MXT141 Manual

Confidentiality Terms

Update Log

Date	Version	Description	Author
2012/05/30	1.0	Initial Version	Marcus Vinícius
2012/05/31	1.1	Update // Output 1	Marcus Vinícius

Summary

Illustrated Summary

Introduction 1

The MXT141 is an excellent electronic automobile device, which main feature is tracking. It is responsible for reading and processing information from vehicle, also provides the communication interface with application from Tracking Central.

It is equipped with a GPS receiver that reads each fraction of seconds, all information of positioning, time zone, displacement, direction and vehicle speed.

MXT141 also reads the ignition status, panic sensor and odometer information, other internal sensors and power supply.

The online structure of communication between MXT141 and Tracking Central, is based on GSM/GPRS technology.

Specs 2

Picture 1: Frontal View

Picture 2 Upper View

Hardware Specs

MXT141 provides a few basic features distinct:

- Tracking: The coordinates are obtained by internal GPS receiver and sent to Central via GSM/GPRS modem.
- IP-67: Water proof and Dust proof.
- Position log (10.000);
- GSM Jamming detection;
- SIM Card protection;
- Flash memory storage up to 2000 Way Points;
- Operating temperature: -40 to +85°C;
- Dimensions: 80.6 X 40.6 X 20.94 mm.

GSM/GPRS Communication

- Quad-Band (850/900/1800/1900 MHz) GSM/GPRS modem;
- 32 bits 156 MHz ARM926EJ-S;
- Stack TCP/UDP;
- GPRS Connectivity: Mobile station class B, multi-slot class 10;
- Communication link is maintained even if the main power is down (with internal backup battery of vehicle);
- Automobile temperature scale;
- Internal GSM Antenna.

GPS

- Internal GPS Antenna short-circuit and open-circuit detection;
- High sensitivity GPS (-160 dBm tracking, -144 dBm acquisition);
- 20 parallel channels (up to 42);
- Hot start < 1S (open sky) @ -130 dBm signal level;
- Cold start < 38S (open sky) @ -130 dBm signal level;
- Position accuracy < 5 m (RMS value) @ -135 dBm (outdoor) signal level.

Internal Battery

- Rated Voltage: 3.7V
- Capacity: 850 mAh;
- Battery fault detection;
- Operating Temperature Range/Humidity: for Charge 0 ~ +45℃ 45-85% RH, for Discharge -20 ~ +60℃ 45-85% RH;
- Over Charge Prohibition: Shut down the circuitry and stop charge if the battery's voltage exceeds more than 4.325±0.025V momentarily or continuously.
- Over Charge Release: If the battery voltage is less than: 4.075±0.025V prohibition mode would be "Reset" and "Start reload".
- Over Discharge Prohibition: Shut down circuitry and stop discharge if the voltage becomes less than 2.5±0.05V momentary or continuously.
- Over Discharge Release: Recover when the voltage reaches above: 2.9±0.05 V.
- Short circuit protection: When protection IC detects the voltage drop on MOS exceeds the specified voltage (0.8 V(min.), 1.1 V(typ.), 1.4 V(max.)), it shall shut the circuit and stop discharge;
- Charging Thermal Regulation Prevents Overheating: Charging is suspended when the battery pack temperature is over +50℃.

I/Os

- RS-232 UART Interface up to 921.6Kbps;
- 2 Digital Inputs including Ignition and Panic;
- 1 Digital Output high side up to 250mA.

Power Supply

- 6.5~48V DC input voltage range;
- 174Vpk @ 350ms Load dump Protection;
- -600V Reverse Protection;
- 1.4mA MAX sleep current @ +12V;

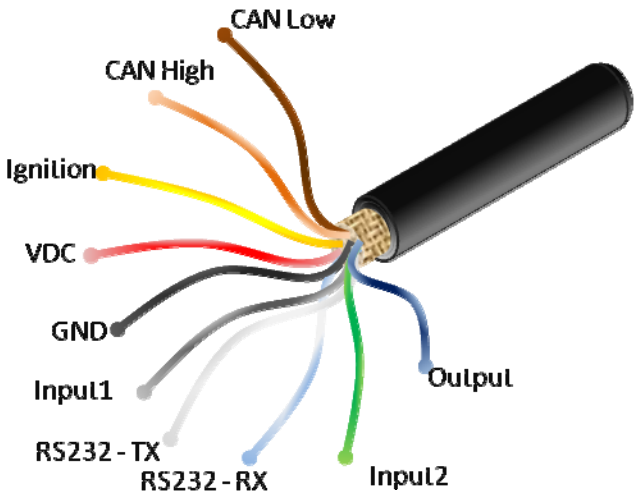
Pins

Picture 3: Internal Connector

Pin	Function	Specs
1	VCC	6,5~48V
2	GND	-
3	Ignition	VCC
4	Input 1	GND
5	Input 2 / Odometer*	Analog/Digital
6	Output 1	GND (up to 250mA)
7	RS232 - TX	-
8	RS232 – RX	-
9	CAN High	-
10	CAN Low	-

*Odometer or analog input for MXT141, and VCC input for MXT140.

Table 1: MXT141 Pins

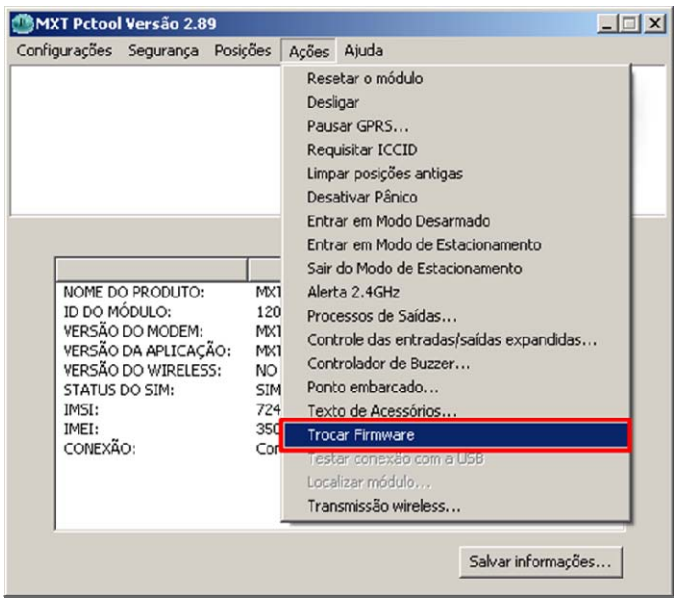


Picture 4: Color cable description

Firmware Update

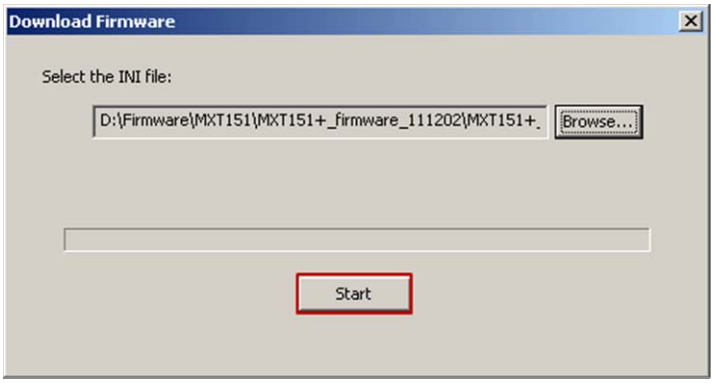
Regularly, Maxtrack support team will available updates from every Maxtrack device, on website http://suporte.maxtrack.com.br. To update the MXT 151+ firmware, do the follow:

1. Plug MXT to PC through mini-USB port;
2. After download the firmware file from Maxtrack Support website, unpack it on PC;
3. Open MXT PCtool > “Actions” > “Firmware Download”;



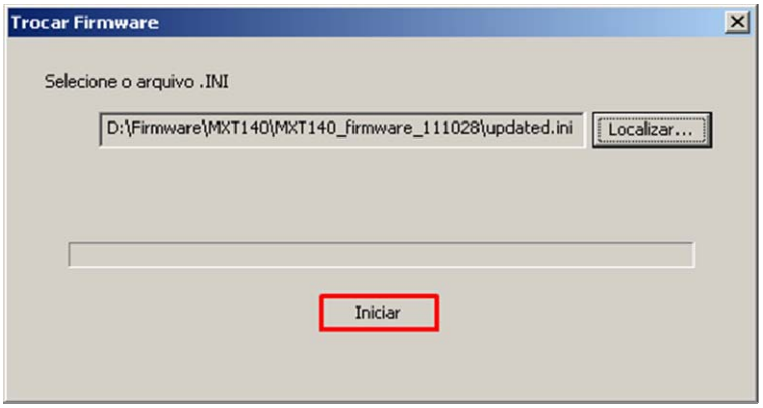
Picture 5: Firmware Update > Actions

4. Click on “Browse” > select “updated.ini” file and click on “Open”;



Picture 6: Firmware Update > Browse

5. Click on “Start” button and wait the end of process to restart the device;



Picture 7: Firmware Update > Start process

6. At the end of process, restart device.

Anti-theft

MXT141 has an Anti-theft system which inhibits thieves' actions. With this device, all output can be activated when vehicle is turned off. E.g.: If the output is connected to electronic actuators like block system, buzzer or luminous alert, they can be activated, i.e., vehicle blocked and alerts started.

General Settings

The setup of the Anti-theft system can be accessed on MXT PCtool > "Configurations" > sheet "Anti-theft". When configured properly, the Anti-theft function will take MXT141 through the four different states:

- *Normal*: (output disabled). Anti-theft system waiting the status exchange from any monitored items. Anti-theft system takes on this status after be deactivated by driver or Control Center;
- *Armed*: (output disabled). Takes on this status after driver action on vehicle (turn off ignition, open and close door, or even move with ignition turned off). Anti-theft system waits the status exchange of ignition, door or G-Sensor to be alarmed;
- *Alarmed*: (output activated). Takes on this status when driver does not disable the Anti-theft system after turn on ignition, move with ignition turned on or even after open and close the door;
- *Suspended*: (output deactivated). When Parking Mode is configured, Anti-theft can be suspended by driver or Control Center. When it is suspended, MXT141 activates the Parking Mode so it does not exchange its status to another. Anti-theft system leaves Parking Mode after receives a command from driver or Control Center.

	The exchange, to any status above, depends on the setup of MXT141 via MXT PCtool > "Configurations" > sheet "Anti-theft".

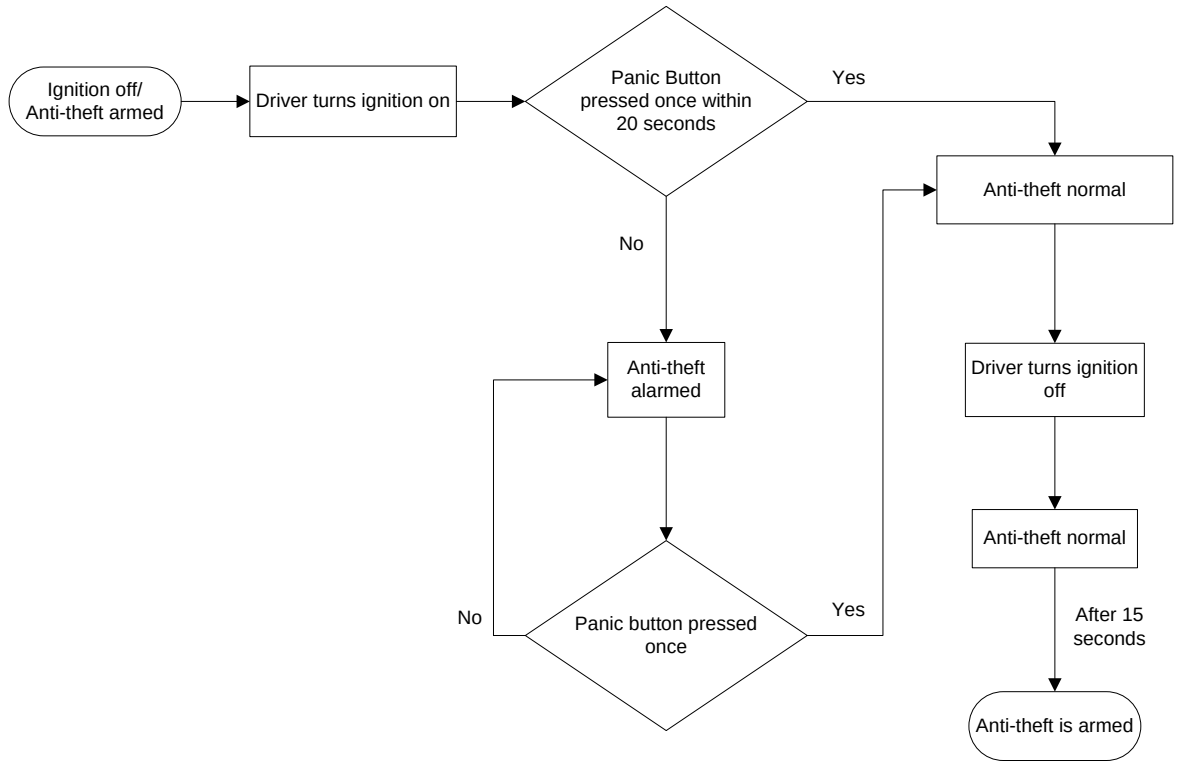
Anti-theft settings

The field “Enable Anti-theft” makes the device check continually the status of ignition to be activated. Depending on the time setted in the field “Alarmed mode Timer” after the ignition be turned on again, the status of Anti-theft system will change from “Armed” to “Alarmed”.

As soon as the ignition is turned on, the Panic Button must be pressed within 20 seconds (*) after, otherwise, all outputs will be activated and its status will change to “Alarmed”.

The Anti-theft system can be disarmed at anytime by pressing the panic Button (Driver Identifier or Input 1).

(*) The timer to enter on Alarmed mode can be setted on the field “Alarmed Mode Timer”.



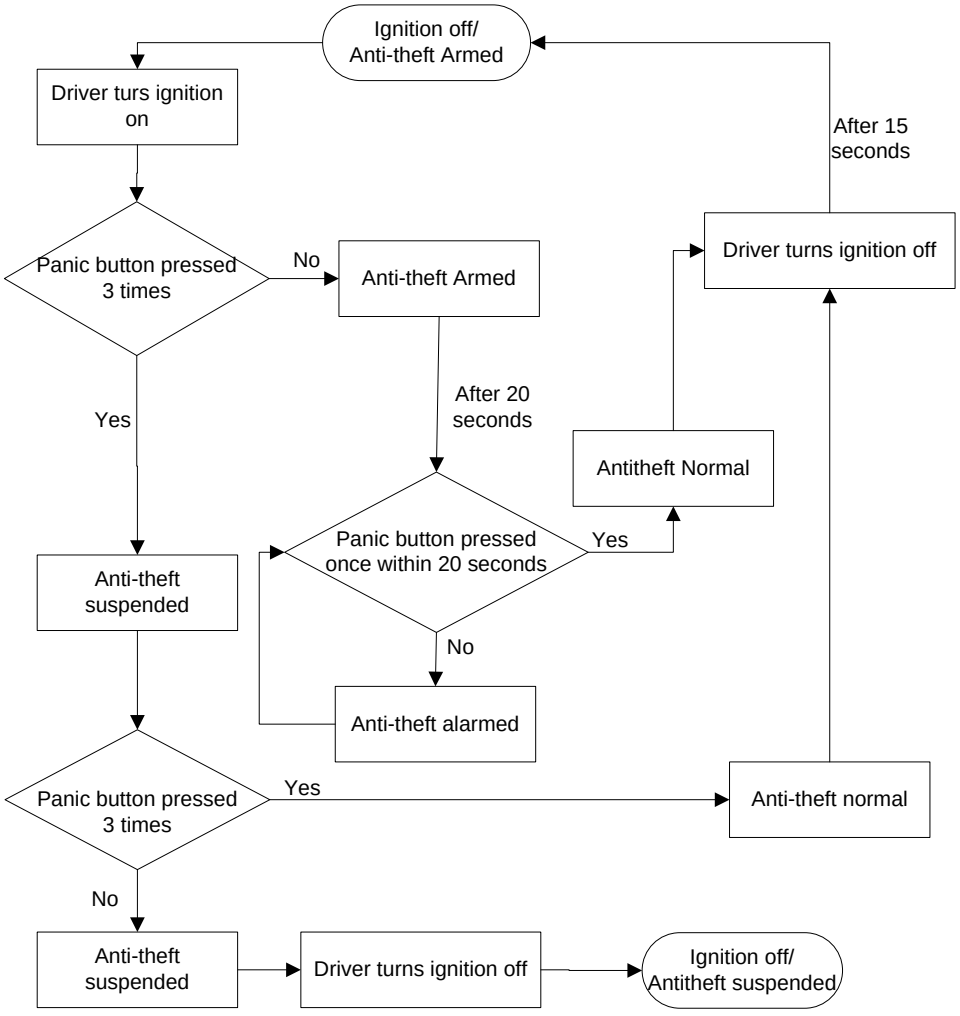
Picture 8: Anti-theft flow diagram

	To use all functions related to Anti-theft system, the filed “Enable Anti-theft” must be activated.

Local Parking settings

The field “Enable Local Parking” allows the status of Anti-theft system changes to “Suspended” when driver need to turn off the vehicle without activating the Anti-theft system.

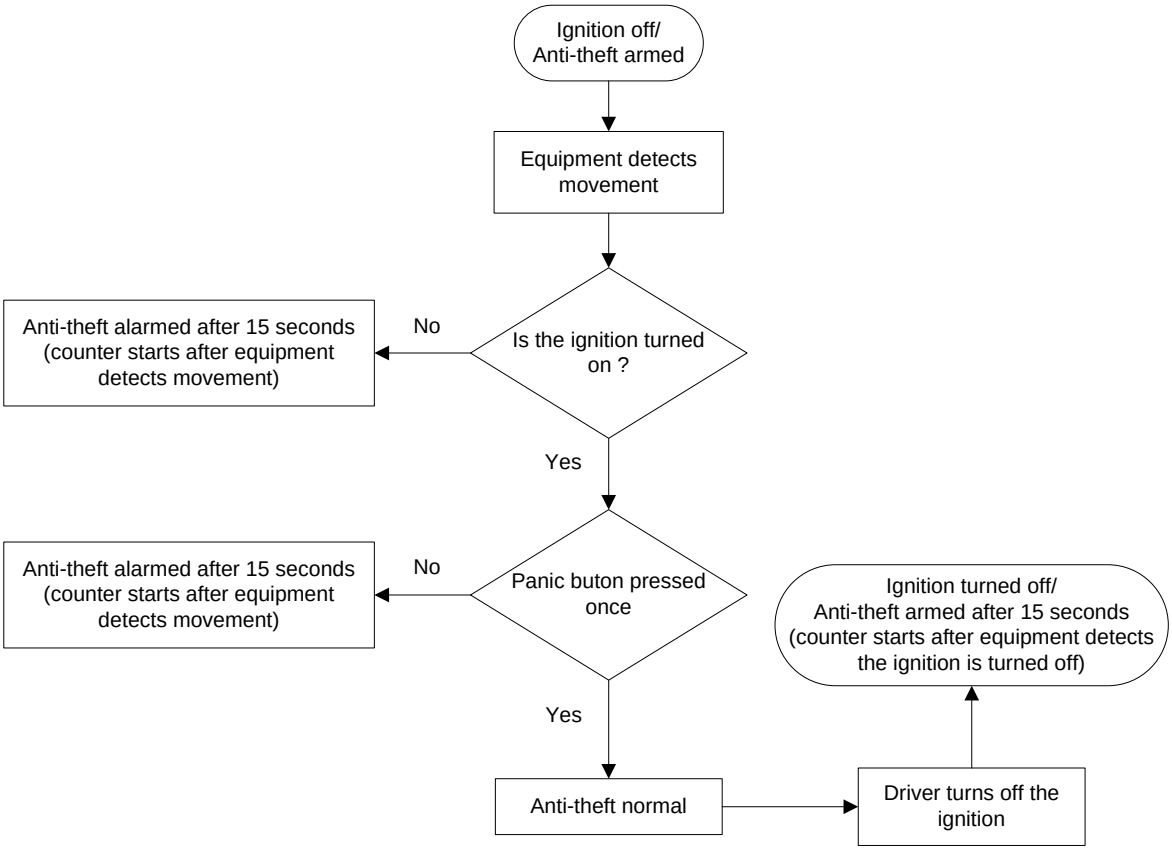
After be configured to enter on Local Parking, to disable the Anti-theft, the driver must press the panic button three times with ignition on. The Anti-theft system will have its status changed to “Suspended”. When on this status, even if ignition be turned on, the Anti-theft system will not have any effect on MXT141. To exchange Anti-theft system to “Normal” mode, the driver must press the panic button three times with ignition on.



Picture 9: Anti-theft flow diagram > Parking mode

Moving trigger alarm

This option allows the status of Anti-theft system be exchanged to “Alarmed” by detecting movement with ignition off. It is not necessary using sensors, because the detection is made by G-Sensor.



Picture 10: Anti-theft flow diagram > Moving trigger alarm

Output Settings

By default, the Anti-theft system activates all outputs when it is alarmed. However, it is possible to mask one or more outputs to make MXT141, activate only the one which was not masked.

The fields “Output 1 mask” are used to mask the outputs of MXT141, when they are setted as “True”. So, only the output setted as “False” will be activated when the status of Anti-theft system exchanges to “Alarmed”.

Communication 4

GPRS Communication

All information collected by MXT141 is sent in datagram to a Web Server via GPRS. These datagram has:

- Geographic Coordinates from vehicle location;
- I/Os status;
- Information of RPM, Odometer, Panic Button, etc.

To make information be received by Web Server is necessary the device be connected to a GSM Provider that will forward data through internet to the server setted on device. This setting is made on MXT PCTool Software, and it is used to setup the device information and the way it works.

RS 232 Communication

MXT141 can be connected through serial port of PC for setup, firmware update and reading of positions with MXT PCtool, delivered by Maxtrack. More information about MXT PCtool is available on its Software Manual.

SMS Communication

Besides the GPRS communication with the server, MXT family equipments can exchange information with a cell phone through SMS. On this mode, it can send regular information captured by the GPS, equipment status information, GPRS and GPS network information, along with text messages to the control center. It can also receive commands send as SMS from a cell phone.

Settings to SMS Communication

The SMS Communication setup is made on MXT PCtool > “Configuration” > sheet “SMS”. When setted, MXT141 will send messages to a cell phone with GPRS Sending Interval configured on “Configurations” sheet “Positions Packets Sending”. E.g.: if the field “Sending Interval in Stopped” is setted with value 30, each 30seconds the MXT141 will send a SMS.

- *Alias Name*: Name that will be shown as a sender on each message sent from MXT141. It is useful to identify the equipment or vehicle on the moment the message was received;
- *Destination Number*: Phone number to which the MXT141 will send its SMS messages. The area code must be inserted in front of the local number;
- *Send Packet Mode*:
    - *NOT Send*: MXT141 Will not send SMS to any number;
    - *Send when no GPRS*: MXT141 will send SMS to the number previously set whenever there is no GPRS signal;
    - *Always Send*: MXT141 will send a SMS to the number previously set whenever it accomplishes a GPRS transmission.
- *Allow Number Mode*: Phone numbers allowed making calls to this device.
    - *All*: MXT141 will accept incoming calls and messages from any phone number;
    - *Destination Only*: Only the number registered as destination number will be able to make voice calls or send SMS to this device.
- *Maximum Sent Value*: Total number of messages that could be sent by MXT141;
- *Sending Interval*: Interval (in seconds) of SMS packets sent by MXT141;
- *Panic or Alert Number*: Each field stores a number which used by MXT to send packets positions when panic activate.
    - *Alert 1*: First number to send by SMS on Panic;
    - *Alert 2*: Second number to send by SMS on Panic;
    - *Alert 3*: Third number to send by SMS on Panic.

Information exchange with equipment

After setting the equipment, it will be ready to send information through SMS and receive commands through text messages.

SMS contents

The messages sent from the equipment will contain the following information:

- *Alias*: Text defined on “Alias”;
- *Equipment ID*;
- *Communication Protocol*: Current communication protocol;
- *Date*: Date the data was stored in memory;
- *Hour*: Time the data was stored in memory;
- *Latitude*;
- *Longitude*;
- *Speed*;

- *Direction*: N-North, NE-Northeast, E-East, SE-Southeast, S-South, SW-Southwest, W-west, NW-Northwest;
- *fix*: GPS signal status: (1 – fix, 0 – invalid);
- *mov*: Movement indication. (0 – Not moving, 1 – Moving);
- *pwr*: Power supply usage (0 – Internal Battery, 1 – External Battery);
- *Ant: GPS Antenna Status*: (0 – Ok, 1 - Antenna Failure);
- *ign*: Ignition (0 – Off, 1 – On);
- *pan*: Panic alert (0 – Off, 1 – Triggered);
- *anti*: Anti-theft status: (0 – Normal, 1 – Armed, 2 – Suspended by User, 3 – Suspended by Panic, 4 – Alarmed);
- *inp*: Input Status: Input 1; Input 2 (States: 0 – Deactivated, 1 – Triggered);
- *out*: Output Status: (States: 0 – Deactivated, 1 – Triggered);
- *Cell ID*: Term used to describe a site where antennas and electronic communications equipment are placed, usually on a radio mast, tower or other high place, to create a cell in a cellular network;
- *MCC*: Mobile Country Code, for use in wireless telephone network station addressing;
- *MNC*: Mobile Network Code;
- *LAC*: Location Area Code.

Message example:

Plate 4343 MXT, 5243285,8,2009-09-11 15:03:04,-19.9340441,-43.949.131,0,E, fx1:1,mov:0, pwr:0,ant:0,ign:1,pan:0,anti:3,inp:0;0;0;0,out:0;0;0,7a4a,724,05,1f

Campo	Valor
Alias	*Plate 4343 MXT*
Equipment ID	*5243285*
Communication Protocol	*8*
Date	*2009-09-11*
Hour	*15:03:04*
Latitude	*-199.340.441*
Longitude	*-43.949.131*
Speed	*0*
Direction	*E (East)*
FX	*1 (Valid GPS)*
MOV	*0 (Device Stopped)*
PWR	*0 (Internal Battery)*
ANT	*Normal*
IGN	*On*
Anti	*Alarmed*
INP	*Deactivated*
OUT	*Deactivated*
Cell ID	*7a4a*

MCC	*724*
MNC	*05*
LAC	*1f (31 in decimal)*

Table 2: SMS > Contents

SMS Commands

To send commands to the equipment using SMS, the message must be typed following this arrangement:
SMS Password*, *Device ID*, *Command Code*, *Command Parameters

Each item must be separated by a comma ",". Some commands do not have parameters, such as request position or deactivate panic. On these cases, just suppress this field when typing the message.

SMS example to trigger output:

0000,6000001,5,1

Field	Value
SMS Password*	*0000*
Device ID	*6000001*
Command Code	*5 (trigger output)*
Command Parameters	*1 (activate)*

Table 3: SMS > Trigger Output

** The SMS Password is setted on MXT PCtool > "Security" > option "SMS Password". Also can be configured through a GPRS command via Arena Control Center, on "Commands Screen" > option "MXT" > "SMS" > "Change SMS Password".*

If any parameter is forgotten or not filled, it will be considered as 0 (zero) valued.

After each command, MXT151+ will answer to sender cell phone, and acknowledgment SMS (ACK) to confirm the message was received by MXT151+. This ACK has the following format:
Alias name, *Device ID*, *Received Command ID*.

Example of ACK sent by device:
Test Equipment,6000001,

Field	Value
Alias Name*	*Test Equipment*
Device ID	*6000001*
Command Code	*5*

Table 4: SMS > ACK sent by device

** Alias Name is the name which recipient can identify it. Can be configured on MXT PCtool > "Configurations" > sheet "SMS" > field "Alias name".*

Above, a list of commands which can be sent via SMS.to MXT151+. To all examples, the Device ID and Password used is 6000001 and 0000, respectively.

- Code 1: Request Position Packet;
- Code 2: Change GPRS Setup;
- Code 3: Change SMS Setup;
- Code 4: Change Accelerometer Setup;
- Code 5: Trigger Outputs;
- Code 6: Deactivate Panic State;
- Code 7: Request GPRS Position Packet;
- Code 9: Reset Device;
- Code 10: Request ICC/ID of SIM Card;
- Code 11: Request GPS Position Packet;
- Code 12: Activate Progressive Block;
- Code 13: Change Odometer;
- Code 14: Change Hourmeter.

Request Position Packet – Code 1

Parameters: No parameters;
Example:
0000,6000001,1.

After receiving this command, MXT141 will send to phone number (setted on MXT PCtool > "Configurations" > sheet "SMS" > field "Destination Number") a message with its position.

Change GPRS Setup- Code 2

Parameters:

Parameter	Value
Communication Protocol	*0 – UDP, 1 – TCP*
APN	*APN address from Provider*
User	*GPRS User from Provider*
Password	*GPRS Password from Provider*
Primary IP Address	*Primary's IP server address*
Primary IP Port	*Primary's IP server port*
Secondary IP Address	*Secondary's IP server address*
Secondary IP Port	*Secondary's IP server port*

Table 5: SMS > Change GPRS Setup

Example: SMS message to change GPRS setup.
0000,6000001,2,1,tim.com.br,tim,tim,200.251.188.130,3232,200.251.188.131,2323.

Change SMS Setup – Code 3

Parameters:

Parameter	Value
Alias Name	*Name in SMS header to identify the sender of message*
Destination Number	*Phone number of SMS receiver*
Allow Number Mode	*0 – Receives commands from any phone number* *1 – Receives commands only from Destination Number*
Send Packet Mode	*0 – Device will not send position packets* *1 – Device will send position packets only when no GPRS connection* *2 – Device will send position packets each transmission interval setted*

Table 6: SMS > Change SMS Setup

Example: SMS message to change SMS setup.
0000,6000001,3,MXT 140,03198765432,1,1.

Change Accelerometer Setup – Code 4

Parameters:

Parameter	Value
Sending Interval in Stopped	*Time in seconds*
Sending Interval in Moving	*Time in seconds*
Sending Interval in Panic	*Time in seconds*
Debounce Stopped	*Time in seconds*
Debounce Moving	*Time in seconds*
Detecting Interval	*Time in seconds*

Table 7: SMS > Change Accelerometer Setup

Example:
0000,6000001,4,10,10,10,1,5,10

Trigger Output – Code 5

Parameters:

Parameter	Value
Output 1	*0 – deactivate, 1 – trigger*

Table 8: SMS > Trigger Output

Example: SMS Message to trigger output 1.
0000,6000001,5,1

Deactivate Panic State – Code 6

Parameters: No parameter;
Example:
0000,6000001,7

Request GPRS Position Packet – Code 7

Parameters: No parameter;
Example:
0000,6000001,7

Obs.: This command makes MXT141 transmit via GPRS.

Reset Device – Code 9

Parameters: No parameter;
Example:
0000,6000001,9

Request ICC/ID of SIM Card – Code 10

Parameters: No parameter;
Example:
0000,6000001,10

Request GPS Position Packet – Code 11

Parameters: No parameter;
Example:
0000,6000001,11

Obs.: After receiving this command, MXT141 will answer a position String.
(alias),6000001,11,http://maps.google.com/maps?q=-19.952727,-44.149321

Activate Progressive Block – Code 12

Parameters: No parameter;
Example:
0000,6000001,12

Change Odometer – Code 13

Parameters

Parameter	Value
Value (in meters) to be setted on device	*from 0 to 4294967295*

Table 9: SMS > Change Odometer

Example: SMS Message to set odometer with 32 meters.
0000,6000001,13,32

Change Hourmeter – Code 14

Parameters:

Parameter	Value
Value (in hours) to be setted on device	*from 0 to 4294967295*

Table 10: SMS > Change Hourmeter

Example: SMS Message to set hourmeter with 21 hours.
0000,6000001,14,21

Transmission Events 5

Transmission Reasons

MXT141 notifies the reason of transmission on each packet sent. Listed on the table below, are the codes, regarding to each one of items that can perform an additional transmission by MXT141.

Code	Transmission Reason	Code	Transmission Reason
1	Device power on	35	Output 3 activated
2	GPRS first attached or reattached	36	Output 3 deactivated
3	Transmission interval stopped	37	Maximum speed exceeded
4	Transmission interval moving	38	Maximum speed OK (after a exceed event)
5	Transmission interval in panic	39	Entering waypoint
6	Some configuration changed (change transmission interval or modify position packet content)	40	Leaving waypoint
7	Server's requirement	41	Backup battery fail
8	Get GPS valid after transmission interval (on transmission interval the GPS does not fix)	42	Backup battery OK (after fail event)
9	Ignition on	43	Delivery fail
10	Ignition off	44	Require from SMS
11	Panic activated	45	Tampering is open
12	Panic deactivated	46	G-sensor rolling threshold reached
13	Input 1 activated	47	G-sensor side threshold reached
14	Input 1 opened	48	G-sensor shock threshold reached
15	Input 2 activated	49	GPS direction changed
16	Input 2 opened	50	On timer of SMS interval
17	Input 3 activated	51	Power off
18	Input 3 opened	52	Anti-theft enter normal from alarmed
19	Input 4 activated	53	GSM Jamming switches from NO to YES
20	Input 4 opened	54	GSM Jamming switches from YES to NO
21	Moving detect	55	Excessive RPM
22	Stopped detect	56	Excessive RPM on neutral
23	Anti-theft alarmed	57	Speeding on neutral
24	At least one accessories critical	58	GPS Failure
25	External power fail	59	Distance attached
26	External power ok	60	Power Fail and GPS Fail
27	GPS antenna fail	61	AGPS requires
28	GPS antenna OK	62	TAG accessories status changed from 1 to 0
29	2.4Ghz packet received	63	TAG accessories battery status changed

30	Entering sleep	**64**	Link broken
31	Output 1 activated	**65**	Expand input changed
32	Output 1 deactivated	**66**	TAG accessories status changed from 0 to 1
33	Output 2 activated		
34	Output 2 deactivated		

Table 11: Transmission Reasons

The events below can be selected (MXT PCtool > “Configurations” > “Select Events”) to make MXT141 perform an additional transmission when identified by device.

Code	Event	Device perform an additional transmission when
2	GPRS first attached or reattached	Obtain or recover GPRS signal
8	Get GPS valid after transmission interval (on transmission interval the GPS does not fix)	Device without GPS valid when transmitting and while trying to recover during transmission intervals
9	Ignition on	Ignition is turned on
10	Ignition off	Ignition is turned off
13	Input 1 activated	Input 1 is activated (at the very first moment of activation)
14	Input 1 opened	Input 1 is deactivated (at the very first moment of deactivation)
15	Input 2 activated	Input 2 is activated (at the very first moment of activation)
16	Input 2 opened	Input 2 is deactivated (at the very first moment of deactivation)
17	Input 3 activated	Input 3 is activated (at the very first moment of activation)
18	Input 3 opened	Input 3 is deactivated (at the very first moment of deactivation)
19	Input 4 activated	Input 4 is activated (at the very first moment of activation)
20	Input 4 opened	Input 4 is deactivated (at the very first moment of deactivation)
23	Anti-theft violated	Anti-theft is alarmed
25	External power fail	Occurs a failure at the external power
26	External power ok	External power recovered after a failure
37	Maximum speed exceeded	Speed limit exceeded
38	Maximum speed OK (after a exceed event)	Vehicle has a speed equal or greater than the limit setted, and slow down to a speed less than the limit setted
39	Entering waypoint	Entering to an area with waypoint
40	Leaving waypoint	Leaving an area with waypoint
43	Delivery fail	Device did not received an ACK from its destination
46	G-sensor rolling threshold reached	G-sensor rolling threshold reached
47	G-sensor side threshold reached	G-sensor side threshold reached
48	G-sensor shock threshold reached	G-sensor shock threshold reached

49	GPS direction changed	Occurs a direction change from a position and another collected by GPS
52	Anti-theft enter normal from alarmed	Anti-theft enter normal from alarmed
53	GSM Jamming switches from NO to YES	GSM Jamming switches from NO to YES
54	GSM Jamming switches from YES to NO	GSM Jamming switches from YES to NO
55	Excessive RPM	Excessive RPM moving
56	Excessive RPM on neutral	Excessive RPM on neutral
57	Speeding on neutral	Speeding on neutral
58	GPS Failure	Occurs a failure with GPS signal
59	Attached distance threshold	Distance limit was reached
60	Power Fail and GPS Fail	Power Fail and GPS Fail
30	Entered sleep Mode	Last transmission before entering sleep mode
	Output control	One or more output has it status changed

Table 12: Additional Events

Appendix 6

LED's actions

Device Status	GPS Off	GPS On (no correction)	GPS On (3D corrected)
No SIM Card / Network	Flashing RED once every 2 seconds	Flashing ORANGE once every 2 seconds	Flashing GREEN once every 2 seconds
Voice Net (no data connection)	Flashing RED once every 8 seconds	Flashing ORANGE once every 8 seconds	Flashing GREEN once every 8 seconds
Data Connection	Flashing RED twice 2 every 8 seconds	Flashing ORANGE twice 2 every 8 seconds	Flashing GREEN twice every 8 seconds

Table 13: LED's Actions

Communication Failures

Situation	Possible Cause	Checking
LEDs are off	Power voltage is below 6 Volts or not connected to pin 8	With a voltmeter, check voltage.
GPS/GPRS LED flashes twice in a second but remains on	MXT is connected to the network but has invalid GPS reading	Check for metallic surfaces above MXT
Sync with wireless accessories does not work	Accessory has problem with its power source	With voltmeter, check voltage. It cannot be lower than 2.3V

Table 14: Communication Failures

Procedure for SIM Card insertion

SIM Card must be inserted inside MXT141. Follows the procedure to remove cover and open the device:

1) Remove the two screws using a Tork wrench T5;

Picture 11: SIM Card Insertion > Removing screws

2) Using a pick or some small plastic stuff, should make a mechanical effort to detach top cover;

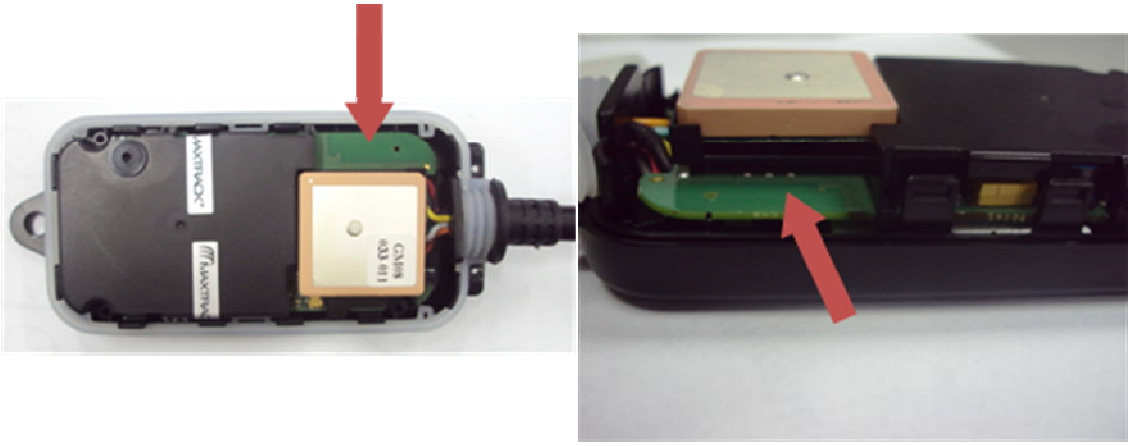
Picture 12: SIM Card Insertion > Detaching top cover

	Do not use coins or metal parts or it will cause damage to device housing.

3) Pull top cover to detach it from bottom cover;

Picture 13: SIM Card Insertion > Detaching bottom cover

4) Below is indicated the local to insert SIM Card;



Picture 14: SIM Card Insertion > Local to insert

5) SIM Card will be inserted on the follow position;

Picture 15: SIM Card Insertion > Positioning

6) To seal MXT141, should pay attention to rubber gasket. It must be rightly positioned to ensure waterproof;

Picture 16: SIM Card Insertion > Rubber gasket

7) Fit both screws to seal MXT141.

Picture 17: SIM Card Insertion > Screwing

	Excessive force on the screw may damage it. The advisable torque is about 1.3KgF/m.

Installation of MXT141

It is recommended to fix MXT141 directing its frontal view upward, making its internal GPS antenna be on this direction.

	MXT141 do NOT be fixed very close or over metallic surfaces. The minimal distance is 15mm.

Picture 18: Installation of MXT141

FCC Warning

This device 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 1: Any changes or modifications to this unit not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

This device must be installed to provide a separation distance of at least 20 cm from all persons and must not be collocated or operating in conjunction with any other antenna or transmitter.