SE5908/ SE5916 (SDK) Series

8 or 16-Port Industrial Ethernet to Serial Embedded Computer

FEATURE HIGHLIGHTS

- Ideal for IoT and IIoT applications; supports NodeRED and dashboard
- Wide -20°C~70°C temperature range for Industrial EMC Protection
- High-performance IPsec VPN throughput; data-rate up to 37.9Mbps*
- 2 x 10/100Mbps Ethernet port
- Up to 16 x RS-232/422/485 port – selectable baud rate up to 921.6 Kbps
- 3 kV optional isolation on the serial ports (supports RS-485/422 only)
- SD Card slot
- Customizable LCM matrix and keypad
- Atop customized Linux SDK environment with reliable APIs
- 100~240VAC or 24~48VDC power input; one Relay Output alarm
- Rugged metal housing in 1U Rack-mount (rack-mount kit included)
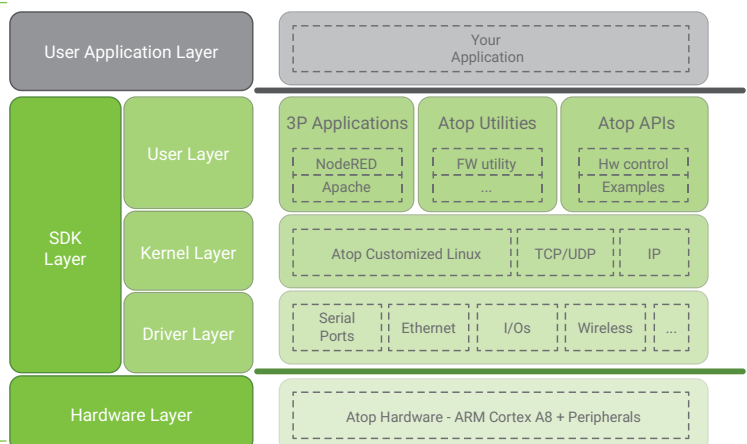
PRODUCT DESCRIPTION

Providing connectivity for the Internet of Things

SE5908/SE5916 (SDK), Atop's Industrial Embedded Computer is your ideal flexible Gateway to the Internet of Things. It provides Serial, Ethernet connectivity and interfaces that can unlock your potential. Based on your specific application, it allowing 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, Serial, I/O, SD card and USB are needed.

And if C Programming bothers you, just add the Atop-Customized NodeRED environment SD-Card to be ready to Go. NodeRED is an open source Building-Block programming environment based on Node.js that will allow you to build your IoT application from an user-friendly, hardware-tailored application design environment.And if also need a user-friendly application dashboard, forget the burden of a HTML-based interface. NodeRED has already all you need.

User Application Layer	Your Application		
	3P Applications	Atop Utilities	Atop APIs
SDK Layer — User Layer	NodeRED / Apache	FW utility / ...	Hw control / Examples
SDK Layer — Kernel Layer	Atop Customized Linux	TCP/UDP	IP
SDK Layer — Driver Layer	Serial Ports / Ethernet / I/Os / Wireless / ...		
Hardware Layer	Atop Hardware - ARM Cortex A8 + Peripherals		

Rugged and flexible for advanced developments

SE5908/SE5916 embeds *high EMC protection, wide temperature operation*, programming and installation flexibility in one device. The device is available in two power input options (100~240VAC or 24~48VDC) and provides one additional relay output

* : test carried out with one VPN-IPsec Tunnel, Peer-to-Peer mode, Ethernet cable.

CE FC RoHS COMPLIANT

v: 0.3

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 Pure-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 (such as Apache webserver)*
- *Utilities and APIs to control the hardware in an easy and effective way*
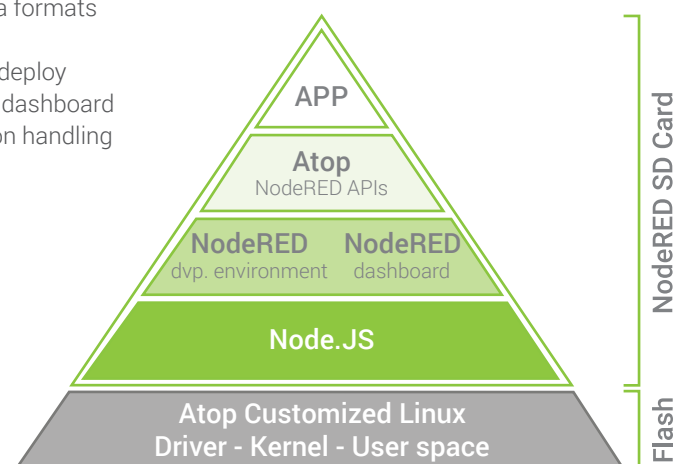- *Example of source code*
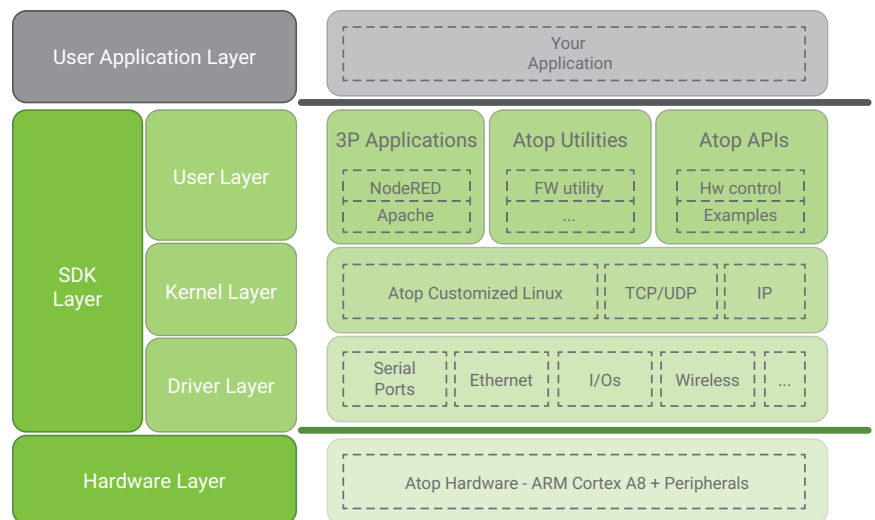
Use Atop's Standard SDK programmable ARM computer with NodeRED Add-ON SD or USB stick card if:
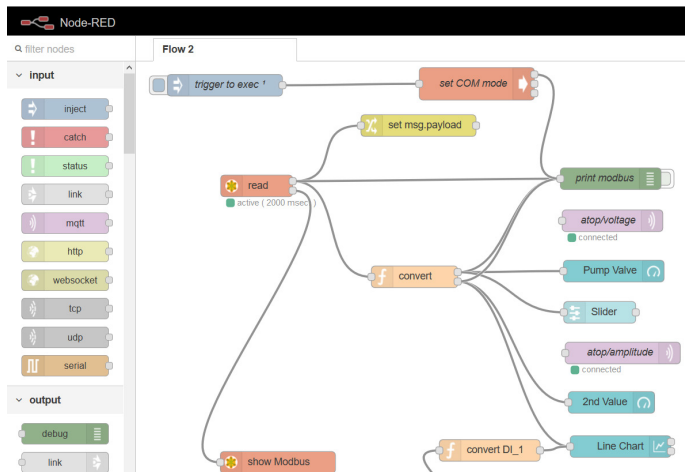
- You're hands-on, with a good understanding of protocols, data formats
- You have some basic Javascript knowledge
- You're looking for a simple, user-friendly and effective way to deploy your applications to the cloud, with a user friendly monitoring dashboard
- You don't have strict performance requirements, and exception handling is not critical
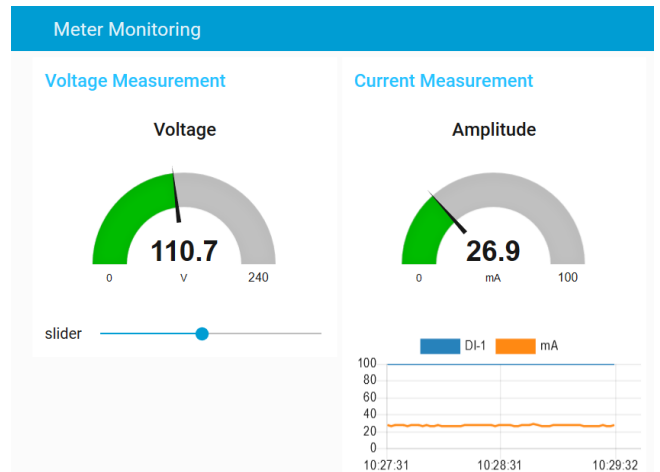
Our NodeRED SD Card provides:

- *NodeRED visual application development environment and dashboard, with automatic start on device boot-up, Node.JS based*
- *Different level of security to allow developers to access development environment and users to access dashboard only*
- *Customized NodeRED APIs (blocks) that will allow you to fully control Atop powerful hardware and control inputs, relays, COM ports, Buzzer, diagnostics and much more*
- *Integrated Modbus and MQTT stacks, for seamless communication with field devices and cloud*
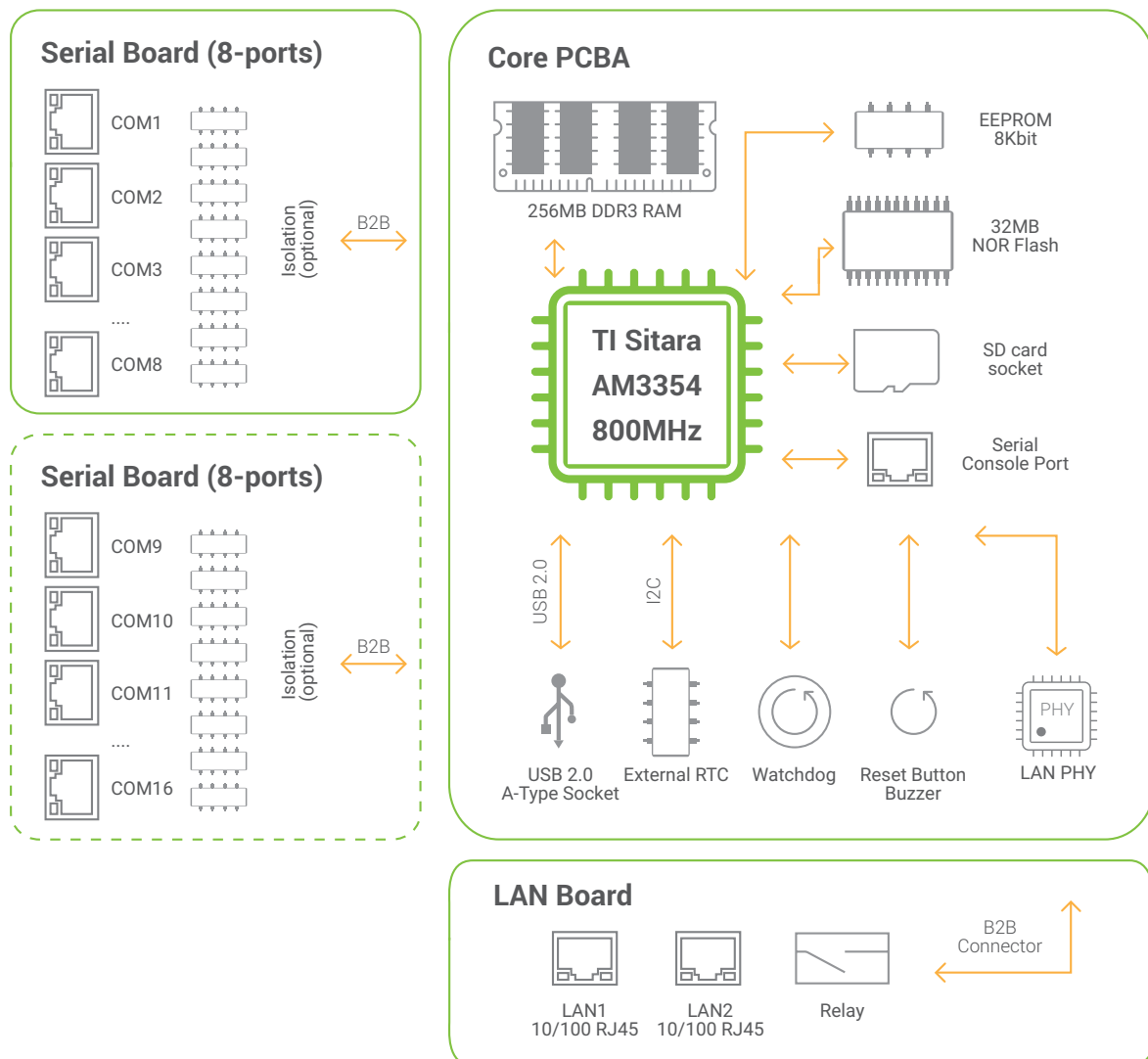
## NodeRED development enrivonment

NodeRED dashboard

Meter Monitoring

Voltage Measurement

Voltage

110.7

0   V   240

slider

Current Measurement

Amplitude

26.9

0   mA   100

DI-1   mA

100
80
60
40
20

10:27:31   10:28:31   10:29:32

BLOCK DIAGRAM

Serial Board (8-ports)

COM1
COM2
COM3
....
COM8

Isolation (optional)   B2B

Serial Board (8-ports)

COM9
COM10
COM11
....
COM16

Isolation (optional)   B2B

Core PCBA

256MB DDR3 RAM

EEPROM 8Kbit

32MB NOR Flash

SD card socket

TI Sitara AM3354 800MHz

Serial Console Port

USB 2.0

I2C

USB 2.0 A-Type Socket

External RTC

Watchdog

Reset Button Buzzer

LAN PHY

LAN Board

LAN1 10/100 RJ45

LAN2 10/100 RJ45

Relay

B2B Connector

SPECIFICATIONS

Hardware Specifications	
CPU	Texas Instruments Sitara ARM Cortex A8 AM3354 800MHz
Flash	32 MB NOR Flash (customizable upon request up to 128 MB)
RAM	256 MB DDR3 (customizable upon request up to 512 MB)
EEPROM	24LC64
Watchdog	ADM706
Real Time Clock (RTC)	Yes - with external chip
Buzzer	Yes
Console port	Yes - on-board connector
Reset button	Yes
Network Interface	
Standards	IEEE 802.3 for 10BaseT IEEE 802.3u for 100BaseT(X)
Ethernet Ports	2x 10/100 BASE-TX RJ-45
Serial Interface	
Connector	RJ45 Connector
Ports	SE5908: 8 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation vers.) SE5916: 16 ports (RS-232/RS-422/RS-485, RS-422/RS-485 on Isolation vers.)
Serial Console	1x Serial Console port (RJ45)
Serial Port Isolation	2.5 kV (SiS version only) - Isolation version supports only RS-422/RS-485
Pull-high / Pull-low /Term. resistors	Software selectable.
Configuration	Baud Rate 50 ~ 921,600bps Data Bits 5, 6, 7, 8 Stop Bits 1, 2 Flow Control None, Xon/Xoff, RTS/CTS (RS-232 only)
Relay Output	
Relay Output	1x 1A@30VDC (Normal open)
Other interfaces	
USB ports	1 x USB A Type (USB 2.0) - internal 1-port High-Speed OTG + power
LCM Matrix	Programmable LCM Matrix with 5-buttons
SD card	SD card slot (internal)
Software	
Bootloader	U-boot 2014.07
Linux kernel	Linux 3.14.26
Linux toolchain	Linux 32 bits toolchain gcc (C/C++ PC cross compiler), glibc
Linux sample code	RS232, RS422, RS485, RTC, watchdog, LED, Relay output, Buzzer, LCM Matrix, Input Buttons network socket
Visual development environment	NodeRED (optional on SD card or USB stick)

Power	
Input Voltage Input Current Power Consumption	DC version: 24 - 48VDC; US-EU version: 100~240 VAC (EU or US Plug) DC version: 0.54 A @24VDC; US-EU version: 0.21A@100VAC Approximately 21 W (Max)
Connector	DC version: 5.08mm 3-pin Lockable Terminal Block EU-US version: IEC 60320-1 C14 AC Power Inlet
Power Redundancy	No
Reverse Polarity Protection	Yes (DC version only)
Environmental limits	
Operating Temperature Storage Temperature Ambient Relative Humidity	-20°C~70°C (-4°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)	436 mm x 43.5 mm x 200 mm
Installation	19" Rack-Mount (Kit included)
Weight	3,000g (8-port version); 3,200 g (16-port version)
Reset Button	Yes

DIMENSIONS & LAYOUT
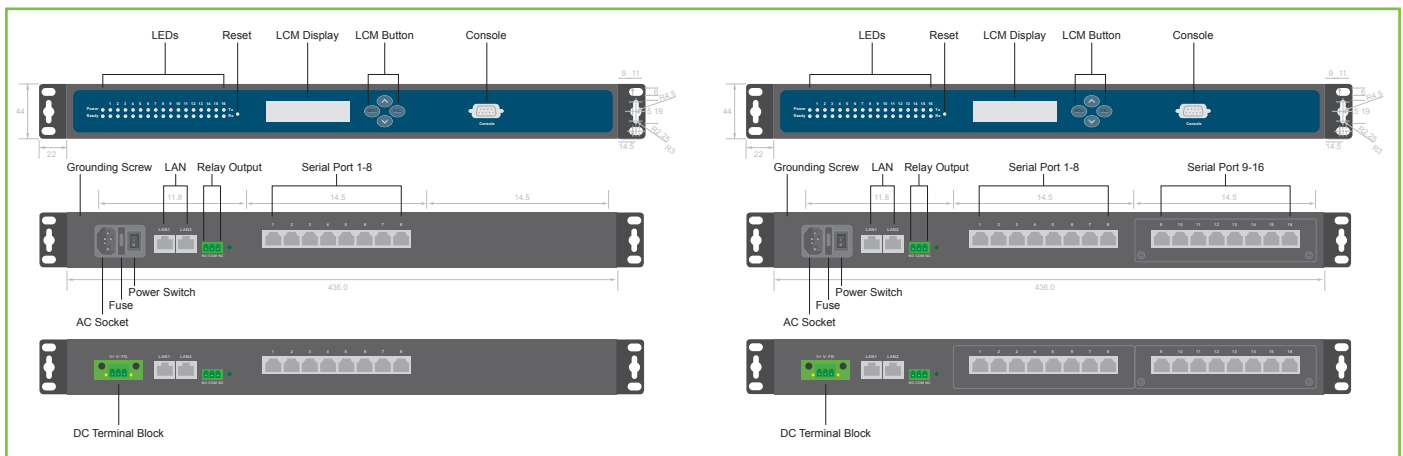
REGULATORY APPROVALS

Regulatory Approvals	
Safety	EN60950-1:2006/ IEC60950-1 LVD
EMC	FCC Part 15, Subpart B, Class B EN 55022, Class B, EN 61000-3-2, EN 61000-3-3, EN 55024

Test		Item	Value	Level
IEC 61000-4-2	ESD	Contact Discharge Air Discharge	±8kV ±15kV	4 4
IEC 61000-4-3	RS	Radiated (enclosure)	10 V/m	3
IEC 61000-4-4	EFT	AC Power Port DC Power Port Signal Port	±4.0KV ±4.0KV ±2.0KV	4 4 3
IEC 61000-4-5	Surge	AC Power Port AC Power Port DC Power Port DC Power Port Signal Port	Line-to Line±2.0KV Line-to Earth±4.0KV Line-to Line±1.0KV Line-to Earth±2.0KV Line-to Earth±2.0KV	4 4 3 3 4
IEC 61000-4-6	CS	AC Power Port DC Power Port Signal Port	10 V rms 10 V rms 10 V rms	3 3 3
IEC 61000-4-8	PFMF	Enclosure	1 A/m	3
IEC 61000-4-11	DIP	AC Power Port	-	-
Shock Drop (Freefall) /Vibration		IEC 60068-2-27 ISTA Test Procedure 2A /IEC 60068-2-64		
RoHS II		Yes		
MTBF		SE5908-DC: 22.74 years; SE5916-US/EU: 13.95 years; SE5908-SiS-DC: 19.00 years; SE5908-SiS-US/EU: 19.03 years; SE5916-SiS-DC: 13.38 years; SE5916-SiS-US/EU: 13.38 years		
Warranty		5 years		

ORDERING INFORMATION

Ordering information

Model name	Ethernet	Serial	Power Input	Remarks
SE5908-N-DC (SDK)	2 (RJ45)	8 (RJ45)	24~48VDC	
SE5908-SiS-DC (SDK)	2 (RJ45)	8 (RJ45)	24~48VDC	2.5kV serial isolation
SE5916-N-DC (SDK)	2 (RJ45)	16 (RJ45)	24~48VDC	
SE5916-SiS-DC (SDK)	2 (RJ45)	16 (RJ45)	24~48VDC	2.5kV serial isolation
SE5908-N-EU (SDK)	2 (RJ45)	8 (RJ45)	100~240VAC (EU)	
SE5908-N-US (SDK)	2 (RJ45)	8 (RJ45)	100~240VAC (US)	
SE5916-N-EU (SDK)	2 (RJ45)	16 (RJ45)	100~240VAC (EU)	
SE5916-N-US (SDK)	2 (RJ45)	16 (RJ45)	100~240VAC (US)	
SE5908-SiS-EU (SDK)	2 (RJ45)	8 (RJ45)	100~240VAC (EU)	2.5kV serial isolation
SE5908-SiS-US (SDK)	2 (RJ45)	8 (RJ45)	100~240VAC (US)	2.5kV serial isolation
SE5916-SiS-EU (SDK)	2 (RJ45)	16 (RJ45)	100~240VAC (EU)	2.5kV serial isolation
SE5916-SiS-US (SDK)	2 (RJ45)	16 (RJ45)	100~240VAC (US)	2.5kV serial isolation

Optional Accessories

Model name	Part Number	Description
USB_NodeRED	-	USB 2.0 Flash Drive, 4GB, NodeRED Libraries included
NodeRED_SD	-	NodeRED SD card
SDR-75-24	50500752240001G	75W/3.2A DIN-Rail 24VDC power supply with 88~264VAC / 124~370VDC input
AD17-24C (US-Y)	50500151240002G	Y-Type power adaptor,100-240VAC input, 0.6A @ 24VDC output, US plug
AD17-24D (EU-Y)	50500151240012G	Y-Type power adaptor,100-240VAC input, 0.6A @ 24VDC output, EU plug
GDC-120	59906861G	120mm copper woven grounding cable
CBL-RJ45(8P)-DB9(M)-90	50891781G	RJ45 to DB9 Male Cable, 90cm
CBL-RJ45(8P)-DB9(M)-200	50891951G	RJ45 to DB9 Male Cable, 200cm
CBL-RJ45(8P)-DB9(F)-90	50891791G	RJ45 to DB9 Female Cable, 90cm
CBL-RJ45(8P)-DB9(F)-90-C	50891971G	RJ45 to DB9 Female Cross Over Cable, 90cm
CBL-RJ45(8)-DB9(F)-200-C	50891961G	RJ45 to DB9 Female Cross Over Cable, 200cm
RMK-718-Black	70100000000040G	Rack Mount Mounting-Kit, Black
Power Cable (US)	50801041G	6 feet Power Cable, US
Power Cable (EU)	50801051G	6 feet Power Cable, EU
Fuse	50709441G	Fuse