

CAN Multiplex System Consumer Manual (UM25 ~ 24324-01)





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Introduction

This manual provides the necessary information for the proper use of Tri*Mark*'s CAN **e**-**ASK** system.

The RF controller and FOB transmitters are shipped programmed. After following installation instructions as shown in this manual, the system will function as described.

Note: Some features discussed in this manual may not be available on your vehicle's installation. Consult with your dealer for more information about features specific to your vehicle.





CAN-enabled Keypad — available vertical or horizontal





CAN-enabled



e-FOB Operation and Features - Standard Mode



Button	Function
Lock	Locks doors and arms security system.
Unlock	Unlocks doors and disarms security system. Also activates the dome light.
Panic	Activates panic mode when pressed and held for 2 seconds.
* Auxiliary Button	Auxiliary output. Possible assignment includes: interior/ exterior lighting, awning extension/retraction, gas cap release, hood release, etc.

Note:

• Only the unlocking function of the **e**-*FOB* remains while the system detects that the engine is running—other functions are deactivated.



e-FOB Operation and Features - Cargo Mode



Button	Function
Entry Lock	Locks entry door and arms security system.
Entry Unlock	Unlocks entry door and disarms security system. Also activates the dome light.
Cargo Lock	Locks cargo doors and arms security system.
Cargo Unlock	Unlocks cargo doors and disarms security system. Also activates compartment lights.

Note:

• Only the unlocking function of the **e**-*FOB* remains while the system detects that the engine is running—other functions are deactivated.



Standard e-PAD Operation and Features

The **e**-**PAD** is shipped with default *Authority* and *Access Codes*. If the OEM or dealer has not changed the default codes, the *Authority* and *Access Codes* are:

Access code:

Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
1/2	3/4	5/6	7 / 8	9/0

Authority code:

Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
7 / 8	7 / 8	7 / 8	7 / 8	7 / 8

Locking Doors With Keypad

Press and hold down the (1 / 2) button for 1-2 seconds. An *Access Code* is not needed to lock the doors.

Secure Operations

Entering a valid 5-digit *Access Code* provides a double-beep and enables a secure operation. After entering an *Access Code*, the keypad is enabled for 5 seconds and the next button pressed initiates a secure operation, such as unlocking the doors.

Notes:

- The *Authority Code* does not allow for secure operations. It is only used to assign access codes (see page **12** for information on setting access codes).
- If an unassigned button is pressed, or no button is pressed, within 5 seconds of a correctly entered *Access Code*, the keypad reverts back to disabled state.
- If the keypad does not Double-beep after the 5th digit of your entered *Access Code*, then you have not entered the correct *Access Code*.
- The secure keypad operations are set depending on the system configuration. See page 6 for more information.





Doorbell e-PAD Operation and Features

Access code:

Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
1	2	3	4	4

Authority code:

Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
4	4	4	4	4

Locking Doors With Keypad

Press and hold down the (1) button for 1-2 seconds. An *Access Code* is not needed to lock the doors.

Door Bell Operation

The doorbell button sends a CAN message to the RF Controller instantly when pressed. An *Access Code* is not necessary for the doorbell.

Secure Operations

Entering a valid 5-digit *Access Code* provides a double-beep and enables a secure operation. After entering an *Access Code*, the keypad is enabled for 5 seconds and the next button pressed initiates a secure operation, such as unlocking the doors.

Note:

- The Authority Code does not allow for secure operations. It is only used to assign access codes (see page **12** for information on setting access codes).
- If an unassigned button is pressed, or no button is pressed, within 5 seconds of a correctly entered *Access Code*, the keypad reverts back to disabled state.
- If the keypad does not Double-beep after the 5th digit of your entered *Access Code*, then you have not entered the correct *Access Code*.
- The secure keypad operations are set depending on the system configuration. See the next page for more information.



e-PAD Configuration

Keypad Setting Configurations:

Entering a 5-digit access code enables the keypad. After entering the Access Code, the next button pressed initiates a secure operation, such as unlocking specific doors or some other operation. The following table should be filled out by your dealer to explain the function of each button. Not all buttons have a function in some installations. Common configurations are listed in Appendix B on page II

Secure Function Button Pressed	Secure Operation
Button (1 / 2) or (1)	
Button (3 / 4) or (2)	
Button (5 / 6) or (3)	
Button (7 / 8) or (4)	
Button (9 / 0)	



Optional Keyless Entry System Features

Not all of these features may be installed on your vehicle. Consult with your Dealer.

Dome/Porch Light Activation

The dome/porch light is activated for a timed duration (5-60 seconds) whenever a keypad button is pressed or when system is unlocked from FOB transmitter or vehicle switch. The time duration is dependent on a mechanical setting inside the control module. The dome/porch light is deactivated an engine-start is detected, or entry doors are locked using a keyless device. Your Dealer should be able to adjust the timing of your porch light if desired.

e-Grab Handle Lighting

The grab handle is lit continuously with a circuit installed separately from the rest of the keyless entry system The timing and control of that light is determined by an outside circuit, but is typically tied to the parking lights circuit or porch light circuit. The **e**-**PAD** back lighting is lit with a button press and while training new access and authority codes.

Lock and Unlock Confirmation

- Standard mode **e-FOB**: The headlights flash once and the horn honks once with a lock command. On unlock, the headlights flash twice.
- Cargo mode **e-FOB**: There is no unlock confirmation. The headlights flash once and the horn honks once when either the entry or compartment doors are locked. When both entry and compartment doors are locked within 10 seconds, headlights flash twice and the horn honks twice.
- *Keypad:* The headlights flash once with a lock command. On unlock, the headlights flash twice.
- Locking and unlocking confirmation is deactivated if the keyless entry system detects that the engine is running.

Door Ajar Warning

A triple siren chirp sounds if any compartment or entry door is open when the entry and compartment doors are locked (security input grounded). If a door is open, the alarm is not armed.

e-PAD Protective Deactivation Security Feature

If a correct code is not entered after 20 button presses, the keypad enters an inactive mode that disables button recognition for 1 minute. This helps prevent unauthorized access by entering random codes. There is no button feedback while the system is disabled.



Deactivate Lock Confirmation

The system defaults to confirmation ON with power-up. Horn and headlight confirmation can be toggled off and on from the keypad.

- 1. Press and hold the (5 / 6) or (3) button for 5 seconds until the keypad beeps.
- 2. Enter the Authority Code. The buzzer stays on.
- 3. Hold the (1 / 2) or (1) button for 5 seconds. A double-beep sounds.
- 4. The ON/OFF status of confirmation output (lights and horn) is toggled.

Alarm

After locking all doors, the system is armed. In cargo mode, both the entry door and compartment doors must be locked within 10 seconds to set the alarm. The alarm is activated when any entry door or compartment door is opened if it is being monitored by an installed security swtich, or by an input from a security sensor (shock sensor, motion sensor or other sensing device).

When alarm is triggered, the siren is continuously activated and headlights flash for 1 minute.

To deactivate alarm mode:

- Unlock all doors via e-FOB transmitter.
- Unlock system via e-PAD or vehicle switch.
- Start the engine (only works if engine monitoring is installed).

The following table describes audio/visual activations at various conditions.

Outputs	Lock Confirmation	Unlock Confirmation	Alarm	
Siren	Not used	Not used	1 minute or when shut off	
Horn	1 chirp	2 chirps	Not used	
Headlights	1 flash	2 flashes	1 minute or when shut off	



Compartment Light Activation

Compartment lights are activated upon unlocking compartment doors (bank A-D) or toggling vehicle switch. The activation duration is controlled via trim pot. Starting the engine deactivates the light.

Auxiliary (*) Output Activation

Standard Mode: With proper wiring and system configuration, Aux 1 output can be activated with the "STAR" or "GEAR" button on the standard version **e**-*FOB* transmitter, via keypad, or toggled with vehicle switch. Ask your dealer for the function that has been assigned to this button and for adjustment of activation duration. This output ceases when the preset time duration expires or if system detects that the engine has started.

Teaching Additional Transmitter FOBs

There are 2 ways that the receiver can be put into **e**-*FOB* learn mode. The first requires that a CAN keypad be connected to the network. This option allows the module to be put into train mode without accessing the module. The 2^{nd} option requires access to the module. Up to (10) transmitters can be trained at one time.

Option 1 (CAN keypad connected to network):

- 1. Hold the (5 / 6) (3) button of keypad for 5 seconds. The keypad will beep and the LEDs will flash.
- 2. Enter authority code. The buzzer stays on.
- 3. Hold (9 / 0) (DB) for 5 seconds. A double-beep plays.
- 4. The receiver module is now in **e-FOB** learn mode. (The LED under the receiver enclosure will be blinking rapidly).
- 5. Next press lock button of each transmitter to be trained. (LED stays solid for 2 seconds as each one is trained.) Press the transmitter button for 0.5-2.0 seconds. A three second delay must occur between each transmitter.
- 6. After 60 seconds of **e**-*FOB* button inactivity, or by simply pressing any key on the keypad, 4 beeps will sound and the module will return to normal operation.



Option 2 (no CAN keypad connected to network):

- 1. Remove power from module.
- 2. Move DIP switches 4-6 to the "ON" position.
- 3. Connect module to CAN network.
- 4. Connect power and GND to module (J1 P4,16 and J1 P7,19).
- 5. Wait about 5 seconds. LED will flash continuously.
- 6. Press any transmitter button for about 5 seconds until LED pattern changes, then release. This trains the first transmitter.
- 7. Press any button of 2nd transmitter, LED pattern changes immediately. This synchs the 2nd transmitter.
- 8. Repeat step 7 until all transmitters are trained.
- 9. Remove power from module.
- 10. Move DIP switches 4-6 to normal position and verify DIP switches 1-3 are in proper position.
- 11. Reconnect power to module.
- 12. Verify that FOBs are synched to the CAN module. CAN module needs to be connected to a valid CAN network (2+ modules on network) or CAN must be disabled to verify functionality.

Notes:

- Up to 10 transmitters can be synched with a module. If a 11th transmitter is added an earlier transmitter becomes invalid.
- All transmitters must be trained together. Training at least one key fob after putting the module into train mode erases all previous FOBs.
- If you place the system in learn mode and teach nothing, the system will return to a normal mode in 60 seconds.
- The memory for codes will not be erased if power is removed



Teaching Keypad New Authority / Access Codes

IMPORTANT: READ ALL INSTRUCTIONS AND ALL NOTES **BEFORE BEGINNING** TO KNOW WHAT TO EXPECT DURING THE PROGRAMMING PROCESS.

The Authority Code has only one purpose: it grants the owner sthe ability to set new Access Codes. The Authority Code must be **EXACTLY 5** digits long. Changing the Authority Code erases all previous Access Codes and sets a new Access Code in memory bank 1 that is the same as the new Authority Code.

Important: *Authority* and *Access Codes* should be different for the greatest security.

Preparation:

1. Find the wiring harness coming out of the back of the keypad. This is usually behind the passenger armrest next to the entrance door. In some cases, the keypad may need to be removed from the side of the vehicle to access the harness in the correct location. See Page 16.

Programming:

- With the keypad still plugged in, short the yellow wire to ground until the keypad begins to beep (tucking the stripped, loose yellow wire into the back of the connector with the black wire works).
- The keypad will beep for 3 seconds; remove the short before the keypad stops beeping. The keypad is now in "Learn Mode."



- Enter a new 5-digit Authority Code (double chirps after each button press). The keypad chirps 3 times after the 5th digit's entry.
- 5. Re-enter the new *Authority Code* for confirmation. The keypad will chirp FOUR times for successful confirmation. **A long beep indicates a failure to change the code.**
- 6. Test the new code to confirm it.



The following area can be used to document the new Authority Code:

My New Authority Code						
Digit 1 Digit 2 Digit 3 Digit 4 Digit 5						

Notes:

- While in "Learn Mode," each button push provides a doublechirp and the backlight flashes.
- The authority code is to be controlled by individuals (owners of vehicle, fleet manager, etc.) who manage the distribution of access codes to vehicle users.
- The authority code should be changed when the vehicle is sold.
- The authority code does not enable secure functions (lock/ unlock doors, etc.)—it is only used to assign access codes.
- Doorbell systems only allow codes using buttons 1-4 and provides memory for 4 unique access codes.
- The keypad automatically leaves "Learn Mode" when the new code is set.

Assign New Access Codes

The *Access Codes* are used for secure functions, such as unlocking doors. The *Access Codes* must be **EXACTLY 5** digits long. With a valid *Authority Code*, a new *Access Code* can be programmed with the following instructions.

Programming:

- Press the (5 / 6) or (3) button for 5 seconds until the keypad beeps. The backlighting of the keypad will flash indicating the keypad is in "Learn Mode."
- 2. Enter the 5-digit Authority Code (see page 4 for the code).
 - If you enter an INCORRECT Authority Code, the keypad will beep for 1 second, and leave "Learn Mode."
 - If you enter a CORRECT *Authority Code*, the keypad will provide a constant beep that will only stop after you have defined a **memory bank** to store the new *Access Code*.

- 3. Press and release the button that corresponds to the **memory bank**. For example, press (1 / 2) or (1) button for Memory #1 and press (3 / 4) or (2) button for Memory #2. During this activity you are choosing 1 of 5 (4) memory banks.
- 4. Enter a new 5-digit *Access Code*. The keypad chirps 3 times after the 5th digit's entry.
- 5. Re-enter the new *Access Code* for confirmation. The keypad will chirp 3 times after a successful confirmation. A long beep indicates a failure to change the code.
- 6. Test the new code to confirm a successful change.

Repeat process to assign additional *Access Codes* to different memory slots.

Notes:

- Up to 5 (or 4 for doorbell keypads) different *Access Codes* can be assigned at any time. As additional *Access Codes* are defined, pre-existing *Access Codes* are overwritten. For example, if a new *Access Code* is assigned to Memory #3, the previous *Access Code* in Memory #3 is no longer valid.
- If an error is made at any point, or if time runs out, the keypad will exit "Learn Mode," provide a 1-2 second beep, and not change anything.

The following area can be used to document the new *Access Code* assignments:

Memory #	User Name	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
1/2 (1)						
3/4 (2)						
5/6 (3)						
7/8 (4)						
9/0						

Troubleshooting

The keypad's "Yellow Programming Wire":

In order to complete many higher-level reprogramming tasks, access to the keypad's "yellow programming wire" is required. Access to this wire is usually intentionally restricted and difficult in an effort to detract unauthorized manipulation of the security system. Typically, a vehicle manufacturer will provide an access panel inside the vehicle to allow users with access to the inside of the vehicle relatively unobstructed access to the harness. Unfortunately, this is not always the case, and some vehicles require the keypad to be completely removed from the vehicle to gain access to the harness at the correct location.

Depending on the model of keypad that is installed on the vehicle, the yellow programming wire will be located in one of two places.

 ON EMBEDDED KEYPADS WITH A BLACK BEZEL (22636-xx) These keypad are multi-function keypads with support for many operating modes. For the purposes of this CAN system manual, only the CAN modes are discussed. This keypad has two wire harnesses; one is a 4pin CAN connector, the other is a 9-pin discrete signal connector. In these keypads, the "yellow programming wire" can be found securely mounted in the 9-pin discrete signal connector.



 ON CHROME e-GRAB CAN-ENABLED KEYPADS (24295-xx) These keypads have a more restricted level of function support because of the lack of space within the e-GRAB base. One consequence of this restriction is being limited to only one harness coming from the keypad. Since the 9-pin discrete signal

connector is not present on these keypads, the "yellow programming wire" does not have a location to be securely mounted. Instead, the "yellow programming wire" is drawn through the convoluted sheathing that protects the CAN wire harness, and then looped around and tucked



back into the sheathing. While this does protect the wire from being unintentionally grounded, it can also be difficult to find during troubleshooting and reprogramming.



CAN Error Diagnostic Codes:

In many cases, when a problem is detected with the CAN bus, one or both Tri*Mark* CAN-enabled devices will announce an error. Similar codes are used with CAN vehicle module and CAN keypad. The keypad uses back lighting and buzzer for announcing codes while the vehicle module uses an internal red LED.

 At power up, the CAN devices will attempt to claim their preferred network address on the CAN bus. After this, they will announce a successful power-up using either the internal LED or a buzzer and backlighting.

This "long announcement" communicates a CPU reset and why:

- One 1-second announcement = normal power on
- Two 1-second announcements = watchdog timer reset the CPU (this indicates a software bug)
- Three 1-second announcements = brownout reset. The power supply fell below the 2.0V requirement momentarily.
- 2. After the long announcement, a series of "short announcements" indicate other errors that may have occurred:
 - Two short announcements = CAN bus error. This means there is an electrical problem with the CAN bus (possibly a problem with bus termination), or simply that the device reporting this error is the only node attached to the bus. If there is intentionally only one CAN-enabled device on the network, CAN communication must be disabled for normal operation.
 - Three short announcements = the device reporting this error couldn't claim its preferred CAN address. This is probably because another device on the bus is set to the same function instance. This is considered a fatal error so the device will reset itself and try again.
- 3. For some problems, the keypad provides five short beeps followed by a pause to indicate a CAN bus error. Make sure that both network wires are intact and connected to all TriMark CANenabled devices.



Problem Description	Possible Solution
e-FOB Hints	
Button press does not provide correct operation	Verify RF receiver is powered and active.
	Re-teach the FOB transmitter to the receiver.
No operation or intermittent operation	Move RF receiver away from enclosed metal areas and fully extend antennae.
	Check FOB transmitter battery voltage. Batteries need to be changed every 1-2 years depending on usage.
One particular e-FOB function does not work	Check wire connection of affected function at RF module, wiring harness, and I/O module.
e-PAD Hints	
No response with button press	Verify RF receiver is powered and active.
	Verify that keypad cable is connected and undamaged.
Access code is not recognized	Verify that code has not been changed. Reassign keypad with instructions starting on pages 11-12.
	Make sure an access code is being used, not the authority code.
Key FOB works correctly, keypad beeps, but no output	Verify that the keypad and RF receiver are using the same CAN protocol.
Unexpected, secure operation occurs	Verify DIP switches are set to correct configuration setting.

e-ASK System Hints	
No response in any system element	Verify power to the RF Receiver.
Lights and panic mode do not turn off with ignition start	Verify that ignition input is wired properly.

This product has been manufactured with methods to ensure high quality and to meet the high expectations of our customers. Tri*Mark* warrants this product to be free from workmanship defects and will remedy issues per Tri*Mark's* warranty policy.

Remote transmitter FOBs, batteries, and other equipment subject to normal ear and deterioration may need to be replaced periodically by dealer and/or end user and are not covered by this warranty. Tri*Mark* will not be liable for indirect, special, incidental or consequential damages.

This system complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference and (2) This device must accept any interference received including interference that may cause undesired operation.

Note: The manufacturer is not responsible for any radio or television interference caused by unauthorized modification to this equipment. Such modification could void the user's authority to operate the equipment.



Appendix A: Installation and Application Notes

This system uses low-voltage circuitry and wireless communication. To protect these components and to ensure the device operates as expected, these application notes must be followed.

General Mounting Guidelines:

The antennae must be left fully extended and exposed. Minimize shielding from metal enclosures.

Looping the antenna, wrapping the antenna around a metallic object, or grouping the antenna wire in with another wire harness will have severe and detrimental consequences on the functional operating range of the remote key fobs.



Appendix B: Available e-PAD Configurations

Configuration D is standard.

Non-doorbell Configuration A

- Button (1 / 2): Unassigned
- Button (3 / 4): Unlocks all entry and compartment doors
- Button (5 / 6): Unassigned
- Button (7 / 8): Toggles Aux 1 output
- Button (9 / 0): Activates zone 6 unidirectional actuation

Non-doorbell Configuration B

- Button (1 / 2): Unlocks all entry door(s)
- Button (3 / 4): Unlocks all entry and compartment doors
- Button (5 / 6): Unassigned
- Button (7 / 8): Toggles Aux 1 output
- Button (9 / 0): Activates zone 6 unidirectional actuation

Non-doorbell Configuration C

- Button (1 / 2): Unlocks all entry doors
- Button (3 / 4): Unlocks all doors assigned to relay bank A
- Button (5 / 6): Unlocks all doors assigned to relay bank B
- Button (7 / 8): Unlocks all doors assigned to relay bank C
- Button (9 / 0): Unlocks all doors assigned to relay bank D

Non-doorbell Configuration D

- Button (1 / 2): Unlocks all entry doors
- Button (3 / 4): Unlocks all entry and compartment doors
- Button (5 / 6): Unlocks all curb side compartment doors (relay banks C-D)
- Button (7 / 8): Unlocks all driver side compartment doors (relay banks A-B)
- Button (9 / 0): Toggles Aux 1 output



Doorbell Configuration A

- Button (1): Unassigned
- Button (2): Unlocks all entry and compartment doors
- Button (3): Unassigned
- Button (4): Toggles Aux 1 output
- Button (doorbell): Activates zone 6 unidirectional actuation

Doorbell Configuration B

- Button (1): Unlocks all entry door(s)
- Button (2): Unlocks all entry and compartment doors
- Button (3): Unassigned
- Button (4): Toggles Aux 1 output
- Button (doorbell): Activates zone 6 unidirectional actuation

Doorbell Configuration C

- Button (1): Unlocks all entry doors
- Button (2): Unlocks all doors assigned to relay bank A
- Button (3): Unlocks all doors assigned to relay bank B
- Button (4): Unlocks all doors assigned to relay bank C
- Button (doorbell): Activates zone 6 unidirectional actuation

Doorbell Configuration D

- Button (1): Unlocks all entry doors
- Button (2): Unlocks all entry and compartment doors
- Button (3): Unlocks all compartment doors (relay banks C-D)
- Button (4): Unlocks all compartment doors (relay banks A-B)
- Button (doorbell): Activates zone 6 unidirectional actuation





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UM25 24324-01 12/13-2