Audio/Radio Management

AR 1.   Introduction

This appendix describes the EFIS pages for Audio/Radio control for a typical customer interface configuration.   One GDR-XXX radio would be represented by the display lines labeled COM1, NAV1, UHF, and MKR when if all features were enabled. Other associated avionics equipment is displayed on this same page, which may include Distance Measuring Equipment (DME), RADAR Transponder (ATC), Inter-com System (ICS), and Automatic Direction Finding (ADF). When two similar units are installed, the associated acronym is followed by a letter, e.g., COM2, would be a second GDR-XXX VHF COM radio.

AR 2.   Audio/Radio Page

The AR page is a common interface for managing multiple audio and radio devices configured for the EFIS. It allows selection of devices and changing of frequencies, settings, modes, volumes, and other values for the devices.

Use labeled buttons and the encoders to manage the AR page. A colored rectangle is drawn around the value, which is changed by the encoder when the line is selected. The color of the rectangle corresponds with encoder labeling (§ AR 3.6).

Figure AR-1: Audio Radio Page Format

AR 2.1. Audio/Radio System Colors

WHITE for items set by pilot and held by the EFIS or items where device feedback is not expected, such as STBY frequency/codes, TX indicator when there is no TX feedback, or marker beacon receiver high/low sensitivity modes. In low-light conditions, light gray is used for analog bar indication.

CYAN (light cyan for visibility) for information received from the device unrelated to a pilot setting, e.g., VOR/ILS/LOC identifier, transponder flight level, transponder reply, and radio receive.

MAGENTA (light magenta for visibility) for pilot-settable items sent to the devices but awaiting confirmation. Examples include ACTV frequency/codes, operating modes, and transmit enabled.

GREEN (light green for visibility) for pilot-settable items confirmed as set via feedback from the device, e.g., ACTV frequency/codes, operating modes, and transmit enabled indications.

AMBER (YELLOW) only for stuck microphone and DME hold, which require immediate pilot awareness.

RED for items requiring immediate pilot action. Only used to indicate a device failure (red "X").

GRAY for device name and selection box around selected device line. Light gray for devices that do not confirm their attribute setting.

AR 3. Common Symbols

Some symbols are common for different lines of the AR page.

Table AR-1: Transceiver Indicator Symbols		
Symbol	**Meaning**	**Notes**
NAVI		Responses from device have ceased for more than 2 seconds. (N/A for audio-only devices.) Red-X is removed when communication with device resumes.
TX	Transceiver selected for transmit	Only displayed for one device at a time.
TX	Failed audio controller	
TX	Selected for transmit	Active TX indicator. When audio controller in use.
TX	Confirms device actively transmitting	
TX	Stuck microphone	Flashes at 1 Hz rate.
RX	Device is actively receiving	
S TX	Split transmit in same color as TX indicator	Pilot and co-pilot sides may independently select active transceiver. RFP excludes this split transmit symbology.
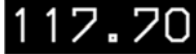
Table AR-2: Line Symbols		
Symbol	**Meaning**	**Notes**
(H)	DME receiver or channel associated with navigation receiver in hold mode	

Table AR-2: Line Symbols		
Symbol	**Meaning**	**Notes**
I	Reporting an active position identification (IDENT)	
R	Actively receiving device	If device is not reporting active position identification but is reporting an active reply to an ATC interrogation
T	Test mode confirmed	Magenta when in squelch test mode
NABC	Decoded station identifier in light cyan	Displays up to five characters
TACT	Name of device being controlled	
ADF	Mode confirmed	Magenta when device is set as the following: **BFO** = BFO mode **TST** = Test mode **REC** = Receive or antenna mode
Table AR-3: Frequencies		
Symbol	**Meaning**	**Notes**
117.70	Frequency confirmed	Active frequency is magenta until confirmed then light green.
117.70	Standby frequency	When selection confirmed, frequency is green.

AR 3.1. Level Bar

The level bar indicates a varying range of attributes, commonly volume. The white rectangle is filled with a color proportionately increasing from left to right, representing the magnitude of its value.

Table AR-4: Level Bar		
Symbol	**Meaning**	**Notes**
	Message sent Not yet confirmed	
	Minimum value is empty level bar filled in black.	Device confirming setting

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Table AR-4: Level Bar		
Symbol	**Meaning**	**Notes**
❶ 1	❶ was pushed to adjust the volume and turned down to lowest setting	
	Muted volume	
	Range of attribute at 50%	Device does not confirm setting
	Volume level	

NOTE:

When an audio controller fails, the line for the intercom is displayed as shown in Figure AR-1. However, failure of the audio controller may cascade across other devices. When the audio controller fails, only the devices with audio control through those other devices' interfaces display a volume level bar.

AR 3.2. VHF COM Transceiver

COM1   TX   134.400   122.800 ▬

Figure AR-2: VHF COM Transceiver Line

NOTE:

See Table AR-1 through Table AR-4 for explanation of symbology.

AR 3.3. VHF NAV Receiver

NAV1   108.80Ⓗ   117.20 ✕

Figure AR-3: VHF NAV Receiver Line

AR 3.4. ADF Receiver

ADF   NABC   190.0 ADF 1799.5 ▬

Figure AR-4: ADF Receiver

AR 3.5. Transponder
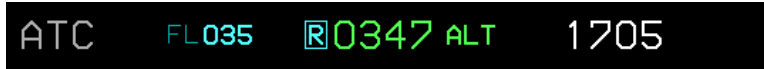
Figure AR-5: Transponder-FL Mode, Actively Receiving Device

Figure AR-6: Transponder-Meters Mode, Active Position Identification
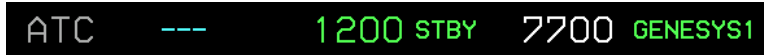
Figure AR-7: Transponder-Altitude Invalid

AR 3.6. Encoder Labeling

When a selected device line is enabled for frequency, code, mode or level adjustment, an indication of the value to be changed by the encoder appears. On the AR menu or expanded menu, a colored rectangle is drawn around the value, which is changed by the encoder when the line is selected. The color of the rectangle corresponds with encoder labeling.

In Figure AR-8, **MHZ** above ❸ correlates with the box on the selected line. **KHZ** above ❷ correlates with the box on the selected line. The level adjustment bar encoder labeling displays a non-dimensional number level value, for example as **45**.
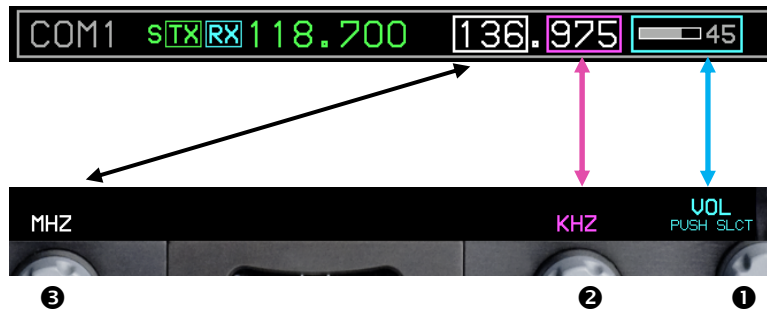
Figure AR-8: Encoder Labeling and Selected Line Coloring

AR 3.7. DONE Shortcut

The final line after the last AR device, **DONE** appears in the AR menu.

Figure AR-9: DONE Shortcut

AR 3.8. AR Menu Options
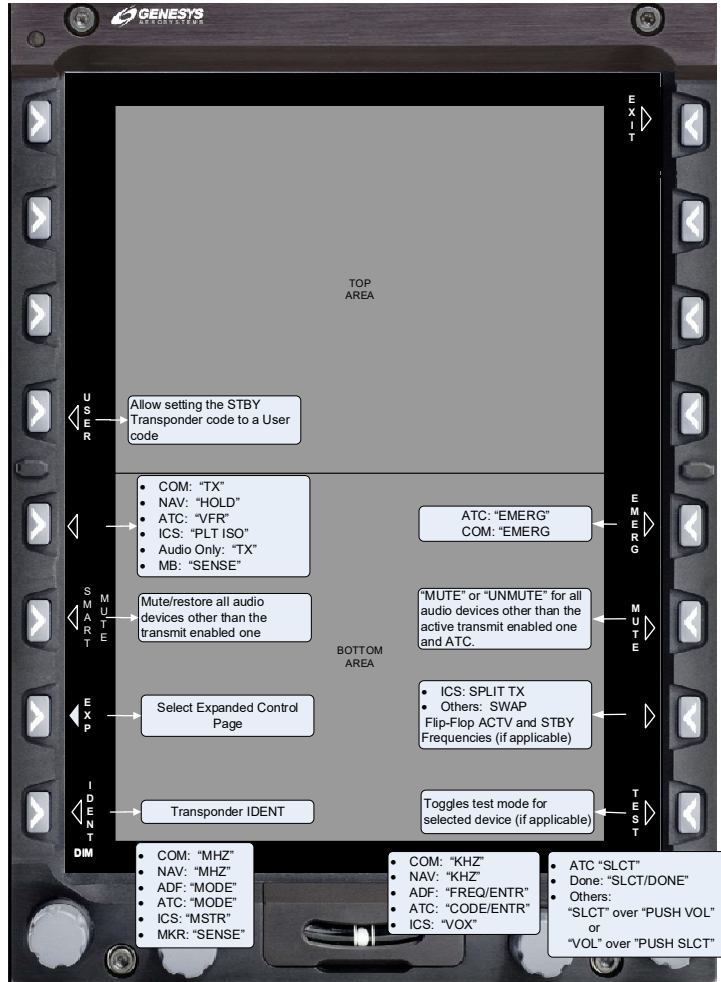
Figure AR-10: AR Menu Options

1) **USER (L4)**: When selected line is a transponder, allows for entry of user code into standby code position. When transponder fails, button appearance and operation are inhibited.

2) **TX (L5)**: When selected line is a VHF COM transceiver or audio-only device, which is not currently transmit enabled, allows for enabling transmitting on the selected transmitter. (Only one

device at a time can be selected.) Enabling transmission automatically unmutes the associated transceiver and disables transmitting on any other transmitter. If the audio controller fails, button appearance and operations are inhibited.

3) **HOLD (L5)**: When selected line is a VHF NAV receiver, toggles DME hold function for the DME channel tuned with the selected navigation receiver. When enabled, the system sets the hold frequency of the DME channel associated with the current NAV receiver equal to the current NAV receiver active frequency. If the VHF NAV receiver fails, button appearance and operation are inhibited.

4) **VFR (L5)**: When selected line is a transponder, places the VFR code into the standby code position. When the transponder fails, button appearance and operation are inhibited.

5) **PLT ISO (L5)**: When selected line is an intercom with pilot isolation (PLT ISO) mode, toggles PLT ISO mode. When audio controller fails, button appearance and operation are inhibited.

6) **SMART MUTE (L6)**: Toggles muting of all audio devices except the active transmit device. If audio controller fails, backup volume level changes can still be performed. When a different device is transmit enabled, automatically mutes on next button press.

7) **EXP (L7)**: When selected line is a device with an expanded menu, activates the expanded menu. If the selected device fails, button appearance and operation are inhibited.

8) **IDENT (L8)**: Enables IDENT feature of the transponder. If the transponder fails, button appearance and operation are inhibited.

9) **EMERG (R5)**: When selected line is a transponder, press to place the emergency code (7700) into the selected transponder standby code. When selected line is a VHF Com transceiver, press to place the emergency frequency (121.500 MHz) into the standby frequency position for the selected VHF Com transceiver. "One Touch Emergency" feature performs the action as described and immediately switches the active and standby code or frequency for the selected device.

10) **MUTE, UNMUTE (R6)**: When audio controller not failed, toggles muting for the device. If audio controller fails, button appearance and operation are not inhibited.

11) **SWAP (R7)**: When selected line is a device with ACTV and STBY frequencies, channels, or codes, toggles the ACTV and STBY frequencies, channels, or codes. If device fails, appearance and operation are inhibited.

12) **SPLIT TX (R7)**: When selected line is an intercom, toggles the split transmit mode. If the audio controller fails, button appearance and operation are inhibited.

13) **TEST (R8)**: When selected line is a VHF COM transceiver or VHF NAV receiver that is not failed and has a TEST mode, toggles the TEST mode.

14) **MHZ (❸)**: When selected line is a VHF COM transceiver, scroll CW to increase or CCW to decrease STBY frequency by 1 MHz from 118 to the maximum for the device. When selected line is a VHF NAV receiver, scroll to increase or decrease STBY frequency by 1 MHz from 108 MHz to 117 MHz. If selected device fails, encoder appearance and operation are inhibited.

15) **MODE (❸)**: When selected line is an ADF receiver, scroll CW to increase or CCW to decrease through ADF receiver modes: **ADF**, **BFO**, **TST**, or **REC**. When selected line is a transponder, scroll to increase or decrease through the transponder operating modes in the following order: **STBY**, **GRND**, **ON**, and **ALT**. If the ADF receiver or transponder fails, encoder appearance and operation are inhibited.

16) **SENSE (❸)**: When selected line is a marker beacon receiver with adjustable sensitivity, scroll through sensitivity modes of LOW and HIGH.

17) **KHZ (❷)**: When selected line is a VHF COM transceiver in 25 kHz spacing mode, scroll to increase or decrease STBY frequency by 25 kHz from 0 to 975 kHz. When selected line is a VHF COM transceiver in 8.33 kHz spacing mode, scroll to increase or decrease STBY frequency by 8.33 kHz spacing channels from 0-990. When selected line is a VHF NAV receiver, scroll to increase or decrease STBY frequency by 50 kHz from 0 to 950 kHz. If selected device fails, encoder appearance and operation are inhibited.

18) **FREQ/ENTR** (**❷**): When selected line is an ADF receiver, scroll to increase or decrease STBY frequency within the frequency range of the ADF receiver on a per-digit basis. Push to change the selected digit. If selected ADF receiver fails, encoder appearance and operation are inhibited.

19) **CODE/ENTR** (**❷**): When selected line is a transponder, scroll to increase or decrease STBY 4-digit code on a per-digit basis. Push to change the selected digit. If selected transponder fails, encoder appearance and operation are inhibited.

20) **VOX** (**❷**): When selected line is an intercom, scroll to increase or decrease VOX threshold. If selected device fails, encoder appearance and operation are inhibited.

21) **SLCT** (**❶ SLCT mode)**: When in SLCT mode and selected line is a transponder, scroll to increase or decrease the selected line. scroll the encoder to proceed through the list to see additional devices.

22) **SLCT/DONE** (**❶ SLCT mode)**: When in SLCT mode and selected line is **DONE**, has the same function as described for **SLCT**. Push for the same function as **EXIT (R1)**.

23) **SLCT PUSH VOL** (**❶ SLCT mode)**: When in SLCT mode and selected line is a VHF COM transceiver, ADF receiver, DME receiver, audio-only device, or marker beacon receiver, has the same function as described for **SLCT**. Push to toggle to VOL mode. Push to unmute a muted device.

24) **VOL PUSH SLCT** (**❶ SLCT mode)**: When selected line is a VHF COM transceiver, VHF NAV receiver, ADF receiver, DME receiver, audio-only device, or marker beacon receiver, scroll to increase or decrease volume. Push to return to SLCT mode.

AR 3.9. Expanded Menu

Some devices have an expanded menu to manage infrequently-used device options. To access the expanded menu, press **EXP (L7)** when the device is highlighted and not in a failed state.
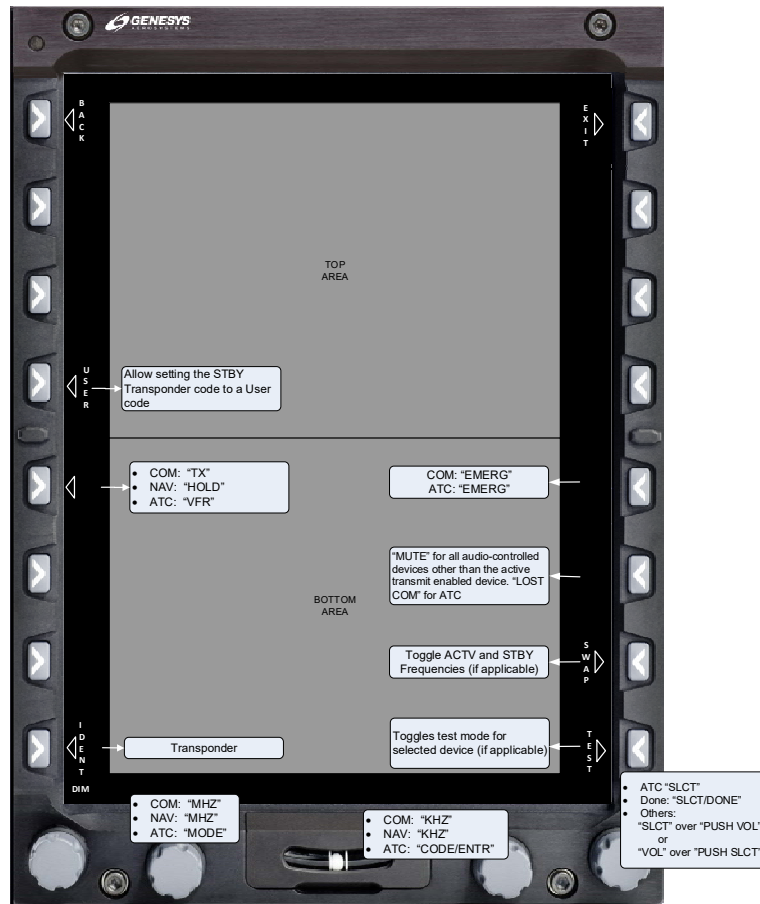
Figure AR-11: AR Expanded Menu Options

The first line of each expanded menu displays the associated line from the AR menu—both text and symbols of the AR page line for that device. Expanded button options are as follows:

1) **USER (L4)**: When expanded menu is for a transponder, has same function as described in § AR 3.8.

2) **TX (L5)**: When expanded menu is for a VHF COM transceiver and first line is selected, has same function as described in § AR 3.8.

3) **HOLD (L5)**: When expanded menu is for a VHF NAV receiver and first line is selected, has same function as described in § AR 3.8.

4) **VFR (L5)**: When expanded menu is for a transponder, has same function as described in § AR 3.8.

5) **IDENT (L8)**: When transponder is not in a failed state, enables IDENT feature of the transponder. Button appearance and operation are independent from the selected line.

6) **EMERG (R5)**: When expanded menu is for transponder or VHF Com transceiver, has same function as described in § AR 3.8.

7) **MUTE (R6)**: When expanded menu is for VHF COM transceiver or VHF NAV receiver and first line is selected, has same function as described in § AR 3.8.

8) **LOST COM (R6)**: When expanded menu is for transponder, places communications failure code (7600) into standby code position.

9) **SWAP (R7)**: Same function as described in § AR 3.8. Button appearance and operation are independent from selected line.

10) **TEST (R8)**: When expanded control page is for a device with a test mode, toggles test mode. Button appearance and operation are independent from selected line.

11) **MHZ (❸)**: When expanded menu is for a VHF COM transceiver or VHF NAV receiver and first line is selected, has same function as described in § AR 3.8.

12) **MODE (❸)**: When expanded menu is for transponder and first line is selected, has same function as described in § AR 3.8.

13) **KHZ (❷)**: When expanded menu is for VHF COM transceiver or VHF NAV receiver and first line is selected, has same function as described in § AR 3.8.

14) `CODE/ENTR` **(❷)**: When expanded menu is for transponder and first line is selected, has same function as described in § AR 3.8.

15) **ADJ (❷)**: Appears when a line other than the first line or **DONE** line is selected.

AR 3.9.1. ADR7050 COM Transceiver
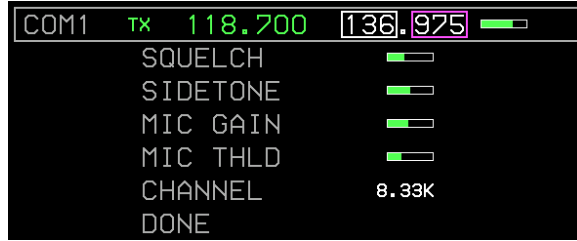
Figure AR-12: ADR7050 COM Transceiver

NOTE:

When ❶ is in SLCT mode for this device and applicable line is selected, scroll CW to increase or CCW to decrease squelch, sidetone mic gain, mic threshold, or channel selection options.

Table AR-5: ADR7050 Com Transceiver Expand Page		
Symbol	**Meaning**	**Notes**
SQUELCH	Squelch level: Filter level applied to incoming signals.	Light magenta until confirmed, then light green.
SIDETONE	Sidetone level: Volume of transmitting voice heard.	
MIC GAIN	Mic gain: Amount of amplification applied to transmitting microphone.	
MIC THLD	Microphone threshold: Filter level applied to transmitting microphone before device allows signal to transmit.	
CHANNEL 25K CHANNEL 8.33K	Device is capable of 25 kHz spaced frequencies or 8.33 kHz channels.	Changes only applicable on individual device.

Table AR-5: ADR7050 Com Transceiver Expand Page

Symbol	Meaning	Notes
		Consider all devices installed.
DONE	Shortcut to save changes and exit expanded view and return to last ND page.	Same result as **EXIT (R1)**

AR 3.9.2. ADR7050 NAV Receiver

NAV1 KMWL 109.00 v 112.90 ▭34
AUDIO MODE   VOICE
DONE

Figure AR-13: ADR7050 NAV Receiver

NOTE:

When applicable line is selected, scroll ❷ **ADJ** to toggle options.

Table AR-6: ADR7050 NAV Receiver Expand Page

Symbol	Meaning	Notes
AUDIO MODE VOICE AUDIO MODE IDENT	Audio filter enhances voice or Morse code signals to be heard.	Voice mode filters out audible navigation aid identifiers.
DONE	Shortcut to save changes and exit expanded view and return to last ND page.	Same result as **EXIT (R1)**

AR 3.10. Mode S Transponder
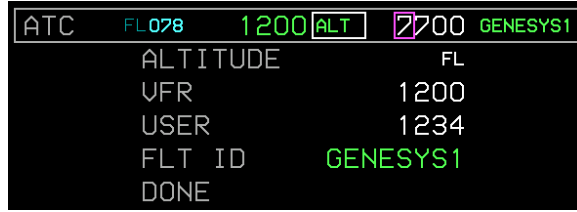
Figure AR-14: Mode S Transponder

NOTE:

When encoder ❶ is in SLCT mode and applicable line is selected, scroll ❷ **ADJ**, **CODE/ENTR** to toggle options and alphanumeric digits (A-Z space and "0"-"9"—space characters only allowed at the end of the Flight ID).

<table>
<tr><th colspan="3">Table AR-7: Mode S Transponder</th></tr>
<tr><th>Symbol</th><th>Meaning</th><th>Notes</th></tr>
<tr><td></td><td>4-digit octal number in range of 4096 codes.</td><td>Light magenta until confirmed, then light green.</td></tr>
<tr><td></td><td colspan="2">Present if reporting an active position identification.</td></tr>
<tr><td></td><td colspan="2">Present if reporting active reply.</td></tr>
<tr><td></td><td>Transponder set to Standby, Ground, ON, or ALT mode.</td><td>Light magenta until confirmed, then light green.</td></tr>
<tr><td></td><td>Display of **METERS** or **FL** mode</td><td>Scroll ❶ to select line and ❷ to adjust options.</td></tr>
<tr><td></td><td>Selects proper VFR code for country of operation.</td><td rowspan="2">Scroll ❶ to select line and ❷ to adjust CODE/ENTR options. Push to</td></tr>
<tr><td></td><td>Selects special USER code for</td></tr>
</table>

Table AR-7: Mode S Transponder		
Symbol	**Meaning**	**Notes**
	customer special purposes.	cycle through digits.
`FLT ID      GENESYS1`	Flight ID sent to ATC and other Mode S aircraft.	Light magenta until confirmed, then light green.
`DONE`	Shortcut to save changes and exit expanded view and return to last ND page.	Same result as **EXIT (R1)**

NOTE:

Changing the Flight ID limited to operations with the transponder in standby mode only.

AR 3.11.   DME Receiver

`DME`

Figure AR-15: DME Receiver

The DME parameters are established through interfaces with VHF navigation receivers as an audio-only device.

AR 3.12.   Intercom

When the Radio page highlighted line is on ICS, the following appears.

`ICS    CALL VOX ▭    RX ▭    ICS ▭`

Figure AR-16: Intercom

Table AR-8: Intercom		
Symbol	**Meaning**	**Notes**
`PLT ISO`	Audio controller has a pilot isolate feature.	

Table AR-8: Intercom

Symbol	Meaning	Notes
VOX ▭▬	VOX level setting for the device.	Filter level applied to user's intercom microphone before audio controller allows signal to be heard.

AR 3.13.   Audio-Only

The UHF is configured for transmit enable and volume adjust through the audio controller.

UHF   ▬▭

Figure AR-17: Audio-Only Device

Table AR-9: Audio-Only

Symbol	Meaning	Notes
TX	When configured for transceiver and selected.	Device loses TX selection if device fails.
▬▭	Volume level. Increasing from left to right.	Volume setting for device.

AR 3.14.   Marker Beacon Receiver

MKR   O M I   LOW   ▭▬

Figure AR-18: Marker Beacon Receiver

Table AR-10: Marker Beacon Receiver

Symbol	Meaning	Notes
O M I	Individual marker beacon indicators.	Individually displayed when valid.
HIGH LOW	Representing sensitivity selected.	Only available on receivers with option available.

Table AR-10: Marker Beacon Receiver

Symbol	Meaning	Notes
	Volume level. Increasing from left to right.	Device loses volume adjustment if device fails.

AR 3.15.   ARINC 716 VHF Communication Transceiver
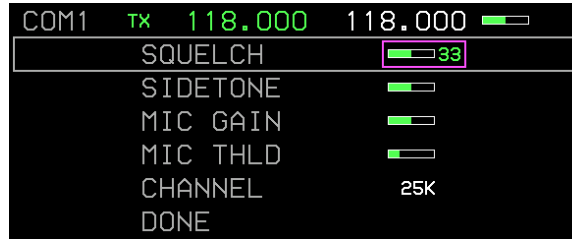
Figure AR-19: ARINC 716 VHF COM

Table AR-11: ARINC 716 VHF Communication Transceiver

Symbol	Meaning	Notes
SQUELCH	Squelch level applied to incoming signals.	Light magenta until confirmed, then light green.
SIDETONE	Sidetone level: Volume of transmitting voice heard.	
MIC GAIN	Mic gain: Amount of amplification applied to transmitting microphone.	
MIC THLD	Microphone threshold: Filter level applied to transmitting microphone before the device allows signal to be transmitted.	
CHANNEL 25K	Device is capable of either 25 kHz spaced	Changes applicable only on

Table AR-11: ARINC 716 VHF Communication Transceiver

Symbol	Meaning	Notes
CHANNEL 8.33K	frequencies or 8.33 kHz channels.	individual device. Consider all devices installed.
DONE	Shortcut to save changes and exit expanded view and return to last ND page.	Same result as **EXIT (R1)**

AR 3.15.1.   RN3320 Nav Receiver

Figure AR-20: RN 3320 Nav Receiver

Table AR-12: RN 3320 Nav Receiver

Symbol	Meaning	Notes
AUDIO FILTER NONE	Allow voice signals or Morse code to be heard.	Displays **NONE** when no filter or **VOICE** for voice filter. Magenta until confirmed, then light green.
DONE	Shortcut to save changes and exit expanded view and return to last ND page.	Same result as **EXIT (R1)**

AR 4.   Radio Frequencies Panel

Figure AR-21: Radio Frequencies Panel

The RFP displays up to six devices in the top margin with or without the AR page active. Some symbols are common for different device fields.

Table AR-13: RFP Common Symbols			
Device	**Color**	**Function**	**Notes**
Abbreviation up to 5 characters	White	Device controlled on AR page	Has precedence over device label
NAVI	Red-X. (See Table AR-1)		
TX	See Table AR-1		
VHF COM Transceiver	COM1 118.000 TX	See Table AR-3	
RX	COM1 124.100 RX	See Table AR-1	
Split Transmit	COM1 118.000 TX	See Table AR-1. RFP excludes indication	
VHF NAV Receiver	NAV1 108.00	Receiver status	See § AR 3.3
ADF Receiver	ADF 1215.5		See Table AR-2
Transponder	ID 1200 I ALT	See § AR 3.5 I See Table AR-2	

AR 5.   Device-Specific Failures

Some devices have specific failure modes presented across multiple lines of the AR page display. When an audio controller fails, only the devices with audio control through those other devices' interfaces and connected to audio controller slots that are able to be heard when failed, will display a volume level bar.