e-*ASK*

electronic *A*ccess *S*ecurity *K*eyless-entry

CAN Multiplex System
Installation & Instructions

(UM26 ~ 24324-02)

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Introduction

This manual provides the necessary information for the proper installation and use of Tri*Mark*'s CAN **e-*ASK*** system including vehicle module and keypad.

Standard e-*FOB* Operation and Features

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.

Cargo e-*FOB* Operation and Features

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:

- The FOB transmitters and receiver are shipped programmed. After making all necessary wiring connections (see Appendix A for wiring information), the ***e-FOB*** system will function as shown.
- Only the unlocking function of the **e-*FOB*** remains while the engine is running—other functions are deactivated.

Non-doorbell e-*PAD* Operation and Features

The **e-*PAD*** is shipped with default authority and access codes. Unless the OEM or dealer has changed default codes, the authority and access codes are as follows:

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**

Doorbell e-*PAD* Operation and Features

The **e-*PAD*** is shipped with default authority and access codes. Unless the OEM or dealer has changed default codes, the authority and access codes are as follows:

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 / 2) or (1) button for 1-2 seconds. An access code is not needed to lock the doors.

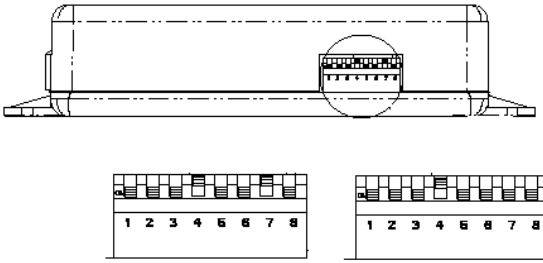
Secure Operations

Entering a valid 5-digit access code enables secure operation. After entering an access code, the keypad is enabled for 5 seconds and a 6th button press and release 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 or no button is pressed while the system is enabled, the keypad reverts back to disabled state.
- The secure keypad operations are set depending on the system configuration.

e-*ASK* CAN DIP Switch Configuration



DIP Switches 1-3:
The settings of DIP switches 1-3 define CAN address of the IO receiver module. A unique address must be assigned when multiple modules are used on a CAN network. If only one module is used on network then all DIP switches should be set to ON position.

- DIP Switch 1: On
- DIP Switch 2: On
- DIP Switch 3: On

DIP Switches 4-6:
The setting of DIP switches 4-6 define configuration of the IO receiver module. Each configuration provides different functionality for keypad and interior switches. Most customers use default configuration D setting. See configuration setting definitions.

Keypad DIP Switch Setting Configurations:
Entering a 5-digit access code enables the keypad. After entering the access code, one must press and release a 6th digit to unlock specific doors or perform an operation according to the following list.

Configuration A [SW 4 off / SW 5 off / SW 6 off]:
- Button (1 / 2) (1): Unassigned
- Button (3 / 4) (2): Unlocks all entry and compartment doors
- Button (5 / 6) (3): Unassigned
- Button (7 / 8) (4): Unassigned
- Button (9 / 0) (DB): Toggles Aux 1 output

Configuration B [SW 4 off / SW 5 off / SW 6 on]:
- Button (1 / 2) (1): Unlocks all entry door(s)
- Button (3 / 4) (2): Unlocks all entry and compartment doors
- Button (5 / 6) (3): Unassigned
- Button (7 / 8) (4): Unassigned
- Button (9 / 0) (DB): Toggles Aux 1 output

Configuration C [SW 4 off / SW 5 on / SW 6 off]:
- Button (1 / 2) (1): Unlocks all entry door(s)
- Button (3 / 4) (2): Unlocks all doors assigned to relay bank A
- Button (5 / 6) (3): Unlocks all doors assigned to relay bank B
- Button (7 / 8) (4): Unlocks all doors assigned to relay bank C
- Button (9 / 0): Unlocks all doors assigned to relay bank D

Configuration D [SW 4 off / SW 5 on / SW 6 on]:

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

Interior Switch Dip Switch Setting Configurations:

The following vehicle switch assignments of connector J1 define functional assignment of interior switches. When the switch input is grounded, its corresponding function is specified.

Configuration A [SW 4 off / SW 5 off / SW 6 off]:

1) J1 pin 1: Unassigned
2) J1 pin 2: Unassigned
3) J1 pin 9: Unassigned
4) J1 pin 10: Unlocks all doors
5) J1 pin 11: Lock all doors
6) J1 pin 12: Unassigned

Configuration B [SW 4 off / SW 5 off / SW 6 on]:

1) J1 pin 1: Lock all compartment doors (banks A-D)
2) J1 pin 2: Unlock all compartment doors (banks A-D)
3) J1 pin 9: Unlock entry door(s)
4) J1 pin 10: Unlock all doors
5) J1 pin 11: Lock all doors
6) J1 pin 12: Lock entry door(s)

Configuration C [SW 4 off / SW 5 on / SW 6 off]:

1) J1 pin 1: Unlock bank A
2) J1 pin 2: Unlock bank B
3) J1 pin 9: Unlock bank D
4) J1 pin 10: Unlock entry door(s)
5) J1 pin 11: Lock all doors
6) J1 pin 12: Unlock bank C

Configuration D [SW 4 off / SW 5 on / SW 6 on]:

1) J1 pin 1: Unlock curb-side compartment doors (banks C-D)
2) J1 pin 2: Unlock driver-side compartment doors (banks A-B)
3) J1 pin 9: Unlock entry door(s)
4) J1 pin10: Unlock all doors
5) J1 pin 11: Lock all doors
6) J1 pin 12: Lock entry door(s)

Note: Configuration D is the default.

DIP Switch 7:

The setting of DIP switch 7 defines the type of remote FOB transmitter, either standard FOB or cargo FOB.

- Off: Standard FOB
- On: Cargo FOB

DIP Switch 8:

The setting of DIP switch 8 defines the type of CAN protocol, either RV-C or SAE J1939.

- Off: RV-C
- On: SAE J1939

Additional Features

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 the trim pot setting. The dome/porch light is deactivated with starting the engine or locking the entry doors.

e-*PAD* Anti-tamper Deactivating Feature

After repeated attempts to enter correct code (20 button presses without enabling), the keypad enters an inactive mode that disables buttons for 1 minute. This helps prevent undesired access by entering random codes. No beep will sound with button press while the system is disabled.

e-*Grab* Handle Lighting

The grab handle is lit continuously. The **e-*PAD*** back lighting is lit with a button press and while training new access and authority codes.

Trim Pot Variable Resistor

The trim pot provides adjustable settings for timed outputs. Clockwise rotation increases activation time.

- Dome/porch light activation (5-60 second range).
- Auxiliary 1 output (0.5-5.0 minute range).
- Auxiliary 2 compartment lighting output (0.5-5.0 minute range).

Note:

- Trim pot setting is updated every 30 seconds.
- Trim pot adjustment may not be observed immediately.

Status LED

LED flashes at power-up and can provide other troubleshooting diagnostics codes.

e-*ASK* Doorbell Mode

The following procedure turns the keypad doorbell mode on or off. The factory default is doorbell mode off.

1. Ground the yellow wire. The buzzer sounds for 3 seconds and the keypad backlights will flash.
2. Press and hold the (5 / 6) (3) button for 5 seconds. The keypad will chirp.
3. Press the (9 / 0) (doorbell) button to activate doorbell mode or press the (1 / 2) (1) to deactivate doorbell mode.
4. A single chirp sounds followed by 1 beep for standard mode activated and 2 beeps for doorbell mode activated.
5. If a Tri*Mark* vehicle I/O module is recognized on the CAN network, it will be automatically updated to doorbell mode.

Miscellaneous I/O Module Features

Door Locking and Unlocking

A pulse output provides locking and unlocking operation to the entry doors and the compartment doors (banks A-D). The locking and unlocking pulses have opposite polarities. Locking and unlocking operations are activated via **e-*PAD***, **e-*FOB,*** and vehicle switch inputs.

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 while engine is running.

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

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.

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, or by grounding the extra security input.

The extra security input could be connected to a 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.

The following table describes audio/visual activations at various conditions in **standard mode**.

Outputs	Unlock Confirmation	Lock 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

The following table describes audio/visual activations at various conditions in **cargo mode**.

Outputs	Single Lock Confirmation	All Lock 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

Timed Dome/Porch Light Activation
The dome/porch light is activated upon pressing any keypad button or by unlocking entry door via **e-*FOB*** transmitter. The activation duration is controlled via trim pot. Starting the engine or locking the doors deactivates the light.

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 1 Output Activation
Standard Mode: With proper wiring and system configuration, Aux 1 output can be activated with ❀ Button on **e-*FOB*** transmitter, via keypad, or toggled with vehicle switch. The activation duration is controlled via potentiometer. Starting the engine deactivates the output.

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 2nd option requires access to the module. Up to (10)

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.

Note:

- 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. Putting the module into train mode erases all previous FOBs.

Teaching Keypad New Authority / Access Codes

When you assign a new authority code, you delete the existing authority code and all access codes.

Note: The authority code you assign following these instructions also becomes an access code saved to the (1 / 2) (1) button.

1. Connect yellow learn wire of keypad to ground. There will be three-second beep.
2. Enter a new five-digit code—this will be your access and authority code.
3. Enter the new code again.
4. The code is stored in position one.

Note: The existing code will only be erased if a new code is assigned.

Important: Authority and access codes should not be the same. If someone figures out an access code and discovers it to be an authority code as well, they can then create their own access code and gain entrance to your vehicle.

The authority code should be changed from the default when the vehicle is sold. All keypads are shipped with the same default code.

Note:

- 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 (unlock doors) it is only used to assign access codes.

The following area can be used to document the authority code:

Authority Code				
Digit 1	**Digit 2**	**Digit 3**	**Digit 4**	**Digit 5**

Assign New Access Codes

With a valid authority code (see page 2 or 11), an access code can be programmed with the following instructions.

1. Press the (5 / 6) (3) button for 5 seconds, the keypad will beep. The backlighting LED of the keypad will flash indicating the **e-*PAD*** learn mode.
2. Enter in the 5-digit authority code. Keypad will provide a long beep that will stop after you have defined an access number.
3. Press and release the button that corresponds to the access number. For example, press (1 / 2) (1) button for access #1 and press (3 / 4) (2) button for access #2. During this activity you are defining 1 of 5 (4) access numbers. A subsequent code will be assigned to this access #. The keypad will provide a confirmation beep after this single button press.
4. Enter in your new 5-digit access code. The keypad will provide three confirmation beeps.
5. Re-enter new access code. The keypad will provide four confirmation beeps.

Repeat process to assign additional access codes.

Up to 5 (4) different access codes can be assigned at one time. As additional access codes are defined, pre-existing access codes are overwritten. For example, if a new access code is assigned for access #3, the previous access #3 code is no longer valid.

The following area can be used to document the access code assignments.

Access #	User Name	Digit 1	Digit 2	Digit 3	Digit 4	Digit 5
1						
2						
3						
4						
5						

Troubleshooting

CAN Error Diagnostic Codes:
Similar codes are used with CAN vehicle module and CAN keypad. The keypad uses back lighting and buzzer for communicating codes while the vehicle module uses D16 and D17 LEDs.

1. At power up the CAN module will attempt to claim its address on the CAN bus. After this, it turns on both LEDs for 1 second.

   This “long blink" of the LEDs communicates a CPU reset and why:
   - One 1 second blink = normal power on
   - Two 1 second blinks = watchdog timer reset the CPU (this indicates a software bug)
   - Three 1 second blinks = brownout reset. The power supply fell below the 2.0V requirement.

2. After the long blinks, a series of "short blinks" indicate other errors that may have occurred:
   - Two short blinks = CAN bus error. This means there is an electrical problem with the CAN bus (possibly a problem with bus termination), or simply that the I/O module is the only node attached to the bus. If the I/O module is the only CAN unit on the network, the CAN communication must be disabled.
   - Three short blinks = the I/O module couldn't claim its CAN address. This is probably because another I/O module on the bus is set to the same function instance. This is considered a fatal error so the I/O module will reset itself and try again.

3. The keypad either provides one long beep followed by two(2) short beeps or five(5) short beeps followed by a pause to indicate a CAN bus error.

Disable CAN Communication (module):

1. Disconnect power from module.
2. Move dipswitches 4-6 to ON position.
3. Connect CAN-H to GND and CAN-L to +12V.
4. Power up system.
5. LED will light for 5 seconds and go off.
6. Disconnect power from module and CAN-H and CAN-L.
7. Move dipswitches 4-6 back to their original position.
8. Power up module.

Note:

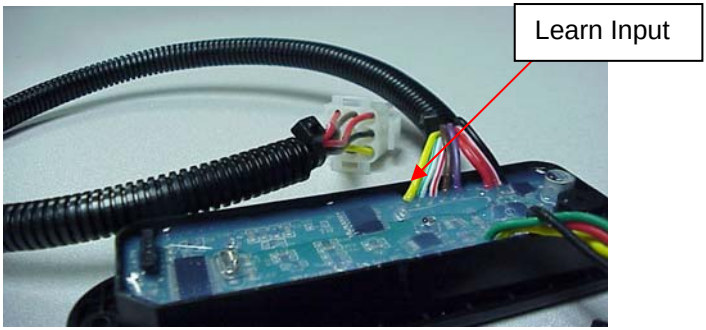
- If the module is powered up while DIP switches 4-6 are ON, CAN communication is enabled.
- If new FOBs are trained to a CAN-disabled module, the module must be CAN-disabled again after the FOB train process is complete.

Disable CAN Communication (keypad):

1. Disconnect power from keypad.
2. Connect yellow wire to GND.
3. Connect CAN-H to GND and CAN-L to +12V.
4. Power up system.
5. Keypad will beep 5 seconds and then provide 5 short beeps.
6. Disconnect power from keypad and CAN-H and CAN-L.
7. Disconnect yellow wire from GND.
8. Power up keypad.

Setting CAN Keypad Function Instance (location):
The following procedure sets the keypad's CAN address and identifies the keypad's location within the vehicle. Each keypad installed in a vehicle must have a unique location. The default function instance is 0. The procedure for assigning keypad function instance follows:

1. Ground the learn mode input (yellow wire). AMP connector housing location 9 or loose. The buzzer will sound for 3 seconds and the keypad backlights will flash continuously ½ second on, ½ second off (note: backlighting can only be seen when dark). Double beeps are provided upon any button press while in learn mode.



2. Press and hold the (1 / 2) (1) button for 5 seconds. The keypad will sound a beep.
3. Next press button to indicate which function instance this keypad should be assigned:

   (1 / 2) (1) = function instance 0 = Driver's side
   (3 / 4) (2) = function instance 1 = Passenger's side
   (5 / 6) (3) = function instance 2 = 3rd keypad
   (7 / 8) (4) = function instance 3 = 4th keypad
   (9 / 0) (DB) = function instance 4 = 5th keypad

Note: This step must be completed within 10 seconds.

4. Single beep sounds to confirm function instance change. Then number of beeps are played indicating which function instance is stored. E.g. 1 beep for function instance 0, 2 beeps for function instance 1...5 beeps for function instance 4.
5. The keypad then resets out of learn mode. The CAN address will be claimed with the new function instance.

Problem Description	Possible Solution
e-*FOB* Hints	
Button press does not provide correct operation	Verify power to the I/O module and RF receiver.
	Re-teach the FOB transmitter to the receiver. Ensure that only Lock button is pressed while in learn mode.
No operation or intermittent operation	Mount 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 power to the I/O module.
	Verify that keypad cable is connected. (rest of system will function)
Access code is not recognized	Verify that code has not been changed. Reassign keypad with instructions starting on pages 11-12.
	Confirm use of an access code, not the authority code.
Key FOB works correctly, keypad beeps, but no output	Cycle power to I/O module
Unexpected, secure operation occurs	Verify DIP switches are set to correct configuration setting.

e-*ASK* I/O Module Hints	
No response in any system element	Verify power to the I/O module.
Lights and panic mode do not turn off with ignition start	Verify that ignition input is wired properly.
Output relay latches on or off	Verify that power to relay comes from external relay power pin.
	Cycle power to system. If condition continues, replace relay.

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: Drawing and Wiring Tables

The following tables and diagrams are provided to show connector and pin assignments for the **e-*ASK*** CAN Multiplex system.

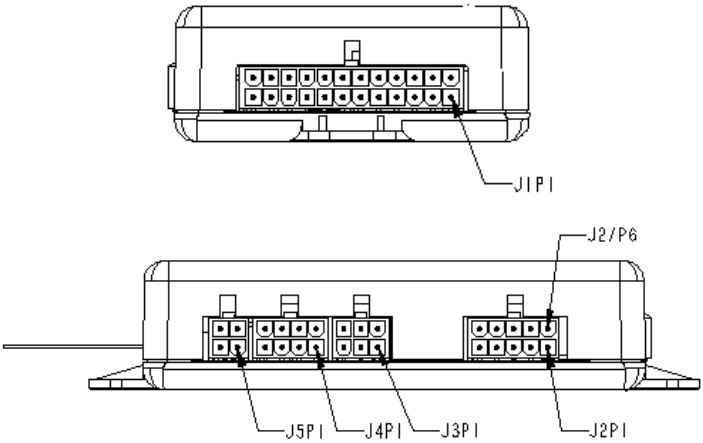


Table 1: Connector and Pin Information

Connector	Mating Connector	Mating Terminal
J1	AMP 2-106527-4	AMP 106529-2
J2	AMP 1-106527-0	
J3	AMP 106527-6	
J4	AMP 106527-8	
J5	AMP 106527-4	

Function	Pin Location
J1 Connector	
Bank C-D Unlock Input (GND)	1
Bank A-B Unlock Input (GND)	2
Compartment Door Ajar Input (GND)	3
Ground	4
Bank D Lock (Relay 30A)	5
Bank D Unlock (Relay 30A)	6
Vehicle Power	7
Unlock Entry Output (Relay 30A)	8
Unlock Entry Input (Gnd)	9
Unlock All Input (Gnd)	10
Lock All Input (Gnd)	11
Lock Entry Input (Gnd)	12
Security Input (Gnd)	13
Unassigned	14
Unassigned	15
Ground	16
Bank D Lock (Relay 30A)	17
Bank D Unlock (Relay 30A)	18
Vehicle Power	19
CAN High	20
Lock Entry Output (Relay 30A)	21
CAN Low	22
Entry Door Ajar Input (Gnd)	23
Dome Light Output (2A Gnd)	24
J2 Connector	
Vehicle Power	1
Unassigned	2
Unassigned	3
Key Inserted Input (See J2P7)	4
Unassigned	5
Ground	6
Ign/Key Input Polarity/Common	7
Ignition Input (See J2P7)	8
Unassigned	9
Ground	10

Function	Pin Location
J3 Connector	
Bank C Lock (Relay 25A)	1
Bank B Lock (Relay 25A)	2
Bank A Unlock (Relay 25A)	3
Bank B Unlock (Relay 25A)	4
Bank C Unlock (Relay 25A)	5
Bank A Lock (Relay 25A)	6
J4 Connector 7	
External Relay Power (+12V)	1
Horn Output (-500 mA)	2
Headlight Output (-500 mA)	3
Auxiliary 1 Output (-500 mA)	4
Compartment Lights Output (-500 mA)	5
Door Ajar Output (-500 mA)	6
Siren Output (-500 mA)	7
Unassigned	8
J5 Connector	
Keypad Power (Does not power relays)	1
CAN Low	2
Ground	3
CAN High	4

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