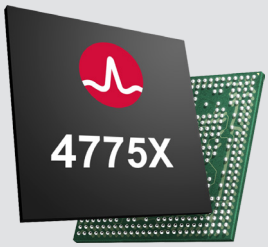
BROADCOM®

Product Brief

BCM4775X

GNSS Receiver with Integrated Sensor Hub



Key Features

- Integrated multi-frequency GNSS baseband and RF front end for simultaneous reception of GPS, GLONASS, BeiDou (BDS), Galileo (GAL), and SBAS satellite systems
- Support for position batching, geofencing, sensor fusion and sensor navigation
- ARM-based 32-bit Cortex-M4F (CM4) CPU:
  - Single-precision Floating Point Unit (FPU)
  - Memory Protection Unit (MPU)
  - 1.125 MB internal SRAM (single-cycle access at full-speed)
  - 1 MB ROM with bootloader capability
  - Single Instruction Multiple Data (SIMD) and Digital Signal Processing (DSP) functions
  - 1.25 Dhrystone MIPS/MHz
  - Operating frequency up to 150 MHz
- ARM-based Cortex-M0 (CM0) CPU:
  - Allows CM4 to sleep by offloading light processes
  - 32 KB RAM
  - Operating frequency of up to 75 MHz

Overview

The Broadcom® BCM4775X family of chips is the latest generation of Broadcom sensor hub microcontrollers with integrated GNSS (Global Navigation Satellite System). The BCM4775X includes many sensor hub and GNSS innovations.

The synergistic benefits of combining sensor hub and GNSS chips into one single chip include low system-level power consumption and a smaller PCB footprint with fewer BOM components than multiple-chip solutions.

The BCM4775X family includes a dual-processor architecture (ARM CM4+CM0) that ensures each task is handled in the most power-efficient manner. The BCM4775X includes a new RF architecture, enabling the lowest power consumption at any received signal condition.

The BCM4775X achieves system-level performance benefits from tightly integrating the sensor and GNSS signals. Measurements from sensors such as accelerometers, gyroscopes, magnetometers, and others are fused with GNSS measurements to provide a highly accurate, cross-calibrated output to applications while lowering system power. Cross-calibration is achieved by using sensor measurements to aid GNSS for small movements and by using GNSS to calibrate sensor measurements, the latter having inherent drift that accumulates over time and larger movements.

The BCM47755 chip supports two frequencies (L1+L5), and as a result, achieves lane-level accuracy outdoors and much higher resistance to multipath and reflected signals in urban scenarios, as well as higher immunity to interference and jamming. The BCM47755 can simultaneously receive the following signals:

- GPS L1 C/A
- GLONASS L1
- BeiDou (BDS) B1
- QZSS L1
- Galileo (GAL) E1
- GPS L5
- Galileo E5a
- QZSS L5

Key Features (con't)

- Peripheral DMA channels for increased peripheral communications speed
- Up to 50 programmable GPIOs
- Integrated 12-bit, 2-channel ADC
- Flexible interfaces to a host Applications Processor and to sensors:
  - SPI: Two master ports for peripherals + 1 slave port for host communication
  - UART: Four ports for host and peripheral communication.
  - BSC (I^2C): Four ports (three master, one slave), peripheral only
- Timers:
  - One Real-time Clock (RTC) (42 bits, 32.768 kHz)
  - Two general-purpose 32-bit microsecond timers
  - One 48-bit microsecond counter for better resolution timestamps than the RTC can provide
- 77-ball WLBGA package

The BCM47758 chip is tailored for wearable devices, computes position, velocity, and time (PVT) on-chip. It simultaneously supports GPS and GLONASS in the L1 frequency band or GPS and Galileo in both the L1/E1 and L5/E5a frequency bands. By doing on-chip PVT computations and position batching, system power is significantly reduced by allowing the host applications processor to sleep.

The BCM47758 also uses a low-power RF path and enables a variety of duty-cycle strategies to further reduce power consumption.

Benefits

- Highest levels of navigation performance.
- Very low GNSS and sensor hub power consumption.
- Small PCB footprint (saves 50% board space over discrete sensor hub + GNSS solutions).
- On-chip PVT calculations available on BCM47758.

Applications

- Smartphones
- Tablets
- Mobile accessories
- Wearables
- Digital cameras

Ordering Information

Part Number	Package
BCM47752KUB1G	77-pin WLBGA, tape-and-reel
BCM47754KUBG	77-pin WLBGA, tape-and-reel
BCM47755KUB1G	77-pin WLBGA, tape-and-reel
BCM47758KUB1G	77-pin WLBGA, tape-and-reel

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