ST9730

Product Description

-Video telematics-

GENERAL DESCRIPTION

The device features built-in FHD dual cameras, precise GPS tracking, and advanced AI algorithms for ADAS (Advanced Driver Assistance Systems) and DMS (Driver Monitoring Systems), enhancing driver safety and convenience. It also boosts the efficiency of transportation and logistics management. Powered by Qualcomm chipsets and the Android platform, the video telematics solution delivers high-performance safety and convenience features for drivers.

EXTERNAL INTERFACE

Power & I/O Events	OBDII Interface (B+/GND), ACC, IGN1, Panic button
Serial communication	USB2.0, UART (For debugging)
Battery interface	OBDII Terminal (Batt+/GND)
LED Indicator	Power, Recording, LTE, GPS
4G/Wi-Fi/BLE/GPS Antenna	Internal Antenna type

RF Feature

	ITEM	Spec
LTE	Standard	3GPP Release 8
	UE Category	LTE Cat 1
	LTE Support	FDD LTE : B2, 4, 5, 12, 13, 17, 25, 26
	RF Path	2 Rx / 1 Tx
	Tx Power	Power Class 3
	Rx Sens	3GPP Spec all meet
	Data Rate	UL : 50Mbps / DL : 150Mbps
GNSS		GPS / GLONASS / BEIDOU
WIFI		2.4G/5GHz 802.11 a/b/g/n/ac
BT		BT4.2 BLE

KEY Feature

- Built-in LTE Cat.4 & Wi-Fi 2.4G/5G & BLE 4.2
- Compact & Slim design with Dual Camera solution
- Live Video streaming and GPS tracking
- Live view allows Real-time driver monitoring and event recording
- Edge AI solution with ADAS and DMS
- OTA firmware and device management

Dimension	**109.8 * 90 * 36.6 mm**
Weight	179g
Approval	TBD
Operating Temperature	-30°C~+70°C * Caution Please pay a full attention that vehicle shall NOT be left under direct sunlight long time in hot weather.

KEY Components

PARAMETER	ITEM	DESCRIPTION
MCU Chipset	SAMC21G17A-MNT	Baseband Digital Processor
LTE Smart Module	SIM8950C	LTE Smart Module
Camera	ST-015F	Road Camera
Camera	ST-035IR	IR Camera

STN1110-1/MM	STN1110-I/MM	OBD to UART interpreter1

1. SAMC21G17A-MNT

Operating Conditions

- 2.7V – 5.5V
- -40°C to +125°C, DC to 48 MHz
- -40°C to +85°C, DC to 64 MHz

Core

- Arm® Cortex®-M0+ CPU running at up to 48 MHz or 64 MHz:
- Single-cycle hardware multiplier
- Micro Trace Buffer
- Memory Protection Unit (MPU)

Memories

- 32/64/128/256 KB in-system self-programmable Flash
- 1/2/4/8 KB independent self-programmable Flash for EEPROM emulation
- 4/8/16/32 KB SRAM main memory

System

- Power-on Reset (POR) and Brown-out Detection (BOD)
- Internal and external clock options with 48 MHz to 96 MHz Fractional Digital Phase Locked Loop (FDPLL96M)
- External Interrupt Controller (EIC) (Interrupt pin debouncing is only available in SAM C20/C21 N)
- 16 external interrupts
- Hardware debouncing (only available in SAM C20/C21 N)
- One non-maskable interrupt
- Two-pin Serial Wire Debug (SWD) programming, test, and debugging interface

Low-Power

- Idle and Standby Sleep modes
- SleepWalking peripherals

Peripherals

- Hardware Divide and Square Root Accelerator (DIVAS)
- 12-channel Direct Memory Access Controller (DMAC)
- 12-channel Event System
- Up to eight 16-bit Timer/Counters (TC), configurable as either (see Note):

Note: Maximum and minimum capture is only available in the SAM C21N devices.

- One 16-bit TC with compare/capture channels
- One 8-bit TC with compare/capture channels
- One 32-bit TC with compare/capture channels, by using two TCs
- Two 24-bit and one 16-bit Timer/Counter for Control (TCC), with extended functions:

– Up to eight PWM channels on each 24-bit TCC
– Up to two PWM channels on each 16-bit TCC
– Up to four compare channels with optional complementary output
– Generation of synchronized pulse width modulation (PWM) pattern across port pins
– Deterministic fault protection, fast decay and configurable dead-time between complementary output
– Dithering that increase resolution with up to 5 bit and reduce quantization error
• Frequency Meter (The division reference clock is only available in the SAM C21N)
• 32-bit Real Time Counter (RTC) with clock/calendar function
• Watchdog Timer (WDT)
• CRC-32 generator
• Up to two Controller Area Network (CAN) interfaces in the SAM C21:
– CAN 2.0A/B and CAN-FD (ISO 11898-1:2015)
• Each CAN interface have two selectable pin locations to switch between two external CAN transceivers (without the need for an external switch)
• Up to eight Serial Communication Interfaces (SERCOM), each configurable to operate as either:
– USART with full-duplex and single-wire half-duplex configuration
– I2C up to 3.4 MHz (Except SERCOM6 and SERCOM7)
– SPI
– LIN host/client
– RS-485
– PMBus
• One Configurable Custom Logic (CCL)
• Up to Two 12-bit, 1 Msps Analog-to-Digital Converter (ADC) with up to 12 channels each (20 unique channels)
– Differential and single-ended input
– Automatic offset and gain error compensation
– Oversampling and decimation in hardware to support 13, 14, 15 or 16-bit resolution
• One 16-bit Sigma-Delta Analog-to-Digital Converter (SDADC) with up to 3 differential channels in the SAMC21
• 10-bit, 350 ksps Digital-to-Analog Converter (DAC) in the SAM C21
• Up to four Analog Comparators (AC) with Window Compare function
• Integrated Temperature Sensor in the SAM C21
• Peripheral Touch Controller (PTC)
– 256-Channel capacitive touch and proximity sensing

I/O

• Up to 84 programmable I/O pin

2. SIM8950 Module

- SIMCom LTE Smart Module

WLAN	2.4G /5G 802.11 a/b/g/n/ac
BT	BT 4.2 BLE
GNSS	BeiDou/GPS/GLONASS
Supply Voltage	3.4V ~ 4.4V
Memory	16GB eMMC + 2GB LPDDR3 32GB eMMC + 3GB LPDDR3 (optional) 64GB eMMC + 4GB LPDDR3 (optional)
Temperature Range	-35℃ ~ +75℃
Dimensions	44.1*45.6*2.8mm
Form Factor	LCC+LGA
Weight	Approx. 12.5g

SIM8950AC	
LTE-FDD	B2/B4/B5/B7/B12/B13/B17/B25/B26
LTE-TDD	B41
WCDMA	B1/B2/B4/B5/B8
GSM	850/900/1900 MHz

- Support dual SIM card
- Support charge management function (optional)
- Support 1080@60fps video recording and playing
- Integrate GNSS function, supports rapid accurate positioning under different environment
- Support double screen and double touch control
- Support double camera

3. ST-015F

Specification

Specification			Remark
Sensor	Image Sensor	1/2.8" Full HD RGB Bayer CMOS	IMX307LQR
	Active pixels	1945(H) x 1109 (V)	
	Frame Rate	30 fps	
	Pixel Size	2.9μm x 2.9μm	
	Dynamic range	High dynamic range(HDR)	
	Output interface	2-Lane MIPI	
	Package	BGA Packge	
Lens	Focal Length	3.0mm ±5%	
	F Number / TTL	F2.0 / 20.73mm	
	Angle of View	59.7(V) X 116.9°(H) X 145.6°(D)	16:9
	Mount Dimension	M12 x P0.5	
	Group & Elements	4Component 4Element [4 Glass]	With IR Cut-off Filter (650nm)

4. ST-035IR

Specification

Specification			Remark
Sensor	Image Sensor	Diagonal 6.46mm (type 1/2.9")	PV3209K
	Active pixels	1928(H)x1088(V)	
	Frame Rate	30 fps TVI	
	Pixel Size	2.8μm x 2.8μm	
	Dynamic range	80 [dB]	
	Output interface	HD-Analog	
	Package	64 CLCC (11.1 [mm] x 11.1 [mm])	
Lens	Focal Length	3.1mm ±5%	
	F Number / TTL	F 2.2/ 14.3mm ±0.4mm	
	Angle of View	56°(V) X 104°(H) X 130°(D)	16:9
	Mount Dimension	M12 x P0.5	
	Group & Elements	4 Glass + 1 IR(With day & night Filter(850nm)	

5. STM110-I/MM

Feature

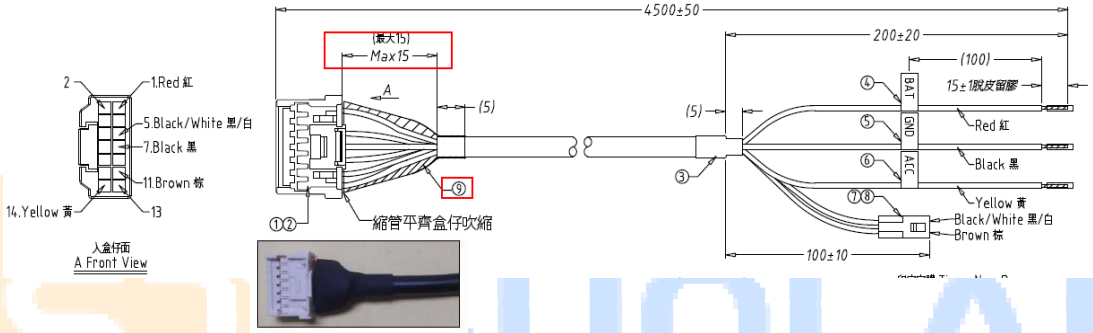
- Fully compatible with the **ELM327 AT command set**
- Feature-rich parallel extended **ST command set**
- UART baud rates from **38 bps to 10 Mbps**(1)
- Large (up to 4KB) data transfers(2)
- **Safe, secure bootloader** for easy firmware updates
- Support for **all legislated OBD-II protocols:**
  - **ISO 15765** (CAN)
  - **ISO 14230** (Keyword Protocol 2000, KWP2K)
  - **ISO 9141** (Asian, European, Chrysler vehicles)
  - **SAE J1850 VPW** (GM vehicles)
  - **SAE J1850 PWM** (Ford vehicles)
  - **SAE J1939** (Heavy Duty vehicles)
- Support for **non-legislated protocols** (not available in all devices):
  - **ISO 11898** (raw CAN)
  - **SAE J2818**
  - **SAE J2411** (GMW3089, Single Wire CAN, GMLAN)
  - **Ford MS-CAN** (Medium Speed CAN)
- Superior **automatic protocol detection** algorithm
- **Large memory buffer**
- Voltage input for **battery monitoring**
- **PowerSave mode with multiple sleep and wakeup triggers**

Specification

Ambient temperature under bias	-40°C to +125°C
Storage temperature	-65°C to +160°C
Voltage on VDD with respect to VSS	-0.3V to +4.0V
Voltage on any pin that is not 5V tolerant with respect to VSS(2)	-0.3V to (VDD + 0.3V)
Voltage on any 5V tolerant pin with respect to VSS when VDD ≥ 3.0V(2)	-0.3V to +5.6V
Voltage on any 5V tolerant pin with respect to VSS when VDD < 3.0V(2)	-0.3V to 3.6V
Maximum current sourced/sunk by any 2x output(3)	8 mA
Maximum current sourced/sunk by any 4x output(3)	15 mA

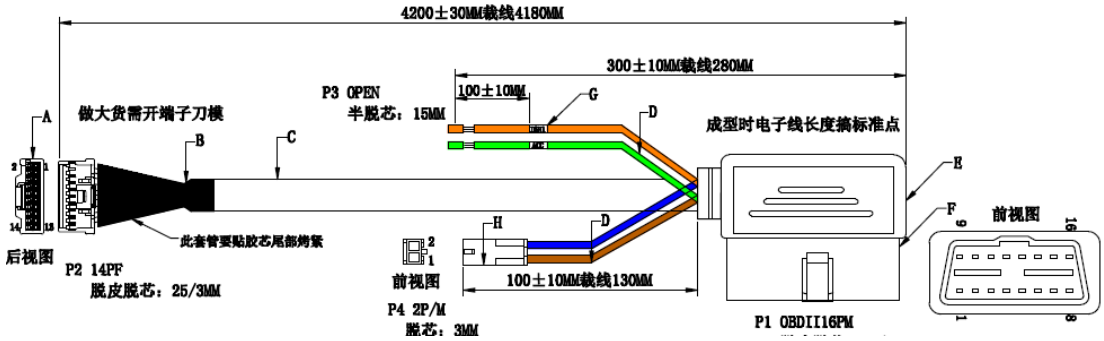
EVENT CABLES (Option)

1. The Event cable interfaces the ST9730 to the vehicle. It has 5 wires, consisting of two for power wires and one ACC and Panic button.



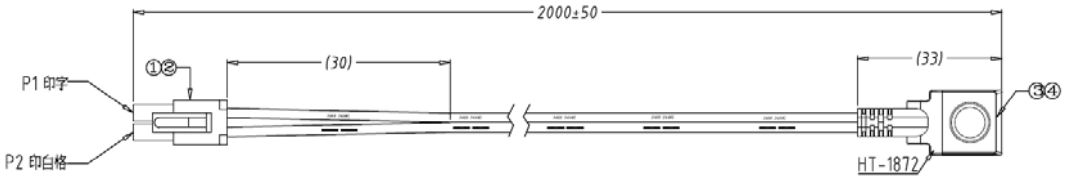
Main Connector (14Pin)	Wire Color	Function	Refer Drawing
Pin1	Red	Battery positive (+12V/+24V)	④
Pin7	Black	GND	⑤
Pin14	Yellow	ACC	⑥
Pin5	Black/White	Panic Button Connector	⑦⑧
Pin11	Brown		

2. The Event cable (OBDII Cable) interfaces the ST9730 to the vehicle. This cable consists of the OBDII interface and cables of ACC/IGN1 and Panic button connections.


4200±30MM裁线4180MM
300±10MM裁线280MM
100±10MM
P3 OPEN
半脱芯：15MM
做大货需开端子刀模
A
B
C
G
D
成型时电子线长度摘标准点
E
F
前视图
后视图
P2 14PF
脱皮脱芯：25/3MM
此套管要贴胶芯尾部烤紧
H
D
前视图
P4 2P/M
脱芯：3MM
100±10MM裁线130MM
P1 OBDII16PM

Main Connector (14Pin)	Wire Color	Function	Refer Drawing
Pin 1	-	Battery positive (+12V/+24V)	P1
Pin 2	-	J1850+	P1
Pin 3	-	Battery positive (+12V/+24V)	P1
Pin 4	-	J1850-	P1
Pin 5	Blue	GND (Panic button)	P4(2P/M)
Pin 6	-	CAN_H	P1
Pin 7	-	GND	P1
Pin 8	-	CAN_L	P1
Pin 9	-	GND	P1
Pin 10	-	K-LINE	P1
Pin 11	Brown	Panic button in	P4(2P/M)
Pin 12	-	L-LINE	
Pin 13	Orange	IGN1	P3(Open)
Pin 14	Green	ACC	P3(Open)

3. The Panic Button can be connected to Event Cable or Event Cable(OBDII).
   This Panic Button Cable is consists of 2P connector and Button.
   If you press the Panic Button, an event occurs.



Connector (2Pin)	Wire Color	Function	Refer Drawing
P1	Black	Panic Enable	③④
P2	Black/White	GND	

LED Status

Color	Condition	Indicator Pattern
RED	**- Device enters shut down mode** **- ACC pin is not connected**	**0.5 seconds ON,** **0.5 seconds OFF**
BLUE	**- Wi-Fi is not set, and no SIM card is inserted** **- No internet connection, IMEI is not registered, or user settings not completed in web browser**	**0.5 seconds ON,** **0.5 seconds OFF**
GREEN	**- All conditions above are satisfied, and LM App is running** **- LM Cloud is connected**	**0.5 seconds ON,** **15 seconds OFF**

GENERAL & 4G SPECIFICATION

Application processor	**Qualcomm SDM450 Platform** **Octa ARM Cortex-A53 cores up to 1.8Ghz**
Operating system	Android 10.1
Camera	Road facing x1 (FHD) Inward x1 (FHD)
External Memory	SD Flash device up to 256GB (SD3.0)
Back-up Battery	5F Super CAP
Power Supply	DC +12V/+24V, Support Reverse Polarity Protection.
Power Consumption	Normal mode TBD @12V Parking mode 5mA @12V Power off mode 150uA @12V
Transmitting Power	Class 3 (23dBm±2dB) for LTE-FDD/TDD bands
Packet Switched data rate	LTE Features - Supports 3GPP R8 Cat.4 - FDD: Max 150 Mbps (DL)/Max 50 Mbps(UL)
Frequency	- LTE-FDD: B2/B4/B5/B12/B13/B17/B25/B26
Watertight	N/A

Event Inputs	- Ignition (Battery positive/Ground) ■ Ignition voltage: 9~ 28V[ON] - Input ■ Low voltage detection ■ Available for Panic button ■ Available for ACC&IGN1 ■ Available OBDII Interface

BLE/WIFI SPECIFICATION

Output power (WIFI)	TBD
Receiving performance (WIFI)	TBD
Output power (BLE)	TBD
Receiving performance (BLE)	TBD

GPS RECEIVER SPECIFICATION

Receiver Type	GPS & Glonass GPS L1 band(1575.42MHz) Glonass L1 band (1601.71MHz)
Position Accuracy [1)]	Accuracy (Open Sky) 2.5m (CEP 50)
TTFF (Time To First Fix) [2)]	Cold starts <35s Warm start <15s Hot start <5s
Sensitivity [3)]	Tracking & Navigation -159dBm Reacquisition -156dBm Cold stat -148dBm
CN0	40dB/Hz@-130dBm
Antenna type	Internal Antenna

FCC Compliance information

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 party responsible for compliance could void the user's authority to operate the equipment.

This device should be installed and operated with minimum 20 cm between the radiator and your body.