UserManual

Flex2-M
CAT-M
Wireless Communication Device

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1 Introduction

The device comes pre-configured from the factory. It is ready to use. TheFLEX2appearstoauseroraserverapplicationasanendpointdevice.Itcan bequeried,updatedandconfiguredeitherthroughaserialconnection, anovertheairIP connection, orthroughSMSmessaging.TheFLEX2presentsitselfoverthese connectionsasanenhancedcellularmodemwithattachedfunctionalelements.Theseelements include:

- GPSlocationengine
- Accelerometer
- Input/outputs dedicated for ignition, relay, buzzer, and general purpose
- SerialUARTport
- Timers
- Watchdoglockupprotection
- Power management
- Event reporting
- Voltage monitoring

AccesstotheseelementsandgeneralpurposeinterfaceisdonethroughanextendedAT command set. Configuration parameters are stored to flash memory and are automatically used on the next power up event. For more details, please reference the AT Command document.
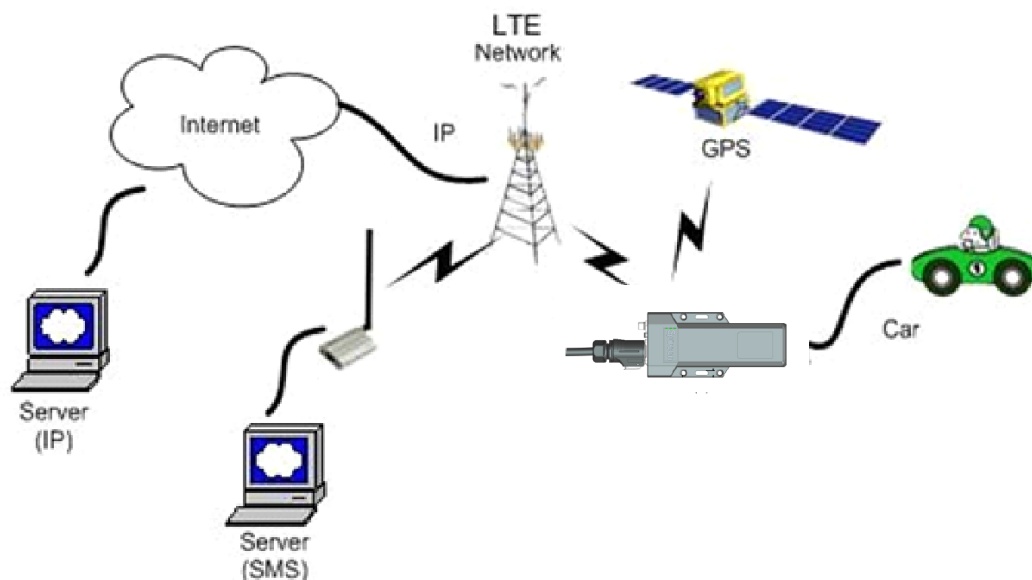
2   HardwareDesign

2.1   Basic Hardware

Items	Requirement

Cellular Modem	Based on QuectelBG96 Module
Cellular Antenna	Internal single antenna
GPSAntenna	Dedicate high performance ceramic antenna
UIMrequirement	Support： 3FF SIM Interrupt Mode
	No Support：Hot Plug/Unplug
BatteryMonitor	Internal analog input
Buildinbatterymanager	Yes
Interface	Debug UART
	12V DC Input Ground
	Relay Drive (Open Drain , 500mA current)
	Dedicated Output for buzzer control
	Ignition Input
	GPIO
DedicateTimers	Yes
Watchdog	External HW via MCU
MotionDetect	Supported（GPS/G-Sensor）
LED	3 LED Supported
	1- RED; 1- Green;1-Orange
Battery	built in battery（4400mAH Lion）
WorkingTime	6months
Powerswitch	No
PowerCablecolor	4 or 6 colors
PowerCableconnectortype	12-pin connector+5pin
PowerConsumption	< 5Watts

TheFLEX2providessupportforspecializedhardwarefeaturesthroughextendedAT commands.Thefeaturessupportedincludethefollowing:

Accelerometer

The accelerometer can be used for motion detection and driver behavior monitoring.

3.2 Remote Update

TheFLEX2supportsOTAfieldupgradesoftheresidentapplication.An overtheairFTP connectionismadeoveran IPconnection. Areplacementfileisthentransferred fromaservertotheFLEX2andthatfilereplaces thepreviousapplicationimage.

3.3 PowerModes

TheFLEX2 devicesupportsseveralpowermodesthataresetbyAT commands. InfullpowermodetheGPSisactiveandthecellularsubsystem willmaintaina persistentcellularconnectionwheneverserviceisavailable.IPconnection ismaintained accordingto theconfigurationofthedevice.

Thedevicecanbeputinlowpowermodewheneveritrunsonabackupbatteryoriftheexternal batteryis loworifitis notmoving.InlowpowermodetheGPSisnot runningand theLED's areoff.Thedevicewouldreturntofull powerwheneveraneventoccursthattriggersareport. Thoseeventsinclude:

- Periodic report
- GPIO change
- IP change
- Battery threshold
- Heartbeat
- Watchdog
- Power-up
- Ignition
- Trip start and stop

Anyhardwareorsoftwareresetwillreturnthedevicetofullpowermode.

4   TestMethod

4.1   *Hardware*

Test Item	Description
Baseband FunctionTest	• Power InputTest • Power Consumption and CurrentTest • Heat DissipationTest • UARTStabilityTest • GPIOLevelTest • LED StabilityTest • DropDownTest • ESDTest • High/LowTemperatureTest • HumidityTest
RFTest	• RF PerformanceTest • GPS PerformanceTest • Antenna PerformanceTest

4.2   *Software Test*

TestEnvironmentConstruct

   MessageTestenvironment

1.USBdongleandPCasmessageserver

2.SendmessagetoFLEX2

   UDPTestenvironment

1.ConnectdongletoPCandcreatedialupasipserver

2.FLEX2createIPconnectiontoserver

   UARTTestenvironment

1.ConnectFLEX2toPCwithcomserialcable

2.OpenTerminaltoolandsendatcommand

3.Responsecanbeshownatterminalwindow

FCC Statement

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. This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
—Reorient or relocate the receiving antenna.
—Increase the separation between the equipment and receiver.
—Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
—Consult the dealer or an experienced radio/ TV technician for help.
    Changes or modifications not expressly approved by the manufacturer could void the user's authority to operate the equipment.

FCC RF Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. To comply with FCC RF Exposure compliance requirements, this grant is applicable to only Mobile Configurations. The antennas used for the transmitter must be installed to provide a separation distance of at least 20cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.