PRODUCT FACT SHEET

MiX 2411-B / MiX 2410-B

Overview

The MiX 241x-B Next Generation Series consists of variants that caters for a variety of needs namely:

a) Entry level Fleet (FLT) variant with LTE CAT1/2G modem with 434 MHz SRD (IP65)
   Low cost vehicle tracking Consumer (CSR) variant with LTE CAT1/2G modem and 434 MHz SRD (IP 54)

Below is a summary of the main features for the two variants:

	Model	**MiX 2411-B FLEET**	**MiX 2410-B CONSUMER**
Features	Part Number	U0102MT	U0101MT
	Category	Entry level Fleet	SVR
	Modem	EG912Y-EU (LTE CAT1/2G)	EG912Y-EU (LTE CAT1/2G)
	Magix (SRD)	434 MHz	434 MHz
	IP Rating	IP65	IP54
	GNSS	ZOE-M8Q	ZOE-M8Q
	SIM card	Nano SIM (4FF)	Nano SIM (4FF)
	Serial communication	RS-232	TTL
	Description	**Number per variant**	
Analog Inputs	Digital inputs can be configured to monitor any device that generates a change in voltage, e.g. seat belts, headlights, refrigeration units, temperature sensors, emergency lights, doors, PTO, UDS, trailer coupling etc.	2	0
Relay Output	The relay drive output can be used to drive a relay. The output impedance (driving low) is less than 1.5 Ohm.	1	0
Buzzer	A buzzer is available to warn the driver and provide feedback on the vehicle's status.	1	0
LED	LEDs provide feedback on the status of the unit.	2	2
Ignition Input	Used to monitor the ignition switch status. Maximum 33V input, impedance > 100kOhm.	1	1
Internal Backup Battery	An internal battery provides power for between 4 and 8 hours if the supply from the vehicle's battery is removed.	1	1
Frequency	Wheel speed sensor/ RPM	1	0
Code Plug	Driver Identification	1	0
Mounting Clip	Provision for convenient mount and dismounting	1	1
Supply	10.5 – 33 V DC	1	1

General Features applicable to both variants	
Trip Data Recording	The following data is recorded: date and time, distance travelled, journey duration, vehicle speed, journey departure and arrival time, driver name, driver ID and vehicle ID.
Driving Violations	The following standard violations are recorded: over speeding, harsh braking, harsh acceleration, harsh cornering moderate and severe impact detected.
Driver Identification	Using the driver code-plug it is possible to know which drivers committed driving violations such as speeding, harsh braking, harsh acceleration, etc. as every trip will have a driver associated with it.
Access Control	Vehicle access can be restricted through the starter interrupt feature. Note the MiX 2000 does not support defined access control lists, any valid blue plug will enable starting of the vehicle.
Customisable Events	Rename input lines to generate customised events such as driver door opening, hazard lights activated, panic button pressed.
Servicing and Licencing	Set reminders for your vehicle's next service or vehicle/driver licence expiry.
GPS Data Recording	Essential information is recorded with every GNSS tracking point, e.g. vehicle and driver ID, date and time, latitude and longitude, altitude, heading, velocity, number of satellites, etc.
Active Tracking	Track your vehicle movements in real-time using automated vehicle location (AVL) updates from the vehicle Replay routes taken on street level or satellite maps.
Active Events	Be notified via email and/or text/SMS message, when selected standard or user-defined events occur.

Technical Specifications

General (applicable to both variants)	
Power	Automatic 12/24V operation Voltage monitoring with low power modes Backup Battery 3.2 V; 1600 mAh LiFePO4 Battery
Communication	LTE CAT1/2G Internal antenna Over-the-air firmware downloads 20,000 buffered messages for data logging during coverage loss
Location	High sensitivity GNSS Internal GNSS antenna
Events	Over-speeding Harsh Acceleration Harsh Braking Harsh Cornering Moderate/ Severe Impact Low Vehicle Battery Vehicle Battery Disconnect / Vehicle Battery Reconnect Ignition On / Ignition Off
Inputs/Outputs	1 x Ignition input (on both variants) 2 X Status LEDs
3-Axis accelerometer	The 3-axis motion sensor capable of measuring accelerations with an output data rate of 1 Hz to 5 kHz. Dynamically selectable full-scale: ±2g/±4g/±8g/±16g
Dimensions	33 x 75 x 100 mm
Weight	SVR: ~120 g FLEET: ~140 g
General (applicable to Fleet variant only)	
Location	Optional external GNSS antenna
Events	Input 1 High / Input 1 Low Input 2 High / Input 2 Low
Inputs/Outputs (Harness dependent) (only on Fleet)	Driver ID via code plug 1 x Output for starter interrupt immobiliser 2 x Digital inputs
Environment	
Temperature	DIN EN 60068-2-1 DIN EN 60068-2-2 (Recommended Storage) 0°C to +50°C (Operating) -20°C to +55°C (limited by Li-Po battery) (Charging) 0°C to +45°C GSM and GPS functionality extends to -40°C and +85°C
IP Rating	MiX 294D-2G-B Consumer: IP54 MiX 294E-2G-B Fleet: IP65
Vibration	In accordance with ISO 16750-3:2007(E) for 9h (at least 1 unit was tested in each perpendicular axis). The vibration profile is as per table 14 of ISO16750-3:2007(E)
Shock	In accordance with Mil-Std-810F method 516.5 at a level 30g and with pulse duration of 11ms.
Mechanics: Free fall	DIN EN60068-2-32: According to automotive guidelines 3 drops from 1 m height (outside packaging)
Humidity	Compliance with MIL-STD-810F figure 507.4-1 (Duration: 5 x 48 h cycles)
Power Supply	
Primary power supply	Rated voltage ($V_{nominal}$): 10.5 to 33 VDC

<table>
<tr><td>Current Consumption at 12V (primary side)</td><td>Out of trip: < 20 mA
Sleep Mode: < 20 mA
Drive / Recovery Mode: < 100mA, consumption depends on instantaneous conditions
Battery charge current: < 200 mA (internally managed by firmware)</td></tr>
<tr><td>Current Consumption at 24V (primary side)</td><td>Out of trip: < 15 mA
Sleep Mode: < 15 mA
Drive / Recovery Mode: < 50mA, consumption depends on instantaneous conditions
Battery charge current: < 100 mA (internally managed by firmware)</td></tr>
<tr><td>Power Consumption</td><td>< 1800 mW</td></tr>
<tr><td>Circuit protection</td><td>ISO7637-2
Over voltage rating: 56 V DC for 60 s</td></tr>
<tr><td>Reverse Polarity Protection</td><td>ISO7637-2</td></tr>
<tr><td>Backup Battery</td><td>3.2 V; 1600 mAh LiFePO4 Battery
(4* hours in the absence of vehicle battery power, *dependent on operational conditions)</td></tr>
<tr><td colspan="2">GNSS (with external antenna)</td></tr>
<tr><td>Receiver Type</td><td>ZOE-M8Q

72-channel u-blox M8 engine
GPS L1C/A and GLONASS L1OF</td></tr>
<tr><td>Protocols</td><td>NMEA, UBX binary and RTCM</td></tr>
<tr><td>RTC</td><td>Share RTC oscillator with Microprocessor- used for faster warm and hot starts</td></tr>
<tr><td>Max Navigation Update Rate</td><td>
<table>
<tr><th>GNSS</th><th>GPS & GLONASS</th><th>GPS</th><th>GLONASS</th></tr>
<tr><td>ROM
Flash</td><td>10 Hz
5 Hz</td><td>18 Hz
10 Hz</td><td>18 Hz
10 Hz</td></tr>
</table>
</td></tr>
<tr><td>Horizontal Position Accuracy[1]

[1] (CEP, 50%, 24 hours static, -130dBm, > 6VS)</td><td>
<table>
<tr><th>GPS & GLONASS</th><th>GPS</th><th>GLONASS</th></tr>
<tr><td>2.5 m</td><td>2.5 m</td><td>4 m</td></tr>
</table>
</td></tr>
<tr><td>Start-up Time / Acquisition[2]

([2] All satellites at –130 dBm, except Galileo at –127 dBm)</td><td>
<table>
<tr><td rowspan="4">Time-To-First-Fix[2]</td><td></td><th>GPS & GLONASS</th><th>GPS</th><th>GLONASS</th></tr>
<tr><td>Cold start</td><td>26 s</td><td>29 s</td><td>30 s</td></tr>
<tr><td>Hot start</td><td>1 s</td><td>1 s</td><td>1 s</td></tr>
<tr><td>Aided starts [3]</td><td>2 s</td><td>2 s</td><td>2 s</td></tr>
</table>
([3] Dependent on aiding data connection speed and latency)
</td></tr>
<tr><td>Sensitivity [4]

([4] Demonstrated with a good active antenna)</td><td>
<table>
<tr><th></th><th>GPS & GLONASS</th><th>GPS</th><th>GLO NASS</th></tr>
<tr><td>Tracking & Navigation</td><td>–167 dBm</td><td>–166 dBm</td><td>–166 dBm</td></tr>
<tr><td>Reacquisition</td><td>–160 dBm</td><td>–160 dBm</td><td>–156 dBm</td></tr>
<tr><td>Cold start</td><td>–148 dBm</td><td>–148 dBm</td><td>–145 dBm</td></tr>
<tr><td>Hot start</td><td>–157 dBm</td><td>–157 dBm</td><td>–156 dBm</td></tr>
</table>
</td></tr>
<tr><td>Operational Limits[5]

([5] Assuming airborne < 4G platform)</td><td>Velocity: 500 m/s
Altitude: 50000m (assuming airborne)
Dynamics: ≤ 4 g</td></tr>
<tr><td>A-GPS</td><td>Supports AssistNow Online and AssistNow Offline, OMA SUPL compliant</td></tr>
</table>

GNSS Antenna (optional external - only on Fleet)			
Centre Frequency	**GNSS**	**BAND**	**FREQ**
	GPS	L1-C/A	1563MHz-1587MHz
	GLONASS	L1-OF	1593MHz - 1610MHz
Bandwidth	10 MHz		
Impedance	50 Ω		
VSWR	<1.5		
Peak gain	4 dBic		
Modulation	RHCP		
Microprocessor			
Processor	STM32F205VE (Cortex ARM-based 32-bit MCU, 150DMIPs, up to 1 MB Flash/128+4KB RAM)		
Memory capability	512kB of Flash memory 512 bytes of OTP memory 128 + 4 Kbytes of SRAM		

Modem	
Modem	**EG912Y-EU**
Description	**CAT1/2G** **(Region 2)**
Class	Output Power Class 3 (23 dBm±2dB) for LTE FDD Class 3 (23 dBm±2dB) for LTE TDD Class 4 (33 dBm±2dB) for EGSM900 Class 1 (30 dBm±2dB) for DCS1800 Class E2 (27 dBm±3dB) for EGSM900 8-PSK Class E2 (26 dBm±3dB) for DCS1800 8-PSK
Band	LTE: FDD Band 1 (2100 MHz) FDD Band 3 (1800 MHz) FDD Band 5 (850 MHz) FDD Band 8 (900 MHz) TDD Band 38 (TD 2600 MHz) TDD Band 40 (TD 2300 MHz) TDD Band 41 (TD 2600+ MHz) 2G: PCS Band II (1900 MH) DCS Band 3 1800 MHz) GSM Band 5 (850 MHz) E-GSM Band 8 (900 MHz)
Data transmission/ rate	LTE: FDD: Max 10 Mbps (DL) / Max 5 Mbps (UL) DC-HSPA+: Max 42 Mbps (DL) / Max 5.76 Mbps (UL) GSM: (2G) 384 Kbps (DL) / 384 Kbps (UL)
Protocol stack	3GPP E-UTRA Release 9 TCP
Antenna	50 Ω
General	Jamming detection Automatic thermal-shutdown

Real Time Clock	
Time Loss	< 10 Minutes per year (typical) < 5 seconds when a GPS is used (auto synchronization)* *temperature change affects the accuracy of the RTC crystal; it's most accurate at +25°C.
Battery Backup Life	> 5 Years (typical at -30° to +70°C)
Auxiliary Inputs and Outputs	
Inputs (only on Fleet)	• 2 x Digital Inputs • 1 x Ignition Input (maximum 33v input, impedance > 100k Ohm)
Outputs (only on Fleet)	1 x Relay Drive output with a maximum current consumption of up to 400mA.
Ignition Input	Used to monitor the ignition switch status. Maximum 33V input, impedance > 100kOhm
LED	
LED	2 x LED
Buzzers (only on Fleet)	
Buzzer	1x Buzzer included in main harness
434 MHz Transceiver	
Current	During transmission: 90 mA During receiving: 21 mA
RF Transceiver	Receiver frequency: 434.3 MHz Frequency deviation: 10 kHz RF Bandwidth: 39.2 kHz RF Radiated Output Power: 10 mW max

Statutory and Regulatory Compliance

ICASA