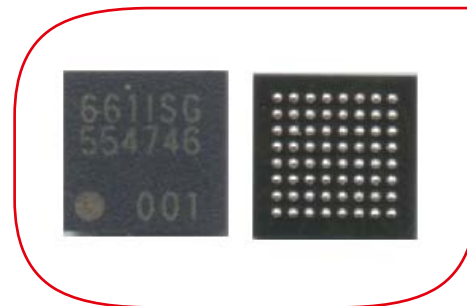


## > TC35661SBG

**SINGLE CHIP CONTROLLER  
FOR BLUETOOTH CLASSIC (3.0+EDR)  
AND BLUETOOTH LE (4.0)**



The TC35661SBG is a highly integrated RFCMOS Bluetooth device which supports Bluetooth Classic (3.0+EDR) and the new BT LE (low energy) 4.0 standard. This product supports the standard Bluetooth HCI interface and offers integration of stack and selected BT profiles on-chip. Through its WIFI coexistence interface it supports the BT3.0-HS function. The device realises an easy way to integrate Bluetooth for various industrial, medical and automotive applications. Toshiba has tested the Bluetooth interoperability extensively. All Toshiba Bluetooth devices and software are BQB qualified.

### > KEY BENEFITS

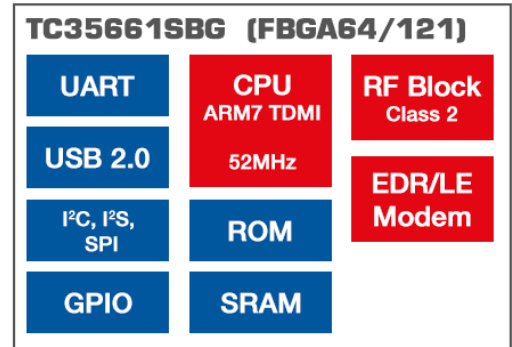
- Dual Mode core for classic and new Bluetooth 4.0 standard
- Proven interoperability of Bluetooth hardware and software
- Flexible system architectures through
  - HCI model
  - Embedded Profile Model
  - Stand Alone Model
- Optional embedded on-chip Bluetooth stack and profiles for easy made Bluetooth system design
- Stand Alone operation for small application feasible without Host MCU
- Two layer PCB design feasible (@ 0.8mm ball pitch) for low cost design
- Ultra low BoM due to very few external components
- Multiple programmable IO options
- On-chip voltage controller and low power modes
- Consumer and Automotive Qualification (AEC-Q100)

System	System Configuration	Product ID(*)
HCI	HCI	TC35661-007
Embedded Profile	SPP	TC35661-203
	HID	TC35661-100
	BLE	TC35661-300
	SPP+BLE	TC35661-501
	SPP+HID	TC35661-600
Stand Alone With Profile	SPP Stand Alone	TC35661-700
	BLE Stand Alone	TC35661-5XX

(\*) SUBJECT TO FIRMWARE UPDATES. SUBJECT TO CHANGE WITHOUT NOTICE.

## > FEATURES

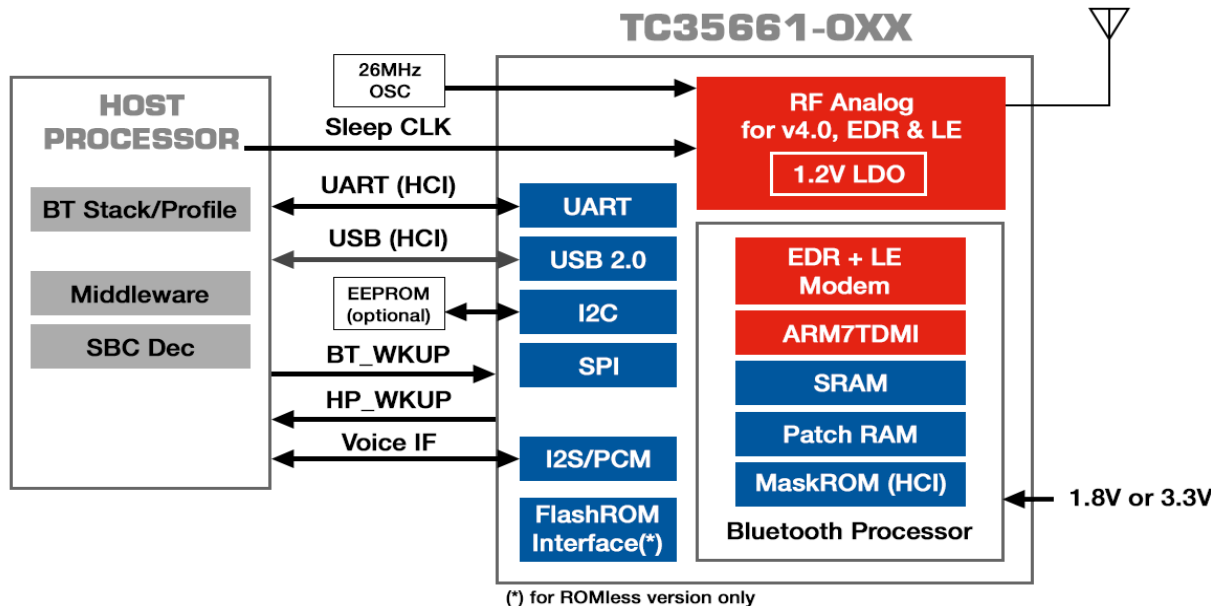
- Bluetooth Core Spec 3.0 and 4.0, EDR and LE support
- TC35661-0XX: HCI type
- TC35661-XXX: embedded profile type
- BT Class 2 support
- RF Sensitivity -91dBm typ.
- Baseband with ARM7TDMI - 13 to 52 MHz
- On-chip ROM, RAM, incl. Patch-RAM
- ROMless version available
- On-chip Balun, Antenna SW, LNA, LDO
- Interfaces: UART, SPI, USB2.0(FS), I2C, I2S/PCM, GPIO
- IEEE802.15.2. 2/3/4 coexistence interface
- Data Transfer up to 2 Mbps (DH5 packets) net
- Package: 64ball BGA (ROM version) - 0.5/0.8 mm pitch
- Package 121ball BGA (ROMless version) - 0.65mm pitch
- Operational Voltage: 1.8V or 3.3V (typ.)
- Low power sleep mode 30uA (max)
- Operation Mode <30mA (depends on packet-type and selected operational mode)
- AEC-Q100 automotive qualification (under development)



Block Diagram

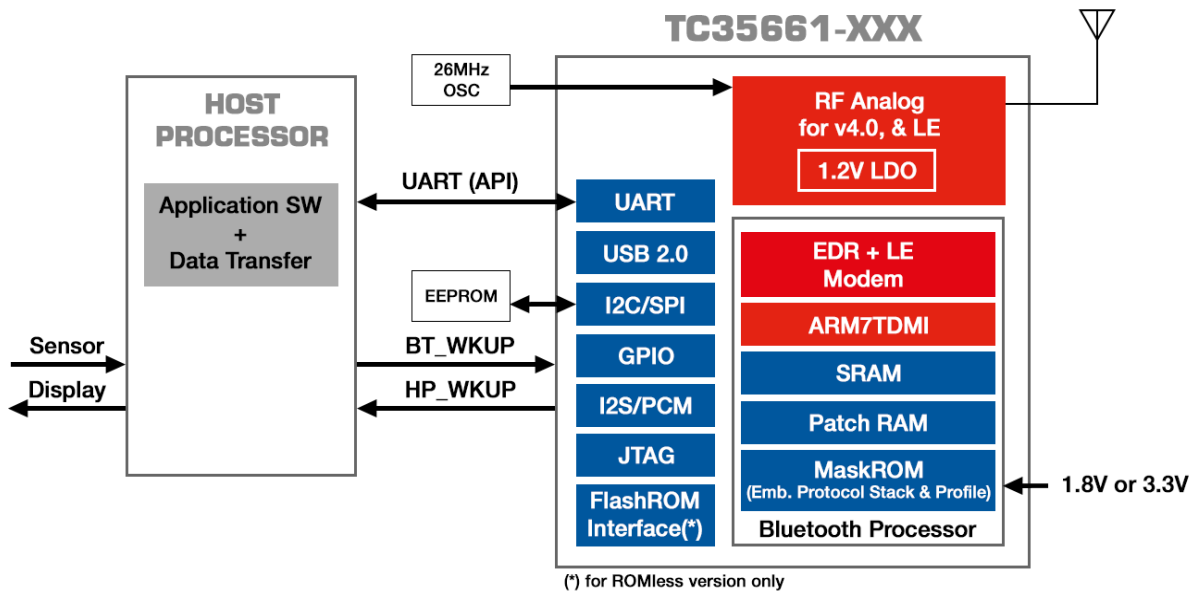
## > HCI SYSTEM CONCEPT

The Bluetooth HCI (host controller interface) model: the low layer stack (RF, LC, LM) runs on the TC35661SBG device (ROM or external flash memory). Through a UART or USB it is connected to an external host processor, which executes the upper Bluetooth stack (L2CAP, RFCOMM) and profiles. Beyond the upper stack the host processor runs the application software. This application processor may also run additional tasks such as middleware and multimedia functions. This concept is suitable for voice and data.



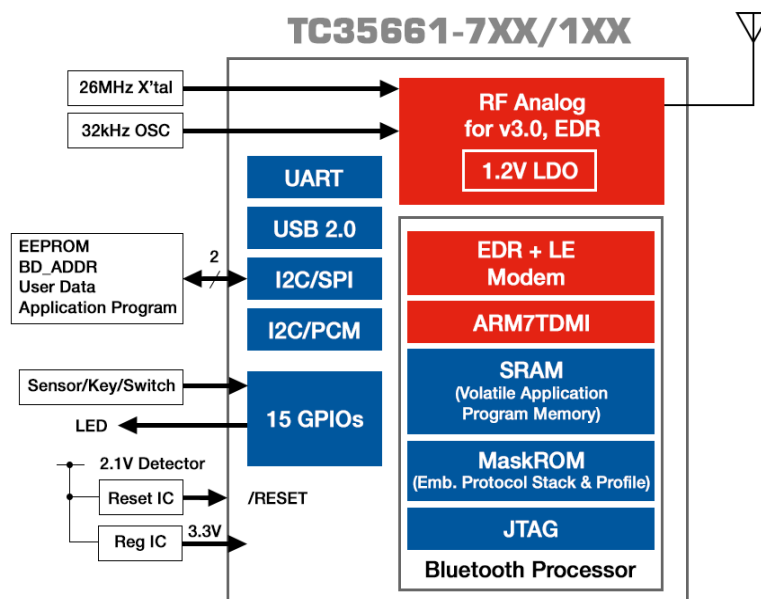
## > EMBEDDED PROFILE SYSTEM CONCEPT

The Embedded Profile model integrates both the lower and upper stack as well as some selected profiles in the TC35661SBG (ROM or external flash memory). The UART interface carries the data of a higher layer API. The whole Bluetooth functionality is managed by the Bluetooth LSI. The host processor only handles the application data. Depending on the complexity of the application the host CPU performance requirement can be very minor. This concept is for data only. The Embedded Profile models for BT4.0 feature Smart Ready (dual mode) or Smart (BLE single mode) Bluetooth marking.



## > STAND ALONE SYSTEM CONCEPT

TC35661 can be run without an additional host MCU for small applications. The application code gets stored into the attached EEPROM. After RESET the code is boot loaded into the embedded SRAM of TC35661-7xx/1xx and executed by the Bluetooth processor itself. This feature is available together with devices containing the Bluetooth stack with embedded SPP profile (-7xx) or HID profile (-1xx) in ROM. Toshiba uses commercial debugger software to allow evaluation of the application code.



## > EMBEDDED PROFILE SOFTWARE MODELS

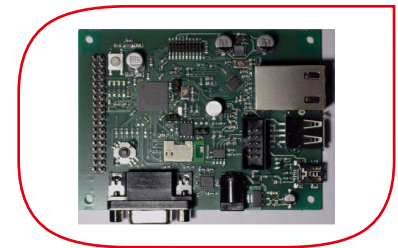
TC35661-2XX		TC35661-3XX		TC35661-5XX			
Profile API		Profile API		SPP-API	GATT-API		
SDP GAP	SPP	GATT Profile		SDP GAP	SPP	GATT	SMP
	RFCOMM	Attribute Protocol			RFCOMM	Attribute Profile	
	L2CAP	L2CAP			L2CAP		
LC/LMP (v4.0)		LC/LMP (v4.0)		LC/LMP (v4.0)			
RF Driver		RF Driver		RF Driver			
with Serial Port Profile (SPP) for wireless cable replacement		with Generic Attribute (GATT) profile for BT 4.0 BLE enabled accessory products		with GATT and SPP profile for BT 4.0 dual mode enabled accessory products			

## > BLUETOOTH STARTER KIT

The BMSKTOPASM369BT(kc) starter kit makes it possible to quickly and easily evaluate Toshiba's Bluetooth® Dual Mode LSI TC35661-5xx in combination with Toshiba CortexM3 MCU as host MCU. It is made to execute the Toshiba Bluetooth Driver software and debug user application code via an embedded J-Link debugger interface. The TMPM369FDG Microcontroller offers embedded Ethernet, CAN, USB host, USB device and RS-232 connectivity.

Starter Kit Content:

- Toshiba TOPAS369BT Board
- Segger J-Link JTAG/SWD Emulator with USB interface
- J-Link 19-pin Cortex-M Adapter
- USB Cable
- Rapid Start-up Guide



For details please visit our Bluetooth home page [www.toshiba-components.com/bluetooth](http://www.toshiba-components.com/bluetooth)

## > BLUETOOTH USB EVALUATION STICK

Quickly and easily evaluate designs with the USB evaluation stick for TC35661SBG. The stick has a USB to UART converter and allows hardware access to the module pins. Two USB sticks for Bluetooth® link tests are available as a kit which includes:

- Easy Rx and Tx measurement
- Basic API commands
- Stream and Command Mode



Evaluation software is necessary to operate the USB stick and you can download it from Panasonic Industrial Devices Europe. The USB evaluation stick with SMD Module PAN1026 is manufactured by Panasonic Industrial Devices Europe. For ordering and product details please contact Panasonic Industrial Devices Europe.

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