NHS31xx Power modes

SECURE CONNECTIONS
FOR A SMARTER WORLD

About

The NHS3xxx IC supports various power control features.

***Active* mode**

- IC is running and all features are available.
- Power and clocks to selected peripherals can be gated.

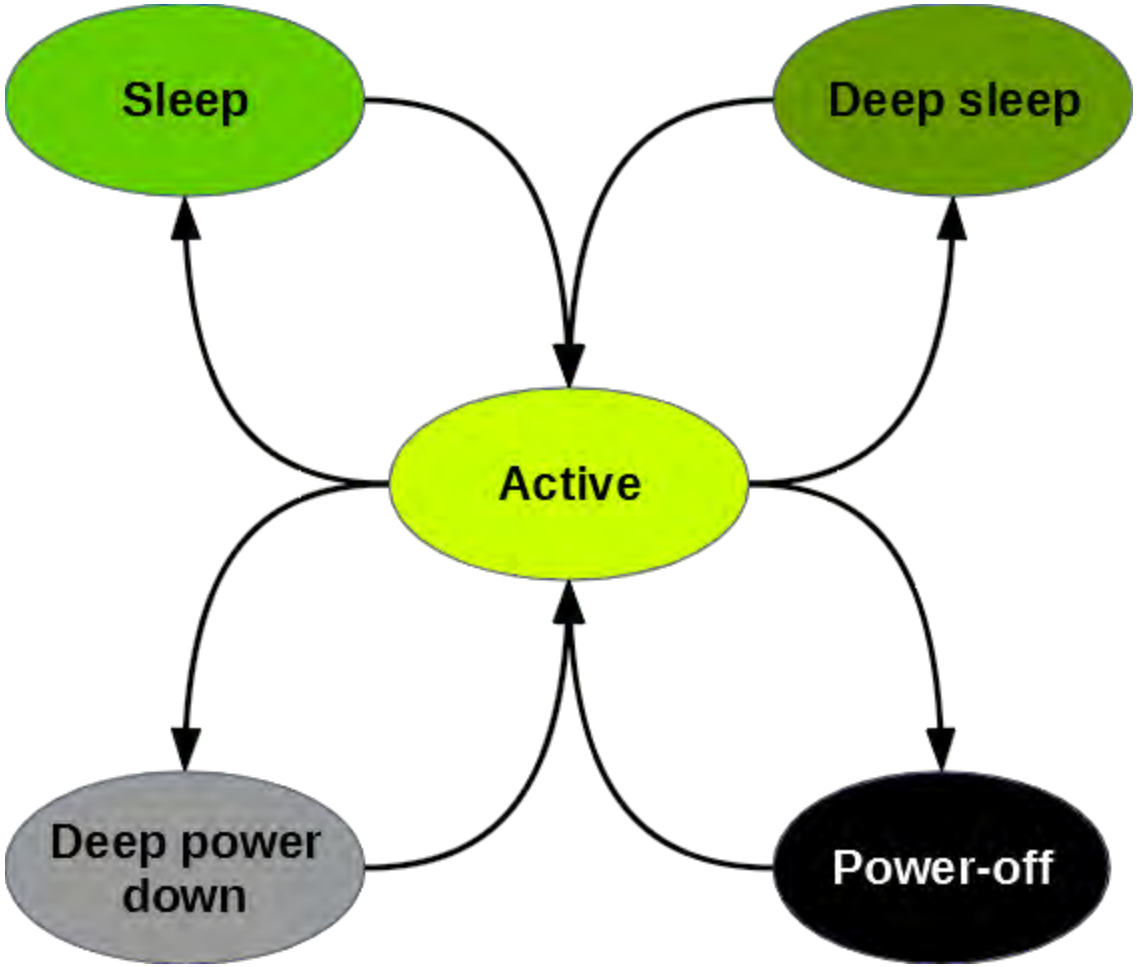
Four low power modes

- Further reduces current consumption.
- *Sleep*, *Deep sleep*, *Deep power down*, *Power-off*.

Modes

- **Active**
  Setting up, communicating, interpreting, storage handling
- **Sleep**
  Waiting for sensor measurement completion.
- **Deep sleep**
  Waiting for communication timeout
- **Deep power down**
  Wait time between two cycles
- **Power-off**
  Shelf life

Transitions



Overview 1 / 3

Active

- The system clock clocks the ARM Cortex-M0+ core and memories
- The system clock, or a dedicated peripheral clock, clocks the peripherals

- Initial mode after reset

Power-off

- All clocks are stopped.
- No memory is retained.
- Battery is disconnected.

- Only power consumption left is in the battery switch circuitry itself.
- Initial mode after physically attaching the battery.

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Sleep

- The ARM Cortex-M0+ core system clock is not clocked.
- Full memory retention.
- Peripheral functions continue operation.
- Automatically left on any interrupt enabled by the NVIC.

Deep sleep

- **Sleep**
  +
- Analog peripherals and EEPROM are powered off.

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Deep power down

- Analog domain is completely powered off.
- Digital domain is almost completely powered off.
  RTC remains powered and continues operation.
- No memory retention except for a few status registers.
- Always-on domain remains powered.
- Only a few wake-up possibilities.

Wake-up possibilities

From … to Active	PIO	GP Timer	RTC	WAKEUP pin	NFC	RESETN pin
Sleep Deep sleep	Continue	Continue	Continue	Continue	Continue	**Reset**
Deep power down	x	x	**Reset**	**Reset**	**Reset**	**Reset**
Power-off	x	x	x	x	**Reset**	**Reset**

- Continue:
  Typically 15-20 cycles.
- Reset:
  Typically 2.8 msec. Dependent on BSS and DATA initialization.

Block availability

	Active	Sleep	Deep sleep	Deep power down	Power-off
ARM	✓	Not clocked	Not clocked	×	×
Flash	✓	Not clocked	Not clocked	×	×
SRAM	✓	Retained	Retained	×	×
Registers	✓	Retained	Retained	×	×
Special PMU registers	✓	Retained	Retained	Retained	×
EEPROM	✓	Unaltered	×	×	×
GP Timer	✓	✓	✓	×	×
RTC	✓	✓	✓	✓	×
Sensors	✓	Unaltered	×	×	×
NFC	✓	Accessible	Accessible	Wake-up only	Wake-up only
Debug	✓	SWD active	SWD active	×	×

Current consumption

In *Active* mode, running at 0.5MHz

- Estimated static current: 66 µA
- Estimated dynamic current: 90 µA

In *Deep power down* mode

- 3 µA @3V
- 2 µA @2V

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