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G1000™

*VHF NAV/COM pilot's guide
for Mooney M20M & M20R*

Record of Revisions			
Revision	Date of Revision	Revision Page Range	Description
A	5/5/05	4-1 – 4-21	Initial release.

4.1 VHF NAV/COM

OVERVIEW

The G1000 VHF NAV/COM frequency controls and windows are located in the top corners of the Primary Flight Display (PFD) and Multi Function Display (MFD). The NAV controls, windows and fields are located on the left side. The COM controls, windows and fields are on the right, as shown in the figure below.

The G1000 VHF NAV/COM interface includes:

- Windows and fields
- Radio selection
- Tuning box
- Frequency Transfer Arrow
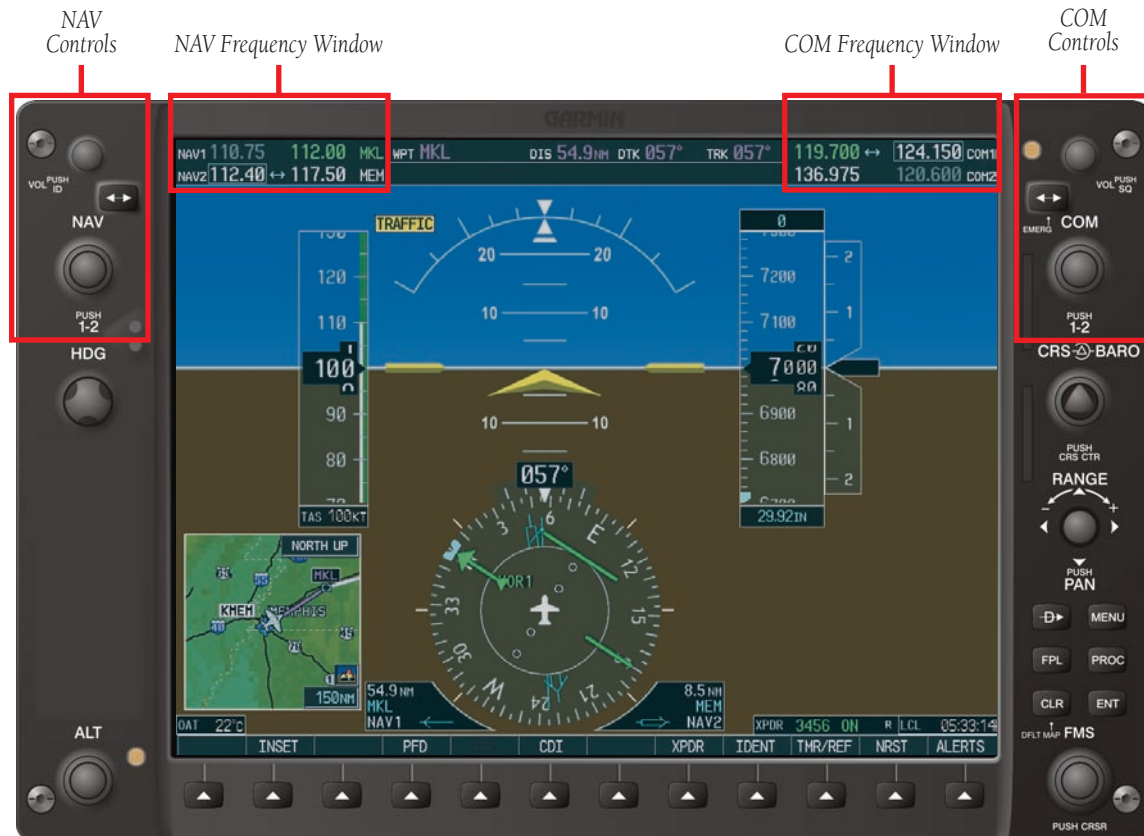- Radio status indications
- Controls

Figure 4.1.1 G1000 VHF NAV/COM Interface (PFD)

WINDOWS AND FIELDS

The NAV and COM Frequency windows are located at the top of the display on either side of the Navigation Status bar on both the PFD and the MFD.

- The **NAV** Frequency window is displayed to the left of the Navigation Status bar.

- The **COM** Frequency window is displayed to the right of the Navigation Status bar.

Each radio frequency window is composed of two fields, a **standby** field and an **active** field.

- In the **NAV** Frequency window, the active frequency is on the right side, the standby frequency is on the left.

- In the **COM** Frequency window, the active frequency is on the left side, the standby frequency is on the right.

> ⚠️ **NOTE:** In GPS mode, both active NAV frequencies are displayed in white indicating they are not active.

RADIO SELECTION

The **NAV** radio is selected with the **CDI** softkey located on the PFD.

- When NAV1 radio is selected, a single green arrow labeled either 'VOR1' or 'LOC1' is displayed on the HSI.

- When NAV2 radio is selected, a double green arrow labeled either 'VOR2' or 'LOC2' is displayed on the HSI.

The active **COM** radio is selected with the audio panel **COM1 MIC** or **COM2 MIC** keys. **COM1 MIC** key activates the COM1 transceiver. **COM2 MIC** key activates COM2.

Frequencies located in the **active field** are displayed in either **green** or **white**.

- An active frequency displayed in **green** indicates that the radio is selected on the audio panel (COM) or HSI (NAV).

- An active frequency displayed in **white** indicates that the radio is not selected on the audio panel (COM) or the HSI (NAV).
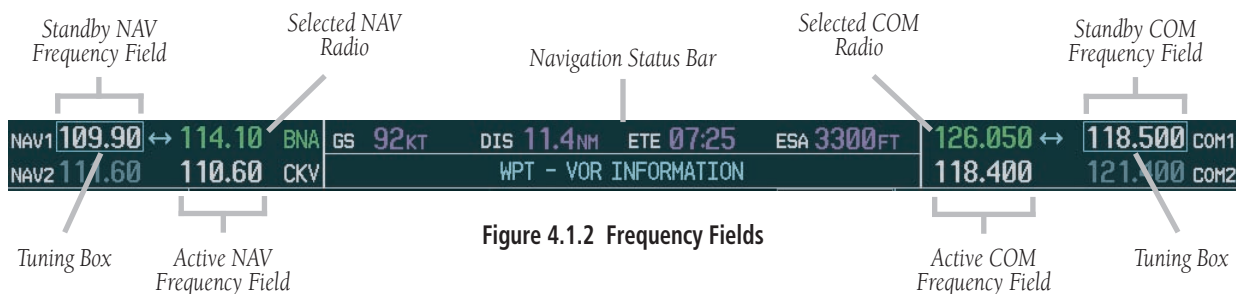

Standby NAV Frequency Field · Selected NAV Radio · Navigation Status Bar · Selected COM Radio · Standby COM Frequency Field

| NAV1 | 109.90 | ↔ | 114.10 | BNA | GS | 92KT | DIS 11.4NM | ETE 07:25 | ESA 3300FT | 126.050 | ↔ | 118.500 | COM1 |
| NAV2 | 111.60 | | 110.60 | CKV | | | WPT – VOR INFORMATION | | | 118.400 | | 121.400 | COM2 |

Tuning Box · Active NAV Frequency Field

Figure 4.1.2 Frequency Fields

Active COM Frequency Field · Tuning Box

TUNING BOX

A light blue tuning box appears around the standby frequency field on both the PFD and MFD. It can be moved from one standby frequency field to another for tuning or radio selection by pressing the dual **COM** or **NAV** knob.

Frequencies located in the **standby** field are displayed in either **white** or **gray**.

- The standby frequency appearing in the tuning box is **white**.

- The standby frequency that is not in the tuning box is **gray**.

Frequency Transfer Arrow　　　　*Tuning Box*

Figure 4.1.3 Frequency Transfer Arrow and Tuning Box

FREQUENCY TRANSFER ARROW

A **Frequency Transfer Arrow** appears between active and standby frequencies in both the COM and NAV windows. Pressing the **Frequency Transfer** key toggles the standby and active frequencies. Pressing the dual **COM** or **NAV** knob transfers both the frequency tuning box and the **Frequency Transfer Arrow** between the radios.

> **NOTE:** When a signal is received or transmitted, the **Frequency Transfer Arrow** is replaced by a white **RX** or **TX** indication.

RADIO INDICATORS

- **RX** – When a COM signal is received, a white **RX** appears by the active COM frequency during signal reception.

- **TX** – When a COM radio is keyed, a white **TX** appears by the active COM frequency during transmission.

- **ID** – When the Morse code identifier is ON for a NAV radio, a white **ID** appears to the left of the active NAV frequency. The Morse code identifier is heard when a NAV radio is selected on the audio panel.

CONTROLS

The NAV Frequency window is controlled by knobs and keys on the left, the COM Frequency window by knobs and keys on the right.

The **NAV** controls:

- **VOL/PUSH ID** knob
  - **Turn** to adjust the NAV radio volume level.
  - **Press** to turn the Morse code ID ON and OFF.

- **Frequency Transfer** key
  - **Press** to transfer the NAV frequencies between the active and standby fields.

- Dual **NAV** tuning knob
  - **Turn** to tune a NAV frequency in the NAV tuning box (**large** knob for **MHz**; **small** knob for **kHz**).
  - **Press** to transfer the NAV tuning box between the NAV1 and NAV2 radios.

The **COM** controls:

- **VOL/PUSH SQ** knob
  - **Turn** to adjust the COM radio volume.
  - **Press** to turn automatic squelch ON and OFF.

- **Frequency Transfer** key
  - **Press** to transfer the COM frequencies between the active and standby fields.
  - **Press and hold** for two seconds to tune the emergency frequency (121.500 MHz) in the active COM field.

- Dual **COM** tuning knob
  - **Turn** to tune a COM frequency in the COM tuning box (**large** knob for **MHz**; **small** knob for **kHz**).
  - **Press** to transfer the COM tuning box between the COM1 and COM2 radios.
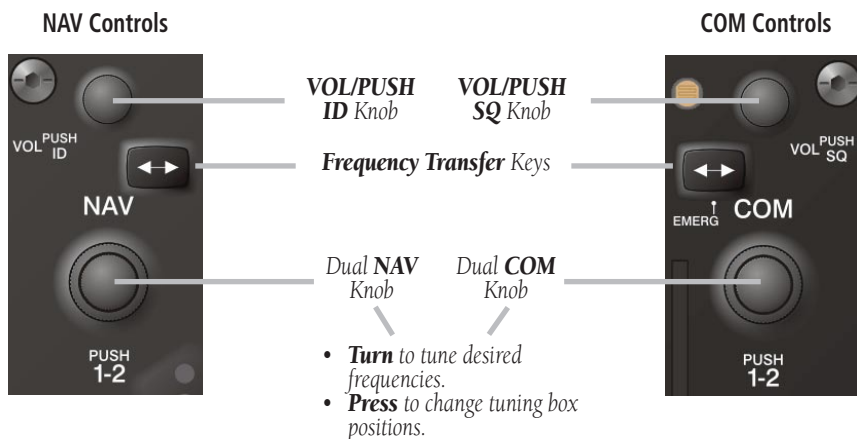
NAV Controls   **COM Controls**

VOL/PUSH ID Knob   *VOL/PUSH SQ* Knob

Frequency Transfer Keys

Dual NAV Knob   *Dual COM Knob*

- *Turn* to tune desired frequencies.
- *Press* to change tuning box positions.

Figure 4.1.4 NAV/COM Controls

4.2 COM OPERATION

FREQUENCY SPACING

The G1000 COM radios can tune either 25 kHz spacing (118.000 to 136.975 MHz) or 8.33 kHz spacing (118.000 to 136.990 MHz) frequencies.

COM channel spacing is configured through the MFD on the System Setup Page of the AUX Page group.

VOLUME

COM radio volume level can be adjusted from 0 to 100% in increments of 3.25%, using the **VOL/PUSH SQ** knob located above the **COM Frequency Transfer** key. Turning the **VOL/PUSH SQ** knob clockwise increases volume, turning the knob counterclockwise decreases volume.

When adjusting volume level for a COM radio, volume level is displayed in place of the standby COM frequency. The **COM1** or **COM2** annunciator is replaced by the word **VOLUME**. Volume level remains in the COM Frequency window for two seconds after the change.

Figure 4.2.1 COM Volume Level

AUTOMATIC SQUELCH

Automatic squelch provides maximum sensitivity to weaker signals while canceling most localized noise sources. Automatic squelch can be disabled for a COM radio by pressing the **COM** knob to select the desired COM sub-window, then by pressing the **VOL/PUSH SQ** knob.

When automatic squelch is disabled, COM audio remains continuously open and an RX indication appears while continuous noise is heard over the speaker and phones.

Figure 4.2.2 Overriding Automatic Squelch

To return to automatic squelch, press the **VOL/PUSH SQ** knob again.

SWITCHING BETWEEN COM RADIOS

Pressing the dual **COM** knob transfers the frequency tuning box between the COM1 and COM2 fields.

> **NOTE:** When a different transceiver (COM MIC key) is selected on the audio panel, the frequency tuning box also transfers on both the PFD and MFD.
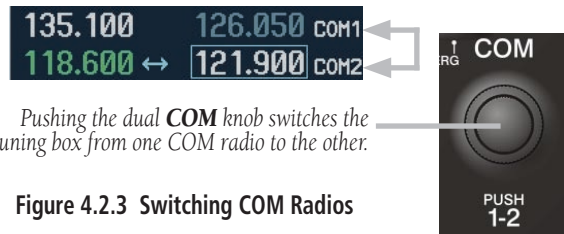

*Pushing the dual **COM** knob switches the tuning box from one COM radio to the other.*

Figure 4.2.3 Switching COM Radios

MANUALLY TUNING A COM FREQUENCY

COM frequency manual tuning is done with the dual **COM** knob. The frequency is tuned in the standby field.

- The <u>MHz</u> frequency digits are tuned with the large **COM** knob.

- The <u>kHz</u> frequency digits are tuned with the small **COM** knob.

Turning the knobs clockwise increases frequency. Turning the knobs counterclockwise decreases frequency.

TOGGLING COM FREQUENCIES

Pressing the **COM Frequency Transfer** key toggles the COM frequencies between the active and standby fields of the COM radio having the **Frequency Transfer Arrow**.
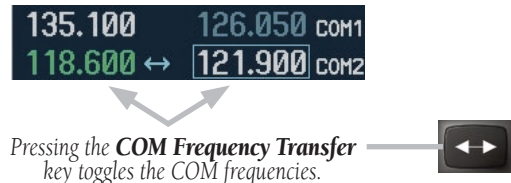

*Pressing the **COM Frequency Transfer** key toggles the COM frequencies.*

Figure 4.2.4 Transfering COM Frequencies

SELECTING A COM RADIO

The desired COM radio is selected using the **COM MIC** keys on the audio panel. When the **COM MIC** key is annunciated, the associated active COM frequency is displayed in green in the COM Frequency window.
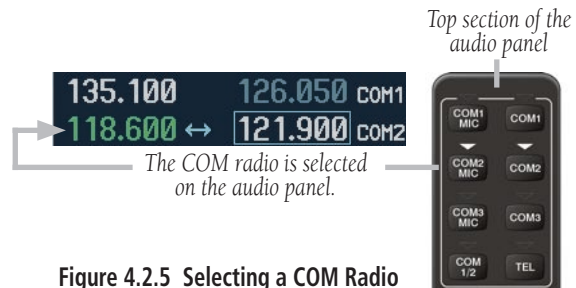

Top section of the audio panel

The COM radio is selected on the audio panel.

Figure 4.2.5 Selecting a COM Radio

> **NOTE:** Refer to the Audio Panel Pilot's Guide for more details on transceiver selection.

RADIO STATUS

When a COM radio is keyed, a white **TX** indication appears to the right of the active COM frequency to indicate transmission.

When a COM signal is received, a white **RX** indication appears to the right of the active COM frequency to indicate signal reception.

Figure 4.2.6   Radio Status Indications

*NOTE: When transmitting or receiving, the **Frequency Transfer Arrow** disappears and is replaced by a white **TX** or **RX** indication.*

EMERGENCY FREQUENCY (121.500 MHZ)

In case of a COM system tuning failure, the emergency frequency (121.500 MHz) is automatically loaded in the active frequency field of the radio in which the tuning failure was detected.

Figure 4.2.7   COM Tuning Failure

NOTE: In case of a dual display failure, the emergency frequency (121.500 MHz) is automatically placed in the active field of the active COM radio.

Quick-Tuning and Activating 121.500 MHz

Pressing and holding the **COM Frequency Transfer** key for two seconds automatically loads the emergency COM frequency (121.500 MHz) in the active field of the active COM radio (the one with the transfer arrow).

Figure 4.2.8   Quickly Tuning 121.500 MHz

STUCK MICROPHONE

If the COM1 or COM2 push-to-talk (PTT) switch becomes stuck, the COM transmitter times out after 35 seconds of continuous transmitting. An alert appears on the PFD to advise the crew of a stuck microphone.
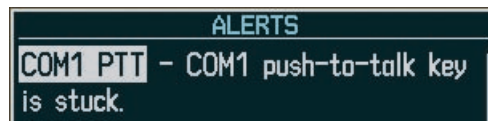

Figure 4.2.9   Stuck Microphone Alert

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4.3 NAV OPERATION

FREQUENCY RANGE

The G1000 NAV radios receive in the VOR/ILS frequency range of 108.00 to 117.95 MHz with 50 kHz spacing. The Nav Frequency window displays the following information:

- NAV1 and NAV2 active and standby frequencies
- NAV1 and NAV2 identifier indication (if the Morse code identifier is received by the system).
- Color-coded indication of the selected NAV radio
- Morse code identifier status

VOLUME

NAV radio volume level can be adjusted from 0 to 100% in increments of 3.25%, using the **VOL/PUSH ID** knob. Turning the **VOL/PUSH ID** knob clockwise increases volume, turning the knob counterclockwise decreases volume. When adjusting the volume for a NAV radio, volume level is displayed in place of the standby NAV frequency. Volume level remains in the NAV Frequency window for two seconds after the change.
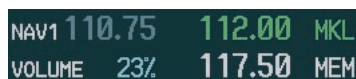

Figure 4.3.1 NAV Volume Level

MORSE CODE IDENTIFIER

Pressing the **VOL/PUSH ID** knob toggles the Morse code identifier ON and OFF. When the Morse code identifier is ON, a white **ID** indication appears to the left of the active NAV frequency. When the Morse code identifier is OFF, the **ID** indication disappears and the Morse code is filtered out of the NAV audio.

The Morse code identifier is ON for the GHM VOR.

Figure 4.3.2 ID Indication

The Morse code ID for an active NAV channel is heard when the white ID is displayed and the NAV radio is selected on the audio panel. Nav audio is available with the ID filtered out for listening to HIWAS and FSS transmissions on VOR stations.

NAV2 is the NAV radio selected on the audio panel. The Morse code identifier for the GHM VOR can be heard.

NAV section of the audio panel

Figure 4.3.3 Morse Code Identifier Audio

> **NOTE:** When a VOR signal is received, the VOR/LOC Morse code identifier is displayed to the right of the active NAV frequency.

SWITCHING BETWEEN NAV RADIOS

Pressing the dual **NAV** knob transfers the frequency tuning box between the NAV1 and NAV2 radios.
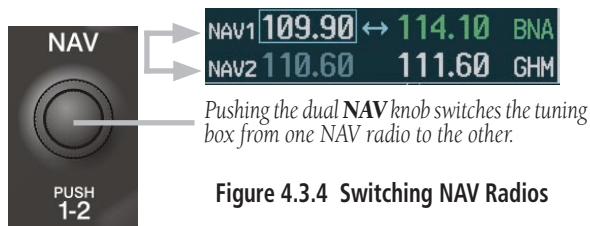
*Pushing the dual **NAV** knob switches the tuning box from one NAV radio to the other.*

Figure 4.3.4 Switching NAV Radios

> **NOTE:** When a different NAV radio is selected on the HSI, the NAV frequency tuning box also changes on the PFD and MFD. However, the NAV frequency tuning box does not change when GPS mode is selected.

MANUALLY TUNING A NAV FREQUENCY

NAV frequency manual tuning is done with the dual **NAV** knob.

- The <u>MHz</u> frequency digits are tuned with the large **NAV** knob.

- The <u>kHz</u> frequency digits are tuned with the small **NAV** knob.

The frequency is tuned in the standby field. Turning the knobs clockwise increases frequency. Turning the knobs counterclockwise decreases frequency.

TOGGLING NAV FREQUENCIES

Pressing the **NAV Frequency Transfer** key toggles the NAV frequencies between the active and standby fields of the NAV radio having the **Frequency Transfer Arrow**.

*Pressing the **NAV Frequency Transfer** key toggles the NAV frequencies.*

Figure 4.3.5 Toggling NAV Frequencies

SELECTING A NAV RADIO

The desired NAV radio is selected using the **CDI** soft-key located on the PFD. The three navigation modes that can be selected are:

- **VOR1** (or **LOC1**) – If NAV1 is selected, a **single green arrow** (shown) labeled either 'VOR1' or 'LOC1' is displayed on the HSI and the active NAV1 frequency is displayed in green.

- **VOR2** (or **LOC2**) – If NAV2 is selected, a **double green arrow** (not shown) labeled either 'VOR2' or 'LOC2' is displayed on the HSI and the active NAV2 frequency is displayed in green.

- **GPS** – If GPS mode is selected, a **single magenta arrow** (not shown) appears on the HSI and neither NAV radio is selected.

> **NOTE:** In GPS mode, both active NAV frequencies are displayed in white.

The NAV radio is selected by the **CDI** *softkey.*

Figure 4.3.6 Selecting a NAV Radio

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4.4 FREQUENCY AUTO-TUNING

The G1000 system offers multiple auto-tuning capabilities. The PFD allows auto-tuning of COM frequencies associated with the nearest airports. The MFD provides auto-tuning of both COM and NAV frequencies from waypoint and nearest pages. In addition, the primary NAV frequency is entered automatically in the NAV window during yapproach loading or approach activation.

Frequencies can be automatically loaded into the frequency windows in the following ways:

- By using the **ENT** key when the frequency is highlighted on the appropriate page (PFD and MFD).

- When loading or activating an approach (PFD and MFD).

> *NOTE: Turn the **FMS** knob to scroll through a list of frequencies.*

*Press the **ENT** key to load a highlighted frequency into the frequency window.*

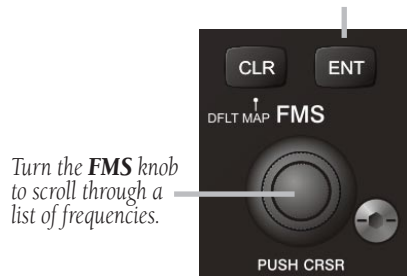*Turn the **FMS** knob to scroll through a list of frequencies.*

Figure 4.4.1 Loading Frequencies

AUTO-TUNING ON THE PFD

COM frequencies for the nearest airports may be viewed and automatically loaded from the Nearest Airports window on the PFD.

To auto-tune a COM frequency for a nearby airport:

1. Press the **NRST** softkey to open the Nearest Airports window, which displays the list of airport identifiers and COM frequencies.

2. Turn either **FMS** knob to highlight the desired COM frequency.

3. Press the **ENT** key to load the COM frequency into the COM tuning box.

> *NOTE: When the desired frequency is entered in the tuning box, it becomes a standby frequency. Pressing **Frequency Transfer** places this frequency into the active field.*

*Pressing the **NRST** softkey opens the Nearest Airports window*

Figure 4.4.2 Nearest Airports Window (PFD)

AUTO-TUNING ON THE MFD

Frequencies can be selected and loaded from the following MFD pages:

- WPT – Airport Information

- WPT – VOR Information

- NRST – Nearest Airports

- NRST – Nearest VOR

- NRST – Nearest Frequencies

MAP **WPT** AUX NRST ☐ ☐ ☐ ■ ☐

Figure 4.4.3 MFD Page Group Icon

*NOTE: In NAV mode during any VOR/ILS approach activation, the NAV frequency is automatically loaded into the **standby field of the selected NAV** radio.*

*NOTE: In GPS mode during any VOR/ILS approach activation, the appropriate NAV frequency is automatically loaded into the **active field of NAV1.***

WPT – Information Page

The Airport Information Page displays runway information and a list of frequencies for the selected airport identifier as well as departure, arrival and approach information.

To display the entire list of frequencies for an airport:

1. On the Airport Information Page, press the **INFO** softkey to display runway and frequency information for a specific airport.

2. Press the **FMS** knob to activate the selection cursor in the window.

3. Turn the **FMS** knob to select the desired airport identifier and press the **ENT** key. A list of all available frequencies for the selected airport appears.

Figure 4.4.4 WPT – Airport Information Page (INFO)

To load a COM frequency into the COM tuning box:

1. When the list of frequencies for the selected airport is displayed, highlight the desired frequency by turning the **large FMS** knob.

2. Press the **ENT** key.

*NOTE: The runway Pilot Controlled Lighting (PCL) frequency (located in the Runways box of the INFO portion of the Airport Information Page) may also be highlighted with the **large FMS** knob and loaded into the COM tuning box by pressing the **ENT** key.*

To load the primary approach NAV frequency into the NAV tuning box:

1. On the Airport Information Page, press the **APR** softkey to display approach information for a specific airport.

2. Press the **FMS** knob to activate the selection cursor in the window.

3. Turn the **large FMS** knob to highlight the primary NAV frequency located in the Primary Frequency box.

4. Press the **ENT** key.

Figure 4.4.5 WPT – Airport Information Page (APR)

WPT – VOR Information Page

The VOR Information Page displays information specific to individual VORs, including the airport that is nearest to the VOR.

To load a VOR frequency into the NAV window:

1. On the VOR Information Page, press the **FMS** knob to activate the VOR Information window.

2. Turn the **FMS** knob as needed to select the desired VOR and press the **ENT** key to validate the selection.

3. Turn the **large FMS** knob to highlight the VOR frequency and press the **ENT** key to load this frequency into the tuning box of the NAV Frequency window.

> **NOTE:** If the **MENU** key is pressed when on the VOR Information Page, the 'View Recent VOR List' menu option is displayed for quick access to recently used VORs. If no VOR frequencies have been tuned, this menu option is grayed out.

Figure 4.4.6 WPT – VOR Information Page

NRST – Nearest Airports Page

The Nearest Airports Page displays a list of the nearest airports as well as related runway, frequency and approach information. On this page, any frequency associated with the selected airport can be loaded into the NAV or COM Frequency window.

To display the entire list of frequencies for a nearby airport and load a frequency from that list:

1. On the Nearest Airports Page, press the **FMS** knob to activate the selection cursor in the Nearest Airports window.

2. Turn the **FMS** knob to scroll through the list of nearest airport identifiers until the desired nearest airport is highlighted.

3. Press the **FREQ** softkey to activate the selection cursor in the Frequencies box.

4. Turn the **FMS** knob to scroll through the list of frequencies for the selected airport.

5. When the desired frequency is highlighted, press the **ENT** key to load this frequency into the tuning box of the appropriate Frequency window (NAV or COM).
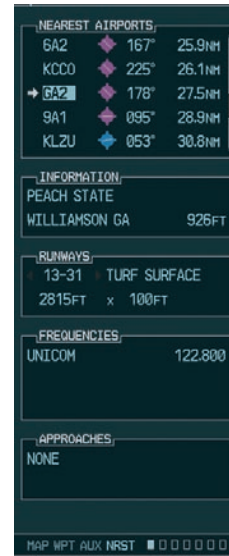

Figure 4.4.7 NRST – Nearest Airport Page

NRST – Nearest VOR Page

The Nearest VOR Page displays a list of the nearest VORs together with related information, including the VOR frequency.

To load a VOR frequency into the NAV window:

1. On the Nearest VOR Page, press the **FMS** knob to activate the Nearest VOR window.

2. Turn the **FMS** knob to scroll through the list of nearest VORs until the desired VOR is highlighted.

3. Press the **FREQ** softkey to activate the selection cursor in the Frequency box and press the **ENT** key to load the frequency into the tuning box of the NAV Frequency window.
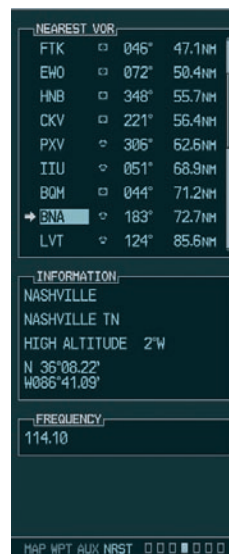
Figure 4.4.8 NRST – Nearest VOR Page

NRST – Nearest Frequencies Page

The Nearest Frequencies Page displays a list of nearest ARTCC, FSS and WX frequencies. For frequency selection, the cursor can be activated on the ARTCC, FSS, or WX windows by using the **ARTCC**, **FSS** and **WX** softkeys.

To view a nearest ARTCC frequency and load it into the standby frequency field:

1. Press the **ARTCC** softkey to activate the selection cursor in the Nearest ARTCC window.

2. Turn the **small FMS** knob to scroll through the list of ARTCC names, then the **large FMS** knob to highlight the desired ARTCC frequency.

3. Press the **ENT** key to load the desired ARTCC frequency into the COM tuning box.

> **NOTE:** The Nearest ARTCC window contains a numbered list of ARTCC names as well as bearing and distance information from the transmitting antenna.

To view a nearest FSS frequency and load it into the standby frequency field:

1. Press the **FSS** softkey to activate the selection cursor in the Nearest FSS window.

2. Turn the **small FMS** knob to scroll through the list of FSS names, then the **large FMS** knob to highlight the desired FSS frequency.

3. Press the **ENT** key to load the desired FSS frequency into the COM or NAV tuning box.

> **NOTE:** The Nearest FSS window contains a list of FSS names as well as bearing and distance information from the transmitting antenna.

To view a nearest WX frequency and load it into the standby frequency field:

1. Press the **WX** softkey to activate the selection cursor in the Nearest WX window.

2. Turn the **FMS** knob to highlight the desired WX frequency.

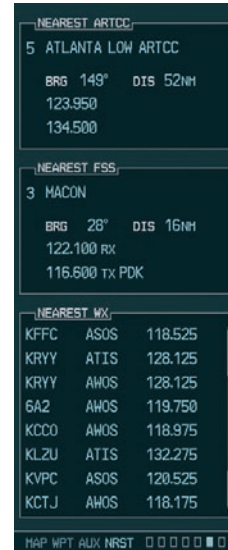3. Press the **ENT** key to load the desired WX frequency into the tuning box.

Figure 4.4.9 NRST – Nearest Frequencies Page

AUTO-TUNING ON APPROACH ACTIVATION (NAV FREQUENCIES)

NAV frequencies are automatically loaded into the NAV Frequency window on approach activation, regardless of the display unit being used.

> **NOTE:** The primary NAV frequency becomes auto-tuned upon loading an approach.

To auto-tune a NAV frequency if the desired approach is not already loaded:

1. Press the **PROC** key to open the Procedures window.

2. Turn the **large FMS** knob to highlight the 'SELECT APPROACH' menu option and press the **ENT** key.

3. Use both the **FMS** knob and the **ENT** key as needed to select the desired airport, VOR/ILS approach and transition.

4. Turn the **large FMS** knob to highlight either the 'LOAD?' or 'ACTIVATE?' prompt and press the **ENT** key. The primary NAV frequency for the activated approach is loaded into the standby field of the selected NAV radio.
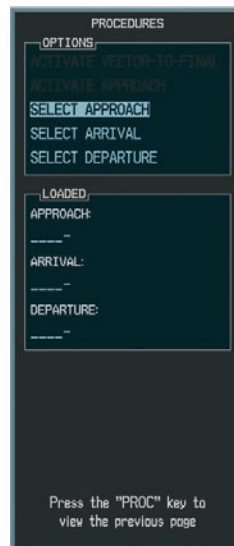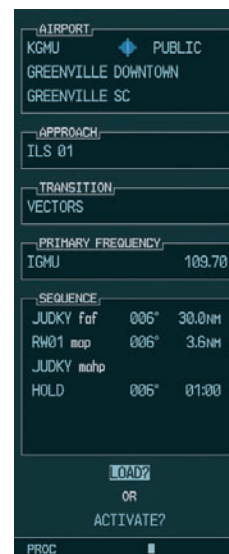

Figure 4.4.10 Selecting an Approach

Figure 4.4.11 Loading an Approach

To auto-tune a NAV frequency if the desired approach is already loaded:

1. Press the **PROC** key to open the Procedures window.

2. Turn the **large FMS** knob to highlight the 'ACTIVATE APPROACH' menu option and press the **ENT** key. The approach primary NAV frequency becomes automatically loaded into the standby field of the selected NAV radio.

> **NOTE:** If the system is in GPS mode when a VOR/ILS approach is loaded or activated, the approach primary NAV frequency is automatically loaded into the **active field of NAV1**.

> **NOTE:** Before loading or activating an approach, the primary NAV frequency may be loaded into the NAV tuning box by highlighting the frequency in the Select Approach window using the **FMS** knob, then pressing the **ENT** key.

> **NOTE:** The NAV frequency is also automatically loaded upon vector-to-final activation, if the NAV frequency is not already loaded in the selected NAV radio.

> **NOTE:** An approach can also be activated with the **MENU** key when the Flight Plan window is open.
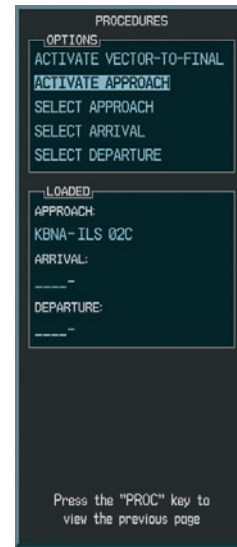

Figure 4.4.12 Activating an Approach

> **NOTE:** When a VOR/ILS approach has been activated in GPS mode, and the ILS CDI Capture option is set to AUTO, the system switches to NAV mode as the final approach course is intercepted (within 15 nm from the FAF). See the Multi Function Display Pilot's Guide for details.

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