

TCSM PART NUMBERS COMPLEXITY

PROGRAMS	RECEIVER	PCB	RF SIP	NO. OF RELAYS	PRT BD ASSY	HOUSING
UN93/173 Expedition/Navigator	1L1T-15K602-A_	1L2F-14A608-SE	YC3F-14B115-AB	5	1L2F-14B115-N_	F77F-14B128-DB
PN96/225 F150, F250	1L3T-15K602-A_			3	1L2F-14B115-P_	
CAL-1 Blackwood	1L1T-15K602-A_ <i>SAME AS UN93/173</i>			5	1L2F-14B115-N_	
U/P207 Explorer Sport Trac	1L2T-15K602-A_			3	1L2F-14B115-P_	1L2F-14B128-AA (Integrated)
PN150 Ranger CC	1L2T-15K602-C_			5	1L2F-14B115-N_	



Functional Description of the Truck Central Security Module (TCSM)

I. Review of System Features:

The Remote Keyless Entry system (RKE) consists of one Truck Central Security Module (TCSM), one to four transmitters assembly (TX) and one keypad. TCSM is a standalone receiver and is a device that provides the customer the convenience of remote entry through the use of a transmitter, keyless entry through the use of a keypad, illuminated entry systems and battery saver. TCSM also designed with Perimeter Anti-Theft to provide security to the customer.

The TX sends command signals to the TCSM as an encrypted RF signal using SHARK protocol (Standard High Performance Architecture). The data transmitted on a single channel containing digital information at the frequency $F \pm 310\text{KHZ}$, the transmitter signal is Amplitude Modulation (ASK) with the bandwidth of 4KHZ, containing 99% of the digital signal and has a 2K Baud rate. When one button from the TX is pressed, minimum of 4 to be transmitted and if a button is continuously pressed, the same data to be transmitted up to 50 data packets maximum. Generally, each packet will include Transmitter Identification Code (TIC) and Rolling Code. When the data transmission is completed, last Counter will be stored in the build-in EEPROM of the TX as well as in the TCSM.

The TCSM normally is in Sleep mode, wakes up when receiving incoming signals, check received signals then goes back to sleep again. If a valid signal received, TCSM will check incoming TIC against the stored TIC, if it is correct the Command to be processed otherwise, the TCSM goes to Sleep mode. The processor in TCSM is the heart to cause all the vehicle subsystems to function when the processor is directed to do so by the TX, by keypad or by various vehicle switch inputs.

The RKE systems functions include:

1. **REMOTE ENTRY:** by using Transmitter, new RKE system is designed to function with ignition key ON or OFF except Panic Alarm that functions with ignition key OFF only. With the Transmitter, user can:

Unlocking the doors

Press Unlock control button to unlock the driver's door. The interior lamps will illuminate.
Press the control a second time within three seconds to unlock all doors.

Locking the doors

Press Lock control button to lock all doors if doors are close.
Press the Lock control second time within five seconds to confirm all doors are closed and locked. If all doors are close and the doors will lock again, the horn will chirp and the lamps will flash.
If any door is ajar, the horn will make two quick chirps, reminding to properly close all doors.

Sounding a panic alarm

Press Panic control button to activate the alarm. To deactivate the alarm, press the control again or turn the ignition to ON. Panic alarm will only operate with the ignition key in the OFF position.

Open Trunk Lid (if equipped):

Press Trunk control button to open the trunk lid if equipped.
The user should close trunk lid manually.

Open & Close Toneau cover (if equipped):

Press Toneau Open control button to open the cover

Press the Toneau Close control button to close the cover

For safety purpose, the cover motor controller has been designed so that the Toneau cover is unable operated during the vehicle is moving.

Illuminate Entry: (interface with GEM module)

- Unlock by keyfob or keypad: illuminate for 25 seconds (200ms)
- Panic by keyfob: illuminate stay ON for 2 minutes and 45 seconds
- Turn Off illumination if Lock or ignition key to Run/Start in 300ms
- Send Lock Sense Wake Up pulse when power door lock switch is pressed

The interior lights will not turn off if they have been turned ON with the dimmer control or any door is open.

Battery Saver: The battery saver will shut off the interior lamps in 25 seconds after the ignition has been turned to the OFF position.

2. **KEYLESS ENTRY:** by using Keypad, the keypad can be analog or digital technology, the user can:

- Lock or unlock the vehicle doors without using the key
- Release or unlock Trunk/Liftgate
- Enable or disable autolock feature
- Arm or disarm anti-theft system
- Program user personal code
- Anti-scan
- Keypad illumination

Locking the doors with the keyless entry system:

To lock all the doors, press 7/8 and 9/0 at the same time. It is not necessary to enter the keypad code.

Unlocking the doors with the keyless entry system:

To unlock the driver's door, enter either the factory-set code or personal code (each digit pressed within five seconds of the prior digit). The interior lamps will illuminate.

To unlock all doors, enter the factory-set code or personal code and press the 3/4 control within five seconds.

Autolock:

The autolock feature will lock all of the vehicle doors when all below conditions were met:

- Doors are closed
- Ignition key is in the ON position
- Shift into or through R (reverse)
- Brake pedal is released

The autolock feature repeats when:

- Any door is opened then closed while the engine is running and
- Put the vehicle in motion by releasing the brake pedal

Deactivating autolock:

Before following the activation or deactivation procedures, make sure that the ignition is OFF and all vehicle doors are closed.

1. Enter the 5 digit entry code
2. Press and hold the 7/8 control
3. Press and release the 3/4 control while holding the 7/8 control
4. Release the 7/8 control

The horn will chirp once if autolock was deactivated or twice (one short and one long chirp) if autolock was activated.

Reactivating autolock:

To reactivate autolock, repeat steps 1 through 3 above. Autolock can also be activated or deactivated with the power door lock control using the following procedure:

User must complete steps 1 through 5 within 30 seconds or the procedure will have to be repeated. If the procedure needs to be repeated, you must wait 30 seconds.

1. Turn the ignition key from OFF to ON
2. Press the power door UNLOCK control three times
3. Turn the ignition key from ON to OFF
4. Press the power door UNLOCK control three times
5. Turn the ignition key from OFF to ON. A horn chirp indicates the enable/disable feature is entered.
6. Press the power door UNLOCK control one time
7. Press the power door LOCK control to toggle the Autolock/Relock state. You will receive a horn chirp followed by either a long honk, autolock/relock is enabled, or no honk, autolock/relock is disabled
8. Turn ignition to OFF.

If autolock/relock has been changed, the horn will chirp to confirm procedure is complete

Programming personal entry code:

1. Enter the factory-set code (keypad will illuminate when pressed)
2. Press the 1/2 control within five seconds of step 1.
3. Enter your personal 5 digit code.

Enter each digit within five seconds of the previous one.

Personal code does not replace the permanent code that provided by manufacturer. User can use either code to unlock the vehicle. If a second personal code is entered, the module will erase the first personal code in favor of the new code.

Erasing personal entry code:

If user wishes to erase personal code, use the following instructions:

1. Enter the factory-set code.
2. Press and hold 1/2 for two seconds within five seconds of step 1. The system will now only respond to the factory-set code.

Anti-scan feature:

The keyless entry pad is disabled for 1 minute after 7 unsuccessful attempts at entering a valid key code. The keypad will flash during this 1 minute mode. However, the 7/8 and 9/0 controls will still lock the vehicle.

Anti-scan will turned off after:

- One minute of keypad inactivity
- Keyfob UNLOCK button is pressed
- Ignition key is turned to the Run/Start position

3. PERIMETER ANTI THEFT:

- **Pre-Arm:** All doors must be closed by either by transmitter, keypad or trim switch, stay in pre-arm for 20 seconds before coming armed.
- **Arm:** All doors closed (pre-armed) after 20 seconds, system armed. If any door ajar, alarm will trigger.
- **Disarm:** System must be in armed or triggered state, system can be disarmed by either transmitter, keypad, trim switch or ignition switch.
- **Trigger:** System must have been in armed state. Alarm will trigger either by door ajar switch, trunk ajar switch or ignition switch (Europe only)
- **Turn OFF trigger Alarm:** by all disarm methods above or use panic button and return vehicle to armed state

II. Characteristic Description:

The TCSM shall be demonstrated over an ambient temperature of -40°C to 85°C and a voltage range of 9.0 to 16.0 volts DC unless otherwise specified.

- **TCSM Parameters -**

Operating Voltage	9VDC to 16VDC
Operating Temp Range	-40°C to +85°C
Dark Current Draw	< 5.0mA – current TCSM 4.9mA
Max Current Draw	130mA
Operating Frequency	315MHz $\pm$ 310KHz
- **Transmitter -**

Carrier Frequency	315MHz $\pm$ 310KHz
Max Field Strength	75dBuV/m @3m
Min Field Strength	71dBuV/m @3m, 66dBuV/m @ -40°C
Battery Life	2 years