Instructions

INTERMOTIVE VEHICLE CONTROLS
An ISO 9001:2015 Registered Company

FlexSpeak™ ADA "Talking Bus"
A-VAM403-A
Installation Instructions

The Talking Bus is a voice annunciator module that announces audio messages for up to 72 geofence triggers per bus route. Additionally, the module announces audio messages upon triggers from 4 discrete inputs and 56 virtual inputs. The module functions as a LIN slave, and the 56 virtual inputs are triggered through a LIN protocol by a LIN master device. These audio messages can be configured through the FlexSpeak Programming Utility software with options for message priority, frequency, and output method. Messages can be played directly on the integrated speaker of Talking Bus, on a PA system, or both. Talking Bus is equipped with an interface to allow audio playback through the vehicle's speakers through a PA system installed on the vehicle. It is also equipped with an interface to display text on a Transign interior sign.

Messages must be in the MP3 file format. Please refer to "Audio Recording Instructions" on pages 10 - 12 for complete details. When all audio messages, configuration file, and route files have been loaded onto the microSD card, it is inserted into a slot on the side of the Talking Bus module. Ensure the microSD card is fully inserted into the slot. On the same side of the enclosure, there is also the volume control knob and the port for the InterMotive Download Cable. In order to remove the microSD card, simply push it again, using a small object if necessary, and it should eject.

Installation Instructions

IMPORTANT — READ BEFORE INSTALLATION

It is the installer's responsibility to route and secure all wiring harnesses where they cannot be damaged by sharp objects, mechanical moving parts and high heat sources. Failure to do so could result in damage to the system or vehicle and create possible safety concerns for the operator and passengers.
Avoid placing the module where it could encounter strong magnetic fields from high current cabling connected to motors, solenoids, etc. Avoid radio frequency energy from antennas or inverters next to the module. Avoid high voltage spikes in vehicle wiring by always using diode clamped relays and solenoids when installing upfitter circuits.

CAUTION
All electronic products are susceptible to damage from Electrostatic Discharge or ESD. Ground yourself before handling or working with the module and harnessing by first touching chassis ground.

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Talking Bus Module

Locate a suitable location to mount the Talking Bus module near the driver position. Drill a 1 3/4" hole at the mounting location to allow for harnessing routing. Do not mount the module until testing is completed and all wire harnesses are routed and secure. The last step will be to mount the module.

Connecting Talking Bus Harnessing

2-Pin Power Pinout Definition

- **Hot-In-Run**, Pin #1, Red—Connect this pin to the vehicle's Hot-In-Run power connection.
- **Ground**, Pin#2, Black—Connect this pin to vehicle ground.
- **Mating connector**—Molex Mini-Fit Jr. 39012020

4-Pin GPS Connector

- The GPS connector is used to connect directly to the GPS module.

4-Pin LIN Connector

- The LIN connector can be used to connect the Talking Bus module to a LIN master, such as the PRPC in the InterMotive Flex Tech system. This connection provides the module with LIN commands to trigger 56 virtual inputs to the Talking Bus.
- See schematic on last page for connector pinout definition.
- **Mating connector**—TE Connectivity AMPMODU MTE 104257-3

8-pin Input Connector Pinout Definition

- See schematic on last page for connector pin out
- **Mating connector**—Molex Mini-Fit Jr. 39012080
- **Audio Message Inputs:**
- **Input 1**, Pin #1, PINK/BLACK—(+12V-activated input). This signal is referred to as Input 1. The module will play the audio message associated with Input 1 upon receiving a +12V trigger.
- **Input 2**, Pin #2, WHITE/BLACK—(+12V-activated input). This signal is referred to as Input 2. The module will play the audio message associated with Input 2 upon receiving a +12V trigger.
- **Input 3**, Pin #3, GREEN/BLUE—(+12V-activated input). This signal is referred to as Input 3. The module will play the audio message associated with Input 3 upon receiving a +12V trigger.
- **Input 4**, Pin #4, BLUE/WHITE—(+12V-activated input). This signal is referred to as Input 4. The module will play the audio message associated with Input 4 upon receiving a +12V trigger.

- **Note: These connections must be made using solder and heat shrink.**

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8-pin Input Connector Pinout Definition (continued)

- **Miscellaneous Inputs:**
- **Input 5**, Pin #5, BROWN/BLACK—(+12V-activated input). This signal is referred to as Input 5. This input is used to enter and operate "Bus Stop Modification Mode."
- **Input 6**, Pin #6, WHITE/ORANGE—(+12V-activated input). This signal is referred to as Input 6. This input is reserved for future use.
- **Input 7**, Pin #7, ORANGE—(Ground-activated input). This signal is referred to as Input 7. This is a multi-purpose input used to operate route-selection mode and to adjust PA volume.

  Connect Input 7 to Pin 4 of the momentary switch.
- **Input 8**, Pin #8, YELLOW—(Ground-activated input). This signal is referred to as Input 8. This is a multi-purpose input used to enter and operate route-selection mode.

  Connect Input 8 to Pin 1 of the momentary switch.

3-Pin Interior Sign Connector

- The interior sign connector connects directly to the Transign interior LED sign.
- See schematic on last page for connector pinout definition.

PA System Connector

The Talking Bus has options for multiple PA systems:
- **Jensen JPA600 (discontinued)**
- **REI 4-Channel PA**

The Talking Bus can play audio messages over the vehicle's speakers through a connection to a PA system. The PA system works by passing the vehicle's radio output to the vehicle's speakers until a message is ready to be announced. When the PA system is activated, the system will interrupt the radio's audio output and switch to the PA system's audio input (coming from the Talking Bus or an external microphone), thus allowing the Talking Bus to play audio over the vehicle's speakers. The Talking Bus automatically switches the PA system if an input that is configured to be played over the PA system is activated.

- The PA System is to be installed between the vehicle's radio and the vehicle's speakers. Connect the radio's audio output connections to the PA connections labeled "Radio Input." There are 8 total connections for four speakers with a + and - connection (Left front, Right front, Left Rear, Right Rear).
- Connect the vehicle's speaker wires to the PA connections labeled "Speaker output." There are 8 total connections for four speakers with a + and - connection (Left front, Right front, Left Rear, Right Rear).
- Connect the PA power wires to Hot-In-Run (Red wire) and Ground (Black wire)
- The 4-pin Philmore connector connects the Talking Bus to interface to the PA system to allow for audio playback through the vehicle's speakers. The module contains a configuration which allows the user to select specific messages to be played through the PA system only, the module's self-contained speaker only, or both.
- See next page for PA options and differences.

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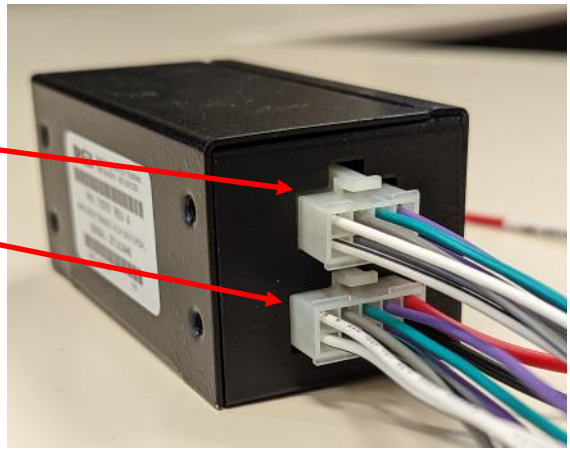
REI 4-Channel PA:

Radio Harness

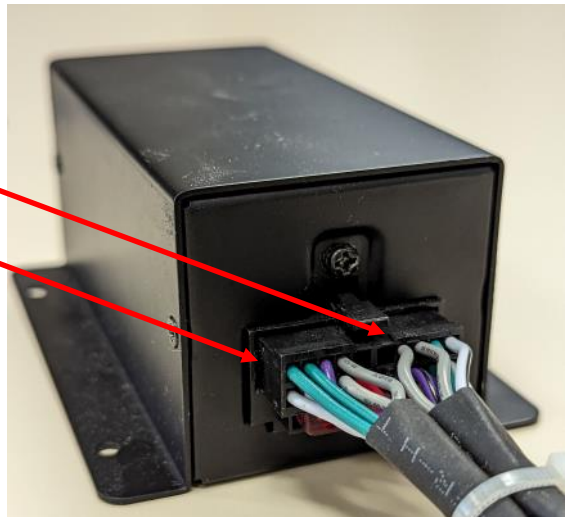
Speaker Harness

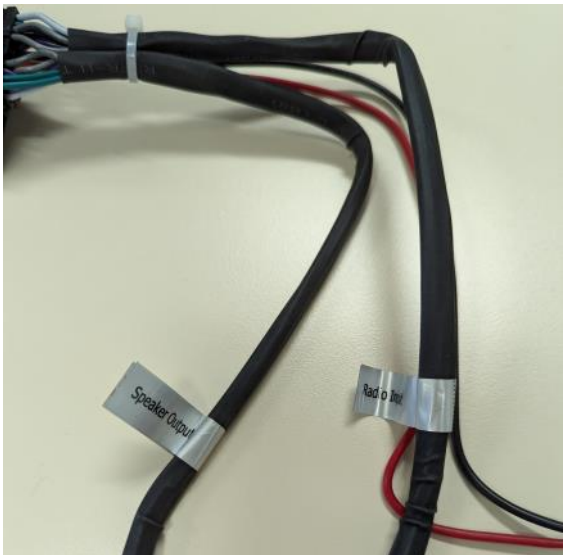


Jensen JPA600:

Radio Harness

Speaker Harness





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Overview

In order to configure the FlexSpeak module, it is recommended to utilize the following functions in this order:

1. Talking Bus stop selector web app (choose bus stop locations and create route) - see below
2. VoiceMaker text-to-speech converter (type and download audio message files) - see page 10
3. FlexSpeak Programming Utility software (configure messages for bus stops) - see below

Configuration — Bus Stop Web App

The Talking Bus stop selector web app is used to set geofences around up to 72 predetermined bus stops. This web app is accessible directly on the InterMotive website or through the FlexSpeak Programming Utility. The following parameters are configurable for each bus stop:

- **Name** - This is the name of the bus stop. If it is an existing bus stop in Google Maps, the name will be copied once added to the table containing all bus stops. If the bus stop does not currently exist in Google Maps, type in its name as desired.
- **Bus Movement Direction** - On a fixed route, the bus will usually approach a stop in the same direction each time. This must accurately be configured in order for the Talking Bus to determine which stop is the current one. For example, if there are two stops right across the street from each other, their directions of approach will be different. This parameter lets the Talking Bus system determine which of these stops to announce.
- **Geofence Radius** - This determines the total area the Talking Bus will use to trigger messages for arrival and departure from stops. The default is 200ft, which means when Talking Bus determines the bus is within 200ft of the bus stop, it will trigger the arrival message. When departing the stop, the departure message will trigger when the module has determines the bus is greater than 200ft from that stop. **Location is updated once per second, so arrival/departure messages may trigger at greater or less than the set distance depending on the speed of the bus.**

Further instructions on operating the web app are available directly on the web app. Files generated from the web app must be stored in the “Routes” folder on the microSD card.

Configuration — FlexSpeak Programming Utility

The Talking Bus system contains a configuration file on the microSD card which allows the user to choose a specific track to be played for each of the 60 input triggers (4 discrete inputs and 56 LIN virtual inputs) and each of the bus stops set in the web app (up to 72 stops). Any of these values can be modified with the FlexSpeak Programming Utility software. This software will allow the user to reconfigure the module as desired. The configuration file should be stored in a folder labeled “Config” on the microSD card to be inserted in the module. **Note: Only one configuration file can be stored in the Config folder at any given time.**

Configuration — FlexSpeak Programming Utility (Continued)

The following parameters are available for modification in the FlexSpeak Programming Utility:

- **Input Message Priority** - Each input trigger is associated with a message priority to allow for prioritization of audio playback. By default, each input is assigned to the lowest message priority (Priority 4) and can be changed to a higher priority if required. Priority 1 is the highest priority. In the case of simultaneous input triggers or of an input trigger event during playback of another message, the messages will be placed in a prioritized queue. The module will play each message in the queue in order of priority on a first-in first-out (FIFO) basis, with a one-second delay between messages. If a priority 1 message is received while another message of a lower priority is being played, Talking Bus will cancel playback of the lower priority message and begin playing the Priority 1 message immediately. **This parameter is unavailable for bus stop-related audio files.**

- **Audio Message Playback Options** - Each input trigger has an associated playback setting to control how often the message is played upon receipt of an input trigger. **This parameter is unavailable for bus stop-related audio files.** The options are the following:

  - **One time per trigger event**—The message will be played one time on a trigger event.

  - **Repeat 10 seconds after message ends**—The message will be continuously added to the message playback queue while the trigger is active, with a 10-second delay between messages. If other input triggers become active during the 10-second delay, the audio message of that input will be played.

  - **Repeat 30 seconds after message ends**—The message will be continuously added to the message playback queue while the trigger is active, with a 30-second delay between messages. If other input triggers become active during the 30-second delay, the audio message of that input will be played.

  - **Continuously while trigger is active**—The message will be continuously added to the message playback queue while the trigger is active, with a one-second delay between messages. If other input triggers become active while the continuous trigger is active, the module will play the audio messages on a First In– First Out basis, in order of priority.

- **Input Message Audio Output** - Each input has an associated audio output option to control whether the message should be played over the PA system only, the module's self-contained speaker only, or both.

- **Input Message Track ID** - Each input is associated with a specific audio message to play upon a trigger event. The specific audio message to be played upon a trigger event can be changed with this option. All audio messages are stored in a folder titled "Playlist" on the microSD card and have a naming convention that must be adhered to. For Inputs 1-64, audio files must follow the naming convention "Trk####" where the pound symbols represent any number 0000-9999. **Note: Leading 0s must be present for a total of 4 digits. For example, track 24 must be named Trk0024.mp3.**

- Inputs 1-4 are mapped to the 4 discrete inputs on the module and Inputs 9-64 are mapped to the 56 virtual LIN inputs to the module. For audio files related to bus stops, there is no required file name template. The only restriction is a maximum of 7 alphanumeric characters (numbers and letters, no symbols). **Please refer to the "Audio Recording Instructions" section on Pages 10 - 12 for complete details.**

Configuration — FlexSpeak Programming Utility (Continued)

- **Route List** - An editable text box is used to enter the names of all routes to be configured. Each route must be on its own line in the text box and only up to 7 characters long. The list will be saved in the "Routes" folder with the file name "Routes.rte." Existing versions of "Routes.rte" can be loaded in as well for modifying existing configuration files.
- **Editing Route** - A drop-down list contains all the routes entered in the previous screen. Select the route to be configured, and then modify all parameters as necessary.
- **Default PA Volume** - The volume control knob on the module controls the volume of the module's self-contained speaker only. The volume of audio playback over the PA system is stored as a configurable value on the module and can be adjusted in the FlexSpeak Programming Utility software as necessary. During operation, PA system volume can be modified by holding Input 7 and turning the volume-control knob. This process affects the module speaker volume so be sure to reset it by releasing Input 7 after setting the PA volume and turning the knob back to the desired position.
- **Chime Setting** - A chime sound precedes every bus-stop-related announcement. Three different chime audio files are provided, but a custom audio file may be added with the specific file name: "Chime.mp3"

Serial Terminal Interface Option

The module's configuration settings can also be viewed with the use of an InterMotive Download Cable and a terminal program such as TeraTerm. The settings for the terminal program are as follows:

Baud rate: 9600, **Data**: 8 bit, **Parity:** None, **Stop:** 1 bit, **Flow control:** None

Before proceeding, disconnect the GPS connector. To view the module's current configuration, plug the InterMotive download cable into the module and a laptop and then power up the module. Then, in the terminal window, **type "param"** to view the module's current configuration. The typed text, "param," will not be shown on the terminal window, but the Talking Bus will still process the command.

SD Card File System

The module's microSD card stores all of the audio messages to be played during trigger events. The microSD card must be formatted with the FAT32 file system (pre-installed on the microSD card that comes with the module). The module can accept microSDSC and microSDHC cards, but it cannot accept microSDXC cards as they are usually formatted with the exFAT file system which is not supported. **If the computer being used does not have a microSD card reader, one card reader is provided with each order.**

All audio messages are stored in a folder titled "Playlist" which should be located in the root directory of the microSD card. Some audio files in the "Playlist" folder do not need to adhere to the aforementioned naming convention. These will be the chime audio files and route name audio files. These files must still adhere to the other aforementioned requirements for audio files.

Please refer to the "Audio Recording Instructions" section on Pages 10 - 12 for complete details.

Diagnostics

Talking Bus has a diagnostic mode to assist users in diagnosing potential issues. To enter diagnostic mode, simply turn the volume control knob on the module from minimum volume to maximum volume three times within a 10-second window.

During diagnostic mode, the module will print diagnostic information to a laptop screen using a terminal program following the set up on the previous page. These messages are designed to assist the user in determining whether the module is properly receiving input triggers and whether or not the module can find the appropriate track stored on the microSD card.

Additionally, the module is designed to announce a diagnostic message if it cannot find the appropriate track on the microSD card, or if another issue is encountered during playback.

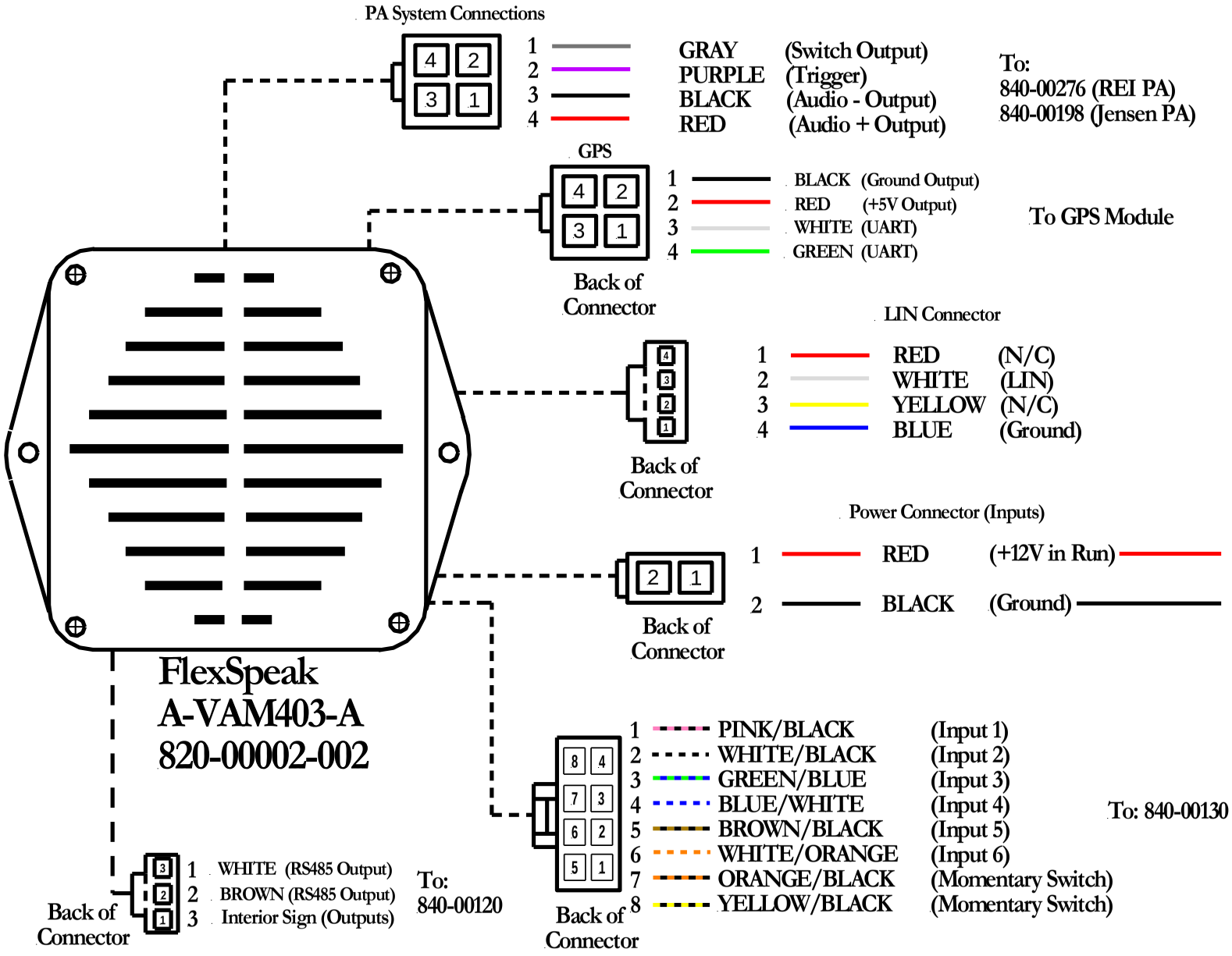
The diagnostic messages that will be announced upon an error include the following:

- "SD card" is announced when a microSD card is not present, or not fully seated.
- "Input" is announced when the module receives a proper discrete input trigger, but cannot play back the associated audio message. For example, if a specific track does not exist in the playlist folder and its associated input trigger becomes active, the module will announce "Input," which will let the user know that the module is properly receiving the input trigger but cannot locate the audio message file.
- "LIN" is announced when the module receives a proper virtual LIN input trigger, but cannot play back the associated audio message.

Post-Installation Operational Test

- After all connections have been made, the microSD card has been configured with the desired audio messages, and it has been inserted into the module, turn the vehicle's key to the RUN position to power the module. On the very first startup, an audio message should indicate that the module is in "Route Selection Mode," and each press of the momentary switch tied to Input 7 or 8 should indicate the selected route. All subsequent startups will load the route that was last selected from the previous run.
- If an input is configured to be played over the module's self-contained speaker and the audio is not heard, check the volume control knob and ensure it is not turned to minimum volume.
- If an input is configured to be played over the vehicle's speakers (PA) and the audio is not heard, ensure that the input's configuration settings are set to play over the PA system speakers. If so, check the module's PA system volume setting. The setting ranges from 0% (lowest volume) to 100% (highest volume). Ensure that the 12V relay control output from Talking Bus is properly connected to the PA system.
- If audio is still not playing over the vehicle's speakers, double check the PA system connections between the vehicle's speakers and the radio. You can test the vehicle's speakers by playing the vehicle's radio as normal.
- **To verify GPS functionality, a test route will need to be set up. Please contact InterMotive tech support at (530) 823-1048 for assistance with setup.**

Once the module has passed the post-installation operational test, permanently mount the module in the desired location.



Submit product registration at www.intermotive.net

If the VAM403 fails any step in the Post Installation Check List, review the installation instructions and check all connections.
If necessary, call InterMotive Technical Support at (530) 823-1048.

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Audio Recording Tools

To create Talking Bus audio messages, you will need:

- **VoiceMaker Text-to-Speech Converter website (purchase)**

  This website will convert any typed text into natural sounding speech, which can be downloaded into MP3 audio files. To access the recommended voices suitable for Talking Bus, you will need to purchase a Premium plan ($8.00 for 30 days of use).

Audio Recording Instructions - VoiceMaker

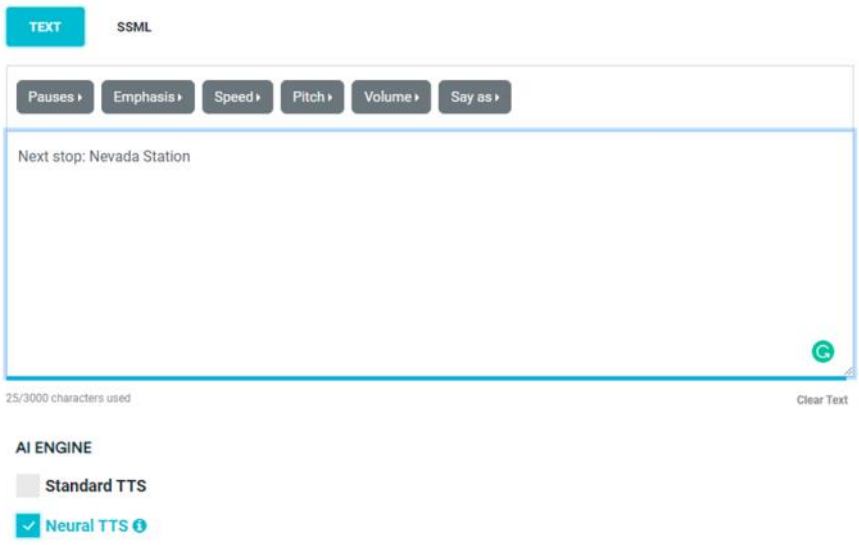
INITIAL SETUP

1. Go to https://voicemaker.in/pricing.
2. To purchase the Premium Plan ($8.00 for 30 days), click on "Get Started."
3. Register with name, email and password.
4. Pay for the Premium Plan using a credit card.

NOTES:
- If you want to continue using VoiceMaker after 30 days, you can re-purchase the plan on a month-to-month basis.
- The free plan is not recommended. The voices sound robotic and are not suitable for Talking Bus.

HOW TO CREATE AUDIO FILES

1. Go to https://voicemaker.in/.
2. Log in so you can access the premium voices.
3. Type the text that you want to convert to speech (up to 3,000 characters for each recording). For example, type "Next stop: Nevada Station" or "Now stopping at Nevada Station."
4. Below the text box, under "AI ENGINE" select "Neural TTS" for more natural-sounding voice options.



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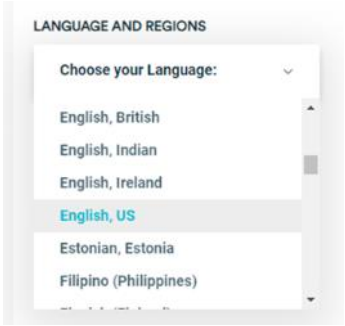
Audio Recording Instructions - VoiceMaker (continued)

5. Under "LANGUAGE AND REGIONS" choose your preferred language/accent.



6. Under "VOICES" select a Premium voice for best quality and most natural-sounding speech. Recommended (English, US): Aria, Female or Jony, Male

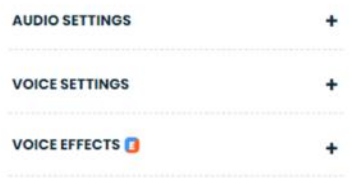
7. Click on the "CONVERT TO SPEECH" yellow button to hear the spoken text. The Premium Plan has unlimited conversions.

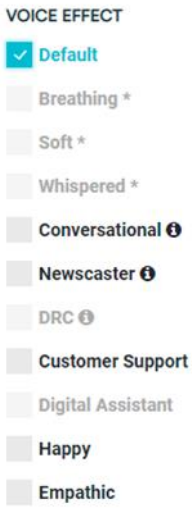
8. If you are satisfied with the spoken text, click on the "DOWNLOAD MP3" button and save the audio file to your computer. You may use up to seven numbers and letters for the file name. To adjust the settings, continue to Steps 9 - 12.

9. Above the text box there are adjustable settings. Highlight the word(s) to adjust and select:

- **Voice Effect:** breathing, soft or whispered
- **Pauses:** 0.5+ seconds between words. There is a 0.2 secs pause between each line of text.
- **Emphasis:** Strong, moderate or reduced
- **Speed:** Five options, extra slow to extra fast
- **Pitch:** Six options, extra low to extra high
- **Volume:** Five options, extra soft to extra loud
- **Say as:** Multiple options - address, phone, spell out, cardinal (counting), ordinal (in order), characters (spell each letter), digits (spell each number) and fractions

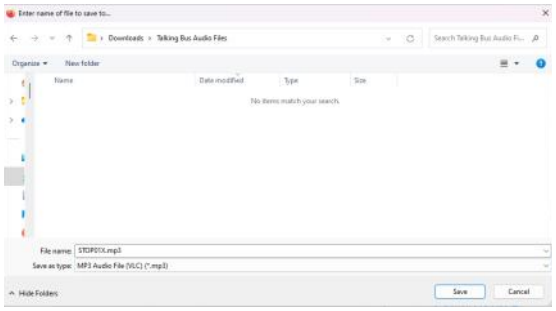
10. Adjustments can also can be made using "AUDIO SETTINGS," "VOICE SETTINGS" and "VOICE EFFECTS" (depending on voice selection).





11. Once you have adjusted your settings, click on the "CONVERT TO SPEECH" yellow button to hear the audio. Adjust and convert as many times as needed.

12. To save, click on the "DOWNLOAD MP3" button and save the audio file to a master folder on your computer. You may use up to seven numbers and letters for the file name. Create as many files as necessary and save it to this master folder. This folder can be used to keep track of all audio files and can be used to quickly copy to the microSD cards in all modules.



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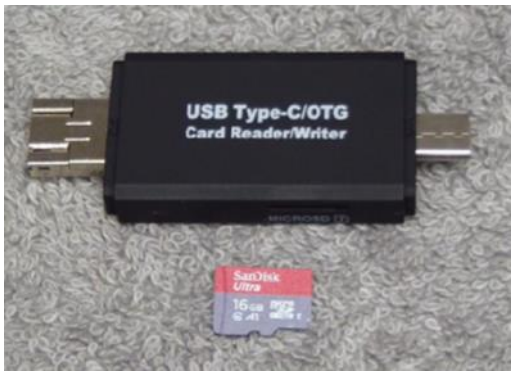
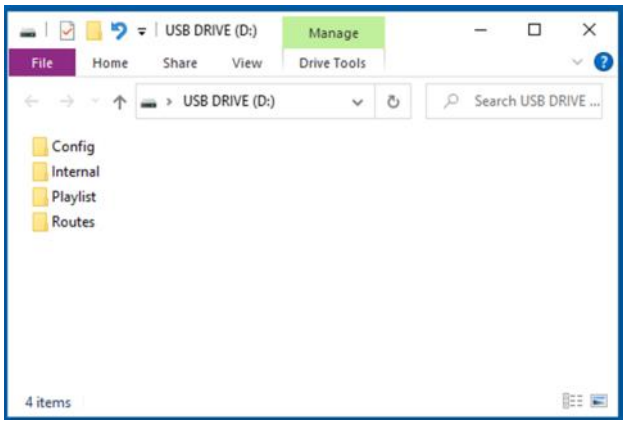
Audio Recording Instructions - VoiceMaker (continued)

13. Insert the FlexSpeak microSD card into the provided card reader (adapter), then insert the reader into a USB or USB Type-C port on your computer.



14. Navigate to the USB drive and click on the “Playlist” folder.

15. Open the master folder with the audio files. Copy and paste the files into the Playlist folder on the USB drive.



Updating microSD Card Files

You will need:

- **SD Card Adapter**

  One SD card adapter is included with the purchase of Talking Bus.

- **MicroSD Card**

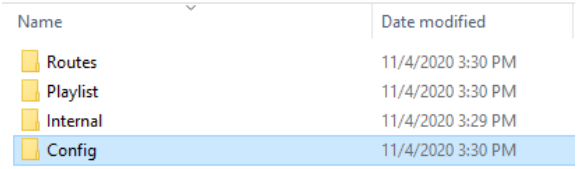
  One microSD card is included with each Talking Bus module. If using a new microSD card, please ensure it has a storage capacity between 2GB and 32GB and is formatted in FAT32.

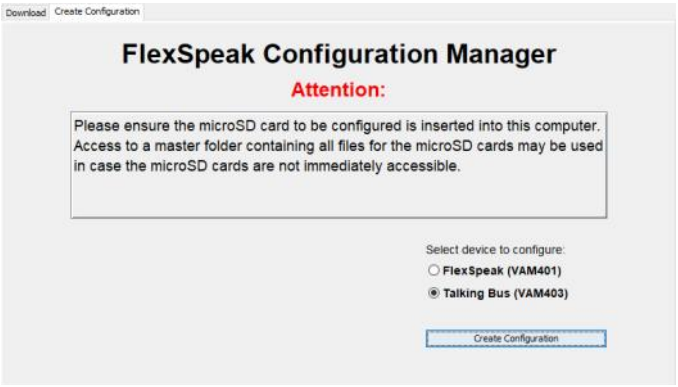
- **FlexSpeak Programming Utility and Bus Stop Web App**

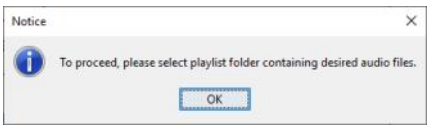
  The FlexSpeak Programming Utility and Bus Stop Web App are two programs used to update the microSD card files. Both can be found here on the InterMotive website in Support > Tech Support > Downloads.

Updating Config File

1. Insert microSD card into adapter and then insert adapter into computer.
2. Double click on "Config" folder to ensure that desired config file is present to be updated.
3. If new config file has already been created, skip to step 8.
4. Open the FlexSpeak Programming Utility, click the "Create Configuration" tab on top, click "Open Folder" and navigate to the "Playlist" folder on the microSD card. Select "Talking Bus (VAM403)" and click "Create Configuration."
5. Create new route list by typing in names of all routes or click on "Load Route List" to modify an existing file. The "Special" route will always be last.
6. Press "Next" and the following prompt will show. Click "OK" and then select the "Playlist" folder on the microSD card.







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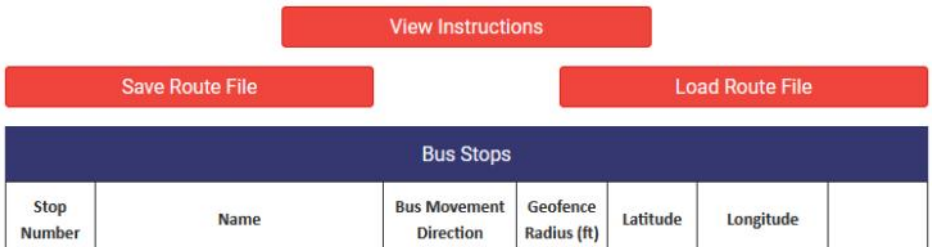
Updating Config File (Continued)

7. Click on “File” and “Load Configuration.” Navigate to the config file located on the microSD card.
8. Modify parameters as necessary.
9. Special functions:
   - “Insert Stop” and “Delete Stop.” These are used to add a new stop along the route or to delete a stop that will no longer be active.
   - “Disable Messages” and “Enable Messages.” These are used to set only arrival or departure audio messages to trigger.
10. Save new config file in the “Config” folder. Please ensure the new config file is now the only file in the “Config” folder.

Updating Route Files

1. Insert microSD card into adapter and then insert adapter into computer.
2. Double click on “Routes” folder to ensure that desired routes file is present to be updated.
3. Open the Talking Bus Web App either through the FlexSpeak Programming Utility or directly through the [InterMotive](#) website.
4. Click the “Load Route File” button and select one of the existing route files within the “Routes” folder.



5. Modify bus stops and other parameters as necessary. Follow instructions on the web app by clicking on “View Instructions” for more details.
6. Save new route files in the “Routes” folder. Please ensure each old route file has been replaced by its corresponding new version in the “Routes” folder.

Instructions

Updating Audio Files

1. Please refer to “Audio Recording Instructions” on pages 10 - 12 for recording new audio.
2. Insert microSD card into adapter and then insert adapter into computer.
3. Double click on “Playlist” folder.
4. Save newly recorded audio files in the “Playlist” folder.
5. Please ensure the following are not deleted:

   Chime.mp3

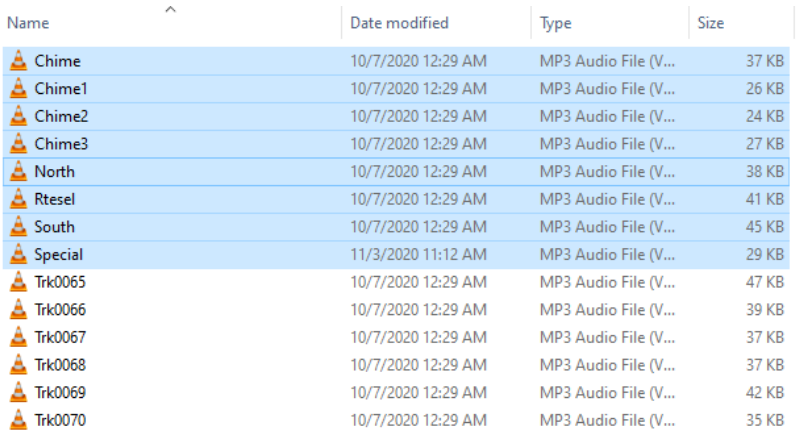
   Chime1.mp3

   Chime2.mp3

   Chime3.mp3

   Rtesel.mp3

   Any audio files pertaining to route names



Name	Date modified	Type	Size
Chime	10/7/2020 12:29 AM	MP3 Audio File (V...	37 KB
Chime1	10/7/2020 12:29 AM	MP3 Audio File (V...	26 KB
Chime2	10/7/2020 12:29 AM	MP3 Audio File (V...	24 KB
Chime3	10/7/2020 12:29 AM	MP3 Audio File (V...	27 KB
North	10/7/2020 12:29 AM	MP3 Audio File (V...	38 KB
Rtesel	10/7/2020 12:29 AM	MP3 Audio File (V...	41 KB
South	10/7/2020 12:29 AM	MP3 Audio File (V...	45 KB
Special	11/3/2020 11:12 AM	MP3 Audio File (V...	29 KB
Trk0065	10/7/2020 12:29 AM	MP3 Audio File (V...	47 KB
Trk0066	10/7/2020 12:29 AM	MP3 Audio File (V...	39 KB
Trk0067	10/7/2020 12:29 AM	MP3 Audio File (V...	37 KB
Trk0068	10/7/2020 12:29 AM	MP3 Audio File (V...	37 KB
Trk0069	10/7/2020 12:29 AM	MP3 Audio File (V...	42 KB
Trk0070	10/7/2020 12:29 AM	MP3 Audio File (V...	35 KB

6. If any of the aforementioned files are deleted, please re-record or replace them.