SPC5 32-bit microcontroller Series featuring Power Architecture

October 2015

http://www.st.com/SPC56
SPC5 32-Bit MCU’s

Our History:
30 Years in Automotive and Harsh Environments

Excellence:
Flash Technology and System Solutions Leadership

Service:
Customized supply, tools, Partners Ecosystem

Stability:
Automotive mindset & Internal Source Supply

Quality: Zero Incidence Mentality

A complete family of high performance & entry level microcontrollers with Automotive Quality using e200z Power Architecture® cores
SPC5 32-bit Power Architecture MCU’s with Automotive Quality

More than 100 Part number Available

Interior, Networking & Low Power Applications

Safety Critical Applications & Motor Control

High Performance

ST Tools
3rd parties Network
On line Community
Myst.com

Internal Manufacturing for Supply Assurance

Crolles

Suitable for markets where safety, severe use conditions, reliability & long term supply are key factors for customer success
SPC56 portfolio performance range

PERFORMANCE
- Security
- Safety
- Timing Coprocessor (eTPU)
- Gateway
- High Density Memory
- Package flexibility: LQFP64 and PBGA324

GENERAL PURPOSE
- Cost Effective
- Small packages
- Middle/low densities Memory
- From 48MHz frequencies

Core
- Dual
- 150 MHz
- 4 MB / 256 kB

Core
- Single
- 32 MHz
- 128 kB / 12 kB

Flash/RAM: Dual Voltage Range
- 3.3V
- 5V

Temperature: -40°C to +125°C

Safety
Security/Ethernet
Powertrain

Smallest
Low-Power
Connectivity
Real-time
SPC5 Family segmentation

**D-Line**
- Base element of the family to address automotive applications migrating from an 8-bit to 32-bit solution
- Combines small package and memory footprints with features such as 12-bit ADCs

**B-Line**
- General purpose line to cover a wide range of control applications with widest memory & package scalability
- Wide interface selection and a solutions for real-time load diagnostics management and low-power standby with fast wake-up

**C-Line**
- Focused to gateway applications that require connections to multiple in-vehicle networks supporting various protocols from LIN, SPI, UART, CAN to FlexRay and Ethernet. Optional Cryptography Services Engine

**P-Line**
- Flexible cost-competitive solution to cover a wide range of motor control and safety oriented applications
- Advanced timer with programmable cross triggering unit for easy development of real-time, sensor-less field-oriented motor control solutions and airbag applications. Single and Dual core options

**L-Line**
- for applications that must meet ISO 26262 up to the most stringent ASIL-D level with a single MCU
- Key safety features include lock-step mode, crossbar, eDMA, MPU, temperature sensors, centralized fault collection and control unit, built-in logic and memory self-test, CRC unit, ECC protected memories, voltages and clock-failure detection

**M-Line**
- Entry level for engine propulsion control and automotive transmission control applications
- High performance time processing unit eTPU with DSP capability

**A-Line**
- Dedicated to the specific needs of propulsion control and transmission control applications
- Offering high performance time processing unit eTPU with DSP capability
SPC56 P / L- lines

**Pictus - SPC560P**
- up to 64 MHz Power Architecture
- e200z0h core
- 512kB Program Flash with ECC
- 40kB SRAM with ECC
- 2 x FlexCAN
- 2 x LINFlex
- 4 x SPI
- 2 x 10-bit ADC (S&H)

<table>
<thead>
<tr>
<th>Flash size</th>
<th>SPC560P50</th>
<th>SPC560P044</th>
<th>SPC560P40</th>
<th>SPC560P34</th>
</tr>
</thead>
<tbody>
<tr>
<td>512K</td>
<td>512KFlash / 40KRam</td>
<td>384KFlash / 40KRam</td>
<td>256KFlash / 20KRam</td>
<td>192KFlash / 20KRam</td>
</tr>
</tbody>
</table>

**Pictus - SPC56AP/OP**
- up to 64 MHz Power Architecture
- Single and Dual e200z0h core
- 1 MB Program Flash with ECC
- 4x16kB EEPROM Flash w ECC
- 80kB SRAM with ECC
- 3 x FlexCAN
- 1 x FlexRay
- 2 x LINFlex
- 5 x SPI
- 2 x 10-bit ADC (S&H)

<table>
<thead>
<tr>
<th>Flash size</th>
<th>SPC560P54</th>
<th>SPC56AP50</th>
</tr>
</thead>
<tbody>
<tr>
<td>768K</td>
<td>768KFlash / 64KRam</td>
<td>768KFlash / 64KRam</td>
</tr>
</tbody>
</table>

**Dual Core**

**Leopard - SPC56EL/4L**
- up to 120MHz Power Architecture
- Single (4L) and Dual (EL) e200z4d core
- Lock Step and Decoupled Parallel modes
- 2MB RWW Flash with ECC
- 192kB SRAM with ECC
- EE emulation
- 3 x FlexCAN, 1 x FlexRay, 2 x LINFlex, 3 x SPI
- 2 x 12-bit ADC (S&H)

<table>
<thead>
<tr>
<th>Flash size</th>
<th>SPC564L70</th>
<th>SPC564L60</th>
<th>SPC564L54</th>
<th>SPC564L60</th>
</tr>
</thead>
<tbody>
<tr>
<td>2M</td>
<td>2MFlash / 192KRam</td>
<td>1MFlash / 128KRam</td>
<td>768kFlash / 96KRam</td>
<td>768kFlash / 96KRam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flash size</th>
<th>SPC56EL70</th>
<th>SPC56EL60</th>
</tr>
</thead>
<tbody>
<tr>
<td>2M</td>
<td>2MFlash / 192KRam</td>
<td>1MFlash / 128KRam</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Flash size</th>
<th>SPC56EL54</th>
<th>SPC56EL54</th>
</tr>
</thead>
<tbody>
<tr>
<td>2M</td>
<td>2MFlash / 192KRam</td>
<td>1MFlash / 128KRam</td>
</tr>
</tbody>
</table>
SPC56 M / A- lines

**Andorra - SPC564A**
- e200z4d core (150MHz)
- 4MB RWW Flash with ECC
- 209kB SRAM with ECC
- 3x FlexCAN
- 3x SCI
- 3x SPI
- FlexRay
- 2x 12-bit ADC (S&H)

**Monaco - SPC563M**
- e200z3 core (80MHz)
- 1.5MB RWW Flash with ECC
- 111kB SRAM with ECC
- 2x FlexCAN
- 2x SCI
- 2x SPI
- 2x 12-bit ADC (S&H)

**SPC564A80**
- 4MFlash / 192K+17kRam

**SPC564A74**
- 3MFlash / 160K+17kRam

**SPC564A70**
- 2MFlash / 128K+17kRam

**SPC563M64**
- 1.5MFlash/94K+17kRam

**SPC563M60**
- 1MFlash/64K+17kRam

LQFP144 / LQFP176

LQFP176 / PBGA324
SPC5 development ecosystem
A new Getting Started Package

- SPC5 Studio Eclipse-based IDE
- JTAG debugger
- Discovery and starter kits
- Full-featured evaluation boards
- Calibration adapters available
- Comprehensive support for SPC5 in AUTOSAR applications
  - Low-level drivers for AUTOSAR (MCAL)
  - AUTOSAR starter kits
SPC5Studio Development Framework

- Eclipse Based Open Framework
- Rapid Application Development
- Easy to Get Started
- Easy to Use
- Free on www.st.com

Save more than 80% time resources

Intuitive
Configure
Evaluation Development Production
Build
Debug

Application Examples
Graphic PIN MAP
Drivers
Customize Generated code
Start-up Code

Libraries
RTOS
Open Source
GCC Compiler and Dedicated Debugger
SPC5Studio

Eclipse based Development environment with GCC compiler

- Configurable Start-up Code
- Collection of Application Examples
- Graphic PIN Functionality Configuration
- Graphic Clock tree Configuration
- Flasher
- Peripherals Drivers
- RTOS
- Cryptography library
- Other resources on st.com
  - Flash drivers
  - Lin Drivers

from support for specific task to full fully integrated development environment

Cryptography library

Lin Drivers

Flash drivers

ChibiOS-RT SPC5608Cxx Test Application
SPC5Studio: Pin Map Wizard

- Visual configuration of I/O alternate functions
- Automatic conflict checker
- Automatic generation of configuration code
- Stand-alone configuration summary in .xls format for customer application’s PCB consistency check

All SPC56 lines supported
SPC5Studio: Documentation Wizard

• On line help for
  • SPC5Studio components API
  • Hal drivers API and functionality

Eclipse built-in Template Proposals

Right click on a component for documentation in chm format side by side with source code
SPC5Studio: Application examples Wizard

- Facilitate the selection of one or more fully working application examples for Evaluation boards
- More than 50 Application examples to jump-start the project
- Built with RLA and HAL drivers
- Added in from 2.0 release onward

Add product line filter

Select a product line:
- SPC500 D line
- All lines
- SPC560 B line up to 512k
- SPC560 B line above 512k
- SPC560 P line up to 512k
- SPC560 P line above 512k
- SPC56A P line
- SPC563 M line
- SPC564 G line
- SPC564 C line
- SPC566 B line
- SPC566 E line
- SPC566 L line

Select a target board

Select your search parameters:

<table>
<thead>
<tr>
<th>Device</th>
<th>Drivers</th>
<th>RTOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADC</td>
<td>PAL</td>
<td>ChibiOS/RT</td>
</tr>
<tr>
<td>CAN</td>
<td>PAL</td>
<td>OSLess</td>
</tr>
<tr>
<td>SPI</td>
<td>PAL</td>
<td>OSLess</td>
</tr>
<tr>
<td>ICU</td>
<td>PAL</td>
<td>OSLess</td>
</tr>
</tbody>
</table>

Select:
- a **Device** or
- a **Driver** or
- an **RTOS**

Select an example

<table>
<thead>
<tr>
<th>Application Name</th>
<th>Description</th>
<th>Device</th>
<th>Drivers</th>
<th>RTOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC560BCxx OS-Less Test Application</td>
<td>Test application for the SPC560BCxx created using the OS-Less framework</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>OSLess</td>
</tr>
<tr>
<td>SPC560BCxx OS-Less PWM-ICU Test Application</td>
<td>Test application for the SPC560BCxx created using the OS-Less framework and the PWM-ICU drivers</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>OSLess</td>
</tr>
<tr>
<td>SPC560BCxx OS-Less DSPI Example Application</td>
<td>Test application for the DSPI unit on the SPC560BCxx created using the OS-Less framework</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>OSLess</td>
</tr>
<tr>
<td>SPC560BCxx OS-Less CAN Test Application</td>
<td>Test application for the SPC560BCxx created using the OS-Less framework and the CAN drivers</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>OSLess</td>
</tr>
<tr>
<td>SPC560BCxx OS-Less ADC Test Application</td>
<td>Test application for the SPC560BCxx created using the OS-Less framework and the ADC drivers</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>OSLess</td>
</tr>
<tr>
<td>ChibiOS-RT SPC560BCxx Test Application</td>
<td>Test application for the SPC560BCxx created using the ChibiOS-RT framework</td>
<td>SPC560B5...</td>
<td>PAL Serial</td>
<td>ChibiOS/RT</td>
</tr>
</tbody>
</table>
Embedded Software inside SPC5Studio framework

• RLA (Register Level Access)
  • RLA is a new feature available in SPC5Studio to allow easy and direct access to Micro and peripheral registers.
    • RLA component can be added and configured via Application wizard
  • Consistent programming interface across product lines
  • Simple and useful Test Application available from Wizard for all supported peripherals
    • RLA is already available for Pictus and Monaco lines. All SPC56 lines supported by end 2015
  • Operating system independent / can be used without any operating system

• HAL Drivers
  • Key peripherals supported
    • General Purpose timer, ADC, ICU/PWM, SPI, Timers, CAN, Serial Interface
  • Delivered inside SPC5Studio:
  • Operating system independent / can be used without any operating system
Embedded Software inside SPC5Studio framework

- **Platform Components**
  - Include startup code, interrupt handling framework I/O configuration and drivers required for debug (TIMER, UART, DMA, I/O)
  - All SPC56 product line supported

- **Libraries**
  - Flash drivers
  - Lin Drivers (RPN: STSW-SPC56002FW)
  - Cryptography library for SPC5 MCU's (RPN: SPC5-CRYP-LIB)

- **RTOS**
  - ChibiOS: Portable, open source, compact and extremely fast RTOS. Designed for deeply embedded real time applications, where timings and code size are key factors. Is available for all platforms.
  - mOSEK: Real-Time and networked Operating System compliant to the Osek/Vdx standard and suitable for the development of embedded real-time applications. Available for Monaco platform
## Compiler and Debugger

### Compiler
- GNU “C” compiler for SPC56 MCU’s
- Book E, VLE and SPE Instruction set with GPL3 open source libraries
- 30 days free trial, full feature
- Integrated inside SPC5Studio
- Designed by HighTec, Distributed by ST or ST franchised distributors

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC5-HTCOMP-NLTL</td>
<td>1 year node-locked license granting support</td>
</tr>
</tbody>
</table>

### Debugger
- JTAG Debugger for SPC56 MCU’s
- Compliant with IEEE1149.1 specification
- Designed by PLS, Distributed by ST or ST franchised distributors

<table>
<thead>
<tr>
<th>Order code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPC5-UDESTK-EVAL</td>
<td>USB/JTAG Adapter with perpetual, full-feature, limited code-size (256 kBytes) license</td>
</tr>
<tr>
<td>SPC5-UDESTK-FULL</td>
<td>USB/JTAG Adapter with one-year, full-feature, unlimited code-size license</td>
</tr>
<tr>
<td>SPC5-UDESTK-PLUS</td>
<td>USB/JTAG Adapter with perpetual, full-feature, unlimited code-size license</td>
</tr>
<tr>
<td>SPC5-UDEDEBG-TL</td>
<td>Time-limited (1 year), full-feature, unlimited code-size UDE Starter Kit license</td>
</tr>
<tr>
<td>SPC5-UDEDEBG</td>
<td>Perpetual, full-feature, unlimited code-size UDE Starter Kit license</td>
</tr>
</tbody>
</table>
Promotion and Evaluation Boards

- Two level of boards to satisfy all needs
  - Premium Evaluation boards
    - Access all peripherals, change MCU using socket and mini-modules
    - Port for JTAG and Nexus trace debuggers
  - Discovery/Discovery+ Boards
    - IC soldered on PCB with customer option to change it
    - Embedded debugger
    - Legacy Automotive connector
    - Connectivity Ports (Can / LIN)
    - Arduino-Compatible (Pictus Discovery+ only)

Promote the solution enabling immediate user operation
Connect to other system in automotive environment
Debug your application
Connect extension modules with ST smart power devices
Connect ARDUINO World
SPC56 Discoveries World

SPC56D-Discovery with SPC560D40L1
- order code: SPC560D-DIS
- Embedded debugger (up to 256kByte free)
- Optocoupler for USB isolation,
- All I/O accessible on connectors
- Standard connector (type B)

SPC56L-Discovery with SPC56EL60L5
- order code: SPC56EL70-DISP
- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC56M-Discovery with SPC563M64L5
- order code: SPC560M-DISP
- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)

SPC56B-Discovery with SPC560B54L5
- order code: SPC560B-DIS
- Embedded debugger (up to 256kByte free)
- Optocoupler for USB isolation,
- All I/O accessible on connectors
- Standard connector (type B)

SPC56P-Discovery with SPC560P50L5:
- order code: SPC560P-DISP
- Embedded detachable on board JTAG debugger (up to 256kByte free)
- Can, Lin Connectivity on board (included transceivers)
- Connector Arduino-Compatible
- Standard connector (type A)

SPC56A-Discovery with SPC563A70L5
- order code: SPC564A-DISP
- Can, Lin Connectivity on board (included transceivers)
- Standard connector (type A)
SPC5 Getting Package

it’s available

SPC5 developers world

Buy

st.com e-Store

SPC56L-Discovery+

SPC56D/B-Discovery

SPC56A/M-Discovery+

SPC56P-Discovery+

Contribute

Open Source Community

http://sourceforge.net/projects/spc5-hal

Download

st.com Software Store

Software examples

Libraries

HighTec C/C++ Compiler open source for ST

Support

Video /e-learning on

Follow

@st_world

@st_world
ST network of third parties and partners

• IDE/Compilers
  • Green Hills MULTI
  • Wind River Compiler and Workbench
  • Cosmic Compiler
  • HighTec

• Debuggers/Emulators
  • Lauterbach PowerDebug and PowerTrace
  • PLS UAD/UDE
  • iSystem ic3000
  • Raisonance Rlink

• Calibration tools
  • VertiCal and proprietary calibration solution

• Operating systems and SW
  • EB
  • ETAS
  • Vector
  • STMicroelectronics and partners

• Trainings
  • MicroConsult for products and toolchain
  • Intecs for getting started with Autosar

• Design House
  • Intecs
  • Raw Power
# Ordering Information

<table>
<thead>
<tr>
<th>SPC</th>
<th>56</th>
<th>0</th>
<th>B</th>
<th>50</th>
<th>L3</th>
<th>C</th>
<th>XX</th>
<th>XXX</th>
<th>Y</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core</td>
<td>Memory Size</td>
<td>Temp Range</td>
<td>Package</td>
<td>Conditioning</td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>0: e200z0</td>
<td>30…...128kByte</td>
<td>B: -40 … 105°C</td>
<td>L1: LQFP64</td>
<td>Y: Tray</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>3: e200z3</td>
<td>34……192kByte</td>
<td>C: -40 … 125°C</td>
<td>L3: LQFP100</td>
<td>R: Tape&amp;Reel</td>
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<td>4: e200z4</td>
<td>40……256kByte</td>
<td></td>
<td>L5: LQFP144</td>
<td>X: Tape&amp;Reel 90°</td>
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<tr>
<td>A: e200z0 dc</td>
<td>44……384kByte</td>
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<td>L7: LQFP176</td>
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<td>E: e200z4 dc</td>
<td>50……512kByte</td>
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<td>L8: LQFP208</td>
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<td>54……768kByte</td>
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<td>B3: LBGA256</td>
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<td></td>
<td>60……1MByte</td>
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<td>B4: PBGA324</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>64……1.5MByte</td>
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<tr>
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<td>80……4MByte</td>
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</tr>
</tbody>
</table>

## Custom Version

<table>
<thead>
<tr>
<th>Pictus</th>
<th>Body Acc., Bolero, Gateway</th>
<th>Andorra</th>
<th>Monaco</th>
<th>Leopard</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-Line: X₁X₂X₃</td>
<td>D,B &amp; C-Lines : X₁X₂X₃</td>
<td>A-Line: X₁X₂</td>
<td>M-Line : X₁X₂</td>
<td>L-Line : X₁X₂X₃</td>
</tr>
<tr>
<td>E: On Chip data Flash</td>
<td>F: Full Featured Motor Control (P44/50)</td>
<td>Version</td>
<td>A: 5V, 64MHz</td>
<td>3: 32MHz</td>
</tr>
<tr>
<td>0: No Data flash</td>
<td>M: Motor Control</td>
<td>B: 3.3V, 64MHz</td>
<td>4: 48MHz</td>
<td></td>
</tr>
<tr>
<td>A: Airbag</td>
<td>C: 5V, 40MHz</td>
<td>6: 64MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>G: F+3rd CAN</td>
<td>D: 3.3V, 40MHz</td>
<td>8: 80MHz</td>
<td></td>
<td></td>
</tr>
<tr>
<td>9: 120MHz</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E: On Chip data Flash</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0: No Data Flash</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**
1. Not all combinations available – Refer to Datasheet
www.st.com/SPC56
www.st.com/spc5studio

Join our e2e community on my.st.com
Thank You!

life.augmented
Annex

Lines details

Functional Safety

Data Security
Lines details
SPC56 P-Line (Pictus) and SPC56 L-Line (Leopard)

STMicroelectronics SPC56 P-Line and SPC56 L-Line are dedicated to the specific needs of chassis and safety applications, with specific focus on functional safety and advanced three-phase motor control. The unique modularity and scalability of the architecture provides compatible devices covering the wide range of chassis and safety applications with optimum cost, safety and performance trade-offs.

**KEY BENEFITS**

**Efficient and safe processing of application data**
- High-performance, 32-bit Power Architecture® cores: e200z0 with VLE for best code efficiency, e200z4d dual issue, cache memory, DSP and vector floating point
- The SPC56 P-line is offering low cost functional safety addressing ASIL-B requirements and in variants providing optimized peripherals for electric motor control & airbag systems.
- The SPC56 L-line is an enhanced development with increased safety implementation such as dual core architecture working both in Lock Step and Decoupled Parallel modes addressing the requirements of ISO 26262. Its safety concept, based on hardware implementation, offers a certified ASIL-D turnkey solution easily extensible to SIL3 compliance.

**Improved time to market**
- Compatibility across families through modular peripheral set
- AUTOSAR compliant, maximizing software and tools reuse
- Memory/pin-out/performance scalability
- SPC56EL proven safety integrity

**Reduced system cost**
- SPC56 L functional safety turnkey SIL3/ASILD solution based on HW measures – no need for external MCU
- Fully autonomous dual motor-control units with programmable cross-triggering unit
- Field-oriented three-phase control for best efficiency and EMI performance
- Sensor-less implementation supported with dedicated library and 32-bit processing performance

**Focus on quality**
- Internal manufacturing for supply assurance
- Latest 90 nm automotive-focused technology
- Reinforced validation facilitated by platform approach and maximum IP reusability between product families
- State of the art robust design, design for test (DFT), design for manufacturability (DFM) techniques

**APPLICATIONS**
- ABS & ESC
- Active Suspension
- Electronic Power Steering
- Airbags
- Safety domain controller
- Braking
- Driver assistance
- Advanced motor control
SPC56 B / C / D- lines

SPC56 B-Line (Bolero), SPC56 C-Line (Gateway) and SPC56 D-Line (Body Access)

STMicroelectronics SPC56 B-Line, SPC56 C-Line and SPC56 D-Line are dedicated to the specific needs of body and convenience applications with focus on networking and security. The unique modularity and scalability of the architecture provides compatible devices covering the wide range of chassis and safety applications with optimum cost, safety and performance trade-offs.

KEY BENEFITS

Efficient Implementation
- The family features a module dedicated to the control of car lighting, providing real-time diagnostic feedback for 100% of the loads. It extends the capability of existing systems as each channel can be configured on the fly for incandescent lamps and LEDs through software.
- A sophisticated low-power management allows for a quantum leap in power saving, avoiding the use of a secondary microcontroller. The low-power and wake-up concepts support LIN and CAN communication from standby mode. STOP mode supports Pretended Networking, with consumption below 4 mA.

Improved time to market
- Standard core for maximum reuse
- Designed for AUTOSAR
- Memory/pin-out/performance scalability
- Compatibility of product family

Reduced system cost
- Lighting module with diagnostic
- EEPROM emulation support
- Improved EMI
- Innovative power management concept
- Dual on-chip RC oscillators

Power and robustness
- Z0h - Z4d Power Architecture Core- Dual core options
- ECC on all memories
- Memory/register protection functions
- Clock security system/backup oscillator
- CPU clock independent watchdog
- Injection robust I/Os

Focus on quality
- Zero defect strategy from design to production
- Internal manufacturing
- Latest 90 nm automotive-focused technology

APPLICATIONS
- Body Control Module (BCM)
- Smart junction box
- Comfort module
- Gateway
- Security/access
- Door module
- Seat module with sensor-less positioning
- Led Lighting
SPC56 M-Line (Monaco) and SPC56 A-Line (Andorra)

SPC56 M-Line and SPC56 A-Line are dedicated to the specific needs of high-performance time processing applications such as mid-range engine propulsion control and automotive transmission. The MCUs family offers an enhanced high-performance time processing unit (eTPU) with DSP capability.

KEY BENEFITS

**eTPU2**
- Enhanced co-processor designed for timing control. Operating in parallel with the host CPU, the eTPU2 processes instructions and real-time input events, performs output waveform generation and accesses shared data without host intervention. Consequently, for each timer event, the host CPU setup and service times are minimized or eliminated. A powerful timer subsystem is formed by combining the eTPU2 with its own instruction and data RAM. ST’s high-level assembler/compiler library allows customers to develop their own functions on the eTPU2.

**Tight emission control**
- High-performance cores integrating digital-signal processing and vector floating-point computation for the SPC563M product lines, in addition to cache memory and dual-issue pipeline for the SPC564A line
- Dual ADCs with variable-gain input amplifier and decimation filter allowing knock detection integration

**APPLICATIONS**
- Gasoline port injection
- Gasoline direct injection
- Diesel direct injection
- CNG/LPG engine control
- Automated manual transmission
- Electric traction
- Battery charger system
- Bidirectional power converter

**Improved time to market**
- Compatibility across families through modular peripheral sets
- AUTOSAR compliant, maximizing software and tools reuse
- Memory/pin-out/performance scalability

**Reduced system cost**
- Very high I/O availability in QFP packages
- Innovative calibration concept and tools support
- Requires only one linear 5 V voltage regulator (SPC563M family)
- On-chip integration of CRC unit and FlexRay controller (SPC564A family)

**Focus on quality**
- Internal manufacturing for supply assurance
- Latest 90 nm automotive-focused technology
- Co-development of technology and state-of-the-art design methodology for zero defects