MX155X Operation Guide

Product Description and Compatibility

The MX155X is a modern direct slide-in replacement for the BendixKing KX155 NAV/COMM (all series). The MX155 will work with both 14V and 28V systems. The radio is designed to work with or without an external glide slope indicator, and is compatible with European 8.33khz separated comm channels by selecting the appropriate menu option. For original installations that utilized a remote comm channel flip-flop switch, this accessory has been disabled to accommodate multiple aircraft input voltages.

Installation

The MX155X is shipped with a 3/32nd Allen wrench to install/uninstall the MX155 and KX155. Use the wrench to unlock the KX155, turning the screw counterclockwise until the lockdown has released. Grab the sides of the KX155 and pull it out of the tray. The knobs should never be used to uninstall or install either radio.

Slide the MX155X in to the tray and press firmly on the front panel to help seat the radio. The access hole for the lockdown on the MX155 is located between the two knobs. Turn the wrench clockwise a number of times to lock the radio securely in the tray, being careful not to over tighten.

Pilot Controls

The MX155X has a very simple set of controls that consist of two Dual-function (push & turn) knobs and 4 'touch points' in the display.

1. The top knob labeled 'VOL' controls the power of the radio and the volume. To power on, press the knob. To power off, hold the knob for 3 seconds. While the radio is on, the knob is dedicated to adjusting the volume up and down; the bar graph in the center of the display gives a visual representation of the volume level.
2. The bottom knob is the Select/Enter knob. This knob is used to navigate the menu and dial in frequency channels. A push and hold of this knob while in operating mode (menu home screen) overrides the squelch to verify proper receiver operation and to allow reception of weak signals.
3. The 'Page' touch point in the display accesses the menu. The lower knob is then used to cycle through the different menu pages. Press the bottom knob to select a page option. To return to the home state, hold the 'Page' button.
4. Press the VC-ID button to receive the Nav station identifier. Holding this button invokes the Nav Volume adjustment page. Use the lower knob to adjust.
5. Press the Comm Standby Frequency to put the radio in to Edit Comm Mode (upper right screen touch point – see diagram).
6. Press the Nav Standby Frequency to put the radio in Edit Nav Mode (lower right screen touch point – see diagram).
7. Use the arrow (←→) between the Comm standby and active frequencies to flip-flop the channels. Holding this touch point for 4 seconds will activate the Emergency Channel (121.500).

8. Use the arrow (←→) between the Nav standby and active frequencies to flip-flop the channels.

Basic Operation

Frequency Selection

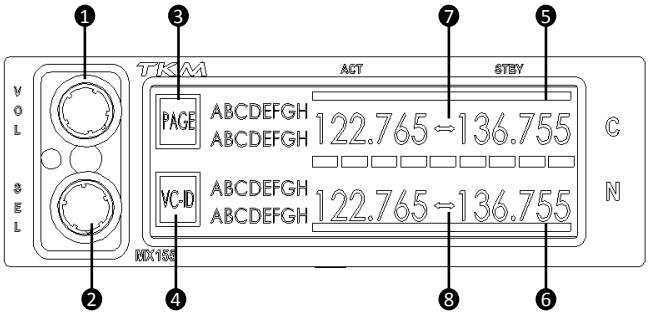
Frequency Selection operates on the Standby channel only. Selection operates the same for Comm and Nav.
Press towards the right side of the Standby frequency to put the radio in Edit Mode.
Use the lower knob to select the mHz side of the channel. Press the knob once to switch to the kHz side and select.
When the desired frequency is indicated in the Standby display, press the Flip-Flop (←→) touch point to activate.

Pages

1. Comm Memory
2. Nav Memory
3. Brightness Adjust
4. Squelch Adjust
5. Channel Spacing (25Khz & 8.33Khz-EASA)

Page Description

1. Comm Memory will store up to 20 channels.
    a. Selecting Comm Memory will bring you to the list of stored channels. Use the lower knob to cycle through the stored memory slots, the corresponding stored channels will be cycling through in Standby. Just use the Flip-Flop to activate a stored channel.
    b. To store a new frequency, press enter on the desired slot position. Use the knob to program a frequency just as you normally would to select a frequency and click Enter. There is an option to save the frequency as is or to attach a 4-Digit identifier to the frequency.
    c. SAVE/EDIT LBL – scroll through the Alphabet and use Enter to choose a letter. 1st – then 2nd (up to 4 digits).
2. Nav Memory will store up to 20 channels. Nav Memory operates the same as Comm Memory.
3. Use the page/lower knob to select and manually adjust LCD brightness.
4. Use the page/lower knob to select and manually adjust the squelch.
5. Use the page/lower knob to select and toggle between 25 kHz and 8.33 (EASA) spacing.



❶ ON/ OFF & VOLUME CONTROL
- ➔ Push for on/ off
- ➔ Turn to adjust audio output level

❷ SELECT/ ENTER
- ➔ Push to enter selected value
- ➔ Turn to adjust value of selected function

❸ MENU
- ➔ Push to scroll through menu functions

❹ VOICE ID
- ➔ Nav station voice identifier

❺ EDIT COM FREQUENCY
- ➔ Push to adjust COM frequency. Use Select/ Enter ❷ knob to set frequency.

❻ EDIT NAV FREQUENCY
- ➔ Push to adjust NAV frequency. Use Select/ Enter ❷ knob to set frequency.

❼ FLIP- FLOP COM
- ➔ Push to switch between active and standby COM frequency

❽ FLIP- FLOP NAV
- ➔ Push to switch between active and standby NAV frequency

Tuning instructions for 8/33khz communication
(from https://833radio.com/news/show/7)

8.33kHz Voice Channel Spacing communications

27-07-2017 10:01:44 - Radio equipment

The fundamental axiom in aviation is: "Aviate, Navigate, Communicate." The first priority is to "aviate" - fly the aircraft and keep it safely in the air; secondly, pilots must navigate - fly the aircraft towards the destination. The final step involves communicating. Whether this is for talking with other aircraft that share the same airspace, with the relevant Air Traffic Services Units along the way or just for receiving important information about weather or conditions at the destination airport, all these involve using the radio equipment on board. These series of articles will try to elaborate on the principles of radio communication, the need for channel spacing, correct usage of the equipment as well as on the changes to be expected when transitioning to an 8.33kHz voice channel spacing environment.

Chapter 2 – Communications in 8.33kHz Voice Channel Spacing

Communications in an 8.33kHz VCS environment

By reducing the channel spacing between consecutive frequencies in the VHF aeronautical communication band, 8.33 channel spacing adds two additional channels for every 25kHz. In such a way, as an example, in addition to 118.025Mhz the following frequencies can be used as well 118.0333MHz and 118.0167MHz (in fact by dividing 25 by 3 we obtain 8.333333… and therefore the new frequencies should be 118.03333333… and 118.016666666… but for simplification the rounded values are considered)

In a today's 25kHz spaced VHF radio communication, the digits selected (dialled) on the radio equipment interface on board the aircraft correspond to the frequency used for transmission and reception (frequency which can be found on the charts or indicated by air traffic controllers). This is valid for most of the radio equipment installed on board the aircraft. For some radio models, however, it may happen that only 2 digits are available for selection after the decimal – this means for example that for frequencies such as 121.625MHz the selection on the display will show 121.62Mhz, but the equipment will actually transmit and receive on 121.625MHz – It can also be noticed that in some parts of the globe, in an environment using 25kHz spacing controllers will only mention the first two digits after the decimal regardless of the frequency to be dialled (e.g. "Contact 121.62")

In an 8.33kHz channel spacing environment, while the frequencies used involve at least 4 digits after the decimal, to ease the communications between controllers and pilots but also to reduce the potential for errors, by convention, a channel has been allocated for each frequency. In such a way only 3 digits after the decimal are required, simplifying a lot the phraseology as well as the manipulation of the radio equipment on board.

Consequently, as an example, in order to communicate on 118.0333Mhz a pilot will have to dial 118.035 on his 8.33 capable radio equipment interface – the system is designed in such a way that when dialling this channel the radio will be tuned to 118.0333MHz. The allocation of a new channel is valid as well for the old 25kHz frequency, regardless the fact that the carrier frequency is the same. As an example, in both 25kHz and 8.33kHz spacing the frequency 118.025Mhz is used, but the for an 8.33kHz channel spacing environment the frequency has been "coded" as 118.030 channel. The new channel is allocated in order to distinguish on the radio interface between the 25kHz spacing and 8.33kHz spacing modes (i.e. in an 8.33 environment in order to transmit on 118.025Mhz, pilots will have to dial 118.030 on the radio interface)

The following table is provided as an example of the pairing between channels and carrier frequencies, for both 25kHz and 8.33 spacing.

Old 25kHz radio	**New 8.33kHz radio**				
	Dial selection			**Real TX/RX frequency**	
Frequency	Dial	25kHz Frequency	8.33kHz Channel	Frequency (Mhz)	Spacing (kHz)
118.000	118.000	118.000		118.0000	25
	118.005		118.005	118.0000	8.33
	118.010		118.010	118.0083	8.33
	118.015		118.015	118.0167	8.33
118.025	118.025	118.025		118.0250	25
	118.030		118.030	118.0250	8.33
	118.035		118.035	118.0333	8.33
Etc…..					

Radio equipment

A new 8.33kHz spacing capable radio will operate on 25kHz or 8.33kHz depending on the user selection. As an example, if the user selects a 25kHz spaced frequency such as 132.000, the new equipment will operate just like the old radio, but if the 132.005 channel is selected, the same frequency will be used but the radio will be working in an 8.33kHz spacing mode. In most of the cases, these radios are provided with a switch to enable them to operate in either 25kHz or 8.33kHz mode. It is essential that the radio is configured on the correct mode to enable the selection of the desired channel or frequency.

It is worth noting that some frequencies will remain designated as 25kHz (such as the emergency frequency 121.5MHz); during the transition period untill all aircraft will be equiped, for safety

reasons, it is also expected that some of the frequency assignments mostly used for information (e.g. ATIS) will remain in 25kHz spacing.

As an example, in practical terms, to instruct a flight to change the communication frequency to 132.0083MHz the phraseology used by air traffic controller will be "Cessna 123 contact London 132.010" ("One tree two decimal zero one zero") Flight crews need to be aware that there will be no specific indication in the phraseology if the new frequency is an 8.33channel or a 25kHz frequency.

Inadequate use of radio

Communications problems caused by mistuning VHF channels are an important safety and security risk for air traffic management. Given the difference between 25kHz spaced frequencies and the 8.33kHz channels, it is very important that flight crews understand the correct operation of their radio equipment and tune their radios accordingly. Pilots have to understand the difference between frequencies and channels and they should not attempt to tune their 25kHz radio to match an 8.33kHz channel.

It worth noting that operating a 25kHz radio in a sector in which communications are performed in 8.33kHz channel spacing, even if the transmission is performed on the central frequency (i.e. identical carrier frequency in both 25kHz and 8.33kHz cases) this may create interference on adjacent 8.33kHz channels which could be in use by another control centre. It is also possible that reception of 25kHz transmissions will be poor on the ground and ATC may not be able to hear the communications.

It is recommended that flight crews, in preparation of the flight, especially after 01/01/2018, consult relevant local aeronautical publication in order to identify the correct equipment requirements for the airspace in which they will operate. Pilots need to be aware that internet available flight information services may not have the correct information regarding the frequencies in use for a particular service and/or airspace, especially in the transition period and after 31/12/2018. Correlating this information with certified sources (such as the local AIP) is recommended before operating.

Useful links

http://www.eurocontrol.int/sites/default/files/article/content/documents/communications/2016-03-frequency%20table.pdf