

### INTRODUCTION

The WL102 Software Library has been developed to provide the developer with a collection of low-level functions and data structures, which can be used as a basis for development of a full wireless data system. The code contained within the library is independent of any higher level functionality and can therefore be used to implement a variety of wireless protocols.

The library is supplied as a series of source files which provide the user with useful software interfaces to each of the functional blocks of the WL102. This ensures that the user does not have to constantly refer back to the hardware specification of the WL102 to use the device effectively. The library is written in ANSI-C in order to make it as portable as possible across different microprocessor platforms. In this way the WL102 can also be used with an external processor if required.

It is intended that this library will aid rapid development of a working system and will provide a basis for user-specific optimisation of critical sections of code, dependant on the particular application.

This Application Brief gives a summary of the functions provided in the library. In addition to these functions, a number of macro definitions are also provided for performing common operations, and to ease portability between different system processors. Data structures are also provided to for accessing the register blocks within the WL102.

### PROCESSOR-SPECIFIC MODULE (PROC.C, PROC.H)

The user is required to provide a processor-specific module, which tailors the software functions for the processor platform used.

Processor-specific source files provided by GPS are:

int8051.c /.h

For the WL102's internal 8051 processor.

Written for use with the Keil C51™ compiler.

buttrfly.c /.h

For a GPS Butterfly (ARM™-based) microcontroller. Written for use with the GPS ARM Software Development Toolkit.

pchost.c /.h

For a PC-compatible Host only. Written for use with Microsoft™ Visual C++.

proc\_c.tpl /proc\_h.tpl

Template files for user-generated processor files.

A compiler directive is used to select which processor-specific header file is required. In this way, adding support for a further processor platform requires only minor modifications (along with generation of the new processor-specific module).

### wlProcCfg

Used to perform basic processor initialisation operations, such as configuring a serial port or timers. This function would typically be called soon after system start-up.

### MEMORY CONTROL BLOCK (MCB.C, MCB.H)

These modules may be used by both the MAC System and the Host.

### wlSetMcbAddr

Loads the MCB address counter to point to the specified buffer memory address. If required, a dummy read is performed on the data register.

### wlReadMcbAddr

Reads the current value of the MCB address counter.

### wlSemQueue

Attempts to acquire the MCB semaphore. This function should be called when exclusive access to an area of the Shared Buffer is required, and prevents the other system from acquiring the semaphore, hence locking the resource. If unsuccessful, the semaphore request is left pending, and the status may then be checked later via wlSemQueue() or wlSemGet().

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### **wlSemGet**

Attempts to acquire the MCB semaphore. This function should be called when exclusive access to an area of the Shared Buffer is required, and prevents the other system from acquiring the semaphore, hence locking the resource. If unsuccessful, the semaphore request is cleared.

### **wlSemRelease**

Releases the MCB semaphore. This function would be called when exclusive access to an area of the Shared Buffer is no longer required, and allows the other system to then acquire the semaphore.

### **wlMcbInit**

Performs initialisation operations on the MCB, including setting the interrupt request output to an inactive state (via the `wlIrqOff()` function). When called by the Host this function also configures the speed of the interface logic for 3volt or 5volt operation.

### **wlMcbLock**

May be used to arbitrate access to the shared buffer between different tasks within the application software, e.g. to prevent a function's operation being corrupted by an interrupt service routine which also wishes to modify the shared buffer.

## **COMMUNICATIONS CONTROL BLOCK (CCB.C, CCB.H)**

These modules are only for use by the MAC System.

### **wlCcbConfig**

Configures the CCB. This structure may be customised to suit the particular MAC protocol employed.

### **wlCcbISR**

Processes a CCB interrupt. This interrupt may be generated for one or more of the following reasons:

- FIFO Error
- Upload Complete (Receive)
- Header Upload Request (Receive)
- Frame Upload Request (Receive)
- CCA Timer Equal To Zero
- Radio Transceiver Synthesiser Unlocked
- Transmit DMA Complete

Whilst the sample code provided demonstrates the kind of techniques required to process the different interrupt causes, it is anticipated that this function will require customisation by the developer to suit the particular system software and protocol, particularly with respect to frame formats and buffer management.

### **wlSetChannel**

Loads the CCB channel select register with the required value.

In the case of the DE6038 radio transceiver, this function determines the required synthesiser values and loads both the receive and transmit channel registers. The operating channel of the radio does not actually change until the next time transmit or receive mode is started.

### **wlSetHash**

Used to set a bit in the CCB hash table, used for address matching.

If the pointer passed is Null, the entire hash table is cleared to zeroes, disabling all hashed addresses.

## **ATTRIBUTE MEMORY (ATTRMEM.C, ATTRMEM.H)**

These modules may be used by both the MAC System and the Host.

### **wlLoadCis**

Loads the Card Information Structure (CIS) area of the WL102 Attribute Memory. A data structure is defined in `attrmem.c`, as an example CIS. This structure should be customised to suit the particular application; details of the CIS may be found in the PCMCIA PC-Card Standard.

### **wlReadCor**

Returns the contents Attribute Memory Configuration Option Register.

### **wlWriteCor**

Writes a new value to the Attribute Memory Configuration Option Register.

## **BUFFER MANAGEMENT (BUFFMGT.C, BUFFMGT.H)**

### **wlHostStoreMsg (Host only)**

Used by the Host to store a new message in the Transmit buffer.

The function determines whether there is sufficient free space for the message, and if so, copies the message into the buffer.

### **wlHostTxFree (Host only)**

Used by the host to maintain up-to-date information about the status of the Transmit buffer.

The function examines the messages which have previously been stored, thereby increasing the amount of free space in the buffer where one or more messages have been completely processed by the MAC System. If one or more outstanding messages are found in the buffer, then an interrupt is sent to the MAC System.

### **wlSysStoreMsg (MAC System only)**

Used by the MAC System to store a new message in the Receive buffer.

If there is sufficient free space for the message, this function returns a pointer to where the stored message begins.

### **wlGetMsg**

Used by the MAC System to get a new message from the Transmit buffer, and by the Host to get a new message from the Receive buffer.

This function may be called either on a polled basis, or in response to an interrupt from the opposite system, generated when it stores a new message in the buffer.

## **CRC (CRC16.C, CRC16.H)**

These modules may be used by both the MAC System and the Host.

### **wlCrc16**

Performs a 16-bit CCITT cyclic redundancy checksum calculation on a block of data.



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