Freescale Semiconductor has years of experience developing sophisticated power management integrated circuits. In the realm of linear and switched mode power supply (SMPS) voltage regulation, Freescale has developed a family of products that combine several popular functions typically used in MCU-based automotive systems. Called System Basis Chips (SBCs), these devices are designed to provide advanced power management and functional safety for the MCU along with additional integrated circuits such as sensors and CAN and LIN transceivers.

System Basis Chips combine low drop out (LDO) voltage regulators, switching voltage regulators, with physical layer transceivers (CAN, LIN), which are the primary functions of the IC. More than a stand alone power management IC, these system oriented solutions help your design in terms of safety, analog and digital flexibility, family device scalability, robustness and finally system cost savings.

Controlled by an MCU through a serial peripheral interface (SPI), SBCs provide power saving modes and functional safety. SBCs are the ideal companion for MCUs to make your embedded system safely powered for automotive and industrial markets.
Automotive + Industrial

Robust, Reliable Performance

Advanced Power Management
- Supply MCU, CAN and other embedded system loads
- Linear (LDO) and Switch Mode Power Supplies (DC/DC) for MCU, physical layers and auxiliary loads

Robust Physical Layer
- Integrated transceivers for CAN and LIN protocols
- Transmit digital information across vehicle network (analog wave) in line with automotive manufacturers and industry standards in terms of electrical, Electromagnetic Compatibility (EMC) and Electrostatic Discharge (ESD) performance

System Management
- Energy Savings: Manage low power modes, with ultra low quiescent current in stand by mode, and wake up of the system
- Functional Safety: Achieve compliance to safety industry standards

Complete Eco-system
- Comprehensive tools and software interface to simplify your design
- EMC compliance reports
- SBCs compatible with Freescale and other MCUs

Leveraging a legacy of automotive analog leadership, Freescale also provides industrial solutions designed for safety, reliability and performance. These robust, reliable high-performance analog mixed-signal and power solutions bridge real world signals with connected processor intelligence enabling complete embedded system solutions. These analog products are designed for a broad array of applications including factory automation systems, industrial networking and power management equipment, portable medical products, smart home and building controls as well as energy storage systems.
An SBC from a Trusted Source

Freescale is one of the top suppliers of automotive semiconductors, for over 30 years, and is leveraging this experience to provide innovative solutions for the industrial market. Freescale was first to supply SBCs into the market over 10 years ago. Freescale’s generation of system basis chips address the needs for robust, low latency networks in systems with increasing electronic automation.

Freescale’s SBCs integrate an energy management module to supply the system MCU, transceiver interfaces to connect with in-vehicle networks and low-power modes to conserve battery life. The SBCs integrate fully certified CAN and LIN interfaces according to latest electrical/ESD/EMC automotive requirements. Devices are pin-to-pin compatible offering customers the scalability desired to meet the needs of multiple platforms.

Freescale is perceived by customers as an essential source of automotive and industrial solutions with high-quality technical support worldwide. Key relationships with OEMs worldwide have led to unique system expertise and network compatibility.

Advanced Safety features

- Monitoring of critical pins 9 (i.e., Reset (RST), Fail Safe (FS))
- Safe pin to drive external ICs in application failure conditions
- Secure critical changes of state machine
- Sense of analog signals (i.e., Vbat, Ivdd, T)
- Programmable fail-safe default status
- Advanced watchdog mechanisms
  - Timeout
  - Window watchdog
  - More advanced for safety related applications (i.e., challenger algorithm on some SBCs)
  - Secured SPI on some SBCs (i.e., parity checks, clock counter)

Innovative Energy Management

- Scalable power supply
- Innovative cranking pulse management
- Energy savings in low power modes (15 µA)

Robust In Vehicle Network (CAN High-Speed and LIN)

- ESD ± 8 kV (150 pF/330 Ohm) gun test
- EMC: Low emission – high immunity in line with market standards
- Various network diagnostics

Our MC33903/4/5 SBCs were recognized as the Data Conversion/Driver/Clock of the Year from China’s Annual Creativity in Electronics (ACE)
SafeAssure Functional Safety Program

Simplify the process of achieving compliance

The focus on safety-critical applications in both the automotive and industrial markets is significantly growing, bringing new and added pressures to systems engineers as they work to solve safety challenges.

The automotive industry is under pressure to provide new and improved vehicle safety systems, ranging from basic airbag deployment systems to extremely complex advanced driver assistance systems (ADAS) with accident prediction and avoidance capabilities. These safety functions are increasingly carried out by electronics, and ISO 26262 is intended to enable the design of electronic systems that can prevent dangerous failures and control them if they occur.

Recent industrial disasters have highlighted the need for improved safety, and an increasing number of industrial control systems are requiring IEC 61508 safety certification. Functional safety is also becoming more prevalent and stringent in markets such as solar energy and aviation, as well as FDA Class III medical. Electronics in industrial markets typically must operate with minimal faults in harsh environments.

Simplifies the process of system compliance, with solutions designed to address the requirements of automotive and industrial functional safety standards

Reduces the time and complexity required to develop safety systems that comply with ISO 26262 and IEC 61508 standards

Supports the most stringent Safety Integrity Levels (SILs), enabling designers to build with confidence

Zero defect methodology from design to manufacturing to help ensure our products meet the stringent demands of safety applications

MC33907/8 SBCs—SafeAssure Solutions

Safety Process—ISO 26262 ASIL D
- Safety measures of architecture and development process (ISO 26262)
- Helps to reduce effort and time on ECU functional safety assessment
- Process definition with dual core lock step MCUs: fault collection control unit (FCCU) monitoring

Safety Hardware—Integrated Safety Architecture (ISA)
- Saves development effort and time as no additional software required (only 1 main MCU)
- Independant voltage monitoring and fail-safe state machine
- High hardware diagnostics to cover single point failure (SPF), latent failure (LT) and common cause failure (CCF)

Safety Software—Secured SBC and MCU Software interactions
- Multiple registers to help software diagnostics, including safe state machine
- Secured SPI communication to access safe state machine
- Advanced watchdog challenger to ensure good MCU synchronization timing

Safety Documentation—Safety enablement provided by Freescale
- Application note for MC33907/8 SBCs and MPC5643L MCU
- Safety manual, failure modes effects and diagnostic analysis (FMEDA) and complete ecosystem for fast, easy development
MC33907/8 SBCs are ISO 26262-Compliant

The MC33907/8 is a switched mode power supply (SMPS) safety architecture concept that demonstrates its capability for ASIL D safety applications per the TÜV SÜD assessment.

MC33907/8 Key Features

- Highly flexible SMPS pre-regulator, allowing two topologies: non-inverting buck-boost or standard buck
- SMPS regulator dedicated to MCU core with 1.2 V up to 3.3 V delivering up to 1.5 A of power
- Linear voltage regulator dedicated to MCU A/D reference voltage or I/Os supply (VCCA) 5.0 V or 3.3 V
- Linear voltage regulator dedicated to auxiliary functions (VAUX), or to a sensor supply (VCCA tracker or independent 5.0/3.3 V)
- Multiple wake-up sources in low power mode: CAN and/or I/Os
- Battery voltage sensing and MUX output terminal
- Enhanced safety block associated with fail-safe outputs
- Six configurable I/Os

MC33907/8 Block Diagram

Integrated Safety

- Independent fail-safe monitoring unit for power management supervision
- Fail-safe inputs for MCU (Fault Collection and Control Unit monitoring) and analog IC error handling
- Advanced watchdog (challenger) for MCU timing monitoring
- Fail-safe outputs (RST and FS pins) to allow system “deactivation” during failure monitoring

Product Longevity Program

These products are supported by Freescale’s Product Longevity Program. For terms and conditions and to obtain a list of available products please see: Freescale.com/productlongevity
Energy-Efficient Solutions

In addition to our corporate thrust for safety, Freescale also has an energy efficiency thrust. The Energy-Efficient Solutions mark highlights selected products that excel in effective implementation of energy-efficient technologies and/or deliver market-leading performance in the application spaces they are designed to address. The need for greater system efficiency has led to the development of SBCs – system basis chips that deliver high efficiency. These are just the latest in a long history of analog system technology that simplifies power management and data communications.

Unique SBC solutions offering dual DC/DC architecture for improved efficiency – up to 85%, the MC33907/8 SBCs support low voltage operation down to 2.7 V for improved system availability. This leading-edge product family combines high-current supply SMPS design with low power mode operation down to 30 µA including wake up by external CAN or I/O inputs.

Freescale Energy Efficiency SBC Segmentation

Transceivers
- High Robustness
- EMC/ESD
- Design for Cost
- CAN FD & CAN Partial Networking

LDO SBCs
- Simple Low Power Modes
- Robustness
- Design for Cost

LDO SBCs with Safety
- Ultra Low Power Modes
- Flexible Power Management
- Medium Functional Safety

SMPS SBCs with Safety
- Energy Efficient (>85%)
- High Current (up to 2.0 A)
- High Functional Safety (fit for ASIL D applications)

Freescale offers different energy efficiency standard solutions for different system needs
Application Examples using Freescale SBCs

In automotive applications, the MC33907/8 SBCs provide the energy management, system management and communications for MCUs in powertrain, engine management, electric vehicle (EV) and hybrid electric vehicle (HEV) controls and battery management systems, gearbox and transmission controls, and steering and suspension controls.

With their assured safety rating and high efficiency, the MC33907 and MC33908 SBCs provide the ideal system solution for powering these complex MCUs.

The MC33903/4/5 and MC33909 provide the right solution for body applications such as body controller modules (BCM), heating, ventilation, and air conditioning (HVAC) and door modules. They are also designed for use on low-end powertrain and safety applications.

Freescale's Extensive Analog and Sensor Automotive Portfolio

Whatever design challenges you encounter, Freescale's broad portfolio of analog and sensor solutions can help you create your next breakthrough automotive design. Our proven lineup includes products in these areas:

Battery/Energy Management
- Alternator regulator chip
- Stop/Start MOSFETs
- Battery monitoring sensors

Safety Automation
- ADAS 77 GHz radar transceiver
- Airbag ECU and crash sensors
- Braking: anti-lock braking system (ABS), electronic stability control (ESC), wheel speed sensor (WSS) control
- Tire pressure monitoring system (TPMS) wireless sensor node

Power Drivers and Switches
- Intelligent distributed controllers
- H-Bridge power drivers
- 3-phase motor pre-drivers
- eXtreme power switches

System Power and Connectivity
- Infotainment power management ICs
- System Basis Chips
- CAN/LIN transceivers
- Multiple switch detection interfaces
Integrated Automotive ECUs

System Basis Chips integrate ECU design requirements to supply the MCU and other loads, manage system low power situations, monitor the environment, set the system in fail-safe state and communicate with the external world.

**Embedded System Solutions for MCUs** – By providing an ideal companion solution for MCUs, SBCs offer a large family of power management solutions dedicated to 8-, 16- and 32-bits. This power management is based on low drop out (LDO) linear regulators, or Switch Mode Power Supply (SMPS) regulators to improve power efficiency.

**Embedded System Availability** – is part of the SBC’s design architecture. When low battery voltage occurs, it is critical to predict the application performance level and implement hardware and software solutions to manage this.

Battery sensing before the reverse battery diode helps the application monitor supply voltage without tank capacitor effect, and reduce the time to decision if low voltage operation is detected.

For LDO SBC solutions such as the MC33903/4/5, Freescale provides configurable reset levels to allow low voltage operations without MCU RST in order to let the system have time for data savings or to reduce the system cost (tank capacitor). On DC/DC SBC solutions such as the MC33907/8/9, Freescale offers configurable Buck/Buck Boost power supply designs that maintain system availability during low voltage operations down to 3.5 V on the battery line (cranking pulse).

**Simplified Embedded Ecosystem** – Combining MCU and SBC is developed to ease ECU development start, including software drivers.

**Product Robustness** – Components like SBCs are connected to the real world through battery line and through in vehicle network cables. They need to sustain harsh environment stresses such as immunity to power injection, or immunity to electrostatic discharges, while minimizing electromagnetic emissions. ESD and EMC techniques are implemented to address these key market requirements from the very beginning of the development.

**Functional Safety** – From a simple watchdog up to an independent safety monitoring unit, Freescale offers a large family of safety-oriented SBCs that help the system provide external hardware redundancy, and set the system in a fail-safe state when a failure occurs. (Page 5)

**Connectivity** – SBC design technology combines energy management and connectivity for efficient energy use in operating modes and system wake up in the lowest power modes by the communication bus through integrated in-vehicle network physical layers.

In addition to significantly reduced development time, highly integrated automotive ECUs offer several other advantages:

- Energy efficiency – Ultra low IQ, power conversion
- Space reduction – PCB design and size optimization
  - Scalability – platform approach
  - Flexibility – I/Os, timings, power management
- System dependability
  - Reliability – fewer solder joints
  - Robustness – against external stresses
  - Functional Safety – MCU checks, fail-safe, secured transitions

**Selecting an SBC**

With several design alternatives, a few simple steps simplify the selection of the right SBC to match the system requirements of the ECU.

- Check connections between SBC, MCU and loads
- Identify power supply requirements
  - MCU supply voltage
  - MCU current consumption
  - ECU load supply voltage
  - ECU load current consumption
- Identify physical layer required
- Identify constraints
  - Wake up sources and events
  - Low power modes
  - Safety requirements

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**Integrated ECU Block Diagram**

[Diagram of Integrated ECU Block Diagram showing Power Supply Network (Vbat line – 12 V), Power, System, Comm., MCU, SPI Control, Safety, Fail Safe, High-Side Drivers, Low-Side Drivers, Motor Driver connections.]
Freescale offers a family of SBCs to cover 16-bit and 32-bit MCUs supply (core and peripherals) as well as 8-bit MCUs.

SBCs are designed to support different MCUs in terms of voltage, current, accuracy and load/line regulation. These products are ideal for your Freescale MCU designs, and can also support other MCUs.

SBCs are proposed in SOIC and LQFP packages with exposed pad for optimized system integration and thermal management.

### Microcontroller Compatibility

Freescale SBCs with CAN and LIN are ideal companions to Freescale microcontrollers.
**Industrial SBC Applications**

Industrial Programmable Logic Controllers (PLCs), Human Machine Interfaces (HMI) and low-voltage motor controls demonstrate industrial applications of how an SBC can simplify powering a microcontroller while providing other system functionality.

In a PLC, the SBC can interface to the 24 V power bus and replace a separate DC/DC converter, LDOs, power drivers for relays and motors and provide the CAN communication physical layer.

In an HMI, the SBC can replace a separate DC/DC converter and LDOs and provide the CAN communications physical layer.

In low-voltage motor controls, an SBC can replace separate DC/DC converter, LDOs and a relay driver.

---

**Programmable Logic Controller (PLC)**

- **24 V Power Bus**: Interfaces with 24 V power bus
- **DC/DC**: Converts power from 24 V to 3.3 V and 5 V
- **LDO**: Low Dropout Regulator
- **MCU MPU**: Central Processing Unit
- **Power Drivers**: Controls relays, motors, etc.
- **LED Backlight**: backlight display

**Human Machine Interface (HMI)**

- **DC/DC**: Converts power from 24 V to 3.3 V and 5 V
- **LDO**: Low Dropout Regulator
- **Ethernet Physical Layer**: Wired Communication
- **CAN Physical Layer**: Wired Communication
- **SDRAM 128 Mb**: Memory
- **FLASH 128 Mb**: Non-volatile Memory
- **SD Card**: Storage
- **USB RS232**: Communication interface
- **Display Graphics**: Display module
- **LEDs**: LED drivers

**Motor Control (Low-Voltage)**

- **DC/DC**: Converts power from 24 V to 3.3 V and 5 V
- **LDO**: Low Dropout Regulator
- **MCU MPU**: Central Processing Unit
- **Display Graphics**: Display module
- **Motor**: Motor control
- **Relay Driver**: Relay control
- **H-bridge**: Motor driver

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Freescale Technology

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**CAN-Based SBCs**

Freescale CAN-based SBCs provide integrated alternatives to a separate CAN physical layer (P/L) and voltage regulator (Vreg). Instead of an entry level SBC that merely combines these two functions into a single packaged IC, the CAN SBC adds low power functionality.

The MC33907 and MC33908 SBCs employ DC/DC conversion for a more efficient power conversion and also has low power capability.

**CAN Physical Layer Features**
- LDO linear power supply 5.0 or 3.3 V, up to 300 mA with an optional external ballast transistor
- LDO auxiliary regulator with ballast transistor (5.0 / 3.3 V configurable)
- CAN interface with internal supply
- Ultra low current consumption in sleep mode (15 µA)
- Fail-safe state machine linked with SAFE pin
- Secured SPI
- Watchdog capability
- High precision VSUP sense monitoring
- Configurable I/O with wakeup feature

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### Freescale CAN-Based SBCs

<table>
<thead>
<tr>
<th>Product Segmentation</th>
<th>CAN P/L</th>
<th>CAN-Based SBCs</th>
<th>LDO SBCs</th>
<th>SMPS SBCs</th>
<th>ASSPs</th>
</tr>
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<tbody>
<tr>
<td>System Basis Chips</td>
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</table>

- **Freescale Products**
  - MC33901
  - MC34901
  - MC33CM0902
  - MC33903P
  - MC33903S
  - MC33903D
  - MC33904D
  - MC3x905S
  - MC33907
  - MC33908
  - MC33909

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<tr>
<th>Part Number</th>
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<td>CAN xcvr + Vreg</td>
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<th>6.5V Pre-regulator</th>
<th>VCore (MCU core)</th>
<th>VCCA (I/O / ATD)</th>
<th>Vaux (auxiliary loads)</th>
<th>VCAN can supply</th>
<th>CAN interfaces</th>
<th>LIN interfaces</th>
<th>IOs</th>
<th>Watchdog</th>
<th>Safety features</th>
<th>Fit for ASIL</th>
<th>LowQ LPOFF</th>
<th>AMUX and battery sense</th>
<th>Fail-safe</th>
<th>Package</th>
<th>Target market</th>
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<td>BCM, HVAC, BMS</td>
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<td>LQFP48eP</td>
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</tbody>
</table>

- **Product Segmentation**
  - CAN H
  - CAN L

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**Application-specific standard products (ASSPs)** add application drivers to functionality of the SBC.

**CAN-Based SBCs**

<table>
<thead>
<tr>
<th>CAN xcvr Vreg</th>
<th>MCU</th>
<th>Appl. driver</th>
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**Freescale CAN-Based SBCs**

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<th>LDO SBCs</th>
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<tr>
<td>MC33901</td>
<td>MC34901</td>
<td>MC33903/4/5 Auto version</td>
<td>MC34903/4/5 Industrial version</td>
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<td>MC34901</td>
<td>MC33CM0902</td>
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<td>1.0 A Buck or Boost 440 kHz</td>
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<td>Time out, window, or advance</td>
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</table>
LIN-Based SBCs
Freescale LIN-based SBCs provide integrated alternatives to a separate LIN physical layer (P/L) and voltage regulator (Vreg). Instead of an entry-level SBC that merely combines these two functions into a single packaged IC, the LIN SBC adds low power and application driver functionality. The intelligent distributed control (IDC) devices integrate an MCU as well as LIN SBC functionality.

LIN Physical Layer Features
- **EMC/ESD**
  - Excellent EMI performance from bus active wave shaping
  - High EMC immunity & ESD robustness
  - Ultra low emissions: (50dBμV max in low frequency, 7dBμV max in high frequency)
- Fast slew rate selectable (>100 kBits)
  - SAEJ2602-2/LIN2.1 options part number selectable
  - Automatic compatibility with 3.3 and 5.0 V MCUs
  - Low sleep current (typical @ 6 μA)
  - Short to ground proof
  - Single battery supply (no 5.0 Vdd required)
  - Dedicated dual edge sensitive wake-up input
  - Control of external voltage regulator through INH

<table>
<thead>
<tr>
<th>Freescale LIN-Based SBCs</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product Segmentation</strong></td>
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<tr>
<td><strong>Freescale Products</strong></td>
</tr>
<tr>
<td><strong>LIN P/L</strong></td>
</tr>
<tr>
<td>LIN xcvr</td>
</tr>
<tr>
<td>Vreg</td>
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<tr>
<td>Appl. driver</td>
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<table>
<thead>
<tr>
<th>Freescale Products</th>
<th>LIN xcvr</th>
<th>LIN xcvr + Vreg</th>
<th>LIN xcvr + Vreg + Low Power + Appl. Driver</th>
<th>LIN Xcvr + Vreg + Low Power + Appl. Driver + MCU</th>
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<tbody>
<tr>
<td>MC33662</td>
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<td>MC33910</td>
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<td>MC33911</td>
<td>MC33912</td>
<td>MC33903S,D</td>
<td>MC33950S,D</td>
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<td>MC33905S,D</td>
<td>MC33907L</td>
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<table>
<thead>
<tr>
<th>Part Number</th>
<th>Physical Layers</th>
<th>System Basis Chips</th>
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<tbody>
<tr>
<td>LIN interfaces</td>
<td>MC33662</td>
<td>MC33663</td>
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<tr>
<td>Standard</td>
<td>LIN2.x</td>
<td>LIN2.x</td>
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<tr>
<td>CAN interfaces</td>
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<td>-</td>
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<tr>
<td>Enable pin</td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td>MCU power supply</td>
<td>No</td>
<td>No</td>
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<tr>
<td>Low power mode stand by current</td>
<td>6 μA</td>
<td>12 μA</td>
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<tr>
<td>System I/Os</td>
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<tr>
<td>Safety features</td>
<td>Tx dominant timeout, TSD</td>
<td>Tx dominant timeout, TSD</td>
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<tr>
<td>System features</td>
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<td>System features</td>
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<tr>
<td>Electrical conformance</td>
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<td>Yes</td>
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<tr>
<td>EMC/ESD certification</td>
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<tr>
<td>Package</td>
<td>SO8</td>
<td>SO14</td>
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</tbody>
</table>

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**Freescale LIN-Based SBCs**
- **LIN P/L**
  - **LIN-Based SBCs**
  - **LIN SBCs**
  - **IDCs**

**LIN xcvr**
**MCU**
**Vreg**
**Appl. driver**

**LIN P/L**
**LIN-Based SBCs**
**LIN SBCs**
**IDCs**
Simplified Ecosystem

Enabling an SBC in your design requires tools, documentation and boards that help to reduce the learning curve. To simplify the design phase, Freescale offers a professional ecosystem that includes evaluation boards (EVBs), evaluation modules (EVMs) and reference design solutions.

Evaluation Modules (SBC + MCU)

KIT33908AEVB and KIT33907AEVB (with graphical user interface) provide easy-to-use EVBs for the MC33907AE and MC33908AE. EVMs such as the Mother Board MC33908 - KIT33908MBEVB, Daughter Board MPC5643L - KITMPC5643DBEVM and Complete kit (includes both) – KIT908-5643EVM provide another simplifying solution.

Application Support

- Application Notes
  - Integrating the MPC5643L and MC33907/08 for Safety Applications (AN4442)
  - Designing the VCORE Compensation Network for the MC33907/MC33908 System Basis Chips (AN4661)
  - MC33907_08 System Basis Chip Recommendations for PCB Layout (AN4766)

- User’s Guide
  - Qorivva MPC5744P Evaluation Board 144LQFP Expansion Board User’s Guide (MPC5744PVEB144UG)

- Electrical and EMC/ESD certification reports with OEM acceptance files

- Thermal prediction tools

- SafeAssure functional safety documentation (Safety Assessment, Safety Manual, FMEDA)

SBC and MCU Ecosystem Development Tools and Kits

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
<th>SBC Reference</th>
<th>MCU Reference</th>
</tr>
</thead>
<tbody>
<tr>
<td>KIT33903B03EVB</td>
<td>MC33903 Evaluation Board</td>
<td>MC33903D</td>
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<tr>
<td>KIT33903B05EVB</td>
<td>MC33903 Evaluation Board</td>
<td>MC33903D</td>
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<tr>
<td>KIT33905B03EVB</td>
<td>MC33903/4/5 Evaluation Board</td>
<td>MC33905D</td>
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<tr>
<td>KIT33905D05EKEVB</td>
<td>MC33903/4/5 Evaluation Board</td>
<td>MC33905D</td>
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<tr>
<td>KIT33907AEVB</td>
<td>MC33907 Evaluation Board</td>
<td>MC33907AE</td>
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<tr>
<td>KIT33908AEVB</td>
<td>MC33908 Evaluation Board</td>
<td>MC33908AE</td>
<td></td>
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<tr>
<td>KITMPC5643DDEVM</td>
<td>MPC5643L EVM Daughter board</td>
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<td>MPC5643L</td>
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<tr>
<td></td>
<td>MPC5744P EVM DB (coming soon)</td>
<td></td>
<td>MPC5643L</td>
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<tr>
<td>KIT33908MBEVB</td>
<td>MC33908 EVM Mother board</td>
<td>MC33908AE</td>
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</tr>
<tr>
<td>KIT908-5643EVM</td>
<td>MC33908/MPC5643L Full EVM</td>
<td>MC33908AE</td>
<td>MPC5643L</td>
</tr>
<tr>
<td>TRK-MPC5604B</td>
<td>MPC5604B/MPC5607B Evaluation Board</td>
<td>MC33905S</td>
<td>MPC5604B</td>
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<tr>
<td>TRK-MPC5634M</td>
<td>MPC5634M Evaluation Board</td>
<td>MC33905S</td>
<td>MPC5634M</td>
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<tr>
<td>MTRCKTSPS5604P</td>
<td>3phase Motor Control Demo (Pictus)</td>
<td>MC33905S</td>
<td>MPC56xxP</td>
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<tr>
<td>MTRCKTSBN5604B</td>
<td>3phase BLDC Sensorless (Bolero)</td>
<td>MC33905S</td>
<td>MPC5604B</td>
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<tr>
<td>MTRCKTSBN5604P</td>
<td>3phase BLDC Sensorless (Leopard)</td>
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<td>MPC5643L</td>
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</table>
Freescale analog products provide system and power management and enhance and simplify system design for several industrial applications including:

- **Factory automation** – PLC, I/O, robotics
- **Home control** – HVAC, elevators, security cameras
- **Energy conversion and storage** – UPS, grid storage, backup storage systems
- **Cordless power tools and smart appliances**
- **Transportation** – Special vehicles/engines, ebikes

Delivering robust, reliable performance, Freescale SBCs provide additional system support to Freescale’s analog portfolio.

<table>
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<tbody>
<tr>
<td>KIT33903BD3EVBE</td>
<td>MC33903 Evaluation Board MC33903D</td>
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<tr>
<td>KIT33903BD5EVBE</td>
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<tr>
<td>KIT33905BD3EVBE</td>
<td>MC33903/4/5 Evaluation Board MC33905D</td>
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<tr>
<td>KIT33905D5EKEVBE</td>
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<tr>
<td>KIT33907AEEVB</td>
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About Freescale Analog Products
Freescale has been a market leader in analog solutions expanding on more than 30 years of innovation. Freescale is a leading provider of high-performance products that use SMARTMOS technology combining digital, power and standard analog functions. Freescale supplies analog and power management ICs that are advancing the automotive, consumer, industrial, medical and networking markets. Analog solutions interface with real world signals to control and drive for complete embedded systems.

Technical Support and Social Media
Freescale takes pride in providing world-class support. Assistance is just a click away at freescale.com/support

Technical Information Center
Freescale engineers offer assistance online or over the phone to meet specific customer needs around the world.

Local Technical Support
Freescale field application engineers are located close to direct customers and are available for direct contact and customer visits.

FAQs
Our vast knowledge base of frequently asked questions (FAQs) is online to offer support 24 hours a day, seven days a week. It is updated and maintained by product experts.

Technical Documents Available at freescale.com
- Engineering Bulletins
- Reference Manuals
- Data Sheets Analog Products Selector Guide (SG1002)
- Safety Manual
- Compensation Network
- Application Note with MCU

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