ADAPTIVE NETWORK SOLUTIONS

. . . smarter wireless connectivity

@ANY SMART MAC SUITE (SMS) TOOL

Easy-to-use Tool for Control of @ANY Platform's Functionality via AT Commands, and Flexible Commissioning

A.N. Solutions applies the same modular approach in software, as it does in hardware. Various embedded software components are designed to interoperate seamlessly and can be easily mixed-and-matched depending on the exact needs of a client. The A.N. Solutions' Smart MAC Suite (SMS) fully meets these requirements and is available for all @ANY platform components, including ZigBee Modules, USB Dongles and BRICK development boards. The SMS tool helps develop and deploy a Wireless Sensor Network (WSN) of choice, based on IEEE 802.15.4 standard with an easy-to-use programming interface.

A.N. Solutions' Smart MAC Suite (SMS) features:

- Easy control of @ANY platform's functionality via AT commands supporting all IEEE 802.15.4-based functions
- Provides a simplified, widely common communication interface using a **standardized AT command set** via the **RS232/UART interface** that allows controlling the majority of @ANY platform features and enables flexible commissioning
- Included **application examples** allow to establish Peer-to-Peer (P2P) & Star networks with supported data throughput of up to 250 KBit/s
- Optional advanced features include frame redirection to establish tree structured networks, a library to create feature enhancements by adding custom C code, and more

Smart MAC Suite, running on @ANY platform, offers the following advantages to an end-user:

- @ANY modules can be connected directly to a host processor as a communication extension, whereas the @ANY module's interfaces enhance the system capabilities by adding additional sensors and actuators
- User can program @ANY Platform via S-Register mapping and AT-Commands. No embedded programming skills needed.
- Complimentary A.N. Solutions SMS Profiler utility simplifies such modifications
- Full IEEE 802.15.4 functionality to users
- Users can set up basic network topologies: peer-to-peer, star, and tree*
- Acknowledged and unacknowledged* data packages can be transmitted directly or broadcasted*
- Temperature sensor support, incl. @ANY-BRICK (LM73) and @ANY-HPT (DS7505), and support of up to 10 GPIO lines
- Functionality enhancements, including support of custom sensors and implementation of external host intelligence directly into @ANY module, are available on request
- Integrated serial bootloader simplifies firmware upgrades

SMS Usage Scenarios

Smart MAC Suite includes several software parts, as shown in Figure 1. In addition to the support of the RF portion, it also takes care of the GPIO control logic, the temperature sensor on the @ANY Brick board (different sensor support is planned for future releases, so please contact us for the latest update) and several other interfaces, such as the UART interface to interact with a host. SMS is utilizing a Media Access Controller, which implements the following IEEE802.15.4-2006 functionality:

- Device scans: searching for networks
- Device association and disassociation: joining or leaving a network
- Direct data transmission: acknowledged or unacknowledged*
- Indirect data transmission
- Data broadcasting*
- Several other features of the IEEE 802.15.4-2006 standard

Since there are applications out in the field, which cannot afford an additional host intelligence, A.N. Solutions implemented some features in SMS, which allow it to run a network node **without any further intelligence**. This means that **no host is required.**

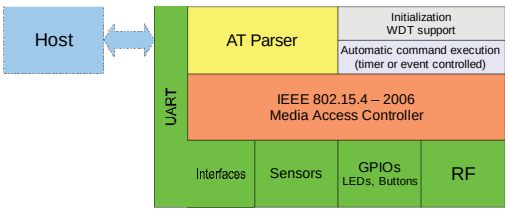


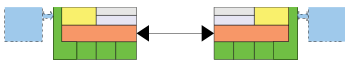
Figure 1. Basic SMS Structure

* - Available with SMS Pro version only

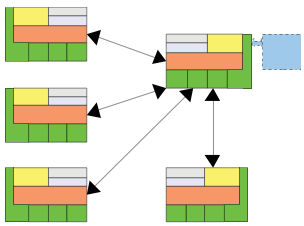
@ANY Smart MAC Suite ("SMS") is provided in 2 different versions, SMS Base and SMS Pro, which characteristics and features are fully adjusted to the main purpose of application and development

- **@ANY SMS** Base version provides basic functionality designed for simple network topologies and evaluation purposes. It can be used to set up Coordinator - End device (star, peer-to-peer) topologies which are used, for example, in basic Wireless Sensor Networks.
- **@ANY SMS** Pro version facilitates development of more complex applications and supports additional tree topologies with static routing, based on IEEE 802.15.4 MAC layer, along with a number of versatile example applications. Moreover, SMS Pro provides additional features like data broadcasting and full function device functionality. The data redirect feature enables users to set up tree network topologies. Finally, SMS Pro is designated to be a code base for customer requested extensions. By utilizing the supplied library version, a developer can extend functionality by linking against his own C code. This provides maximum flexibility and enables integration of external host intelligence directly into @ANY module, support of additional sensors, and more.
- Both versions will be complemented by **@ANY SMS Monitor**, a simple, user-friendly GUI for network monitoring, which is an example of an application-driven extension. A serial bootloader simplifies firmware upgrades. The possibility of making configuration data reads and writes through the serial interface further simplifies semi-automated device commisioning.

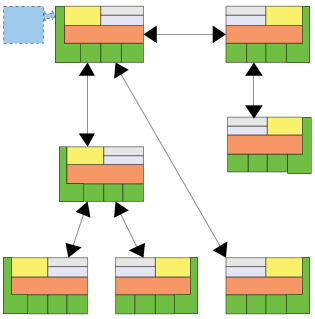
Feature	SMS Base	SMS Pro
Peer-to-peer network	Yes	Yes
Star network	Yes	Yes
Tree network	No	Yes
Frame redirection	No	Yes
Temperature Sensor support	Yes	Yes
GPIOs (8 in/output lines, 2 lines for input and event trigger)	Yes	Yes
Sleep mode	Yes	Yes
Data transmission (direct / indirect)	Yes	Yes
Data transmission (acknowledged)	Yes	Yes
Data transmission (non-acknowledged, broadcast)	No	Yes
Radio Register access	No	Yes
EEPROM content accessible via UART/USB	Yes	Yes
CW mode	No	Yes
Bootloader	Yes	Yes
Library version	No	Yes
Vendor support	No	Yes



Peer-to-peer network



Star network



Tree network

Figure 2. Network Configurations

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Doc. ANS 2009-SW-001 2.1