

# DS-1201

9/8th Generation Intel® Core™ Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 1x PCI/PCIe Expansion Slot



- Supports 9/8th Generation Intel® Core™ / Pentium® / Celeron® Octa Cores 35W/65W LGA 1151 Processors
- 2x DDR4 SO-DIMM Socket, Supports Up to 2666MHz, 64GB
- Triple Independent Displays: 1x DVI-I and 2x DP (4K Resolution)
- 1x M.2 2280 M Key Socket, Auto-detection for PCIe4x NVMe SSD or SATA Gen3 SSD
- 2x Front Accessible SIM Card Slots for Signal Redundancy
- 1x PCI/PCIe Slot for Add-on Cards (Maximum Length: 235 mm)
- 4x CMI Slots for Modular I/O Expansions
- 1x CFM Slot for Power Ignition Sensing Function
- Wide Operating Temperature (-40°C to 70°C)
- EN50121-3-2 Certified / LVD EN62368-1

## Overview

DS-1201 is a high performance fanless embedded computer, powered by 9/8th Generation Intel® Core™ processor (Coffee Lake) with up to 8 cores and 64GB DDR4 memory capacity for unprecedented performance to fulfill all kinds of high-end computing requirements. The system also incorporates rich I/O, such as 2x Intel® GbE ports, 2x USB 3.1 (Gen2), 4x USB 3.0, 1x DVI-I, 2x DisplayPort, and 1x M.2 Key M 2280 socket for ultra-fast data transfer speed.

Based on Cincoze' innovative CMI & CFM Technology, it allows users to expand I/O and functionalities through ready-to-use modules, such as GbE/PoE ports, serial ports, optical isolated digital I/O and power ignition function. Furthermore, DS-1201 is available with one PCI(e) expansion slot to accommodate versatile add-on cards.

Designed to operate under harsh conditions, DS-1201 has passed rigorous testing like EN50121-3-2 and EN60950-1 to fulfill industrial applications such as rolling stock. Besides, DS-1201 features with wide operating temperature (-40°C to 70°C), wide range DC power input (from 9V to 48V), high tolerance of shock/vibration (5G/50G), and industrial-grade protections (OVP, OCP, ESD Surge, ...etc).

## Highlights



### High Performance

The new 9/8th Generation Intel® Core™ processor (Coffee Lake) offers for the first time up to 8 cores, 16 threads and 1.4 times computing performance improvement comparing to the previous generation (Kaby Lake).



### Fully Modular and Expandable

Featuring PCI/PCIe expansion slot, Mini-PCIe slots, CMI (Combined Multiple I/O), CFM (Control Function Module), and versatile ready-to-use modules, DS-1201 provides great flexibility to configure the system according to your need.



### Wide Temperature

DS-1201 is designed for continuous operation in wide temperature range from -40°C to 70°C. In addition, it also features with anti-shock/vibration and ESD/surge protection for tough industrial environments.

## Specifications

### Processor

- 9th Generation Intel® Coffee Lake-R S Series CPU:
  - Intel® Core™ i7-9700E 8 Cores Up to 4.4 GHz, TDP 65W
  - Intel® Core™ i5-9500E 6 Cores Up to 4.2 GHz, TDP 65W
  - Intel® Core™ i3-9100E 4 Cores Up to 3.7 GHz, TDP 65W
  - Intel® Core™ i7-9700TE 8 Cores Up to 3.8 GHz, TDP 35W
  - Intel® Core™ i5-9500TE 6 Cores Up to 3.6 GHz, TDP 35W
  - Intel® Core™ i3-9100TE 4 Cores Up to 3.2 GHz, TDP 35W
- 8th Generation Intel® Coffee Lake S Series CPU:
  - Intel® Core™ i7-8700 6 Cores Up to 4.6 GHz - 12M Cache, TDP 65W
  - Intel® Core™ i5-8500 6 Cores Up to 4.1 GHz - 9M Cache, TDP 65W
  - Intel® Core™ i3-8100 4 Cores 3.6 GHz - 6M Cache, TDP 65W
  - Intel® Core™ i7-8700T 6 Cores Up to 4.0 GHz - 12M Cache, TDP 35W
  - Intel® Core™ i5-8500T 6 Cores Up to 3.5 GHz - 9M Cache, TDP 35W
  - Intel® Core™ i3-8100T 4 Cores 3.1 GHz - 6M Cache, TDP 35W
  - Intel® Pentium® G5400 2 Cores 3.7 GHz - 4M Cache, TDP 58W
  - Intel® Pentium® G5400T 2 Cores 3.1 GHz - 4M Cache, TDP 35W
  - Intel® Celeron® G4900 2 Cores 3.1 GHz - 2M Cache, TDP 54W
  - Intel® Celeron® G4900T 2 Cores 2.9 GHz - 2M Cache, TDP 35W

### BIOS

- AMI 32MB SPI BIOS

### Chipset

- Intel® Q370

### Memory

- 2x DDR4 2400/2666 MHz SO-DIMM Sockets
- Supports Un-buffered and Non-ECC Type Up to 64 GB

### Graphics

- Integrated Intel® UHD Graphics 630: Core™ i7/i5/i3
- Integrated Intel® UHD Graphics 610: Pentium® /Celeron®
- Supports Triple Independent Display (1x DVI-I, 2x DisplayPort)

### Audio

- Realtek® ALC888
- High Definition Audio

### External I/O Interface

- 1x DVI-I (DVI-D: 1920 x 1200 @60Hz / VGA: 1920 x 1080 @60Hz)
- 2x DisplayPort Connector (4096 x 2304 @ 60Hz, According to CPU Specifications)
  - \* Verified maximum resolution: 3840x2160.
- 2x GbE LAN (Supports WoL, Teaming, Jumbo Frame & PXE), RJ45
  - GbE1: Intel® I210
  - GbE2: Intel® I219-LM
- 2x USB 3.2 Gen2 (TypeA)
- 4x USB 3.2 Gen1 (TypeA)
- 2x USB 2.0 (Type A)
- 2x RS-232/422/485 with Auto Flow Control (Supports 5V/12V), DB9
- 1x PS/2, 6-pin mini-DIN Female Connector
- 1x Line-out & 1x Mic-in, Phone Jack 3.5mm
- 1x ATX Power On/Off Button
- 1x AT/ATX Mode Switch
- 1x Clear CMOS Switch
- 1x Remote Reset Connector, 2-pin Terminal Block
- 1x Remote Power On/Off Connector, 2-pin Terminal Block
- 1x External Fan Connector, 4-Pin Terminal Block (Supports smart fan function)

### Storage

- 2x 2.5" SATA HDD/SSD bay (Gen3), 1x Internal, 1x Front Accessable Supports RAID 0/1
- 3x mSATA (shared by Mini-PCIe socket) (Gen3), BIOS Selectable
- 1x M.2 Key M 2280 Socket, Supports PCIe x4 NVMe SSD or SATA SSD (Gen3)

### Expansion

- 3x Full-size Mini-PCIe Socket
- 2x SIM Socket
- 1x CFM (Control Function Module) Interface
- 2x CMI (Combined Multiple I/O) High Speed Interface
- 2x CMI (Combined Multiple I/O) Low Speed Interface
- 2x Antenna Hole
- 1x PCI/PCIe Expansion slot (with Optional Riser Card)
  - \* Supports maximum dimensions of add-on card (H x L) : 111 x 235 mm

### Other Functions

- Supports Instant Reboot Technology (0.2 sec)
- SuperCap Integrated for CMOS Battery Maintenance-free Operation
- Watchdog Timer: Software Programmable Supports 256 Levels System Reset

### Power Requirement

- Supports AT/ATX Power Type
- Power Input Voltage 9~48VDC
- 1x 3-Pin Terminal Block
- Power Adapter AC/DC 24V/5A 120W or 24V/9.2A 220W (Optional)

### Physical

- Dimensions (WxDxH): 227 x 261 x 108 mm
- Weight: 4.92 kg
- Construction: Extruded Aluminum with Heavy Duty Metal
- Mounting: Wall Mount
- Unibody Chassis
- Fanless Design
- Jumper-less Design

### Protection

- Reverse Power Input Protection
- Over Voltage Protection: Protection Range: 51~58V
  - Protection Type: shut down operating voltage, re-power on at the preset level to recover
- Over Current Protection: 15A

### Operating System

- Windows® 10
- Linux: Supports by project

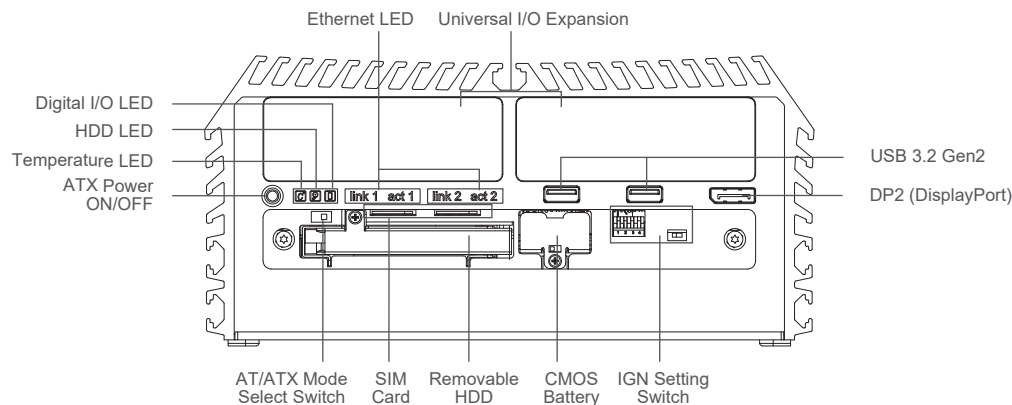
### Environment

- Operating Temperature:
  - 35W TDP Processor: -40°C to 70°C
  - 51~65W TDP Processor: -40°C to 45°C
  - \* PassMark BurnInTest: 100% CPU, 2D/3D Graphics (without thermal throttling)
  - \* With extended temperature peripherals; Ambient with air flow
  - \* According to IEC60068-2-1, IEC60068-2-2, IEC60068-2-14
- Storage Temperature: -40°C to 85°C
- Relative Humidity: 95%RH @ 70°C (non-Condensing)
- Shock: Operating, 50 Grms, Half-sine 11 ms Duration
  - \* w/ SSD, according to IEC60068-2-27
- Vibration: Operating, 5 Grms, 5-500 Hz, 3 Axes
  - \* w/ SSD, according to IEC60068-2-64
- MTBF: 396,565 Hours
- EMC:
  - CE, UKCA, FCC, ICES-003 Class A
  - EN 50155 (EN 50121-3-2 Only)

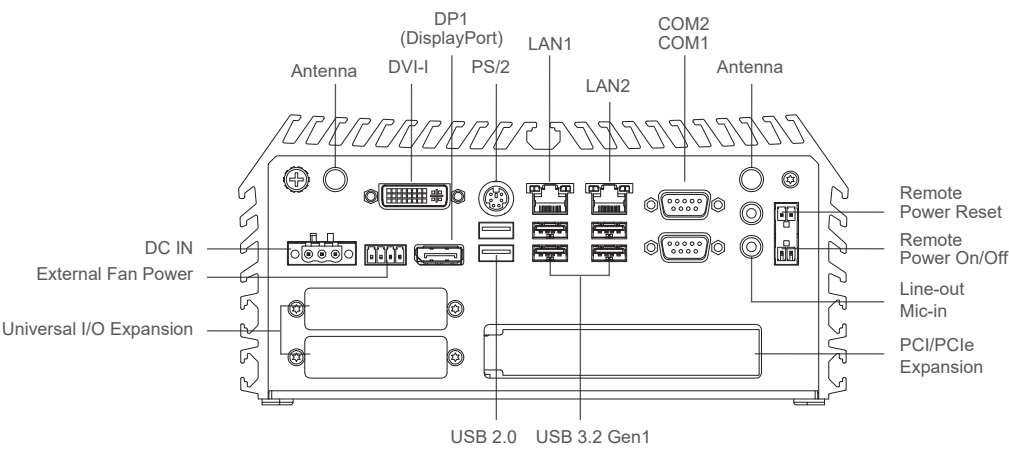
- EMI:
  - CISPR 32 Conducted & Radiated: Class A
  - EN/BS EN 50121-3-2 Conducted & Radiated: Class A
  - EN/BS EN IEC 61000-3-2 Harmonic current emissions: Class A
  - EN/BS EN 61000-3-3 Voltage fluctuations & flicker
  - FCC 47 CFR Part 15B, ICES-003 Conducted & Radiated: Class A
- EMS:
  - EN/IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV
  - EN/IEC 61000-4-3 RS: 80 MHz to 1000 MHz: 20 V/m
  - EN/IEC 61000-4-4 EFT: AC Power: 2 kV; Signal: 2 kV
  - EN/IEC 61000-4-5 Surges: AC Power: 2 kV
  - EN/IEC 61000-4-6 CS: 10V
  - EN/IEC 61000-4-8 PFMF: 50 Hz, 1A/m
  - EN/IEC 61000-4-11 Voltage Dips & Voltage Interruptions:  
0.5 cycles at 50 Hz
- Safety: LVD IEC/EN 62368-1

External Layout

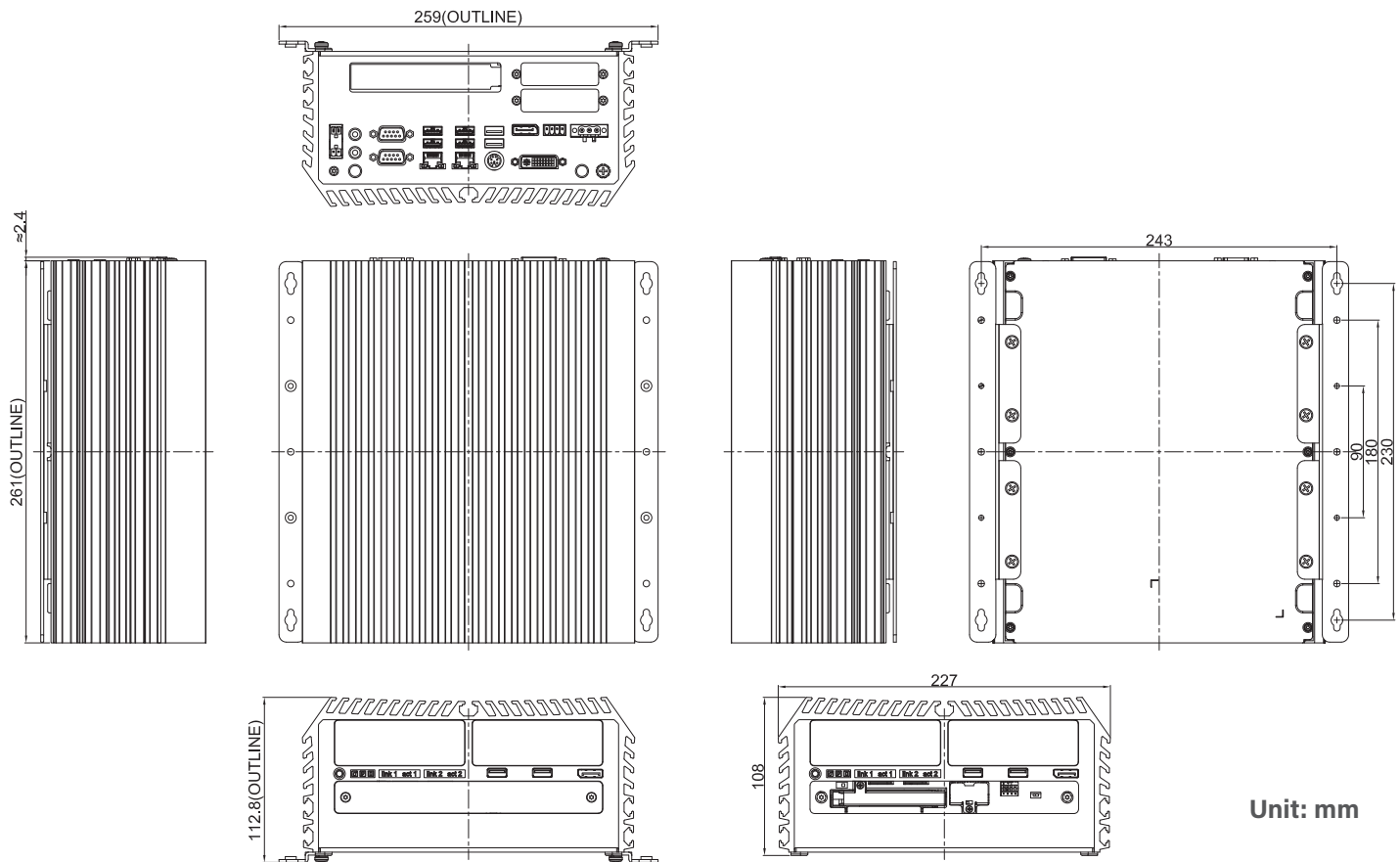
Front I/O



Rear I/O



Dimensions



## Ordering Information

### Available Models

| Model No.   | Description                                                                                                                                        |
|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------|
| DS-1201-R10 | 9/8th Generation Intel® Core™ Series Processors, High Performance, Expandable and Modular Rugged Embedded Computer with 1x PCI/PCIe Expansion Slot |

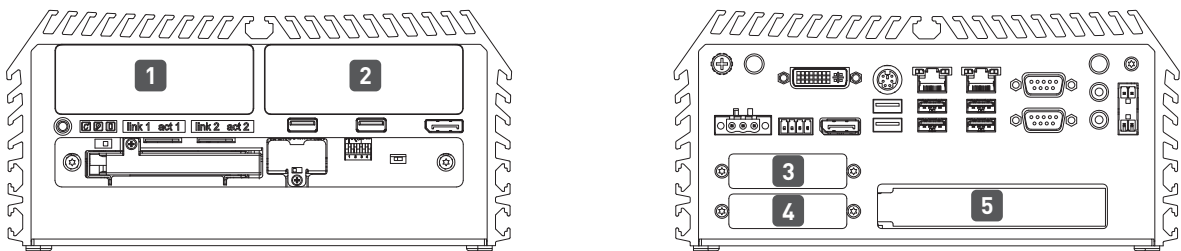
### Package Checklist

- DS-1201 Embedded System x 1
- Heat Sink Pack x 1
- Screw Pack x 1
- Wall Mount Kit x1
- DVI-I to VGA Adaptor
- Power Terminal Block Connector x 1
- Remote Power On/Off Terminal Block Connector x 1
- Remote Power Reset Terminal Block Connector x 1
- Fan Terminal Block Connector x 1

### Optional Modules & Accessories

| Model No.                    | Description                                                                                                       |
|------------------------------|-------------------------------------------------------------------------------------------------------------------|
| CFM-PoE03                    | CFM Module with PoE Function, Individual Port 25.5W                                                               |
| CFM-IGN101                   | CFM Module with Power Ignition Sensing Function, 12V/24V Selectable                                               |
| CMI-LAN01-R12/UB1012         | CMI Module with 4x Intel I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout                       |
| CMI-M12LAN01-R12/UB1010      | CMI Module with M12 Connector, 4x Intel GbE LAN / 1x Universal Bracket with 4x M12 Cutout                         |
| CMI-XM12LAN01-R10/UB1030-R10 | CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports / Universal Bracket with 4x M12 X-Coded Cutout |
| CMI-DIO02/UB1018             | CMI Module with 16DIO (8in 8out) / 1x Universal Bracket with DIO Cutout                                           |
| CMI-COM02/UB1004             | CMI Module with 4x RS232/422/485 Ports (Support 5V/12V) / 1x Universal Bracket with 4x DB9 Cutout                 |
| CMI-ICOM01/UB1004            | CMI Module with 4x Isolated RS232 Ports / 1x Universal Bracket with 4x DB9 Cutout                                 |
| MEC-COM-M212-DB9/UB0303      | Mini-PCIe Module with 2x RS-232 Ports, 1x Standard DB9 Cable / 2x Universal Bracket each with 1x DB9 Cutout       |
| MEC-USB-M102-30/UB0314       | Mini-PCIe Module with 2x USB 3.2 Gen1 Ports, 1x30 cm cable, 1x Universal Bracket with 2x USB Cutout               |
| MEC-LAN-M102-30/UB0311       | Mini-PCIe Module with 2x LAN Ports, 2x 30cm cable / 1x Universal Bracket with 2x RJ45 Cutout                      |
| FAN-EX101                    | External Fan with 4pin Terminal Block Plug, Mounting Bracket, Support smart fan                                   |
| PAH01                        | Power Adapter Holder for GST120A24                                                                                |
| PAH02                        | Power Adapter Holder for GST220A24                                                                                |
| GST120A24-CIN                | Adapter AC/DC 24V 5A 120W, with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, level VI                        |
| GST220A24-CIN                | Adapter AC/DC 24V 9.2A 220W with 3pin Terminal Block Plug 5.0mm Pitch, with TUBES, level VI                       |
| RC-E16-01                    | Riser Card with 1x PCIe16 Slot                                                                                    |
| RC-PI-01                     | Riser Card with 1x PCI Slot                                                                                       |

## Optional Module Configuration



| Model No.                             | Description                                                                                                                                       | 1  | 2  | 3  | 4 | 5  |
|---------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|----|----|----|---|----|
| CMI-LAN01-R12/UB1012                  | CMI Module with 4x Intel I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout                                                       | V  |    | -- |   | -- |
| CMI-M12LAN01-R12/UB1010               | CMI Module with M12 Connector, 4x Intel GbE LAN / 1x Universal Bracket with 4x M12 Cutout                                                         | V  |    | -- |   | -- |
| CMI-XM12LAN01-R10/UB1030-R10          | CMI Module with M12 X-Coded Connector, 4x Intel I210 GbE LAN Ports / Universal Bracket with 4x M12 X-Coded Cutout                                 | V  |    | -- |   | -- |
| CMI-LAN01-R12/UB1012/<br>CFM-PoE03    | CMI Module with 4x Intel I210 GbE LAN, RJ45 Port / 1x Universal Bracket with 4x RJ45 Cutout / CFM Module with PoE Function, Individual Port 25.5W | V  |    | -- |   | -- |
| CMI-M12LAN01-R12/<br>UB1010/CFM-PoE03 | CMI Module with M12 Connector, 4x Intel GbE LAN / 1x Universal Bracket with 4x M12 Cutout / CFM Module with PoE Function, Individual Port 25.5W   | V  |    | -- |   | -- |
| CMI-DIO02/UB1018                      | CMI Module with 16DIO (8in 8out) / 1x Universal Bracket with DIO Cutout                                                                           | V  |    | -- |   | -- |
| CMI-COM02/UB1004*                     | CMI Module with 4x RS232/422/485 Ports (Support 5V/12V) / 1x Universal Bracket with 4x DB9 Cutout                                                 | V  |    | -- |   | -- |
| CMI-ICOM01/UB1004*                    | CMI Module with 4x Isolated RS232 Ports / 1x Universal Bracket with 4x DB9 Cutout                                                                 | V  |    | -- |   | -- |
| MEC-COM-M212-DB9/UB0303               | Mini-PCle Module with 2x RS-232 Ports, 1x Standard DB9 Cable / 2x Universal Bracket each with 1x DB9 Cutout                                       | -- |    | V  |   | -- |
| MEC-USB-M102-30 /UB0314               | Mini-PCle Module with 2x USB 3.2 Gen1 Ports, 1x30 cm cable, 1x Universal Bracket with 2x USB Cutout                                               | -- | V  |    | V | -- |
| MEC-LAN-M102-30/UB0311                | Mini-PCle Module with 2x LAN Ports, 2x 30cm cable / 1x Universal Bracket with 2x RJ45 Cutout                                                      | -- | -- |    | V | -- |
| RC-E16-01                             | Riser Card with 1x PCIe16 Slot                                                                                                                    | -- |    | -- |   | V  |
| RC-PI-01                              | Riser Card with 1x PCI Slot                                                                                                                       | -- |    | -- |   | V  |

\*Maximum one CMI-COM02 or CMI-ICOM01 module can be installed in this system.

V : Compatible