



AgustaWestland **AW**<sup>189</sup>  
HF-9000 RADIO SYSTEM  
PILOT'S GUIDE

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## **HF-9000 RADIO SYSTEM PILOT'S GUIDE**

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# SECTION I

## GENERAL

### SCOPE

Purpose of this paper is to describe which are the HF Radio functions supported by the AW189 for the so called "Phase 3" Avionic Software configuration.

### APPLICABILITY

This document is applicable to the AgustaWestland AW189 Helicopter. This document is applicable to the AMMC software version 5.1.4 (P/N 8G4620AA0301) with HF RADIO option set in the AMMS Option File.

### RELATED DOCUMENTS

Ref.	Doc. Num.	Title
1	189G4620U004	AW189 Cabin-PC and Mission Console User Manual

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## **SECTION II**

### **SYSTEM DESCRIPTION**

The HF-9000 pilot's manual describes the functionalities of the AgustaWestland HF-9000 Radio system installed on board of the AgustaWestland AW189 helicopter.

The AW189 Avionic system incorporates one HF transceiver. The HF Radio System is integrated with the AW189 AMMS system. The HF Radio System is the Rockwell Collins HF-9000 and it is a versatile, solid-state, HF radio communications systems. The HF-9000 provides HF radio operational capability in the 2.0000 to 29.9999 MHz frequency range. The system is tuneable in 100-Hz increments over their entire range and is capable of operation in the following modes: USB, LSB and AME.

The HF-9000 provides user-programmable preset channels with simplex or half-duplex operation. All half-duplex voice International Telecommunications Union (ITU) maritime radiotelephone frequencies, plus 6 emergency channels, are pre-programmed for instant use. The HF-9000 kit includes a receiver-transmitter, an antenna coupler and equipment mounts.

The HF Radio functionalities are enabled when the AMMS Options File include the HF RADIO option equal to HF-9000.

The Radio controls are by mean of the HF pages on the MCDU displays. The MCDU displays are connected to the AMMCs that control the HF Receiver/Transmitter by mean of ARINC 429 lines.

The HF Radio System installed on the AW189 consists of four units:

- the Antenna Coupler (HF-9040),
- the FL-9003 connector adapter,
- the Receiver/Transmitter (HF-9031A) and
- the Towel Bar Antenna Array.

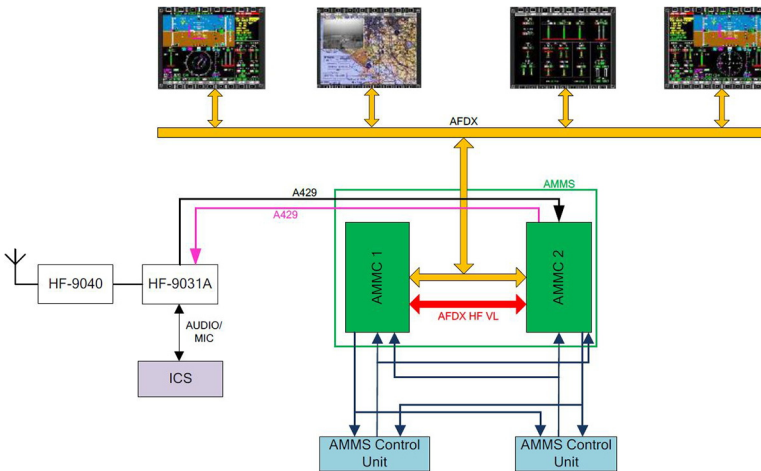
The Antenna Coupler and the Receiver/Transmitter compose the main Rockwell Collins HF-9000 Radio System while the antenna array is designed with parts of the Chelton antennas series 485 and 465.

The Receiver/Transmitter HF-9031A and the Antenna Coupler HF-9040 intercommunicate via a fiber optic cable that routes serial data in a simple loop configuration.

According to the helicopter configuration, in particular related to the presence or not of a Mission Computer in the cabin, the following combinations will be possible:

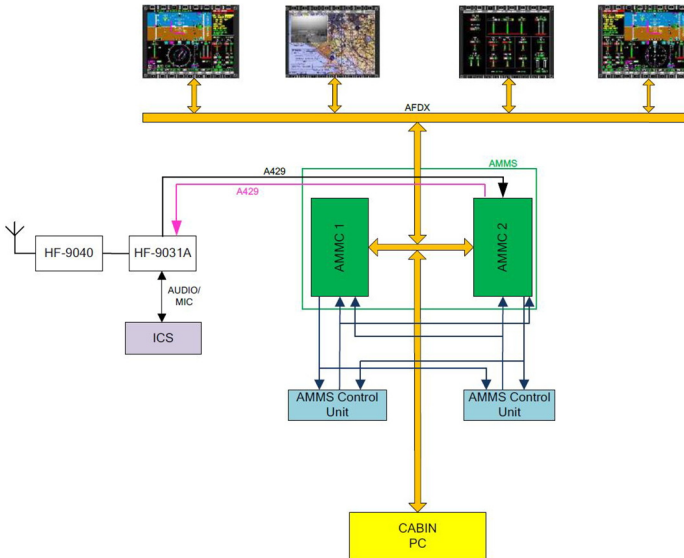
- when no Mission Computer is installed on the cabin, HF radio controls are available only in the Cockpit;
- when a Mission Computer is installed on the cabin, the HF Radio can be controlled also through the Mission Computer in the cabin.

The HF Radio interactions available in the cabin are not described in this document; please refer to document [Ref. 1](#) for details.



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Figure 2-1 HF Radio kit Architecture



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**Figure 2-2 Radio Architecture with Cabin PC installed**

The HF analog audio Input/Output lines are wired between the HF Receiver/Transmitter and the ICS system. The HF audio level can be controlled through the ICS audio control panels.

This Pilot's Manual reflects the AW189 configuration specified in "Applicability" section.

This Pilot's Manual is organized in Sections with the purpose to describe specific Operational uses of the HF Radio.

The following Sections are included in the Manual:

- *HF Radio Control Device*: in this section the HMI rules used by the MCDU are listed, in terms of colour coding, symbols and pages organization.
- *Starting the HF Radio system*: this section details the startup procedures and initialization conditions of the HF Radio.
- *The HF Radio functions*: this section details the HF functions with the relevant interactions using the MCDUs.

The HF Radio functions illustrated in this Manual are:

- Simplex Frequency management.
- Half-duplex Frequency management
- ITU Maritime channel management
- Emergency channel management
- Settings management
- Preset management

## **SECTION III**

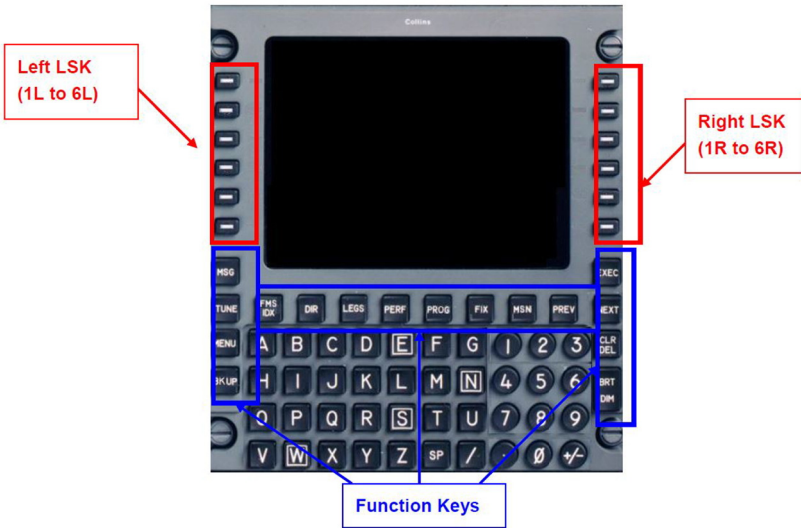
# **HF RADIO CONTROL DEVICE**

The AMMC provides integrated control of the HF Radio via MCDUs. The MCDU is used as primary radio controller. A secondary radio control method is through the Cabin computer.

The Operator shall use the MCDU device for interfacing with the HF Radio. The MCDU is connected to the AMMC via an ARINC 739 logical protocol supported by an ARINC 429 physical protocol.

The MCDU is composed by the following parts:

- a display;
- Line Select Keys (LSK). Six are on the display left side and six are on the display right side. All of them are vertically positioned.
- a Scratchpad used to enter data;
- a Numeric keyboard (that includes numbers from 0 to 9, the dot and the key “+/-”);
- an Alphabetical keyboard (that includes letters from A to Z, the space and the dash);
- PREV and NEXT keys used to navigate Horizontal pages ;
- EXEC key used to perform executable actions and an EXEC lamp (in the Message Line)
- CLR/DEL key used to clear the scratchpad (CLR) or to delete data (DEL);
- MSG key used to display avionic messages and alerts and a MSG lamp (in the Message Line);
- MENU key used to display the FMS Start Up page;
- System Menu keys (SMK) used to reach the Top pages:
  - TUNE: to tune Comms and Nav aids;
  - FMS: to display FMS top page;
  - DIR: to manage the FMS DIRECT TO;
  - LEGS: to manage the active Flight Plan;
  - PERF: to manage the Helicopter and FMS Performances;
  - PROG: to manage the Progress pages
  - FIX: to manage the FIX page;
  - MSN: to manage Mission pages.



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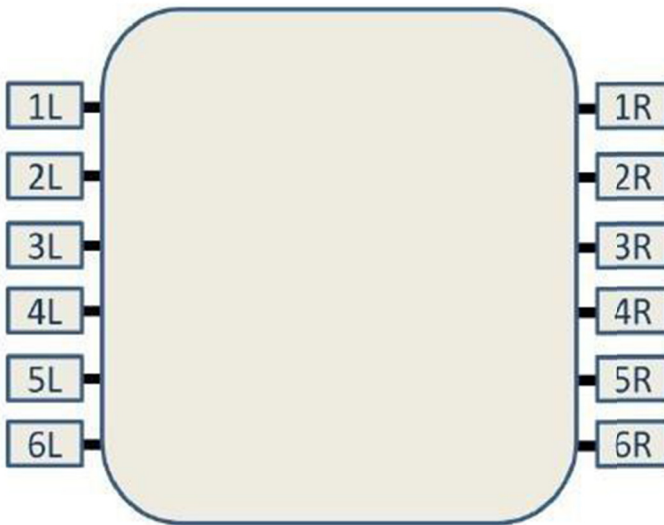
Figure 3-1 MCDU Layout

## THE MCDU DISPLAY

The MCDU display contains 15 rows; each of them comprises 24 characters. The first row on the top is the title line and is used to display the title page. The last row is the Message line and the 14th row is the scratchpad. Whenever the Pilot presses a Numeric or Alphabetical keyboard key then the scratchpad echoes the chosen number or letter.

The remaining 12 rows are used to display information, data and commands (see next section) and are managed as six couples of header and data lines. The data lines are adjacent to the LSK (Line Select Key) and the corresponding header line is just over the data line.

In this Pilot's manual the following MCDU simplified picture is used to give operational examples:



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**Figure 3-2 MCDU LSK identification**

## THE SCRATCH PAD

The scratchpad is the fourteenth row of the MCDU display and has four functional working modes: edit, delete, confirm and error message.

The default working mode is the edit one. No legend is used to state this condition. The others modes are consequence of an AMMS action activated by a Pilot command.

When in editing mode the scratchpad echos the keypresses entered by the Pilot. The keypresses do not have any HF Radio effect until they are associated to a LSK. The Pilot can therefore verify the correctness of the input value before finalizing desired HF action, by pressing the desired LSK.

The data is cleared from the scratchpad when a command is successfully executed, but is maintained during successive pages navigation (if the requested page is even a command then the scratchpad is cleared).

These are the rules applied to any entry generated by a keyboard keypress and then echoed in the scratchpad:

- the echoed characters are displayed in normal white color
- the maximum number of characters accepted in the scratchpad are 22, the subsequent ones are ignored
- space (SP) characters inserted at the end of the scratchpad string are ignored while spaces followed by other chars are included in scratchpad validation
- the Pilot can delete last scratchpad character by pressing the CLR DEL key; if the scratchpad is empty then the keypress puts it in delete mode
- the Pilot can delete the entire scratchpad content by holding down CLR DEL key until the scratchpad is cleared; if the scratchpad is already empty then the keypress puts it in delete mode
- the +/- key is used to change the scratchpad content sign even if the displayed string does not represent a number. The '+' symbol is not displayed. For example: if '1234' is displayed in the scratchpad the +/- keypress changes the string to '-1234', a subsequent +/- keypress brings back the value to '1234'

The delete scratchpad mode, recognizable by the inverse video DELETE string put in the scratchpad center, is described in the CLEAR/DEL section.

The message scratchpad mode, recognizable by the presence of an error message inverse video in inverse video in the scratchpad center, is entered when a Pilot DMG command results in an error. Error messages are command specific however similar conditions, met in different requests, generate the same message.



The scratchpad edit mode, along with its content, can be restored by pressing any key.

The AMMS generates error messages in the scratchpad, to indicate that the interaction has not been closed positively.

The scratchpad confirm mode, recognizable by the inverse video CONFIRM string in the center of the scratchpad, is entered when the requested AMMS command needs Pilot confirmation in order to be finalized. The edit mode, with its contents, is restored By pressing any key with the exception of the EXEC key.

## **THE NUMERIC AND ALPHABETIC KEYBOARDS**

The MCDU keyboards are used to input data to HF Radio. All alphanumeric inputs are displayed in the scratchpad.

These are the possible input characters for their location refer to [Figure 3-1](#):

- numbers from 0 to 9;
- dot and “+/-” keys;
- letters from A to Z;
- space (SP) and dash keys.

## **THE MESSAGE LINE**

The Message line is the fifteenth and last row of the MCDU display. There are two possible indications, both shown as a white inverse video legend:

- an EXEC input is needed for finalizing an active MCDU session, indicated by an EXEC string displayed at the end of the line;
- at least one raised Alert message has not yet been acknowledged, indicated by a MSG string displayed at the beginning of the line

Note that:

- the EXEC string is cleared when the required input is provided or the Pilot abandons the update session;
- the MSG string is cleared when all the raised alerts are acknowledged, a new alert occurrence re-activates the legend.

## THE PREV AND NEXT KEYS

PREV and NEXT keys are used for horizontal pages navigation. The mm/nn title line notation, where mm is the current displayed page while nn is the total number of the pages, identifies that the showed page is a parallel one.

Horizontal pages are managed as a circular list: page 1/nn is displayed when NEXT is pressed on nn/nn page (last one) while PREV pressing on nn/nn page (the last one) displays the 1/nn page (the first one).

## THE EXEC KEY

Whenever an EXEC input is needed for finalizing an active MCDU session, the AMMS shows at the end of the Message line a white EXEC string in inverse video. At this point, the EXEC key pressing provides confirm for function execution.

The EXEC legend is displayed only for those commands that functionally require that kind of input.

The EXEC key while the EXEC legend is not displayed does not have any effect on the current MCDU session. However if the scratchpad is in delete/message/confirm mode the EXEC key, like all the other keypresses, returns the scratchpad to the edit mode.

## THE CLR/DEL KEY

The CLR/DEL key is a context-sensitive input that depends on the current scratchpad mode.

When a Pilot input string is echoed in the scratchpad the CLR/DEL keypress causes the last char string deletion and if the same key is held down for more than 1 second it clears the entire displayed string.

When the scratchpad is empty the CLR/DEL keypress opens a delete session and puts the scratchpad mode in delete mode. This condition is identified by a DELETE string in inverse video displayed in the middle of the scratchpad. A subsequent LSK keypress provokes one of the following actions:

- delete the selected item;
- restore System Data value for enterable selected data;
- reset manual inserted value for enterable selected data;
- restore default value for enterable selected data.

After the delete/reset function execution the delete session is closed, the DELETE string is cleared from the scratchpad, which returns to the edit mode with its previously content displayed, if any.

Any other keypress (included LSK that are not associated to data/items that can be reset or deleted) closes the delete session, i.e. the scratchpad is put in edit mode with the previously defined content displayed, if any.

### **THE MSG KEY**

The Message (MSG) key is used to display alerts information. The Pilot is advised to check the Alerts page by a MSG indicator on PFD and a MSG legend on MCDU Message Line. If the MSG indicator/legend is not present, the MSG key pressing displays an empty page.

The MSG indicator/legend is cleared when all the info contained in the Alerts page are acknowledged by the Pilot.

### **THE MENU KEY**

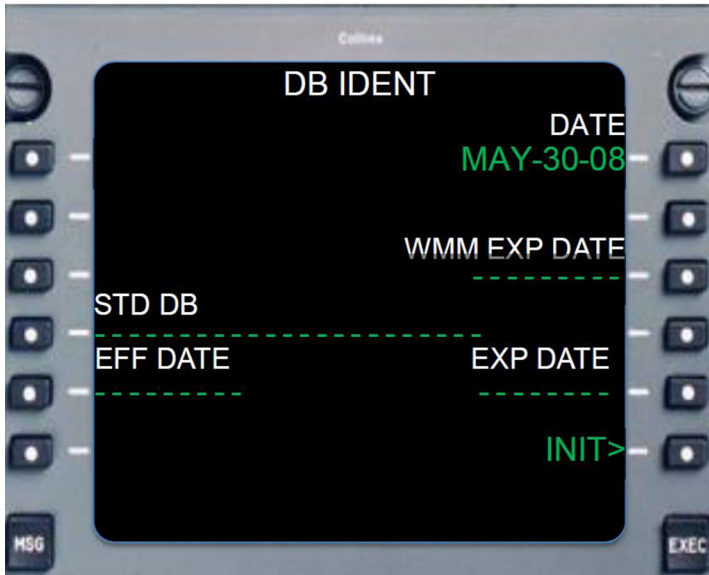
The MENU page is displayed when the Menu key is pressed. To be noted that the page displayed after the AMMC power-on is not the MENU but the DB IDENT (that on the page tree is achievable by 5R LSK pressing on MENU page).

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## SECTION IV

### STARTING THE HF RADIO SYSTEM

At AMMC power on, the MCDU initialization pages are used to verify/insert data for the FMS. The following MCDU screenshot describes the DB IDENT page and is the default page presented at AMMC power on:



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**Figure 4-1 MCDU Initialization Page (for reference only)**

The MCDU has a menu paging system with LSK and Function keys buttons. Pressing the TUNE Function Key the MCDU allows the access to the COMMS functions pages. That shows the TUNE 1/3 page. All other pages are accessed from the TUNE 1/3 page using the NEXT/PREV Function Key buttons. Access to the HF main page is by the LSK in TUNE page 2/3.

At helicopter power on, the HF Radio is powered on; the HF radio settings are recovered from last session.



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Figure 4-2 HF Radio TUNE page (for reference only)

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## SECTION V

### HF RADIO CONTROLS

HF radio can be controlled from the COMMS TUNE page or in detail through the HF Main page.

#### HF TUNE PAGE

In COMMS TUNE page, two types of radio frequencies are displayed.

- Active frequency is the one that the radio is currently set to for receiving or transmitting (displayed in green).
- Standby frequency is the one waiting to be used next (displayed in white).

The Receiving frequency is identified by the “R” identifier, while the transmitting frequency is identified by the “T” identifier. All frequencies are expressed in MHz with precision of 100Hz.

With reference to [Figure 4-2](#):

- LSK 4L: displays the values of the Active receiving and transmitting frequencies. If the scratch pad is empty, pressing LSK 4L key, it is performed the swap between the Active frequencies with the Standby ones;
- LSK 5L: displays the values of the Standby receiving and transmitting frequencies. If the scratch pad is empty, pressing LSK 5L key, it is performed the GO TO the HF Main page.

Next to the white “HF” label it can be displayed also:

- white “TX” label when the HF is transmitting;
- white “SQ” label when the HF squelch is OFF.

The HF radio can operate in simplex mode and half-duplex mode. In simplex mode the receiving and transmitting frequency are the same; in half-duplex mode the receiving and the transmitting frequency are different.

The frequency can be changed through the MCDU's scratchpad and LSK buttons. The frequency is first digitated into the scratchpad and then it is commanded the frequency change to the radio through the LSK buttons. The insertion in the scratchpad follows the same rules in the simplex and half-duplex mode.

The range of valid HF frequency values is 2.0000 to 29.9999 MHz.

To insert a simplex or half-duplex frequency:

- The frequency digit shall be inserted in the scratchpad from left to right with the dot separator. The frequency is expressed in MHz (for example 22.2222 or 3.5).
- If the dot separator is not inserted, the inserted value is intended in MHz (for example insertion of 10 is equivalent to the insertion of 10.0000).
- If, after the dot separator, more than four digits are inserted, for example 3.34567, the entire frequency insertion is considered not valid.
- If, after the dot less than four digits are inserted, the remaining digits are considered zero. For example, the insertion of 3.4 in the scratchpad is equivalent to the insertion of the value 3.4000.

To distinguish the change of the receiving or the transmitting frequency, the “/” separator shall be used.

- To change the transmitting frequency, the “/” separator shall be inserted in the scratchpad before the new frequency values (for example /3.15)
- To change the receiving and the transmitting frequency at the same time, the receiving frequency is digitized first, then the / separator and then the values of the transmitting frequency.
- To change the receiving frequency, if in Half-duplex mode, both receiving and transmitting frequency shall be inserted.

When the frequency value is invalid, the MCDU returns the message “INVALID DATA”.

Once the frequency is digitized into the scratchpad,

- pressing the LSK 4L applies the change to the Active value;
- pressing the LSK 5L applies the change to the Standby value.

### Note

If the inserted frequency is equal to an Emergency channel frequency and the Emission mode is set to Upper side Band, the Radio will be set in Emergency mode to that emergency channel. To operate an emergency channel frequency outside of Emergency mode, the Emission shall be set first to Lower Side Band (LS) or Amplitude Mode Equivalent (AM).



**Note**

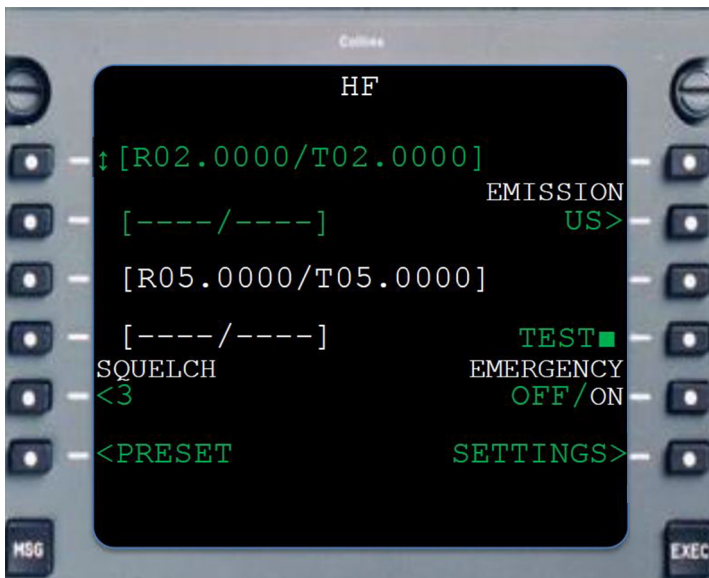
If the inserted frequency is equal to an ITU Maritime channel frequency and the Emission mode is set to Upper side Band, the Radio will be set to that Maritime channel. To operate an ITU maritime channel frequency in different Emission mode, , the Emission shall be set first to Lower Side Band (LS) or Amplitude Mode Equivalent (AM).

**Example**

- To change the Active Transmitting frequency from T3.5250 MHz into T6.7500 MHz
  - 1 digit into scratchpad the "/" separator followed by 6.75 or 6.7500 digits.  
/6.75
  - 2 press LSK 4L.
- To change the Standby Receiving and Transmitting frequency values from R2.5000/T6.0000 into R4.1234/T8.1200:
  - 1 digit into scratchpad the new receiving frequency value 4.1234, followed by the "/" separator and the new transmitting frequency 6.75:  
4.1234/6.75
  - 2 press LSK 5L

## HF MAIN PAGE

The HF Main page is accessed from COMMS TUNE page 2/3 by pressing the LSK 5L.



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**Figure 5-1 HF Radio MAIN page (for reference only)**

The information provided into HF Main page are the following:

**LSK 1L:** displays the values of the Active receiving and transmitting frequencies. If the scratch pad is empty, pressing the LSK 1L key, it is performed the swap between the Active frequencies with the Standby ones.

**LSK 2L:** displays

- the four characters label identifier and the number of the preset channel in use as Active value
- the "MAR" label identifier and the number of the maritime channel in use as Active value
- the "EMER" label identifier and the number of the emergency channel in use as Active value

**LSK 3L:** displays the values of the Standby receiving and transmitting frequencies.

**LSK 4L:** displays

- the four characters label identifier and the number of the preset channel in use as Standby value
- the “MAR” label identifier and the number of the maritime channel in use as Standby value
- the “EMER” label identifier and the number of the emergency channel in use as Standby value.

**LSK 5L:** displays the squelch level. Through its pressing the squelch selection page is opened.

**LSK 6L:** is a GOTO to the Preset pages

**LSK 2R:** displays the active Emission mode. Through its selection, the emission selection page is opened.

**LSK 4R:** is the TEST execution key. The Built-in Test equipment function will provide diagnostic testing and monitoring to determine that the system is capable of providing the specified performance. Through LSK 4R key pressing the HF Radio test is executed. The HF main page shows TEST in yellow whenever the test is running with the page fields in amber colour, and it displays PASS or FAIL according to the test result.

**LSK 5R:** switch ON/FF of the emergency mode.

**LSK 6R:** is a GOTO to the SETTINGS page.

## **FREQUENCY MANAGEMENT**

The frequency management follows the same rule as in COMMS TUNE page: the frequency can be changed through the MCDU's scratchpad and LSK buttons. The frequency is so first digitated into the scratchpad and then it is commanded the change to the radio through the LSK buttons.

The range of valid HF frequency values is 2.0000 to 29.9999 MHz.

To insert a simplex or half-duplex frequency:

- The frequency digit shall be inserted in the scratchpad from left to right with the dot separator. The frequency is expressed in MHz (for example 22.2222 or 3.5).
- If the dot separator is not inserted, the inserted value is intended in MHz (for example insertion of 10 is equivalent to the insertion of 10.0000).
- If, after the dot separator, more than four digits are inserted, for example 3.34567, the entire frequency insertion is considered not valid.

- If, after the dot less than four digits are inserted, the remaining digits are considered zero. For example, the insertion of 3.4 in the scratchpad is equivalent to the insertion of the value 3.4000

To distinguish the change of the receiving or the transmitting frequency, the “/” separator shall be used.

- To change the transmitting frequency, the “/” separator shall be inserted in the scratchpad before the new frequency values (for example /3.15)
- To change the receiving and the transmitting frequency at the same time, the receiving frequency is digitized first, then the / separator and then the values of the transmitting frequency.
- To change the receiving frequency, if in Half-duplex mode, both receiving and transmitting frequency shall be inserted.

When the frequency value is invalid, the MCDU returns the message “INVALID ENTRY”.

Once the frequency is digitized into the scratchpad:

- pressing the LSK 1L applies the change to the Active value;
- pressing the LSK 3L applies the change to the Standby value.

### **Note**

If the inserted frequency is equal to an Emergency channel frequency and the Emission mode is set to Upper side Band, the Radio will be set in Emergency mode to that emergency channel. To operate an emergency channel frequency outside of Emergency mode, the Emission shall be set first to Lower Side Band (LS) or Amplitude Mode Equivalent (AM).

### **Note**

If the inserted frequency is equal to an ITU Maritime channel frequency and the Emission mode is set to Upper side Band, the Radio will be set to that Maritime channel. To operate an ITU maritime channel frequency in different Emission mode, , the Emission shall be set first to Lower Side Band (LS) or Amplitude Mode Equivalent (AM).

**Examples**

- To change the Active simplex frequency from 2.5126 MHz into 6.135 MHz
  - 1 digit into scratchpad the new frequency digits  
*/6.135*
  - 2 press LSK 1L
- To change the Standby Half Duplex Receiving frequency value from R2.5000/T6.0000 into R4.1234/T6.0000:
  - 1 digit into scratchpad the new receiving frequency value 4.1234, followed by the “/” separator and the transmitting frequency:  
*4.1234/6*
  - 2 press LSK 3L

**ITU MARITIME CHANNEL MANAGEMENT**

The HF radio can be set to use one of the 249 International Telecommunications Union (ITU) maritime radio telephone network channel. Each channel is identified with four digits and corresponds to a couple of frequencies: one for the transmitting and one for the receiving in half-duplex mode. The admitted ITU channel ranges are:

- 0401-0429
- 0601-0608
- 0801-0837
- 1201-1241
- 1601-1656
- 1801-1815
- 2201-2253
- 2501-2510

The 249 ITU channels all operate half-duplex in the Upper Side Band mode.

An ITU maritime channel is identified in the COMMS TUNE page or into HF Main page through its receiving and transmitting frequency values, through its ITU channel number and through the “MAR” label identifier.

When an ITU maritime channel is set to Active value, the Emission mode is set equal to Upper Side Band and not displayed in the HF Main page.

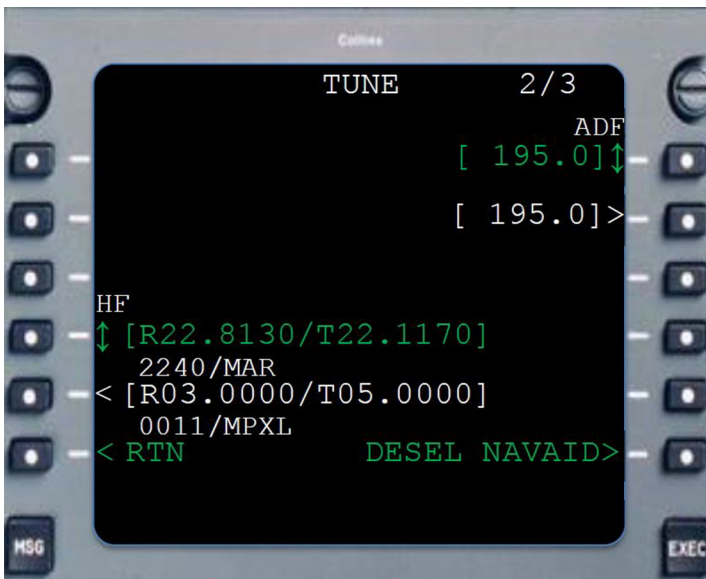
The complete list of the ITU channel is provided in [Appendix C](#).

To insert an ITU channel two modes are provided:

- Through the insertion of the channel frequencies in the scratchpad, as described in previous section, if the Active emission mode is set to Upper Side Band (US).
- Through the insertion of the channel number in the scratchpad with the following rules:
  - The channel number shall be inserted in the scratchpad from left to right;
  - If the inserted channel value is outside of the valid range, the command is discarded and no message is returned;
  - If more than four digits are inserted, for example 18015, the entire channel insertion is considered not valid and the MCDU returns the message "INVALID ENTRY".

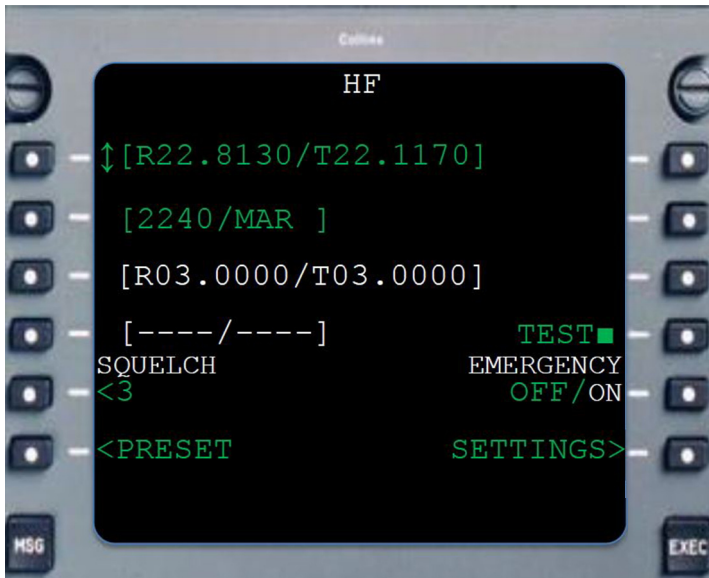
### Note

The insertion of an ITU maritime channel by its channel number is not valid in COMMS TUNE page.



189G2310X001-0008-01

Figure 5-2 ITU Maritime channel display format in HF Radio TUNE page (for reference only)



189G2310X001-0009-01

**Figure 5-3 ITU Maritime channel display format in HF Radio MAIN page (for reference only)**

### EMERGENCY CHANNEL MANAGEMENT

The HF radio is able to set one of six pre-programmed guard/distress channels. The six pre-programmed guard/distress frequencies are fixed in the radio and cannot be modified.

An Emergency channel is identified in the COMMS TUNE page or into HF Main page through its receiving and transmitting frequency values, through its Emergency channel number and through the "EMER" label identifier.

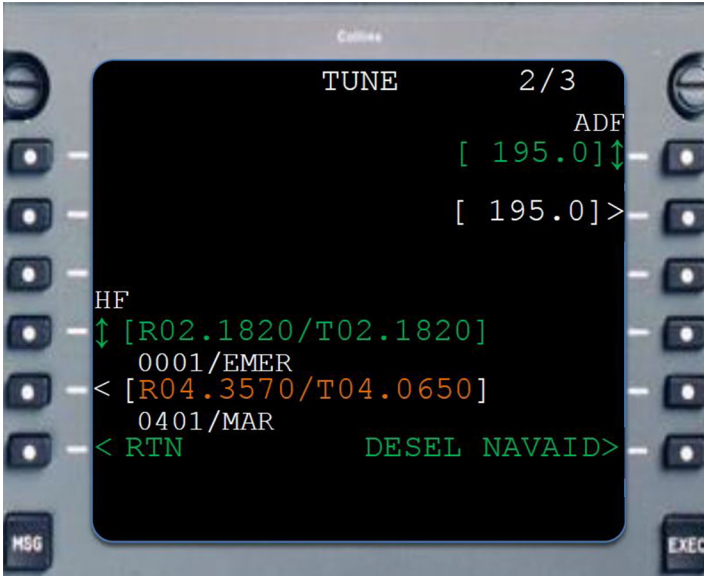
It is possible to insert an Emergency channel in the following modes:

- Through the insertion of the channel frequencies in the scratchpad, as described in previous sections, if the Active emission mode is set to Upper Side Band (US).
- By setting the Emergency switch to ON in the HF Main page: in this case it is selected active the channel defined first in the SETTING page

Entering the Emergency mode, the current active setting is saved and later, exiting the emergency mode, it is restored. The emergency channel in used is set as Standby value.

When the emergency channel is set to Active, the Standby value in the COMMS TUNE page is displayed in amber colour (ref. to [Figure 5-4](#)).

The swap function is not allowed and if the LSK 5L is pressed, MCDU returns the message “ACTION UNAVAILABLE”.



189G2310X001-0010-01

**Figure 5-4 Emergency display format in HF Radio TUNE page  
(for reference only)**

When an Emergency channel is set to Active value, the Emission mode is set equal to Upper Side Band and is not displayed in the HF Main page; moreover the the Standby value in the HF Main page is not displayed (ref. to [Figure 5-5](#)).

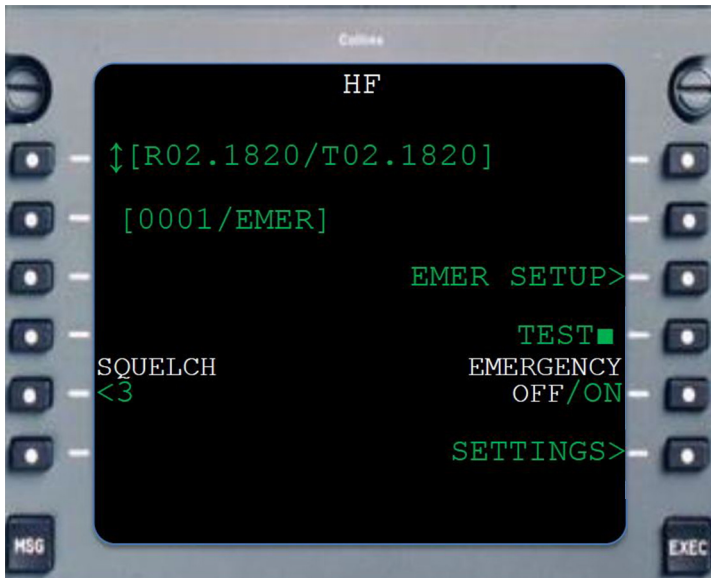
It is possible to change the Emergency channel:

- in the COMMS TUNE page and in the HF Main page through the insertion of the new Emergency channel frequencies;
- in the HF Main page through the EMER SETUP and SETTINGS pages.

#### Note

The attempt to change the emergency channel through the insertion of its channel number returns the message “DATA NOT DEFINED”.





189G2310X001-0011-01

**Figure 5-5 Emergency display format in HF Radio MAIN page  
(for reference only)**

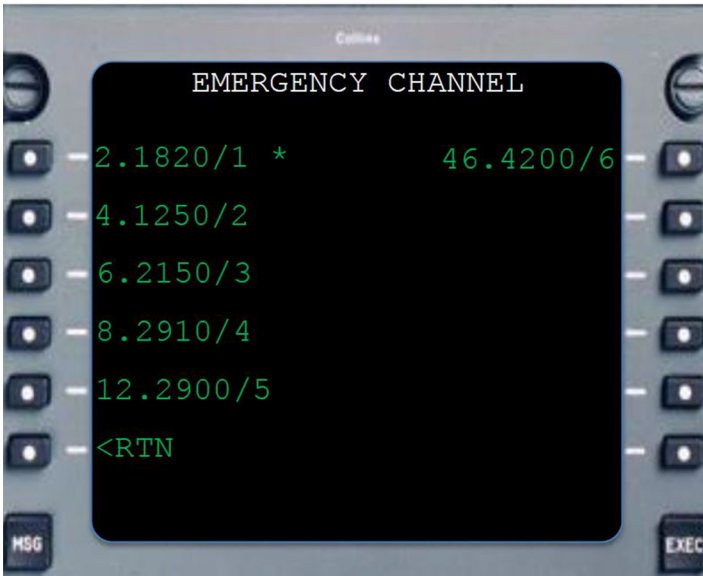
To change the Emergency channel by the EMER SETUP page press LSK 3R: once pressed the channel selection page of [Figure 5-6](#).

To change the Emergency channel by SETTING page, press SETTINGS LSK 6R key in HF Main page, then EMER SETUP LSK 4R key: once pressed the channel selection page of [Figure 5-6](#).

The active emergency channel is identified with the “\*” character.

The selection of a different Emergency channel is performed by lateral LSK key buttons.

The return to the HF main page or Setting page is made through the RTN LSK 6L key.



189G2310X001-0012-01

Figure 5-6 Emergency Channel selection page (for reference only)

## SQUELCH

The squelch level selection is available from HF Main page by pressing the LSK 5L key. The HF Squelch selection page of [Figure 5-7](#) will be opened.

The squelch is available among three levels, allowing the operator to avoid missed communications and to operate at the minimum level that provides satisfactory communication under current propagation conditions.

The active squelch level is identified with the "\*" character.

To change the Squelch level:

- press in HF Main page the LSK 5L;
- select the desired squelch level by lateral LSK or press RTN LSK 6L to return to HF Main page.

### Note

If the squelch is set to OFF, in COMMS TUNE page the label SQ will be displayed.



189G2310X001-0013-01

Figure 5-7 Squelch selection page (for reference only)

## EMISSION MODE

The Emission mode selection is available for the Active frequency from HF Main page by pressing the LSK

2R key. The Emission mode selection page of [Figure 5-8](#) will be opened.

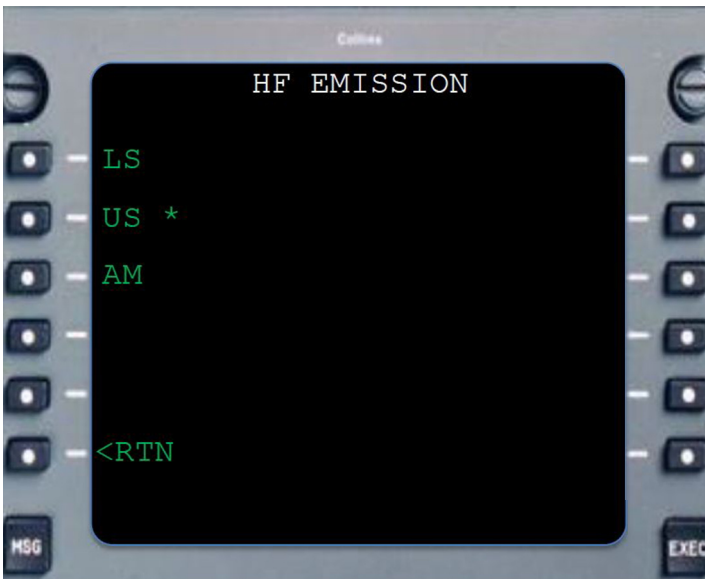
The communication is available in both simplex and half-duplex modes in Upper Sideband (US), Lower

Sideband (LS) and Amplitude Modulation Equivalent (AM) Emission modes.

The active Emission mode is identified with the "\*" character.

To change the Emission mode:

- press in HF Main page the LSK 2R;
- select the desired Emission mode by lateral LSK or press RTN LSK 6L to return to HF Main page.



189G2310X001-0014-01

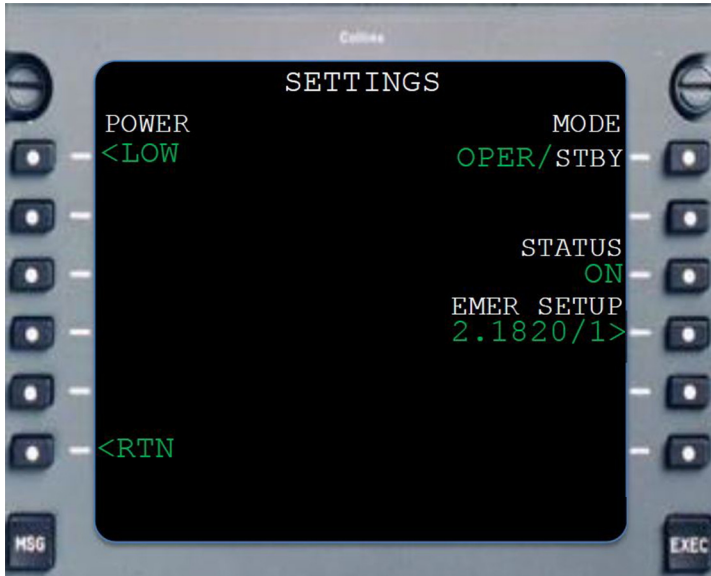
**Figure 5-8 Emission mode selection page (for reference only)**

### Note

For Active Emergency and ITU maritime channel frequencies, Emission mode selection is not available.

## SETTING PAGE

The Setting page is available from HF Main page by pressing the LSK 6R key. The Settings page of [Figure 5-9](#) will be opened.



189G2310X001-0015-01

**Figure 5-9 HF Radio Settings page (for reference only)**

**LSK 1L:** displays the Power level of the radio. Through its selection, the Power level selection page is opened

**LSK 6L:** is the RTN to the HF Main page

**LSK 1R:** is a toggle switch between the HF Operative mode and the HF Standby mode. The Standby mode is a mean to ensure that no automatic transmission is performed. In Standby mode the system is basically turned off: the audio is muted and the controls are disabled.

**LSK 3R:** displays the HF Radio system STATUS. The following statuses are allowed:

- FAIL when a failure is detected in AMMS or in HF radio system.
- TEST when the test is in progress
- DEGR when the HF radio is operating in degraded mode
- ON when the system is operative.

**LSK 4RL:** displays the pre-selected Emergency channel. Through its pressing the Emergency channel selection page is opened. Ref. to [EMERGENCY CHANNEL MANAGEMENT](#).

## POWER LEVEL

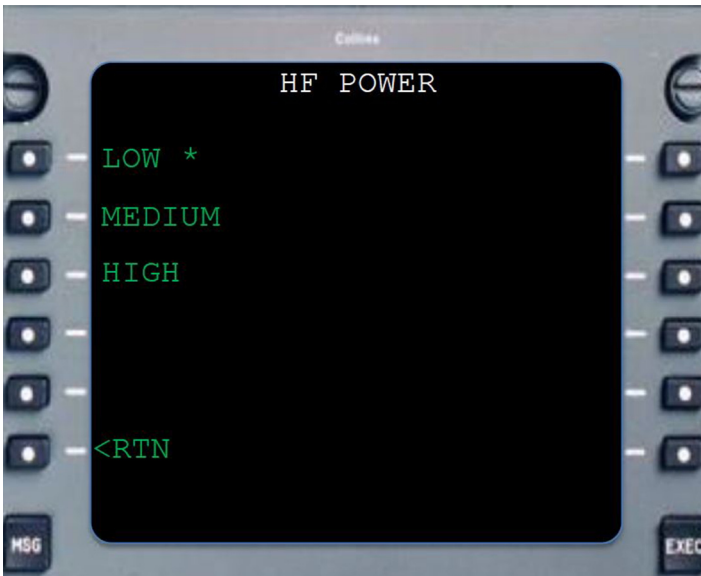
The Power level selection is available from HF Settings page by pressing the LSK 1L key. The Power setting page of [Figure 5-10](#) will be opened.

The output power level selection is available among three options: LOW, MEDIUM and HIGH.

The current Power level is identified with the “\*” character.

To change the Power level:

- press in HF Settings page the LSK 1L;
- select the desired Power by lateral LSK or press RTN LSK 6L to return to HF Settings page.



189G2310X001-0016-01

**Figure 5-10 HF Radio Power selection page (for reference only)**

## **PRESET MANAGEMENT**

### Preset Management

AMMS allow the setting of HF presets setup by pressing of LSK 6L key in HF Main page. The scope of the preset channels is to minimize the workload. Up to 40 preset channels can be saved locally into the AMMS system and they can be used to tune the HF radio.

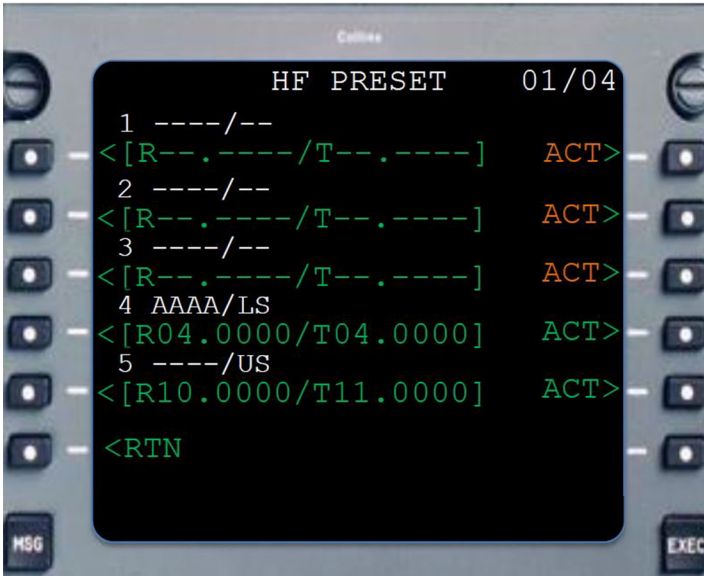
A Preset channel is recalled as Active frequency by selecting it out from a list available in dedicated HF Preset pages. Four Preset pages are available (ref. to [Figure 5-11](#)).

The HF radio preset can be setup on ground or in flight.

With reference to [Figure 5-11](#), every row identify one preset; a preset is composed by the following information:

- the number of the preset in white next to the LSK on the left;
- the four characters label identifier, if available, in white next to the preset number;
- the emission mode in white next to the label identifier, separated by the "/" separator;
- the receiving and transmitting frequency in green.

The HF preset page shown on the right the ACT function key: through its selection the preset is set as Active frequency. If the preset is not available for selection, the ACT function key is not available for selection and displayed in amber colour.

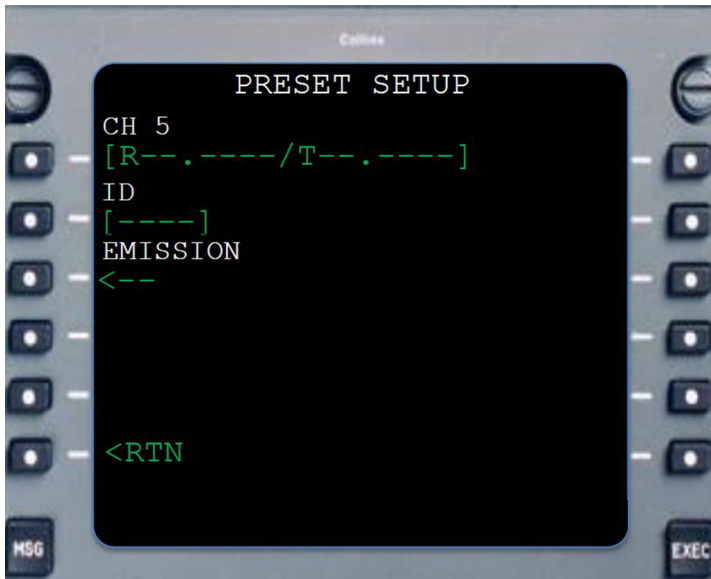


189G2310X001-0017-01

**Figure 5-11 HF Radio Preset page (for reference only)**

To setup a preset press the relevant LSK key on the left. The Preset setup page of [Figure 5-12](#) will appear.





189G2310X001-0018-01

**Figure 5-12 HF Radio Preset setup page (for reference only)**

**LSK 1L:** displays the receiving and transmitting frequencies. The frequencies can be set using the insertion rules described in par. [HF TUNE PAGE](#) or [FREQUENCY MANAGEMENT](#).

#### **Note**

When a frequency value is defined, the Emission mode, if not previously specified, is set equal to Upper Side Band (US).

#### **Note**

If it is inserted a frequency correspondent to an ITU maritime channel, the MCDU returns the message "MARITIME CHANNEL".

### Note

If it is inserted a frequency correspondent to an Emergency channel, the MCDU returns the message “EMERGENCY CHANNEL”.

**LSK 2L:** displays the four character identifier. The preset identifier can be a combination of letter and number characters.

### Note

If more than four characters are inserted, the MCDU returns the message “INVALID ENTRY”.

**LSK 3L:** displays the preset Emission mode. Through its selection, the Emission mode selection page is recalled. To set different Emission mode refer to procedure detailed in par. [EMISSION MODE](#).

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## SECTION VI

# TROUBLESHOOTING

The HF radio transmission is inhibited on ground.

With AMMC2 FAIL, the HF Radio is not controllable. Radio status is displayed equal to FAIL and all fields are displayed amber dashed. In this condition, if HF radio equipment is not failed too, the radio transmission and reception can be performed onto the last active frequencies.

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## APPENDIX A

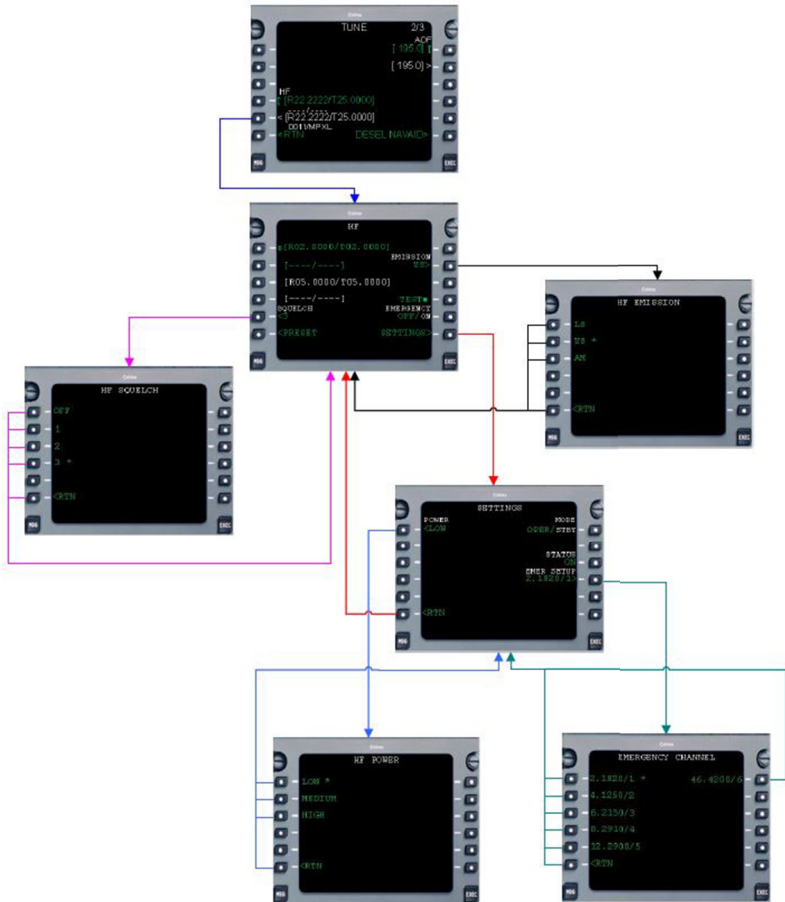
### LIST OF ACRONYMS

<b>AME</b>	Amplitude Modulation Equivalent
<b>AMMC</b>	Aircraft & Mission Management Computer
<b>AMMS</b>	Aircraft & Mission Management System
<b>CB</b>	Circuit Breaker
<b>CCD</b>	Cursor Control Device
<b>CDS</b>	Cockpit Display System
<b>CPLT</b>	Copilot
<b>DU</b>	Display Unit
<b>ECDU</b>	Enhanced Control Display Unit
<b>EPGDS</b>	Electrical Power Generation and Distribution System
<b>GND</b>	Ground
<b>H/C</b>	Helicopter
<b>HF</b>	High Frequency
<b>ITU</b>	International Telecommunications Union
<b>LSB</b>	Lower Side Band
<b>MCDU</b>	Multifunction Control Display Unit
<b>MFD</b>	Multi Function Display
<b>PFD</b>	Primary Flight Display
<b>PLT</b>	Pilot
<b>SW</b>	Software
<b>USB</b>	Upper Side Band
<b>VMS</b>	Vehicle Monitoring System
<b>WOW</b>	Weight on Wheel

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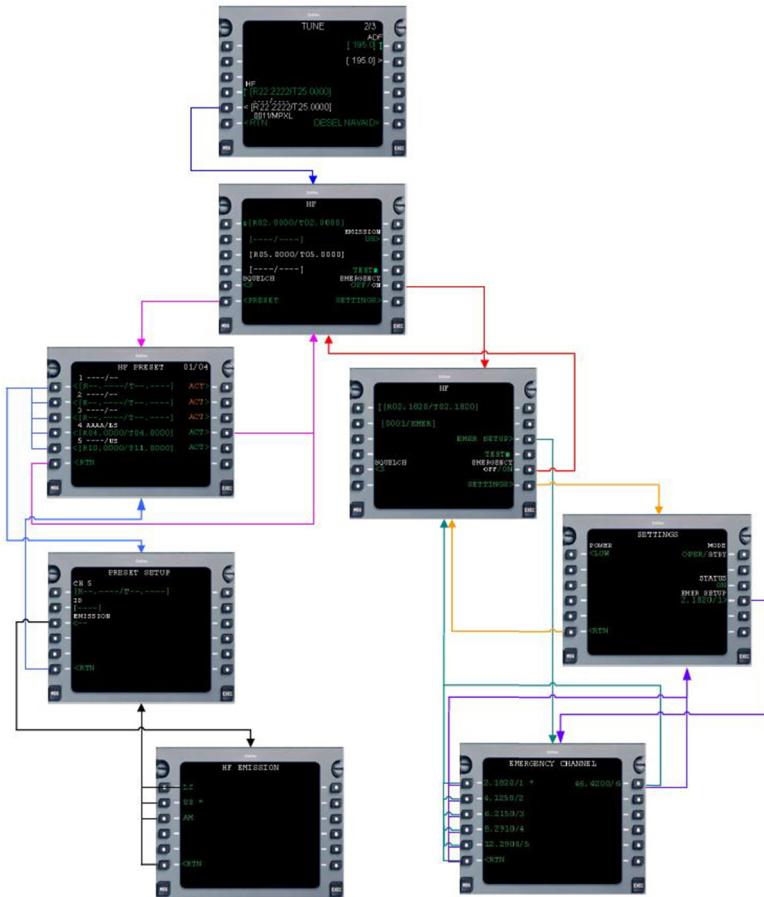
# APPENDIX B

## PAGE TREE



189G2310X001-0019-01

Figure AppB-1 Page Tree (Sheet 1 of 2)



189G2310X001-0020-01

Figure AppB-2 Page Tree (Sheet 2 of 2)



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## APPENDIX C

# ITU MARITIME CHANNELS

Commandant (G-SCT-2)

U.S. Coast Guard

27 Aug 1999

Washington DC 20593

HF Single Sideband Maritime Radiotelephone Channels

4 MHz Duplex Channels

ITU Channel No.	Coast Transmit	Ship Transmit	
401	4357 kHz	4065 kHz	
402	4360	4068	
403	4363	4071	
404	4366	4074	
405	4369	4077	
406	4372	4080	
407	4375	4080	
408	4378	4086	
409	4381	4089	
410	4384	4092	
411	4387	4095	
412	4390	4098	
413	4393	4101	
414	4396	4104	
415	4399	4107	
416	4402	4110	
417	4405	4113	
418	4408	4116	
419	4411	4119	
420	4414	4122	
421	4417	4125	(Calling; distress & safety working on 4125 kHz simplex)
422	4420	4128	
423	4423	4131	
424	4426	4134	(USCG Calling)
425	4429	4137	
426	4432	4140	
427	4435	4143	

428	4351	(varies)
429	4354	(varies)

**6 MHz Duplex Channels**

ITU Channel No.	Coast Transmit	Ship Transmit	
601	6501 (kHz)	6200 (kHz)	(USCG Calling)
602	6504	6203	
603	6507	6206	
604	6510	6209	
605	6513	6212	
606	6516	6215	(Calling; distress & safety working on 6215 kHz simplex)
607	6519	6218	
608	6522	6221	

**8 MHz Duplex Channels**

ITU Channel No.	Coast Transmit	Ship Transmit	
801	8719 (kHz)	8195 (kHz)	
802	8722	8198	
803	8725	8201	
804	8728	8204	
805	8731	8207	
806	8734	8210	
807	8737	8213	
808	8740	8216	
809	8743	8219	
810	8746	8222	
811	8749	8225	
812	8752	8228	
813	8755	8231	
814	8758	8234	
815	8761	8237	
816	8764	8240	(USCG Calling)
817	8767	8243	
818	8770	8246	
819	8773	8249	
820	8776	8252	
821	8779	8255	(Calling)
822	8782	8258	

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823	8785	8261
824	8788	8264
825	8791	8267
826	8794	8270
827	8797	8273
828	8800	8276
829	8803	8279
830	8806	8282
831	8809	8285
832	8812	8288
833	8291	8291
834	8707	(varies)
835	8710	(varies)
836	8713	(varies)
837	8716	(varies)

**12 MHz Duplex Channels**

ITU Channel No.	Coast Transmit	Ship Transmit
1201	13,077 kHz	12,230 kHz
1202	13,080	12,233
1203	13,083	12,236
1204	13,086	12,239
1205	13,089	12,242 (USCG Calling)
1206	13,092	12,245
1207	13,095	12,248
1208	13,098	12,251
1209	13,101	12,254
1210	13,104	12,257
1211	13,107	12,260
1212	13,110	12,263
1213	13,113	12,266
1214	13,116	12,269
1215	13,119	12,272
1216	13,122	12,275
1217	13,125	12,278
1218	13,128	12,281
1219	13,131	12,284
1220	13,134	12,287
1221	13,137	12,290 (Calling)
1222	13,140	12,293
1223	13,143	12,296

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1224	13,146	12,299
1225	13,149	12,302
1226	13,152	12,305
1227	13,155	12,308
1228	13,158	12,311
1229	13,161	12,314
1230	13,164	12,317
1231	13,167	12,320
1232	13,170	12,323
1233	13,173	12,326
1234	13,176	12,329
1235	13,179	12,332
1236	13,182	12,335
1237	13,185	12,338
1238	13,188	12,341
1239	13,191	12,344
1240	13,194	12,347
1241	13,197	12,350

16 MHz Duplex Channels

ITU Channel No.	Coast Transmit	Ship Transmit
1601	17,242	16,360
1602	17,245	16,363
1603	17,248	16,366
1604	17,251	16,369
1605	17,254	16,372
1606	17,257	16,375
1607	17,260	16,378
1608	17,263	16,381
1609	17,266	16,384
1610	17,269	16,387
1611	17,272	16,390
1612	17,275	16,393
1613	17,278	16,396
1614	17,281	16,399
1615	17,284	16,402
1616	17,287	16,405
1617	17,290	16,408
1618	17,293	16,411
1619	17,296	16,414
1620	17,299	16,417

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1621	17,302	16,420	(CaLLing)
1622	17,305	16,423	
1623	17,308	16,426	
1624	17,311	16,429	
1625	17,314	16,432	(USCG CaLLing)
1626	17,317	16,435	
1627	17,320	16,438	
1628	17,323	16,441	
1629	17,326	16,444	
1630	17,329	16,447	
1631	17,332	16,450	
1632	17,335	16,453	
1633	17,338	16,456	
1634	17,341	16,459	
1635	17,344	16,462	
1636	17,347	16,465	
1637	17,350	16,468	
1638	17,353	16,471	
1639	17,356	16,474	
1640	17,359	16,477	
1641	17,362	16,480	
1642	17,365	16,483	
1643	17,368	16,486	
1644	17,371	16,489	
1645	17,374	16,492	
1646	17,377	16,495	
1647	17,380	16,498	
1648	17,383	16,501	
1649	17,386	16,504	
1650	17,389	16,507	
1651	17,392	16,510	
1652	17,395	16,513	
1653	17,398	16,516	
1654	17,401	16,519	
1655	17,404	16,522	
1656	17,407	16,525	

**18/19 MHz Duplex Channels**

ITU Channel No.	Coast Transmit	Ship Transmit
1801	19,755 kHz	18,780 kHz
1802	19,758	18,783

1803	19,761	18,786	
1804	19,764	18,789	
1805	19,767	18,792	
1806	19,770	18,795	(Calling)
1807	19,773	18,798	
1808	19,776	18,801	
1809	19,779	18,804	
1810	19,782	18,807	
1811	19,785	18,810	
1812	19,788	18,813	
1813	19,791	18,816	
1814	19,794	18,819	
1815	19,797	19,822	

22 MHz Duplex Channels

ITU Channel No.	Coast Transmit	Ship Transmit	
2201	22,696 kHz	22,000 kHz	
2202	22,699	22,003	
2203	22,702	22,006	
2204	22,705	22,009	
2205	22,708	22,012	
2206	22,711	22,015	
2207	22,714	22,018	
2208	22,717	22,021	
2209	22,720	22,024	
2210	22,723	22,027	
2211	22,726	22,030	
2212	22,729	22,033	
2213	22,732	22,036	
2214	22,735	22,039	
2215	22,738	22,042	
2216	22,741	22,045	
2217	22,744	22,048	
2218	22,747	22,051	
2219	22,750	22,054	
2220	22,753	22,057	
2221	22,756	22,060	(Calling)
2222	22,759	22,063	
2223	22,762	22,066	
2224	22,765	22,069	
2225	22,768	22,072	

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2226	22,771	22,075
2227	22,774	22,078
2228	22,777	22,081
2229	22,780	22,084
2230	22,783	22,087
2231	22,786	22,090
2232	22,789	22,093
2233	22,792	22,096
2234	22,795	22,099
2235	22,798	22,102
2236	22,801	22,105
2237	22,804	22,108
2238	22,807	22,111
2239	22,810	22,114
2240	22,813	22,117
2241	22,816	22,120
2242	22,819	22,123
2243	22,822	22,126
2244	22,825	22,129
2245	22,828	22,132
2246	22,831	22,135
2247	22,834	22,138
2248	22,837	22,141
2249	22,840	22,144
2250	22,843	22,147
2251	22,846	22,150
2252	22,849	22,153
2253	22,852	22,156

**25/26 MHz Duplex Channels**

ITU Channel No.	Coast Transmit	Ship Transmit
2501	26,145 kHz	25,070 kHz
2502	26,148	25,073
2503	26,151	25,076
2504	26,154	25,079
2505	26,157	25,082
2506	26,160	25,085
2507	26,163	25,088
2508	26,166	25,091
2509	26,169	25,094
2510	26,172	25,097 (Calling)

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