In the on-demand world, vehicles need to be able to offer a stylized yet simple way to convey complex information to drivers. Instrument clusters need to offer high-resolution colour displays with realistic visual renderings.

NXP's portfolio of instrument clusters covers entry level cost-effective solutions, through 2D and 3D hybrid displays. Each solution combines a full suite of hardware and software tools, complemented by our extensive ecosystem development tools.
Recommended Products for Entry Instrument Cluster

**MCU**
- **iMX-RT1170**: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores
- **MAC57D5xx**: Ultra-Reliable Multi-Core Arm®-Based MCU for Clusters and Display Management
- **MPC560xS**: Ultra-Reliable MPC560xS MCU for Automotive and Industrial Instrument Clusters

**Automotive Ethernet**
- **TJA1120**: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver
- **TJA1103**: TJA1103, ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver
- **TJA1101**: TJA1101B, IEEE 100BASE-T1 Compliant Automotive Ethernet PHY Transceiver

**Signal Conditioning**
- **CD1020**: Low-Cost 22-CH Multiple Switch Detect Interface

**CAN Transceiver**
- **TJA144x**: Automotive CAN FD Transceiver Family
- **CAN Transceivers**: CAN Transceivers
<table>
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<td>Automotive LIN Solutions</td>
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<td>Power Management IC</td>
<td>FS23: Safety System Basis Chip (SBC) Family with Power Management, CAN and LIN</td>
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<td>FS24: Safety Mini CAN FD SBC for Automotive Applications Fit for ASIL-B</td>
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<td>System Basis Chips: System Basis Chips</td>
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<td></td>
<td>VR5500: High Voltage PMIC with Multiple SMPS</td>
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<td>FS5600: Automotive Dual Buck Regulator and Controller with Voltage Monitors and Watchdog Timer</td>
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<tr>
<td></td>
<td>PF7100: 7-Channel Power Management Integrated Circuit for High Performance Applications, Fit for ASIL B Safety Level</td>
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<td>FS4500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver</td>
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<td>FS6500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver</td>
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<td></td>
<td>VR5510: Multi-Channel (9) PMIC for S32G Processor – 8 High Power, 1 Low Power, Fit for ASIL D Safety Level</td>
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<td>MMPF0100: 14-Channel Configurable PMIC</td>
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<td>PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level</td>
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<td>PF5024: Multi-Channel (4) PMIC for Automotive Applications – 4 High Power, Fit for ASIL B Safety Level</td>
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<tr>
<td>LED Backlight Driver</td>
<td>MC33996: 16-Output Switch with SPI Control</td>
</tr>
<tr>
<td>GPIO</td>
<td>PCAL9722: 22-Bit SPI I/O Expander with Agile I/O Features</td>
</tr>
<tr>
<td></td>
<td>PCAL9714: 14-Bit SPI I/O Expander with Agile I/O Features</td>
</tr>
</tbody>
</table>

2D Instrument Cluster Block Diagram
**Recommended Products for 2D Instrument Cluster**

<table>
<thead>
<tr>
<th>Component</th>
<th>Options</th>
</tr>
</thead>
</table>
| **MCU**                    | • i.MX-RT1170: i.MX RT1170: 1 GHz Crossover MCU with Arm® Cortex® Cores  
                             • i.MX93: i.MX 93 Applications Processor Family – Arm® Cortex®-A55, ML Acceleration, Power Efficient MPU  
                             • MAC57D5xx: Ultra-Reliable Multi-Core Arm®-Based MCU for Clusters and Display Management  
                             • MPC564xS: Ultra-Reliable MPC56xS MCU for Automotive and Industrial Instrument Clusters  
                             • MPC560xS: Ultra-Reliable MPC560xS MCU for Automotive and Industrial Instrument Clusters  |
| **Automotive Ethernet**    | • TJA1120: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver  
                             • TJA1103: TJA1103, ASIL B Compliant Automotive Ethernet 100BASE-T1 PHY Transceiver  
                             • TJA1101: TJA1101B, IEEE 100BASE-T1 Compliant Automotive Ethernet PHY Transceiver  |
| **Signal Conditioning**    | • CD1020: Low-Cost 22-CH Multiple Switch Detect Interface                                          |
### Safety SBC
- **FS23**: Safety System Basis Chip (SBC) Family with Power Management, CAN and LIN
- **FS24**: Safety Mini CAN FD SBC for Automotive Applications Fit for ASIL-B
- **VR5500**: High Voltage PMIC with Multiple SMPS
- **FS6000**: Automotive Dual Buck Regulator and Controller with Voltage Monitors and Watchdog Timer
- **PFT100**: 7-Channel Power Management Integrated Circuit for High Performance Applications, Fit for ASIL B Safety Level
- **FS4500**: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver
- **FS6500**: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver
- **VR5510**: Multi-Channel (9) PMIC for S32G Processor – 8 High Power, 1 Low Power, Fit for ASIL D Safety Level
- **MMPPF0100**: 14-Channel Configurable PMIC
- **PF5020**: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level
- **PF5024**: Multi-Channel (4) PMIC for Automotive Applications – 4 High Power, Fit for ASIL B Safety Level

### Sensors
- **Sensors**: Sensors

### CAN Transceiver
- **TJA144x**: Automotive CAN FD Transceiver Family
- **Automotive LIN Solutions**: Automotive LIN Solutions
- **CAN Transceivers**: CAN Transceivers

### LED Backlight Driver
- **MC33996**: 16-Output Switch with SPI Control

### GPIO
- **PCAL9722**: 22-Bit SPI I/O Expander with Agile I/O Features
- **PCAL9714**: 14-Bit SPI I/O Expander with Agile I/O Features

### 3D Instrument Cluster Block Diagram
### Recommended Products for 3D Instrument Cluster

**MPU**

- **iMX95**: i.MX 95 Applications Processor Family: High-Performance, Safety Enabled Platform with eIQ® Neutron NPU
- **iMX6D**: i.MX 6Dual Processors - Dual-Core, 3D Graphics, HD Video, Multimedia, Arm® Cortex®-A9 Core
- **iMX8**: i.MX 8 Family – Arm® Cortex®, A53, Cortex-A72, Virtualization, Vision, 3D Graphics, 4K Video
- **iMX8X**: i.MX 8X Family – Arm® Cortex®, A35, 3D Graphics, 4K Video, DSP, Error Correcting Code on DDR

**MCU**

- **MAC57D5xx**: Ultra-Reliable Multi-Core Arm®-Based MCU for Clusters and Display Management
- **MPC564xS**: Ultra-Reliable MPC56xS MCU for Automotive and Industrial Instrument Clusters
- **MPC560xS**: Ultra-Reliable MPC560xS MCU for Automotive and Industrial Instrument Clusters

**Automotive Ethernet**

- **TJA1120**: TJA1120, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver
- **TJA1103**: TJA1103, ASIL B Compliant Automotive Ethernet 1000BASE-T1 PHY Transceiver
- **TJA1101**: TJA1101B, IEEE 100BASE-T1 Compliant Automotive Ethernet PHY Transceiver
| CAN/LIN Transceiver                  | • TJA144x: Automotive CAN FD Transceiver Family  
• TJA1043: High-Speed CAN Transceiver with Standby and Sleep Mode  
• Automotive LIN Solutions: Automotive LIN Solutions |
|-------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power Management IC                | • VR5500: High Voltage PMIC with Multiple SMPS  
• PF8101-PF8201: 9-Channel Power Management Integrated Circuit (PMIC) for High-Performance Processing Applications  
• PF7100: 7-Channel Power Management Integrated Circuit for High Performance Applications, Fit for ASIL B Safety Level  
• FS5600: Automotive Dual Buck Regulator and Controller with Voltage Monitors and Watchdog Timer  
• FS4500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver  
• FS6500: Grade 1 and Grade 0 Safety Power System Basis Chip with CAN Flexible Data Transceiver  
• VR5510: Multi-Channel (9) PMIC for S32G Processor – 8 High Power, 1 Low Power, Fit for ASIL D Safety Level  
• MMPF0100: 14-Channel Configurable PMIC  
• PF5020: Multi-Channel (5) PMIC for Automotive Applications – 4 High Power and 1 Low Power, Fit for ASIL B Safety Level  
• PF5024: Multi-Channel (4) PMIC for Automotive Applications – 4 High Power, Fit for ASIL B Safety Level |
| Sensors                            | • Sensors: Sensors |
| Signal Conditioning                | • MC33972: MSDI with Suppressed Wakeup |
| Software                           | • i.MX Software: i.MX Software and Development Tools  
• Professional Support for Processors and Microcontrollers  
• NXP Engineering Services: NXP Engineering Services |
| GPIO                               | • PCAL9722: 22-Bit SPI I/O Expander with Agile I/O Features  
• PCAL9714: 14-Bit SPI I/O Expander with Agile I/O Features |

View our complete solution for Digital Cluster.

Note: The information on this document is subject to change without notice.

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