



- **MAMBO2**
- *VOICE COMMUNICATION VIA BLUETOOTH*
- *HEADSET OR HANDSFREE KIT*
- 
- **APPLICATION NOTE**



## VERSION HISTORY:

*This table provides a summary of the document revisions.*

Version	Author	Changes	Modified
		-	
1.0.1	F. Beqiri	<ul style="list-style-type: none"><li>- Replaced <b>Figure 1</b> by a new one.</li><li>- Updated chapter <b>1.1</b> - If you don't know the MAC address of the Bluetooth audio device to be connected, then set this entry to <b>0</b> (alternative setting).</li><li>- Replaced command "\$PFAL,BT.Audio.Disconnect" from the Table 1 to Step 7.</li><li>- Added <b>Figure 2</b> - Shows the call button on Bluetooth audio devices</li></ul>	14/08/2009
1.0.0	F. Beqiri	- Initial version	20/01/2009

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# 1 ABOUT THIS DOCUMENT

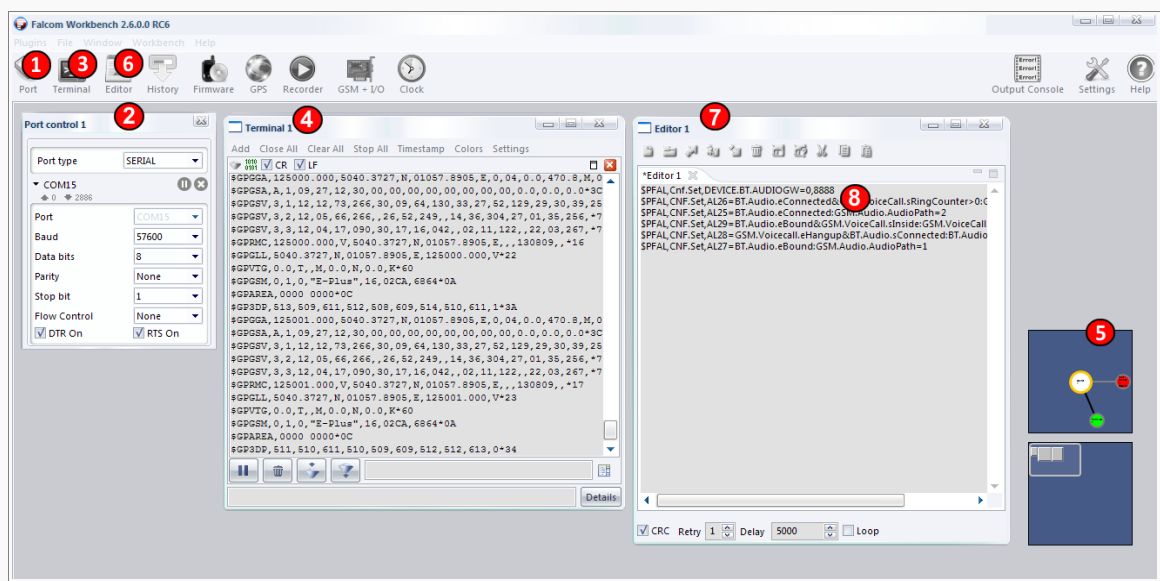
This application note provides information how to make a connection to Bluetooth headset or handsfree kit and to receive voice calls on them. Detailed information about the function of the PFAL commands given in this document can be found in a separate manual called "**MAMBO2PFALCommandsReferenceGuide.pdf**". How to get started with MAMBO2 and how to connect your MAMBO2 to a PC (via USB or Bluetooth) is given in a separate manual called "**MAMBO2EvalKitGettingStarted.pdf**".

Below is an example of how to pair a Bluetooth Headset (*type BTE050*) or handsfree kit (*type BT-33A1*) and receive voice calls on them. Remember, some Bluetooth Headsets and handsfree kits devices can vary in their procedure but the steps in the next chapter will give a good foundation in understanding the concept.

## 1.1 Pairing a Bluetooth headset or handsfree kit to the MAMBO2 device and receive voice calls on them

Pairing a Bluetooth Headset or handsfree kit device to a MAMBO2 usually requires seven steps. These steps are listed below:

1. Turn off the Bluetooth Headset or handsfree kit device.
2. Turn on the MAMBO2 device.
3. Connect the MAMBO2 to a PC via either USB or Bluetooth.
4. Start the **FALCOM Workbench** software (see **Fig. below**) open a port console from the **Toolbar**<sup>1</sup>. Choose the COM **Port**<sup>2</sup> to which the MAMBO2 is connected and define the communication settings. From from the **Toolbar**<sup>3</sup> and <sup>6</sup>, open a new **Console**<sup>4</sup> and a new **Editor**<sup>7</sup> respectively. Select **Console**<sup>4</sup>, go to the **Connection view**<sup>5</sup> and connect **Console** to **Port control**<sup>2</sup> as well as **Editor**<sup>7</sup> to the **Console**.



**Figure 1:** FALCOM Workbench software.

5. Depending on what audio device you want to connect to the MAMBO2, copy the corresponding configuration given below, past it to the **Editor**<sup>8</sup> and then send it to the MAMBO2. This configuration containing the MAC address (if known<sup>1</sup>) and the correct pass-code (second entry) of the audio device to be connected, sets the MAMBO2 device in the discovery mode:

<sup>1</sup> If you don't know the MAC address of the Bluetooth audio device to be connected, then set it to 0 (alternative setting).

**\$PFAL,Cnf.Set,DEVICE.BT.AUDIOGW=0013EF19C369,8888** // for **BTE050** headset <sup>2</sup>  
**Alternative configuration:** **\$PFAL,Cnf.Set,DEVICE.BT.AUDIOGW=0,8888** // for **BTE050** headset  
**\$PFAL,Cnf.Set,DEVICE.BT.AUDIOGW=000D18A0C583,0000** // for **BT-33A1** handsfree kit <sup>2</sup>  
**Alternative configuration:** **\$PFAL,Cnf.Set,DEVICE.BT.AUDIOGW=0,0000** // for **BT-33A1** handsfree kit

This configuration resets the Bluetooth stack inside the MAMBO2 and also changes the present Bluetooth pass-code used for serial data (default=0000). If you are sending and receiving data with the MAMBO2 via Bluetooth, you will need to reconnect your MAMBO2 and **enter the new pass-code** when prompted and **NOT the default one** (e.g. enter **8888** - if the configuration for the **BTE050** headset has been sent to).

- Now, place the Bluetooth audio device into the "pairing" mode. Pairing is a process that is intended to be done one time for a device. To set the Bluetooth audio device into the "pairing" mode while the audio device is turned off, press and hold the call (action) button on the Bluetooth audio device until the corresponding LED indicator flashes **blue** and **red** alternately (**Don't release the button when you will hear a tone and the LED indicator will flash only blue, but when it flashes blue and red alternately**). This process may be different from device to device.

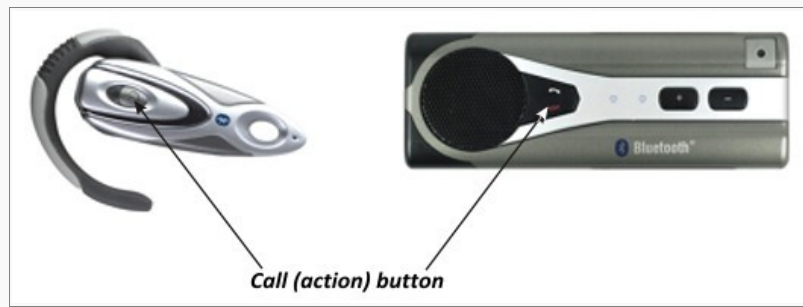


Figure 2: Call (action) button on the Bluetooth headset & handsfree kit.

- During the Bluetooth audio device is in pairing mode, send the PFAL command **\$PFAL,BT.Audio.Bound** to the MAMBO2. It is also possible to create a user menu and execute this command from the display - e.g. **\$PFAL,CNF.Set,DISP.MENU3=BT Bound:BT.audio.bound**. Pairing is completed when the LED indicator turns on for a second and then flashes blue. *After both devices are paired they enter automatically into the connected state. To be able to answer any incoming voice call from the Bluetooth headset or handsfreekit both devices should be switched into the "bound" state, which is done after executing the PFAL command **\$PFAL,BT.Audio.Disconnect**<sup>3</sup>.*

<sup>2</sup> To get the MAC address of the the audio headset, just connect it to a Bluetooth-enabled PC or Laptop, then go to the audio headset icon, right click on it, and then start "Properties ....". Copy the device address given on this dialog box (e.g. 00:13:EF:19:C3:69) and then enter it in the configuration without colon". The Mac address uses only Hexadecimal characters 0-9 and A-F).

<sup>3</sup> Once the "bound" state is entered the event **BT.Audio.eBound** occurs. The command **\$PFAL,BT.Audio.Disconnect** should be sent to the MAMBO2 device only when connecting devices for the first time, after that the "bound" state is set automatically by the configuration given in table above.

**To receive an incoming voice call on a Bluetooth headset or handsfree kit, send the following configuration to the MAMBO2 device:**

**\$PFAL,CNF.Set,AL25=BT.Audio.eConnected:GSM.Audio.AudioPath=2**

*If the call button on the Bluetooth audio device is pressed, the MAMBO2 switches the audio path to 2 and forwards the received voice signals to the Bluetooth audio device through this path.*

**\$PFAL,CNF.Set,AL26=BT.Audio.eConnected&GSM.VoiceCall.sRingCounter>0:GSM.VoiceCall.Accept**

*The MAMBO2 accepts an incoming voice call when the call button on the Bluetooth audio device is pressed. Pressing that call button makes the MAMBO2 generate the events **BT.Audio.eConnected** or **BT.Audio.eBound** alternately.*

**\$PFAL,CNF.Set,AL27=BT.Audio.eBound:GSM.Audio.AudioPath=1**

*The MAMBO2 switches the audio channel automatically for 2 to 1 (internal audio) once both devices get Bluetooth-disconnected ("bound" state).*

**\$PFAL,CNF.Set,AL28=GSM.Voicecall.eHangup&BT.Audio.sConnected:BT.Audio.Disconnect**

*If the voice call is ended by the other party, the MAMBO2 disconnects that audio connection and sets itself into the "bound" state.*

**\$PFAL,CNF.Set,AL29=BT.Audio.eBound&GSM.VoiceCall.sInside:GSM.VoiceCall.Hangup**

*When you are inside a voice call and pressing the call button on the Bluetooth audio device, then the MAMBO2 device ends that call. Pressing that call button makes the MAMBO2 generate the events **BT.Audio.eConnected** or **BT.Audio.eBound** alternately.*

***Hint:** To prevent overwriting of alarm indices from 25 to 29 that may already exist in your configuration, please change these indices to unused ones before sending them to the MAMBO2 device.*

**Table 1:** Alarm configuration to be sent to the MAMBO2 device

After sending the above configuration to the MAMBO2 device, to answer (or end) an incoming voice call, press the call button on the Bluetooth audio device. When answering an incoming voice call, be sure that the Bluetooth audio connection is into the "bound" state. Each time you press the call button on the Bluetooth audio device, the connection state switches from "Bound" to "Connected" and vice versa. Both states are identifiable by the events **BT.Audio.eConnected** and **BT.Audio.eBound** which occur when these states are entered respectively.

Bluetooth devices get also disconnected when one of them is turned 'off' or moved out of the designated Bluetooth operating range. For detailed information, please refer to the user manual of the used Bluetooth audio device.