SE5901B (SDK) Series

3G/4G LTE Cellular to Ethernet and Serial Secure Embedded Computer

FEATURED HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports Node-RED and dashboard
- Extensive 3G and LTE Band Support:
  - EU: 2100/1800/850/2600/900/800MHz (B1/B3/B5/B7/B8/B20)
  - US: 1900/AWS/850/700/700/1900MHz (B2/B4/B5/B13/B17/B25)
- High-performance IPsec VPN throughput; data-rate up to 37.9Mbps*
- Wide temperature range for Industrial-grade performance
- 1 x 10/100/1000Mbps Ethernet port
- 1 x RS-232/485 port – baud rate up to 921.6 Kbps
- 1 x USB2.0 high speed OTG port; 1 x Port USB Power-only port
- 2 x Digital Inputs; 2 x Relays in the I/O version
- Additional embedded power-bank for fault-relay capability in B Version

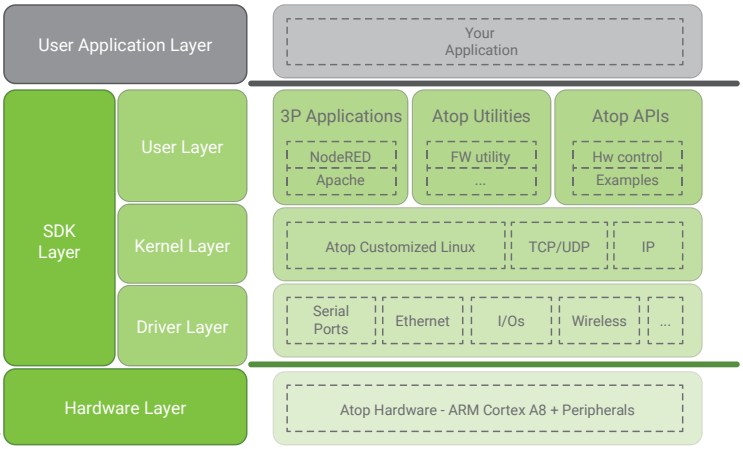
PRODUCT DESCRIPTION

Providing connectivity for the Internet of Things

ATOP's Industrial Embedded Computer is your ideal flexible Gateway to the Internet of Things. It provides 3G/4G LTE, Serial, Ethernet and Cellular connectivity and additional I/Os and interfaces that can unlock your potential. Based on your specific application, it allows almost any serial device to be connected, providing and retrieving the data you need to and from the cloud, no matter what provider you're using.

Programmability

Write your customized application in C language and run it on its powerful Industrial low-power 800MHz ARM Cortex A8 TI Sitara AM3354 CPU. Make flexible use of your peripherals, no matter storage, SMS, Serial, I/Os and USB are needed.
SE5901B is available as a Standard SDK or Node-RED version. The Node-RED version, embedding a Node-RED micro-SD card, adds to the powerful hardware platform, the possibility add the ATOP-Customized Node-RED environment and an user-friendly Device Configuration UI. Node-RED, an open source Building-Block programming environment, will allow you to build your IoT application from an user-friendly, hardware-tailored application design environment and dashboard.



Rugged and flexible for advanced developments

SE5901B embeds ***high EMC protection, wide temperature operation***, programming and installation flexibility in one device. A dedicated *I/O version* provides 2 Digital Inputs and 2 Digital Outputs, *GPS version* provides Global positioning system geolocation and, specifically for the Internet of Things, a *"B" version* provides additional 15 seconds power during a power failure, allowing the device to relay back to the host the failure. This is Industry 4.0.

** : Node-RED only - Test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode, Ethernet cable. Performance can change based on the Cellular Network.*

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v: 0.7

APPLICATION

The **IoT** (Internet of Things) or **IIoT** (Industrial Internet of Things) is a trending topic these days. It's all about bringing devices, sensors, actuators, data and commands to the cloud, with the ultimate goal to improve the quality of life, the services Smart Cities can offer, saving energy or saving money. This requires two things: to vehiculate the collected data to the cloud in a format that can be recognized and processed and to process, compute and analyze all this amount of data in real time.
It is not a concept far from reality. Imagine you'd like to bridge a Modbus Sensor to the cloud. And you'd like to have the application running on the cloud to be able to process multiple sensors' data, and to trigger some event in some specific stations along the network. You may also have the need to override the cloud control and manage the application locally. Any application has its story.

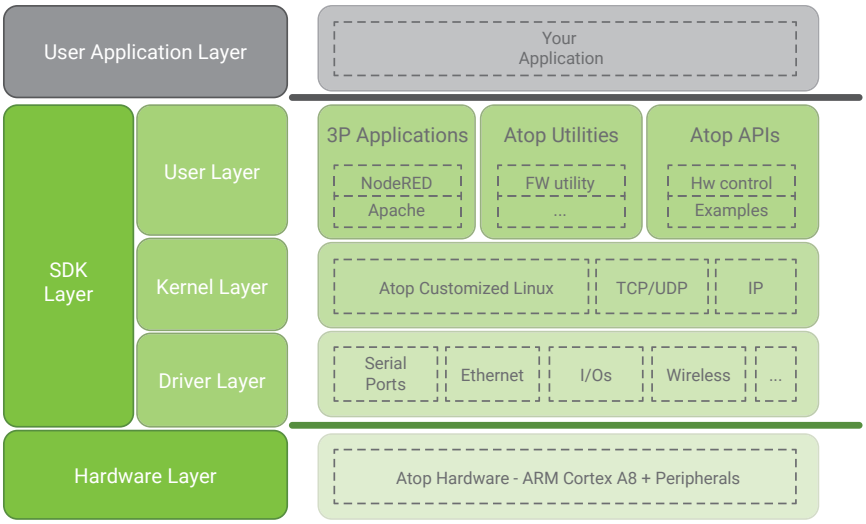
Here at ATOP, we understand these different needs and we are providing you different working models, based on what your needs are.

Use the Standard SDK, programmable embedded computer if:

- You are familiar with Linux OS
- You have ANSI C programming skills
- Your application is strictly time/ performance sensitive
- Your application has very critical exception handling requirements

Our SDK products provide:

- *Ported, proven and tested peripherals (such as I/Os, Ethernet, Serial, Wireless) and integrated drivers*
- *ATOP customized Linux Kernel and network protocols*
- *Ported, debugged and proven third party applications*
- *Utilities and APIs to control the hardware in an easy and effective way*
- *Example of source code*

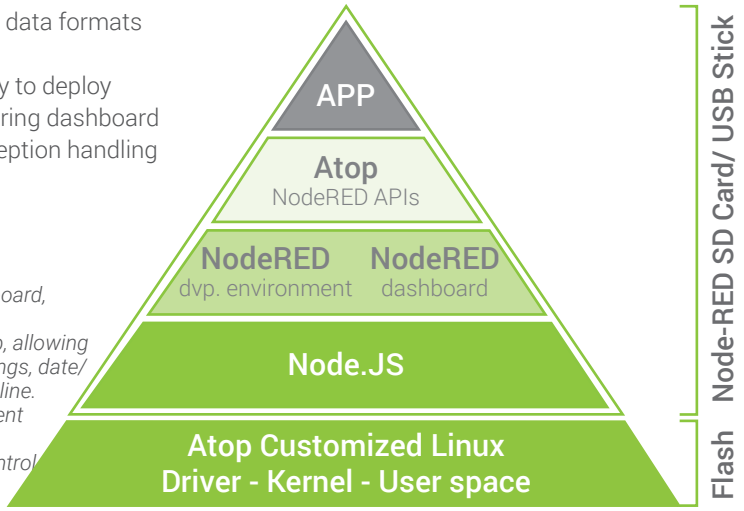


Use ATOP's Node-RED version with the embedded Micro-SD card if:

- You're hands-on, with a good understanding of protocols, data formats
- You have some basic Javascript knowledge
- You're looking for a simple, user-friendly and effective way to deploy your applications to the cloud, with a user friendly monitoring dashboard
- You don't have strict performance requirements, and exception handling is not critical

Our Node-RED version provides:

- *Node-RED visual application development environment and dashboard, with automatic start on device boot-up, Node.JS based*
- *ATOP-customized dedicated Web-UI for user friendly device set-up, allowing you to create VPN tunnels, set-up the network or the Cellular settings, date/ time, diagnostics and much mode without using Linux command line.*
- *Different level of security to allow developers to access development environment and users to access dashboard only*
- *Customized Node-RED APIs (blocks) that will allow you to fully control ATOP powerful hardware and control inputs, relays, Buzzer, diagnostics and much more*
- *Integrated Modbus and MQTT stacks, for seamless communication with field devices and cloud*
- *Integrated AWS, Azure, Google and IBM Bluemix Nodes.*



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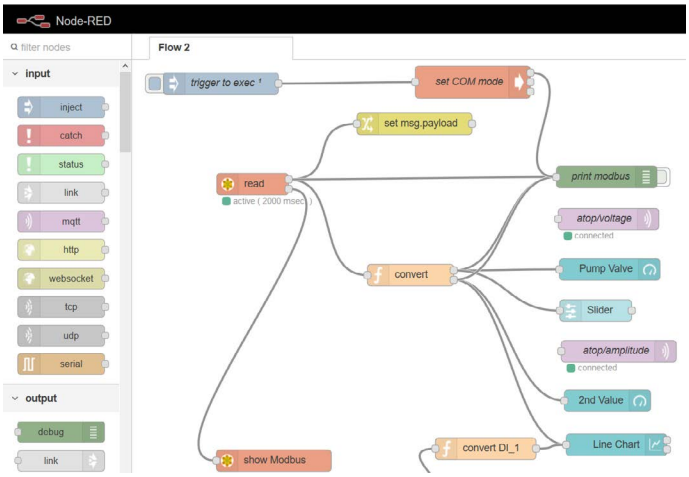
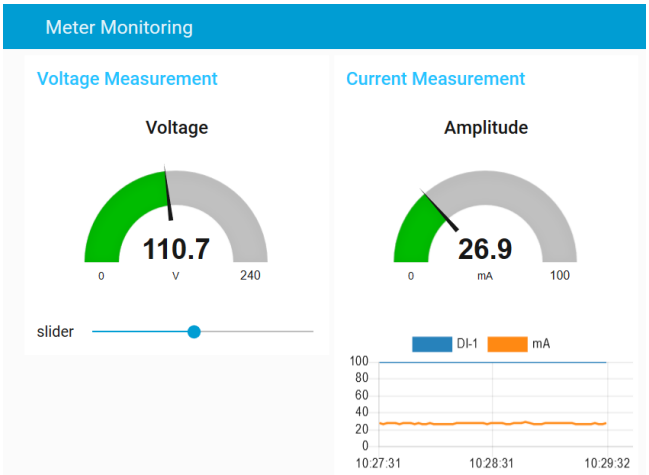
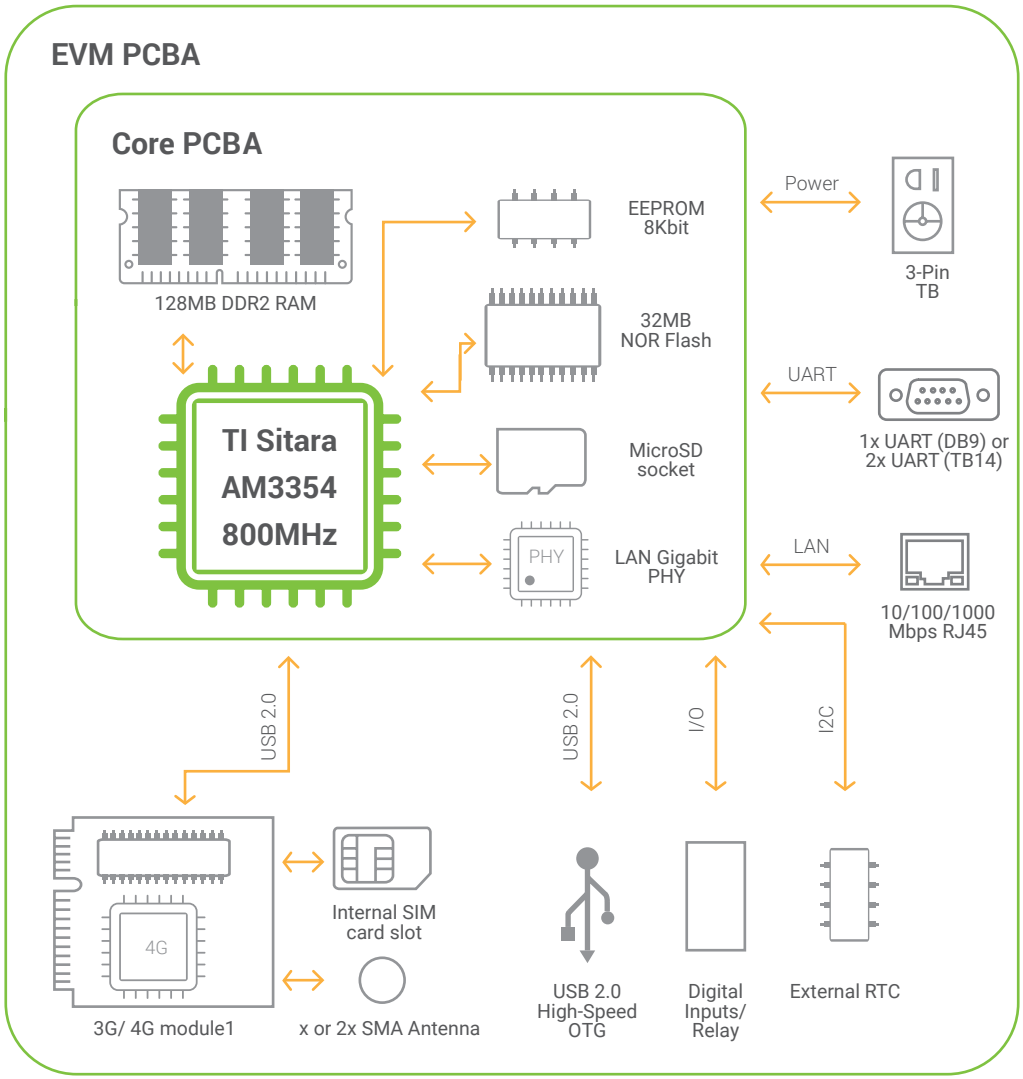
NodeRED development enrivonment



NodeRED dashboard



BLOCK DIAGRAM



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SPECIFICATIONS

Hardware Specifications				
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz			
Flash	SDK version: 32 MB NOR Flash (supports up to 128 MB) Node-RED version: 64 MB NOR Flash			
RAM	SDK version: 128 MB DDR2 (supports up to 256 MB) Node-RED version: 256 MB DDR2			
EEPROM	24LC64			
Watchdog	ADM706			
Real Time Clock (RTC)	Yes - with external chip			
Buzzer	Yes			
Console port	Yes - on-board connector			
Reset button	Yes			
Wireless Interface				
Standard	GSM/ GPRS/ EDGE/ UMTS/ HSPA+/ SCDMA/ LTE			
Wireless Module	EU version: Quectel EC25-E; US version: Quectel EC20-A			
Antennas/ SIM card	1 (3G) or 2 (4G) - Included. Internal SIM card slot (x1)			
Band Options	Version	Band	Bands	
	EU	FDD LTE TDD LTE WCDMA GSM	2100/1800/850/2600/900/800MHz (B1/B3/B5/B7/B8/B20) 2600/2300/2500MHz (B38/B40/B41) 2100/850/900MHz (B1/B5/B8) 900/1800	
	US	FDD LTE UMTS GSM	1900/1700/850/700/700bMHz (B2/B4/B5/B12/B17) 1900/1700/850MHz (B2/B4/B5) 850/1900MHz	
Data Rate	Version	Band	Downlink Speed	Uplink Speed
	EU	LTE-FDD LTE-TDD DC-HSPA+ UMTS TD-SCDMA EDGE GPRS	150 Mbps 130 Mbps 42 Mbps 384 Kbps 4.2 Mbps 236.8 Kbps 85.6 Kbps	50 Mbps 35 Mbps 5.76 Mbps 384 Kbps 2.2 Mbps 236.8 Kbps 85.6 Kbps
	US	LTE-FDD LTE-TDD DC-HSPA+ UMTS TD-SCDMA EDGE GPRS	100 Mbps 61 Mbps 42 Mbps 384 Kbps 4.2 Mbps 236.8 Kbps 85.6 Kbps	50 Mbps 18 Mbps 5.76 Mbps 384 Kbps 2.2 Mbps 236.8 Kbps 85.6 Kbps
Network Interface				
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X) IEEE 802.3ab for 1000BaseT(X)			

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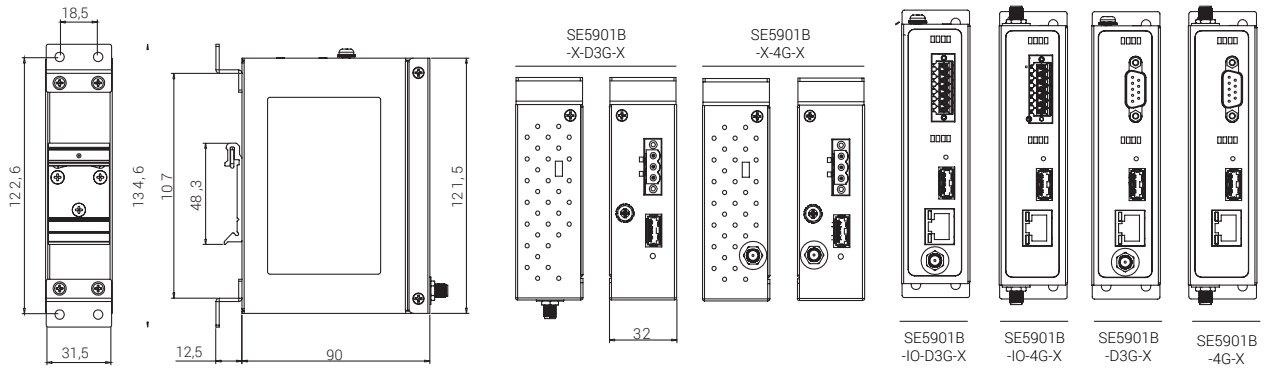
Ethernet Ports	1x 10/100/1000BASE-TX RJ-45	
Serial Interface		
Connector	D-Sub9 RS-232/485 software selectable (DB model) 14-Pin 5.08mm Terminal Block (integrated with DI/DOs)	
Ports	1 port RS-232/485 (2-wire) - (DB Model) 1 port RS-232/485 (2-wire) and 1 port RS-232 (IO model only)	
Configuration	Baud Rate Data Bits Stop Bits Flow Control	50 ~ 921,600bps 7, 8 1, 2 None, Xon/Xoff, RTS/CTS (RS-232 only)
Digital Inputs/Outputs (IO Models)		
Digital Inputs (DIs) Digital Outputs (DOs)	2 channels photo coupler isolated digital input 2 channels relay outputs (normal open; 2A@24VDC)	
GNSS (GPS Models)		
Supported GNSS Connector	GPS, Glonass, Beidou 1x SMA	
Other interfaces		
USB ports	2 x USB A Type (USB 2.0): 1-port High-Speed OTG + 1-port power only	
SD card	Micro-SD card slot (internal)	
Software		
Bootloader	U-boot 2014.07	
Linux kernel	Linux 3.14.26 (SDK version)	
Linux toolchain	Linux 32 bits toolchain gcc (C/C++ PC cross compiler), glibc	
Linux sample code	RS232, RS485, RTC, watchdog, LED, DI, DO, Buzzer, 3G/4G API, SMS, Button, network socket	
Additional features (Node-RED version only)	Pre-installed Node-RED Micro-SD card, with auto-run on startup Dedicated Web UI for device settings Integrated SMS alarm, ARP, DHCP Client/Server (NAT enabled), IPv4, NTP/SNTP client, SNMP v1/v2c/v3, OpenVPN client/server, IPsec, and PPTP.	
Power		
Input Voltage	9-48 VDC - reverse polarity protection	
Connector	3-Pin 5.08mm Lockable Terminal Block	
Power Consumption	0.6A @ 12VDC (7.2 W Max)	
Power Redundancy	USB DC 5V Power Input	
Environmental limits		
Operating Temperature Storage Temperature Ambient Relative Humidity	-40°C~70°C (-40°F~158°F) -40°C~85°C (-40°F~185°F) 5%~95%, (Non-condensing)	
Mechanicals		
Housing	IP30 protection, SPCC metal housing	
Dimensions(W x H x D) Weight	32mm x 122mm x 92mm 400 g	
Installation	DIN-Rail or Wall-Mount (optional kit)	
Reset Button	Yes	

DIMENSIONS & LAYOUT



REGULATORY APPROVALS

Regulatory Approvals				
Safety	UL60950-1/IEC60950-1/EN 60950-1:2006			
EMC/Radio	FCC 47 CFR PART 22H, FCC 47 CFR PART 24H,FCC PART 27L, FCC Part 15B, EN301511,EN301908-1,EN301908-2,EN301489-1,EN301489-7,EN301489-24, EN55032,EN55024, EN61000-6-2,EN61000-6-4			
Test	**Item**		**Value**	**Level**
IEC 61000-4-2	ESD	Contact Discharge Air Discharge	±6KV ±8KV	3 3
IEC 61000-4-3	RS	Enclosure Port	10(V/m), 80-1000MHz	3
IEC 61000-4-4	EFT	AC Power Port DC Power Port Signal Port	±2.0KV ±2.0KV ±1.0KV	3 3 3
IEC 61000-4-5	Surge	DC Power Port DC Power Port Signal Port	Line-to Line±1.0KV Line-to Earth±2.0KV Line-to Earth±2.0KV	3 3 3
IEC 61000-4-6	CS	0.15-80MHz	10V rms	3
IEC 61000-4-8	PFMF	(Enclosure)	AC 50Hz 10A/m	3
IEC 61000-4-11	DIP	AC Power Port	>95%,Reduction,0.5period 30%, Reduction,25 period >95%,Reduction,250 period	-
Shock	MIL-STD-810G Method 516.7			
Drop	MIL-STD-810G Method 516.7			
Vibration	MIL-STD-810G Method 514.7			
RoHS	Yes			
MTBF	20.88 years according to MIL-HDBK-217F (Model average)			
Warranty	5 years			

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ORDERING INFORMATION

Ordering information

Software Type	Model name	Cellular	Serial Ports	I/O	Other
SDK version suffix: (SDK) Node-RED version suffix: -NR	SE5901B-D3G-US	3G (US)	1 (DB9)	-	-
	SE5901B-IO-D3G-US	3G (US)	1 (TB) +1 RS232	2/2	-
	SE5901B-IO-D3G-GPS-US	3G (US)	1 (TB) +1 RS232	2/2	GPS
	SE5901B-4G-US	4G (US)	1 (DB9)	-	-
	SE5901B-IO-4G-US	4G (US)	1 (TB) +1 RS232	2/2	-
	SE5901B-IO-4G-GPS-US	4G (US)	1 (TB) +1 RS232	2/2	GPS
	SE5901B-4G-B-US	4G (US)	1 (DB9)	-	Battery
	SE5901B-IO-4G-B-US	4G (US)	1 (TB) +1 RS232	2/2	Battery
	SE5901B-IO-4G-GPS-B-US	4G (US)	1 (TB) +1 RS232	2/2	GPS - Battery
	SE5901B-D3G-EU	3G (EU)	1 (DB9)	-	-
	SE5901B-IO-D3G-EU	3G (EU)	1 (TB) +1 RS232	2/2	-
	SE5901B-IO-D3G-GPS-EU	3G (EU)	1 (TB) +1 RS232	2/2	GPS
	SE5901B-4G-EU	4G (EU)	1 (DB9)	-	-
	SE5901B-IO-4G-EU	4G (EU)	1 (TB) +1 RS232	2/2	-
	SE5901B-IO-4G-GPS-EU	4G (EU)	1 (TB) +1 RS232	2/2	GPS
	SE5901B-4G-B-EU	4G (EU)	1 (DB9)	-	Battery
	SE5901B-IO-4G-B-EU	4G (EU)	1 (TB) +1 RS232	2/2	Battery
	SE5901B-IO-4G-GPS-B-EU	4G (EU)	1 (TB) +1 RS232	2/2	GPS - Battery
	SE5901B-DB	-	1 (DB9)		
	SE5901B-IO	-	1 (TB) +1 RS232	2/2	
	SE5901B-IO-B	-	1 (TB) +1 RS232	2/2	Battery

Optional Accessories

Model name	Part Number	Description
UN315-1212(US-Y) LV6	505001511200003G	Y-Type (5.08 mm) adaptor, 100-240VAC input, 1.25A @ 12VDC output, US plug
UNE315-1212(EU-Y)LV6	505001511200013G	Y-Type (5.08 mm) adaptor, 100-240VAC input, 1.25A @ 12VDC output, EU plug
ADP-DB9(F)-TB5	59906231G	Female DB9 to Female 3.81mm TB5 Converter
WMK-315-Black	701000000000050G	Black Aluminum Wall Mount Kit
WL-7200-V1 WLAN Dongle	59908002G	802.11b/g/n 300M , USB Dongle