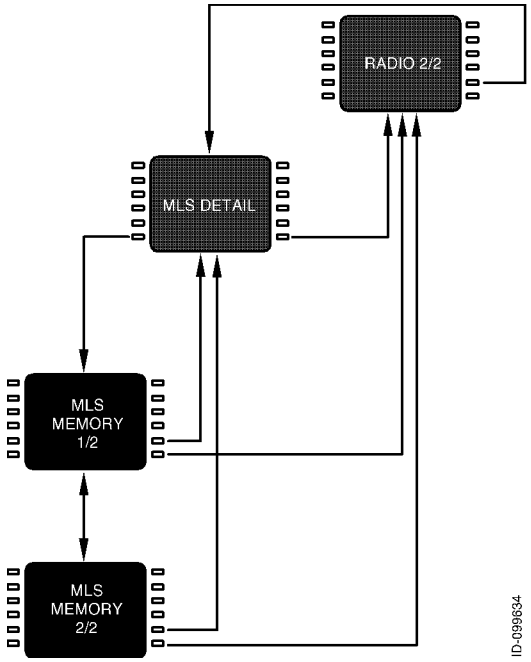


Figure 38

The RADIO MENU is used for manually tuning the radios. Pushing the RADIO key on the MCDU displays the RADIO MENU page 1/2.

2B-09-20: BASIC OPERATION

In keeping with the titling and numbering conventions used by MCDU functions, each MCDU page is arranged with a centered title at the top and a page number in the upper-right corner. Page numbers are formatted as the current page number (among those with the same page title), a slash "/", and the number of pages with the same title. For example, there are two pages entitled "RADIO," the first is labeled RADIO 1/2, as shown in Figure 39, and the second RADIO 2/2.

The bottom line on each page displays the characters entered on the MCDU keypad and is called the scratchpad. The scratchpad is shared across all MCDU client functions, and is not under the control of the radio tuning function.

The text area adjacent to each line select key (LSK) on the MCDU is referred to as a field, and identified by the LSK it is associated with. For example, the active frequency for VHF COM radio 1 (shown as COM1, 123.200) on the RADIO 1/2 page is in field 1L.

Figure 39

Pushing the NEXT or PREV key when this page is displayed displays the RADIO MENU page 2/2, shown in Figure 40.

Figure 40

When the scratchpad is empty, pushing a line select key either moves the format cursor to the adjacent field, or performs the function indicated by the icon that appears near the key. The icons and their functions are described below.

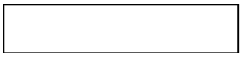
"Swap" frequencies. This symbol indicates that exchanges between the active and preset frequencies for the associated radio can be made. This has the effect of saving the currently active frequency in the preset memory, and tuning the radio to the frequency previously stored as the preset.

Page indicator. When this icon is displayed, pushing the adjacent LSK changes the display to another page. The page to be displayed is either labeled explicitly or it is a detail page for the radio in the associated field.

Exclusive selection. This icon is displayed next to a list of mutually exclusive options. Each time the adjacent LSK is pushed, the next options become selected, wrapping around to the first when the last option is reached. The selected value is displayed in the active color (**green** in this document) and large font, while the other selection are displayed as smaller, **white** characters.

Immediate function. This icon indicates that the function identified in the field will be carried out immediately when the adjacent LSK key is pushed.

Copy value. This icon is used on the memory pages to indicate that the frequency highlighted by the format cursor will be copied into the active frequency for the associated radio.



Format cursor. The cursor box highlights the value in the currently active field.

Tuning curl. This icon indicates that the data value highlighted by the format cursor can be changed by turning the MCDU tuning knob.

If LSK 2R, the second on the right hand side, shown in Figure 41, is pushed, the format cursor and tuning curl move from the 2L field (COM1) to field 2R (COM2). Likewise, pushing LSK 3L moves the format cursor to the active frequency field for VHF NAV 1 radio. Once positioned on a field, turning the tuning knob changes the highlighted frequency.

Figure 41

When an icon shown above is displayed next to a line select key, the function denoted by the icon takes precedence over moving the format cursor. For example, pushing LSK 1L exchanges the active and preset frequencies for VHF COM1 radio, without moving the format cursor. Consequently, it is not possible to tune the active frequency for a radio using the tuning knob.

The exception to this rule is the case where a preset frequency is not shown for the associated radio. This can happen when a VHF navigation radio is in DME HOLD, which causes the preset frequency to be removed in order to show the separately tuned DME frequency (refer to fields 3L and 4L in Figure 41).

When one or more characters are present in the scratchpad, the icons adjacent to fields that accept text entries are removed to indicate that pushing those LSKs enters the scratchpad data into the field, as shown in Figure 42. Entering the contents of the scratchpad into a field, or manually clearing the scratchpad, restores the icons and the normal functions of the line select keys.

Scratchpad entries can be made into any editable field at any time. Making a scratchpad entry into an active frequency field moves the previously active frequency into the preset field for that radio.

Figure 42

2B-09-30: DETAILED PAGE DESCRIPTIONS

1. RADIO 1/2

RADIO 1/2, described below, displays the following radio data

- VHF COM1 and COM2 radios
- VHF NAV1 and NAV2 radios
- The currently selected TCAS/transponder mode,
- The aircraft ID (if available)
- The current transponder code and status

Access to RADIO 2/2 is via the NEXT or PREV function keys.

VHF COM 1 active frequency. Pushing LSK 1L exchanges the active and preset frequencies for VHF COM 1. A scratchpad entry into the field replaces the preset frequency with the previously active frequency. The **MICSTK** is an example of an alert that is displayed on the radio tuning pages.

This section is the VHF COM 2 active frequency. Pushing LSK 1R exchanges the active and preset frequencies for VHF COM 2. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

VHF COM 1 preset frequency. This is the default field for the format cursor when the RADIO function key is pushed. Pushing LSK 2L when the format cursor is already in the field displays the COM 1 page.

This section is the VHF COM 2 preset frequency. Pushing LSK 2R when the format cursor is already in the field displays the COM 2 page.

VHF NAV 1 active frequency. When DME HOLD for NAV 1 is OFF, pushing LSK 3L exchanges the active and preset frequencies for VHF NAV 1. When DME HOLD for NAV 1 is ON, pushing LSK 3L moves the format cursor to field 3L or displays the NAV 1 page if the cursor is already in the field. A scratchpad entry into 3L replaces the preset frequency with the previous active frequency.

This section is the VHF NAV 2 active frequency. Pushing LSK 3R when DME HOLD for NAV 2 is OFF, exchanges the active and preset frequencies for VHF NAV 2. Pushing LSK 3R when DME HOLD for NAV 2 is ON moves the format cursor to field 3R or displays the NAV 2 page if the cursor was already in the field. A scratchpad entry into 3R replaces the preset frequency with the previous active frequency.

When DME HOLD for NAV 1 is OFF, this section displays the VHF NAV 1 preset frequency. When DME HOLD is ON, this section displays the active DME frequency for NAV 1. The format cursor can be used in field 4L in either case. If the LSK 4L is pushed when the format cursor is in the field, the NAV 1 page is displayed. The **DME H PXR** waypoint-name line is displayed to draw the crew's attention to the separate tuning of the DME receiver.

When DME HOLD for NAV 2 is OFF, the VHF NAV 2 preset frequency is displayed. When DME HOLD is ON, the active DME frequency for NAV 2 is displayed. The format cursor is allowed in field 4R in either case. Pushing LSK 4R when the format cursor is in the field displays the NAV 2 page.

This section displays TCAS/XPDR 1/1

This section is the Active TCAS/XPDR mode. Pushing LSK 6L toggles between standby (STBY) and the active TCAS/XPDR mode selected on TCAS/XPDR 1/1.

This section displays the Active transponder code and reply indicator. The header for field 5R shows the flight ID, if is is available or was entered by the crew. The reply indicator (●) lights when the transponder is replying to a RADAR or TCAS interrogation. Pushing LSK 5R moves the format cursor to the field or displays TCAS/XPDR 1/1 if the cursor is already in the field.

Commands the transponder to transmit ident.

2. RADIO 2/2

RADIO 2/2, described below, displays the following radio data:

- HF1 and HF2 radios
- ADF1 and ADF2 radios
- Optionally installed:
  - COM Radio
  - NAV Radio
  - NAV/COM Radio
  - MLS.

Access to RADIO 1/2 is via the NEXT or PREV function keys.

This section is the HF COM 1 active frequency. Pushing LSK 1L exchanges the active and preset frequencies for HF COM 1. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This section is the HF COM 2 active frequency. Pushing LSK 1R exchanges the active and preset frequencies for HF COM 2. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This section is the HF COM 1 preset frequency. It is the default field for the format cursor when the RADIO 2/2 page is displayed. Pushing LSK 2L when the format cursor is already in the field displays the HF 1 page.

This section is the ADF 1 active frequency. Pushing LSK 3L exchanges the active and preset frequencies for the ADF. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This is the HF COM 2 preset frequency. Pushing LSK 2R when the format cursor is already in the field displays the HF 2 page.

This is the ADF 2 active frequency. Pushing LSK 3R exchanges the active and preset frequencies for the ADF. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This section is the ADF 1 preset frequency. Pushing LSK 4L when the format cursor is already in the field displays the ADF 1 page.

This is the ADF 2 preset frequency. Pushing LSK 4R when the format cursor is already in the field displays the ADF 2 page.

This is the Active COM 3, NAV 3, or COM/NAV 3 frequency. Pushing LSK 5L exchanges the active and preset frequencies for the installed radio. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This section is the COM 3, NAV 3, or COM/NAV 3 preset frequency. Pushing LSK 6L when the format cursor is already in the field displays the detail page for the installed radio.

This section is the Active MLS channel number. Pushing LSK 5R when the format cursor is already in the field displays the MLS page.

This section displays the MLS glidepath angle.

3. COM1 Page

The COM1 page, described below, is used to access to the controls specific to VHF communications radios, including squelch, operating mode, and frequency spacing. It is also used as a quick method for retrieving frequencies from memory. The format cursor defaults to the memory tuning field (3L), providing quick access to stored frequencies. The page also provides access to the COM memory pages.

Active VHF COM frequency on the selected radio (the page title reflects which COM radio was selected). Pushing LSK 1L exchanges the active and preset frequencies (when the format cursor is on field 2L), or copies a frequency stored in memory (when the format cursor is on field 3L) for the selected COM radio. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This LSK toggles the squelch feature for the selected VHF COM radio.

This section displays the VHF COM preset frequency.

This section is the COM memory display. This is the default field for the format cursor when the COM 1 or COM 2 pages are displayed. This section can be used in a fashion similar to the RMU's memory tune feature. Turning the tuning knob while field 3L is selected cycles through the frequencies stored in memory, by location, showing the associated label and the stored frequency below.

This LSK toggles between voice and data mode for the selected VHF COM radio.

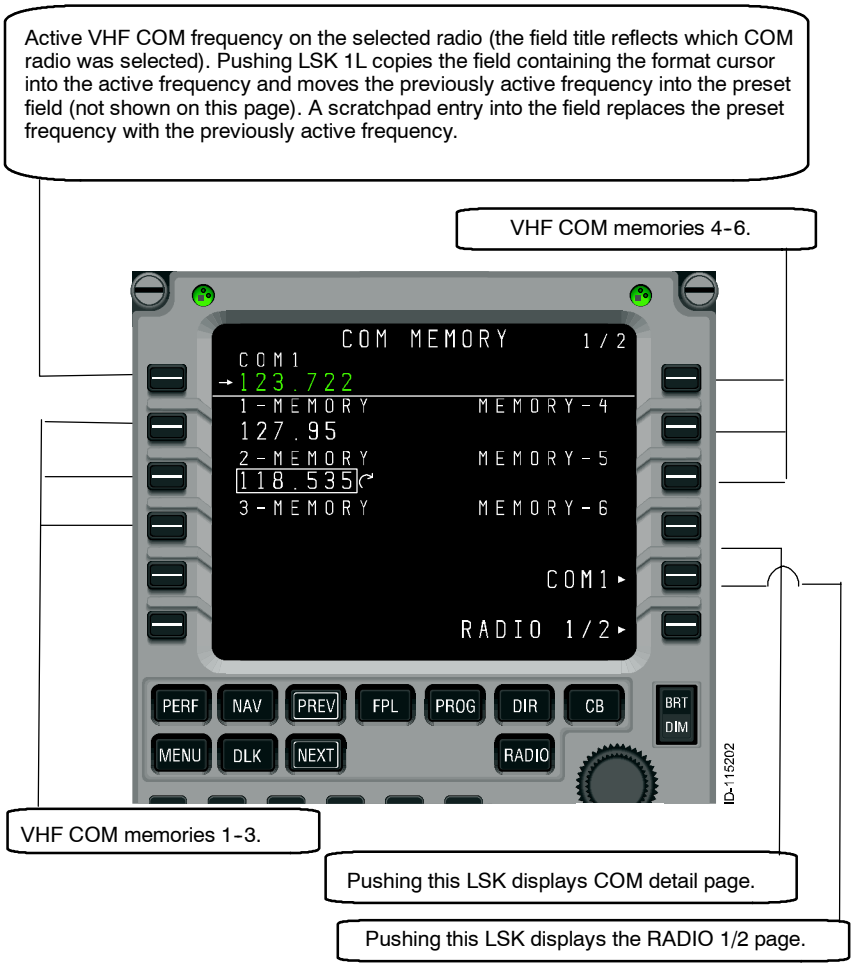
Toggles the frequency spacing selection for the selected VHF COM radio between 8.33 KHz and 25 KHz.

Pushing this LSK displays the RADIO 1/2 page.

Displays the COM MEMORY 1/2 page.

4. COM Memory 1/2 Page'

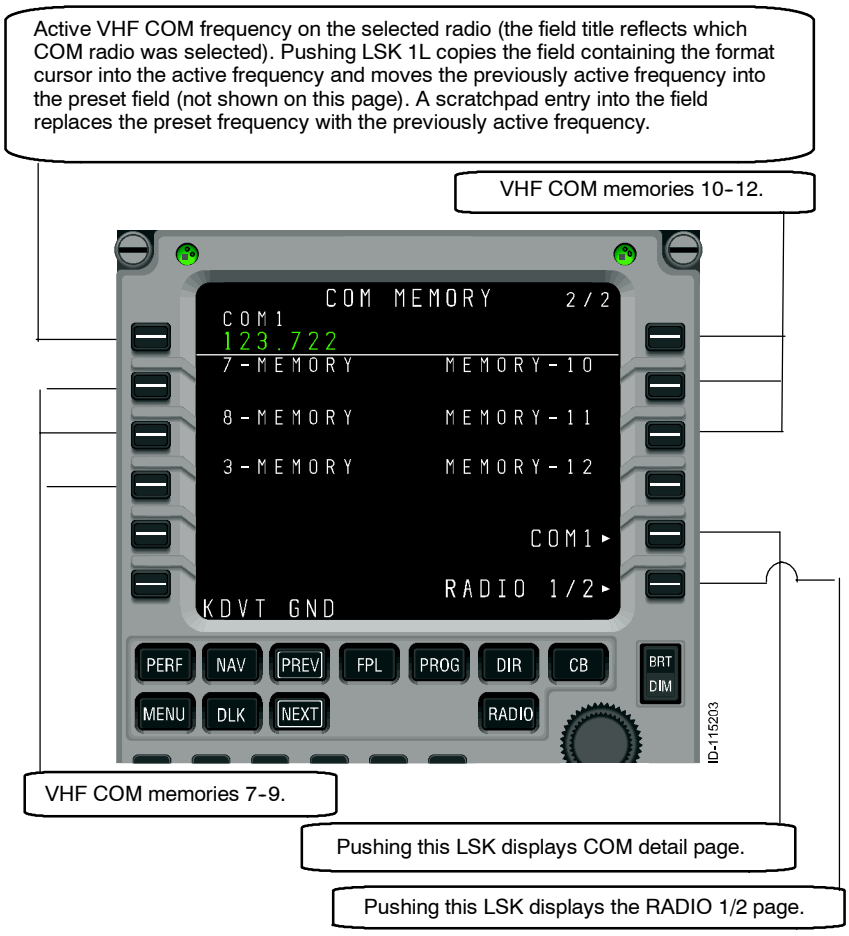
The radio tuning function supports 12 memories per radio type (i.e., COM, NAV, HF COM, etc.) displayed on two pages each. In addition to entering or dialing-in frequencies for each memory, a text label of up to eight characters can be entered for each stored frequency (except for the HF COM memory page, which does not support labels due to display area limitations). The default label for each memory is "MEMORY," a dash, and the memory number, with the memory number always on the outboard edge of the display.



Labels are entered by typing into the scratchpad and pushing the line select key adjacent to the desired frequency. If the radio tuning function determines that the entry is a valid frequency for the radio, the entry is accepted into the frequency field. If not, the entry is considered a label and is entered into the label field above the frequency. A label can be replaced by making another scratchpad entry into a memory field, or by pushing the DEL key. Pushing the DEL key places the text "DELETE" in the scratchpad and, when entered on a

memory field, deletes the associated text label, returning it to the default. If the DEL key is used on a memory where there is no user-entered label, and the frequency is deleted from memory.

Access to COM MEMORY 2/2, described below, is via the NEXT and PREV function keys.



5. NAV1 Page

The NAV1 page, described below, is used to access and control VHF navigation radios, FMS automatic tuning, and DME hold mode. The format cursor defaults to the memory tuning field (4L), providing quick access to stored frequencies. The page can also access to the NAV memory pages.

Active VHF NAV frequency on the selected radio (the page title reflects which NAV radio was selected). Pushing LSK 1L exchanges the active and preset frequencies (when the format cursor is on field 2L) or copies a frequency stored in memory (when the format cursor is on field 4L) for the selected NAV radio. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

Pushing this LSK toggles the FMS autotune feature ON and OFF for the selected VHF NAV radio.

This section is the VHF NAV preset frequency.

This section is the Active DME frequency. This field is only displayed when the DME hold mode is enabled, otherwise DME tuning is slaved to the corresponding VHF NAV radio frequency.

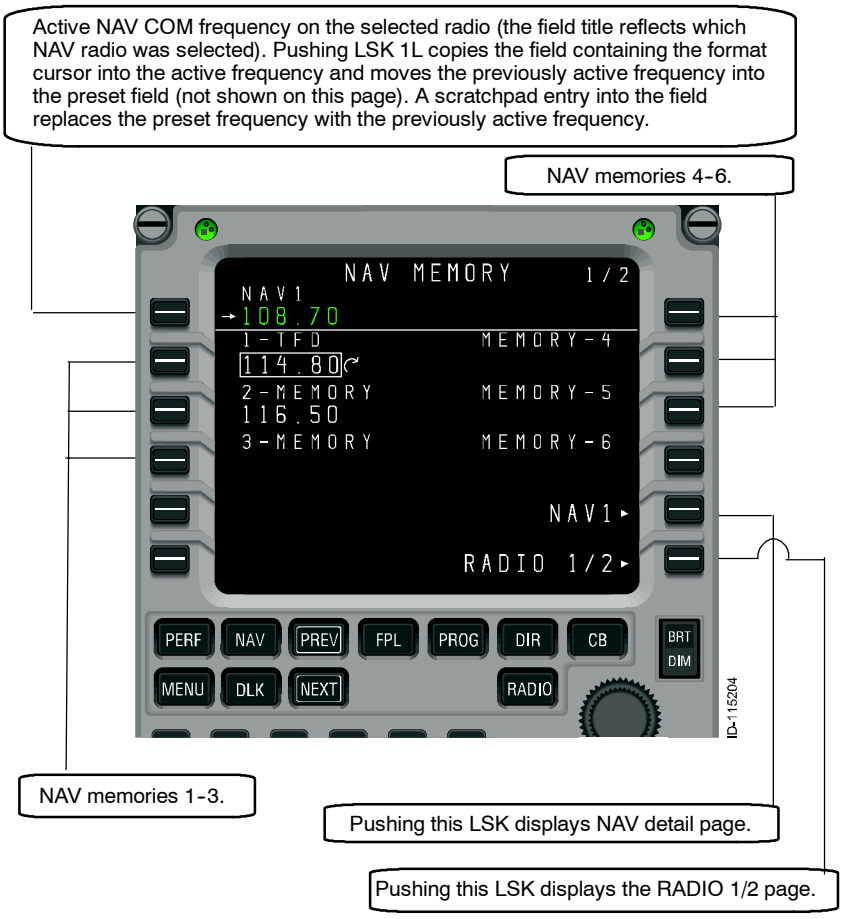
Pushing this key displays the NAV MEMORY 1/2 page.

This section is the NAV memory display. This is the default field for the format cursor when the NAV 1 or NAV 2 pages are displayed. This section is similar to the RMU's memory tune feature. Turning the tuning knob while field 4L is selected cycles through the frequencies stored in memory by location, showing the associated label and the stored frequency below.

Pushing this LSK toggles the DME hold mode ON and OFF for the selected VHF NAV radio.

Pushing this LSK displays the RADIO 1/2 page.

As with the other radio types, the radio tuning function supports 12 navigation radio memories displayed on two pages. In addition to entering or dialing-in frequencies for each memory, a text label of up to eight characters may be entered for each stored frequency. The default label for each memory is "MEMORY," a dash, and the memory number, with the memory number always on the outboard edge of the display, as described below.



Labels are entered by typing into the scratchpad and pushing the line select key adjacent to the desired frequency. If the radio tuning function determines that the entry is a valid frequency for the radio, the entry is accepted into the frequency field. If not, the entry is considered a label and is entered into the label field above the frequency. A label may be replaced by making another scratchpad entry into a memory field, or by pushing the DEL key. Pushing the DEL key places the text "DELETE" in the scratchpad and, when entered on a memory field, deletes the associated text label, returning it to the default. If the DEL key is used on a memory where there is no user-entered label, the frequency is deleted from memory.

Access to the NAV MEMORY 2/2, described below, is via the NEXT and PREV function keys.

Active VHF NAV frequency on the selected radio (the field title reflects which NAV radio was selected). Pushing LSK 1L copies the field containing the format cursor into the active frequency and moves the previously active frequency into the preset field (not shown on this page). A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

NAV memories 10-12.

NAV memories 7-9.

Pushing this LSK displays NAV detail page.

Pushing this LSK displays the RADIO 1/2 page.

6. COM/NAV 3 Page

The COM/NAV 3 Page is selected from the radio page 2/2. Select the RADIO function button on the MCDU. Select the NEXT function button to get to Radio 2/2, then select the line select L6 twice to display the page. **Where's the NAV3? This looks like a COM Page with selectable COM and NAV memories**

Active VHF COM frequency on the selected radio (the page title reflects which COM radio was selected). Pushing LSK 1L exchanges the active and preset frequencies (when the format cursor is on field 2L), or copies a frequency stored in memory (when the format cursor is on field 3L) for the selected COM radio. A scratchpad entry into the field replaces the preset frequency with the previously active frequency.

This LSK toggles the squelch feature for the selected VHF COM radio.

This LSK toggles between voice and data mode for the selected VHF COM radio.

This section displays the VHF COM preset frequency.

Displays the NAV MEMORY 1/2 page.

Displays the COM MEMORY 1/2 page.

This section is the COM memory display. This is the default field for the format cursor when the COM 1 or COM 2 pages are displayed. This section can be used in a fashion similar to the RMU's memory tune feature. Turning the tuning knob while field 3L is selected cycles through the frequencies stored in memory, by location, showing the associated label and the stored frequency below.

Pushing this LSK displays the RADIO 2/2 page.

Toggles the frequency spacing selection for the selected VHF COM radio between 8.33 KHz and 25 KHz.

2B-09-40: TCAS/XPDR 1/1

The TCAS/XPDR 1/1 detail page, described below, accesses the controls and data specific to the transponder and TCAS systems, including transponder code, source selections, and operating mode. It also displays the pressure altitude being transmitted and the flight ID. The format cursor defaults to the transponder code preset (4L), which defaults to 1200 (VFR).

This LSK selects absolute or relative altitude display for TCAS targets. The selected altitude is displayed in **green**.

This section displays the Active TCAS/transponder mode. TA/RA is the typical setting, while the TA ONLY setting inhibits resolution advisories and the STBY places the TCAS system in the standby mode..

These LSKs select the altitude range for TCAS target display. AUTO includes the typical TCAS detection range, while ABOVE and BELOW extend the range in the selected direction.

This LSK is used to manually select the air data source used for altitude reporting. This line shows an example of an aircraft equipped with 3 air data sources, although this varies by installation.

Pushing this LSK displays the RADIO 1/2 page.

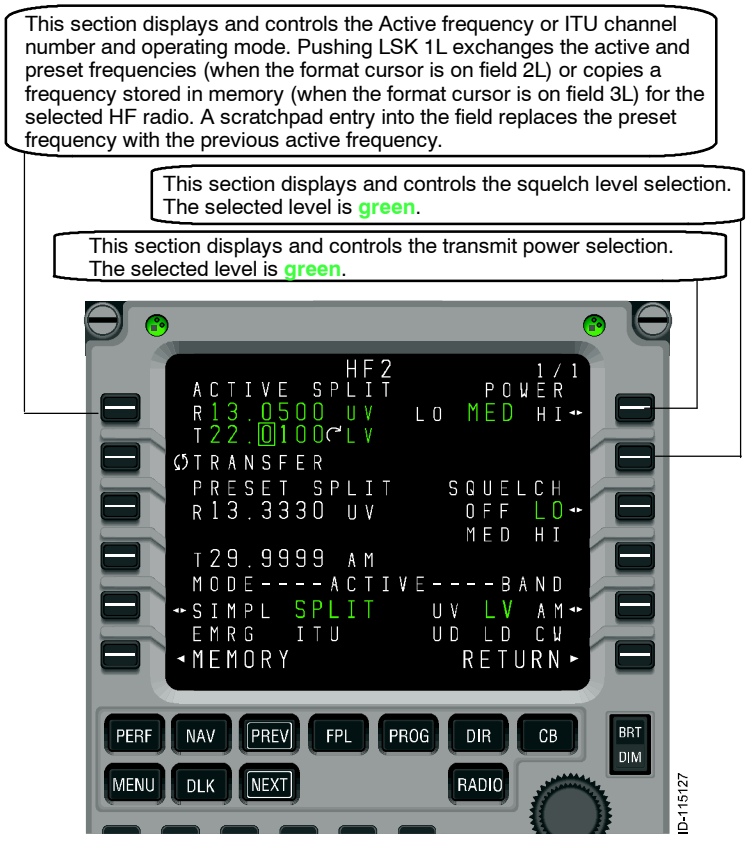
This section displays the current flight ID. This can be entered by the crew or it is received from the FMS.

2B-09-50: HF COM 1/1

The HF communications detail page, described below, is used to control HF tuning (manually and from memory), HF tuning mode selection, transmit power selection, squelch, and to select the operating mode. The tuning functions work just like the VHF COM selections, but each of the tuning modes that HF radios provide: simplex, split (duplex), emergency, and ITU (channel numbers) is also selectable on this page.

The preset field (2L) is not used when the tuning mode is set to split (duplex), because that field is used to display and tune the active receive frequency, while 1L displays the desired transmit frequency.

When tuning from the memory field (3L), the active tuning mode is set to match the stored frequency when it is selected. For example, in the figure below, the active tuning mode is ITU, but the selected memory location displayed in 3L is a simplex frequency. Pushing LSK 3L to move the format cursor to the memory field, then pushing LSK 1L to make the memory value active, changes the selected tuning mode from ITU to simplex (with frequency 20950 selected).



This section displays and controls the HF memory display. This is the default field for the format cursor when the HF 1 or HF 2 pages are displayed. Turning the tuning knob while field 3L is selected cycles through the frequencies stored in memory, by location.

This section displays and controls HF COM preset frequency (when in simplex, emergency, or ITU tuning modes) or HF COM receive frequency (when in split tuning mode). The preset feature is not available when in split mode.

This section displays the HF MEMORY 1/2 page.

This section contains Active frequency mode. The LSK can be used to select simplex, split (duplex), emergency, and ITU tuning modes.

The receive frequency is stored for the selected memory location when the memory contains a split frequency.

Pushing this LSK displays the RADIO 1/2 page.

This LSK is used to select the operating mode: upper sideband voice (UV), lower sideband voice (LV), amplitude modulated (AM). upper sideband data (UD), lower sideband data (LD) and continuous wave (CW).

1. HF MEMORY 1/2

The HF MEMORY 1/2 and 2/2 pages, described below (HF MEMORY 1/2 only), work like the VHF COM and VHF NAV memory pages, but have a slightly different appearance due to the need to support two line frequency displays (for split mode tuning). As a result, space limitations do not allow assigning labels to HF memory locations. This should not be a problem since HF is generally used while trans-oceanic and in remote areas where the frequencies to be used are different for each flight.

The HF memory pages each contain the active HF frequency, six stored frequencies, and controls for changing the tuning and operating modes for each memory.

Access to HF MEMORY 2/2 is via the NEXT or PREV function keys.

These areas display and control stored HF COM memories 1-3 (7-9 on HF MEMORY 2/2). When a memory field contains a split frequency pair, the first push of the associated line select key moves the format cursor to the first frequency, the second push moves it to the second frequency field 3L as shown.

This LSK displays and controls the Active HF COM frequency on the selected radio (the field title reflects which radio was selected). Pushing LSK 1L copies the field containing the format cursor into the active frequency and moves the previously active frequency into the preset field (not shown on this page). A scratchpad entry into the field replaces the preset frequency with the previous active frequency.

This section is used to select Operating mode for the frequency highlighted by the format cursor.

This section contains and controls the tuning mode selection for the frequency highlighted by the format cursor.

Tuning mode selection for the frequency highlighted by the format cursor.

Pushing this LSK displays the RADIO 2/2 page.

2B-09-60: ADF 1 PAGE

The ADF page, described below, displays the active, preset, and selected memory frequencies for the automatic direction finders, along with controls for the active mode (antenna or ADF) and the BFO setting (ON or OFF). It is also used to the ADF memory pages.

This section displays the ADF preset frequency.

This section displays and controls the Active ADF frequency on the selected radio (the page title reflects which ADF was selected). Pushing LSK 1L exchanges the active and preset frequencies (when the format cursor is on field 2L) or copies a frequency stored in memory (when the format cursor is on field 3L) for the selected ADF radio. A scratchpad entry into the field replaces the preset frequency with the previous active frequency.

Pushing this LSK toggles the ADF operating mode for the selected ADF. The active mode is in **green**.

Pushing this LSK displays the ADF MEMORY 1/2 page.

This section displays and controls the ADF memory display. This is the default field for the format cursor when the ADF X page is displayed. Turning the tuning knob while field 3L is selected, cycles through the frequencies stored in memory by location, showing the associated label and the stored frequency below.

Pushing this LSK displays the RADIO 2/2 page.