

	Document Name	Version	Release Date
	Tbox & NG-eCall User Manual	V1.0	

EU Tbox & NG-eCall

User Manual

Product Name: Vehicle Terminal

Product Model: YLB04

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Document Revision History

Version	Date	Author	Section	Revision Description
V1.0	2025/9/25	Zhang Junhao		Initial Release



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1 Overview

The YLB04 is a general-purpose overseas T-Box (telematics box) with an integrated in-vehicle emergency call terminal, planned by Foton Zhike and independently developed by Yaxon (Yaxun). It complies with the regulatory requirements of the EU, the Middle East and other regions. The NG-eCall function of this product is mainly used, in emergency situations, to establish a hands-free call with the emergency call system service platform manually or automatically and to transmit vehicle information, including vehicle characteristics, vehicle position, time, etc. This product is applicable to M1 and N1 category vehicles.

In addition, this product can also implement Foton's overseas connected-vehicle functions (data collection, remote OTA, remote diagnostics). This document focuses on the NG-eCall function and does not describe the T-Box connected-vehicle functions in detail.

1.1 Reference Standards

Table 1 Reference Documents

No.	Source	Title
1	EU 2015/758	Type-approval requirements for the deployment of the eCall in-vehicle system
2	EU 2017/78	Administrative provisions of the European Commission on type approval
3	EU 2017/79	Technical requirements for the deployment of the eCall in-vehicle system
4	EN 16454:2015	eCall end-to-end conformance testing
5	EN 15722:2020	eCall minimum set of data (MSD)
6	EN 301511	Essential requirements for mobile stations of the digital cellular telecommunications system operating in the GSM900/GSM1800 frequency bands
7	EN 301908-1	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 third-generation cellular networks; Part 1: Harmonised EN for IMT-2000, introduction and common requirements, covering the essential requirements of Article 3.2 of the R&TTE Directive
8	EN 301908-2	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 third-generation cellular networks; Part 2: Harmonised EN for IMT-2000 and CDMA Direct Spread (UTRA FDD) User Equipment (UE), covering the essential requirements of Article 3.2 of the R&TTE Directive
9	EN 301908-13	Electromagnetic compatibility and Radio spectrum Matters (ERM); Base Stations (BS), Repeaters and User Equipment (UE) for IMT-2000 third-generation cellular networks; Part 13: Harmonised EN for IMT-2000 and Evolved Universal Terrestrial Radio Access (E-UTRA) User Equipment (UE), covering the essential requirements of Article 3.2 of the R&TTE Directive
10	EN 303413-2017	Satellite Earth Stations and Systems (SES); Global Navigation Satellite System (GNSS) receivers; Radio equipment operating in the 1 164 MHz to 1 300 MHz and 1 559 MHz to 1 610 MHz frequency bands; Harmonised Standard covering the essential requirements of Article 3.2 of Directive 2014/53/EU
11	EN 62368	Safety requirements for audio/video, information and communication technology equipment
12	EN 301489-1	Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 1: Harmonised Standard for common technical requirements of electromagnetic compatibility
13	EN 301489-17	Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems; Harmonised Standard covering the essential requirements of Article 3.1(b) of Directive 2014/53/EU
14	EN 301489-19	Electromagnetic compatibility (EMC) standard for radio equipment and services;

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		Part 19: Specific conditions for mobile Earth stations providing data communications in the 1.5 GHz band and GNSS receivers providing positioning, navigation and timing data in the RNSS band; Harmonised Standard covering the essential requirements of Article 3.1(b) of Directive 2014/53/EU
15	EN 301489-52	Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 52: Specific conditions for cellular communication user equipment (UE), handheld and ancillary equipment; Harmonised Standard covering the essential requirements of Article 3.1(b) of Directive 2014/53/EU
16	CISPR25-2016	Vehicles, boats and internal combustion engines — Radio disturbance characteristics — Limits and methods of measurement for the protection of on-board receivers
17	ISO 7637-2	Road vehicles — Electrical disturbances from conduction and coupling — Part 2: Electrical transient conduction along supply lines only
18	ISO 7637-3	Road vehicles — Electrical disturbances from conduction and coupling — Part 3: Electrical transient transmission by capacitive and inductive coupling via lines other than supply lines
19	ISO 11452-2	Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 2: Absorber-lined shielded enclosure
20	ISO 11452-4	Road vehicles — Component test methods for electrical disturbances from narrowband radiated electromagnetic energy — Part 4: Bulk current injection (BCI)
21	ISO 10605	Road vehicles — Test methods for electrical disturbances from electrostatic discharge
22	VW80000	Electrical and electronic components in motor vehicles up to 3.5 t — Test items, test conditions and test requirements
23	ISO 16750-2	Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 2: Electrical loads
24	ISO 16750-3	Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 3: Mechanical loads
25	ISO 16750-4	Road vehicles — Environmental conditions and testing for electrical and electronic equipment — Part 4: Climatic loads
26	IEC 62321	Standard for banned and restricted substances
27	IEC 60695-11-10	Fire hazard testing — Part 11-10: Test flames: 50 W horizontal and vertical flame test methods
28	ISO 20653	Road vehicles — Degrees of protection (IP code) — Protection of electrical equipment against foreign objects, water and access
29	SASO-2944	The Saudi Standards, Metrology and Quality Organization (SASO) has updated the Saudi standard based on the relevant ADMO, international and national "eCall" requirements
30	ETSI TS 103 683 V1.1.1 (2020-02)	Next Generation eCall Advanced Application Protocol (HLAP) interoperability testing
31	UAE.S 5019_2024	UAE Standard/Technical Regulation technical committee. Through the Vehicle Standards Technical Committee, the Ministry has developed UAE.S 5019:2024 — Vehicles — Technical requirements for emergency call ("eCall").
32	EN2024-1180	Amended (EU) 2015/758, in particular Articles 5(9) and 6(12) thereof,
33	GSO-Technical-Regulations-MV-2026-MY-D2	The Gulf States have issued a list of regulations updating the UAE eCall regulation version: UAE.S 5019:2018 updated to UAE.S 5019:2024;
34	PD CEN TS 17240-2018	Intelligent transport systems — E safety — eCall end-to-end conformance testing for IMS packet-switched-based systems
35	EN 18031-1:2024	Common security requirements for radio equipment - Part 1: Internet connected radio equipment

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1.2 Abbreviations

Table 2 Abbreviations

Abbreviation	Description
IGN	Ignition signal of the vehicle
CAN	Controller Area Network (vehicle CAN bus)
MCU	Microcontroller Unit
MPU	Microprocessor Unit
VIN	Vehicle Identification Number
PSAP	Public Safety Answering Point
MSD	Minimum Set of Data

2 Product Functions

2.1 Basic Functions

Table 3 Basic Functions

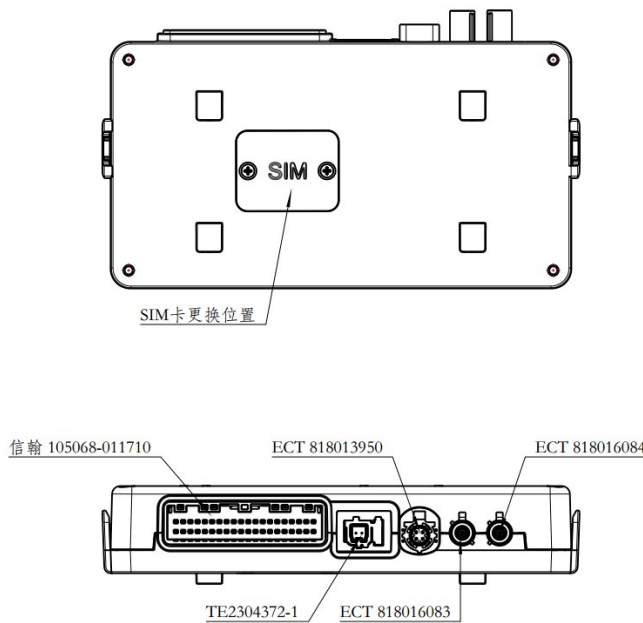
No.	Function	Function Sub-item	Description
1	Self-test	Self-test	After the vehicle is started (ignition on), the system shall perform a self-test and indicate the self-test status through an indicator light. The self-test covers the terminal operating normally (file system mounted correctly, internal components communicating normally), the communication network, the positioning module, the crash control unit, the power supply, the backup battery, the loudspeaker and the microphone.
2	Mute Control	- Hard-wire control - CAN-line control	- When an emergency call is triggered, the head unit is muted via a normal hard-wire control, active-low - When an emergency call is triggered, the head unit is muted via the CAN line
3	ECALL Triggering	- SOS button detection - Airbag triggering - Rollover triggering	- Supports manual triggering of the ECALL service via the SOS button - Supports triggering of the ECALL service via the airbag crash hard-wire signal or the crash CAN message - Supports triggering of the ECALL service when the sensor detects vehicle rollover
4	Positioning	Multi-mode positioning	Built-in positioning antenna; supports GPS and Galileo for standalone or combined positioning, etc.
5	Communication Network	Communication Network	Built-in wireless network antenna; supports transmission of the MSD (minimum set of data) Supports NG-eCall Meets the CEN/TS 17240-2018 end-to-end conformance requirements
6	MSD Framing	MSD Framing	Frames the data in accordance with EN 15722:2015 "ECALL minimum set of data" and reports it to the PSAP
7	Hands-free Call	Hands-free Call	Combines the external microphone and external loudspeaker to enable two-way calls between the driver/passengers and the PSAP operator; call quality meets the test requirements of EU 2017/79
8	Power	Backup battery	Combining IGN, the backup battery internal resistance and

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	Management	- management - Low-power management - Main/backup power switching	temperature, and the main power status, implements backup battery management, low-power management, and main/backup power switching management
9	Upgrade Management	- OBD upgrade - USB upgrade - Bootloader	Supports a variety of different upgrade methods.
10	Production and End-of-Line Testing	- End-of-line (EOL) testing - After-sales testing - Six-axis calibration operation guide	Performs end-of-line production and after-sales management via the UDS diagnostic tester

3 Appearance and Structure

3.1 Product Appearance



3.2 Structural Features

- Host dimensions: 145 mm × 75 mm × 32 mm;
- Material: PC+ABS;

3.3 Structural Dimensions

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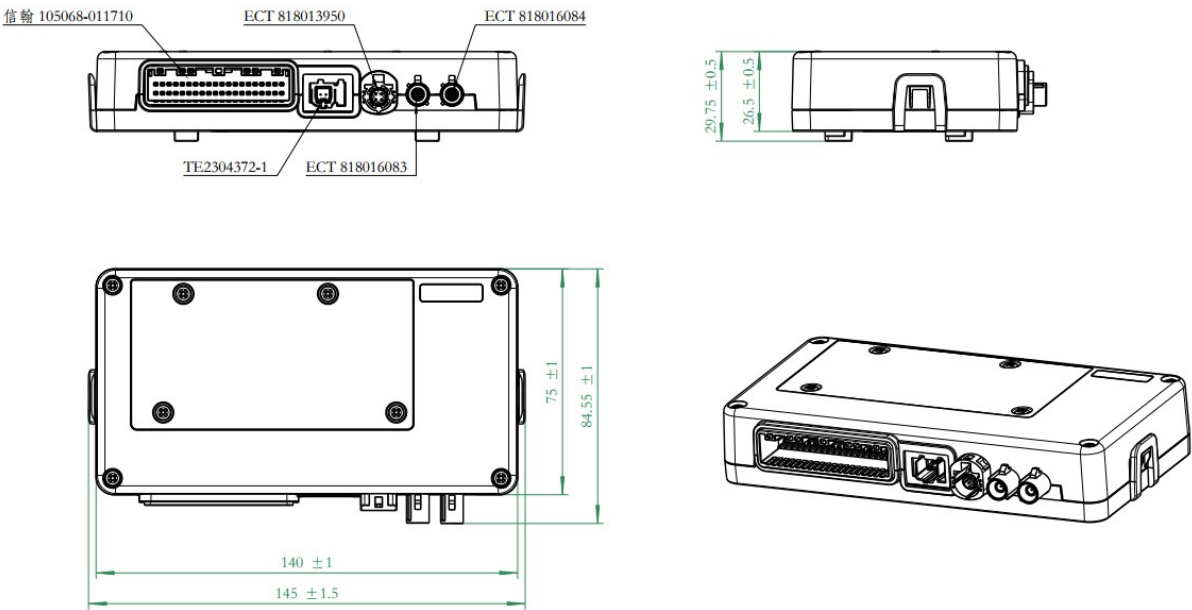


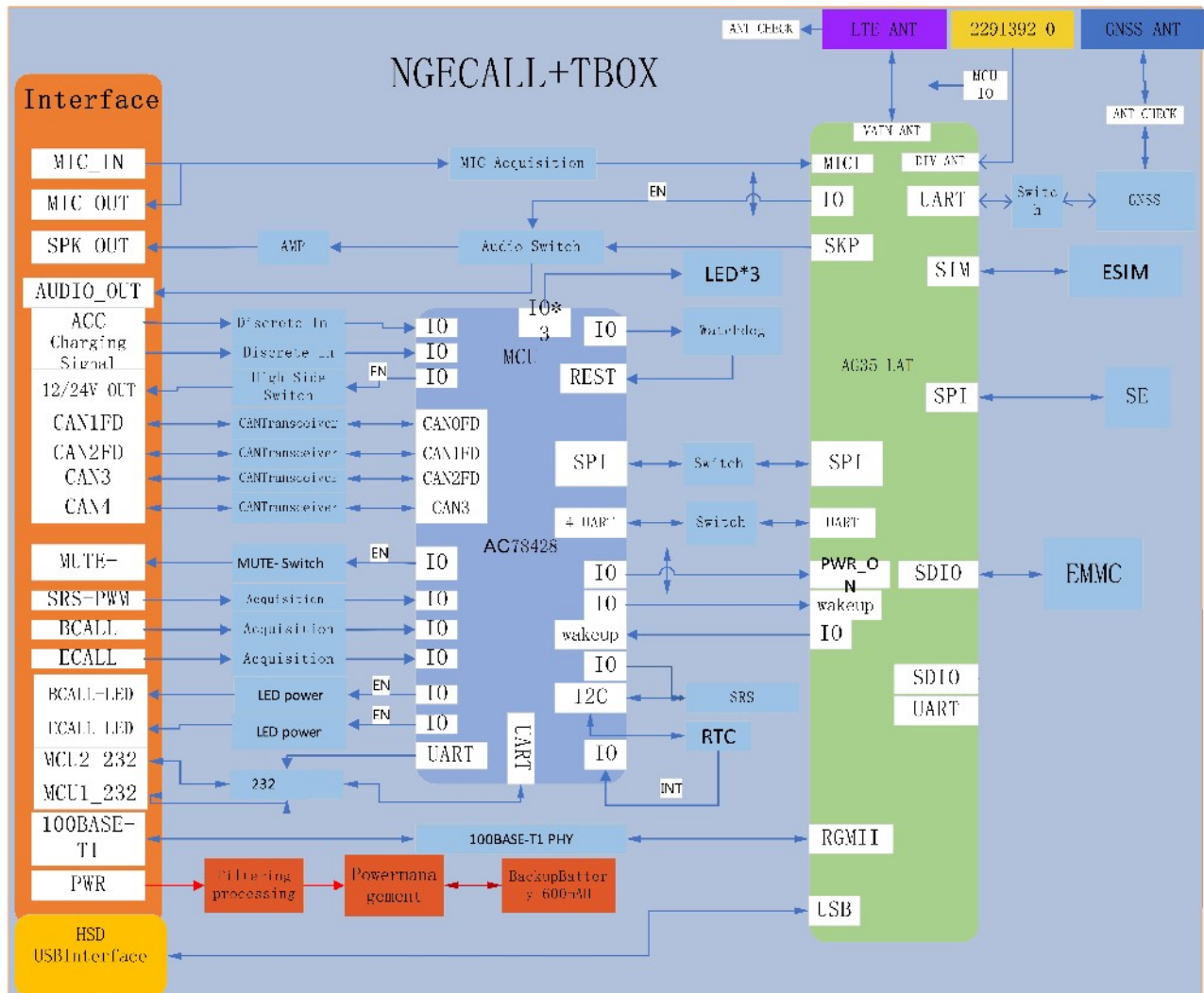
Figure 3 TCU host interface dimensions



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4 Hardware Specifications

4.1 Hardware Design Block Diagram



Name	Model	Brand	Remark
4G module /MPU	AG35-LAT	Quectel	
MCU	AC78428	AutoChips	
Positioning module	ATGM332U	Zhongke Microelectronics	
CAN transceiver	TPT1042VQ	3PEAK	

4.2 TCU Hardware Specification List

Table 6 Hardware Specification List

Parameter	Performance Specification
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Operating voltage	9 V - 32 V; rated voltage: 12 V or 24 V	
Operating temperature	-40 ° C to +75 ° C (excluding backup battery)	
Storage temperature	-40 ° C to +75 ° C	
Sleep (quiescent) current	$\leq 3\text{mA}@12\text{V}$	
Average operating current	$\leq 500\text{mA}@12\text{V}$	
max power	6w	
Net weight	<200g	
Backup battery	Rated voltage	3.7V
	Nominal capacity	600mA
	Operating temperature	-20 ° C to +75 ° C
	Cut-off discharge voltage	3.2V
Positioning	Frequency band(s)	GPS-L1 (1575.42±1.023MHz) GALILEO-E1 (1575.42±2.046MHz) GLONASS - L1 (1597.5~1605.8 MHz)
	Positioning mode	Supports standalone or combined positioning with GPS, GALILEO and GLONASS
	Positioning accuracy	Horizontal positioning accuracy $\leq 15\text{ m}$; vertical positioning accuracy $\leq 15\text{ m}$; speed accuracy $\leq 0.1\text{ m/s}$
	Start-up time	Hot start $\leq 10\text{ s}$ Cold start $\leq 60\text{ s}$
	Update rate	$\geq 1\text{Hz}$
Mobile Communication	Communication modes	LTE-FDD/WCDMA/GSM
	Communication frequency band	LTE-FDD: B1/2/3/4/5/7/8/28 WCDMA: B1/2/3/5/8 GSM/EDGE: 850/900/1800/1900 MHz

4.3 Navigation Antenna Specification (If Required)

Table 7 Navigation Antenna Specification Parameters

Item	Parameter Specification
Operating voltage	3.0-3.6V
Operating current	10-30mA@3.3V
LNA gain	30±3dB
Polarization	RHCP
Operating temperature	-40 to +75 ° C
Storage temperature	-40 to +75 ° C

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5. 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.

6. Statement

Simplified EU Declaration of Conformity

The simplified EU declaration of conformity referred to in Article 10(9) shall be provided as follows:

Hereby, [BEIQI FOTON MOTOR CO.,LTD.]

declares that the radio equipment type [designation of type of radio equipment] is in compliance with Directive 2014/53/EU. The full text of the EU declaration of conformity is available at the following internet address: <https://www.foton.com.cn/>