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GSM PROTOCOL STACK

G23

RLP – RADIO LINK PROTOCOL

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1. Initial version
2. English check

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List of Figures and Tables

List of References

[ISO 9000:2000] International Organization for Standardization. Quality management systems - Fundamentals and vocabulary. December 2000

1.1 References

[C_8410.001] 8410.001.98.102; September 18, 1998
G23 Product Description; Condat

[C_8410.008] 8410.008.98.002; June 15, 1998
GTI Interface Description; Condat

[C_8410.003] 8410.003.98.103; September 09, 1998
Test Facilities Description; Condat

1.2 Abbreviations

MMI	Man Machine Interface
PEI	Protocol Stack Entity Interface
RLP	Radio Link Protocol

1.3 Terms

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2 Introduction

G23 is a software package implementing Layers 2 and 3 of the ETSI-defined GSM air interface signaling protocol, and as such represents the part of a GSM mobile station's protocol software which is both, platform and manufacturer independent. Therefore, G23 can be viewed as a building block providing standardized functionality through generic interfaces for easy integration.

The G23 suite of products consists of the following items:

- Layers 2 and 3 for speech & short message services,
- Layers 2 and 3 for fax & data services,
- Application Control Interface,
- Slim MMI [02.30] and
- Test and integration support tools.

For a detailed description of the G23 components, please refer to the Product Description [C_8410.001]. For detailed information regarding the integration into the target system, please refer to the Generic Target Interface [C_8410.008]. For detailed information about the compiling and linking procedure, please refer to the User Guide on the delivery CD.

This Technical Documentation document shows how to use the RLP object in target systems. It lists the headers involved and describes how to link RLP with other components. The customer-specific functions included are listed and described.

3 Configuration

3.1 Headers

The modules include several header files. Header files which can be changed by the user are marked (*). These header files are used to integrate the protocol stack entities into a specific target system.

cnf_rlp.h (*)

Constants for dynamic configuration of RLP are defined in this header. It is acceptable to change the commands and the parameter names for the dynamic configurations supported.

cus_rlp.h (*)

Custom specific definitions for the protocol stack entity are located in this header. Timer values and identifiers are changeable. A version identifier is defined.

mon_rlp.h

Constants for the monitoring of RLP are defined in this header.

rlp.h

This header contains constants for the radio link protocol and the prototypes of the component.

ccdapi.h (*)

This header defines the prototypes and some constants for the Condat Coder Decoder (CCD).

custom.h (*)

This header file defines global constants for the integration of the protocol stack entity into a specific target system. The user may define the identifier of the communication resource, the traces supported, the communications method (by copying primitives or by exchanging references to primitives) , the custom-specific primitive, etc.

gsm.h

This header file contains global definitions for all protocol stack entities. Depending on the definitions in custom.h, many options and traces are defines in this header.

pconst.cdg

This header file is generated by the CCD compiler. It includes all primitive identifiers and some constants required by the entities.

pei.h (*)

Prototypes for the protocol stack entity interface are defined in this header file Some parameters and return types can be changed by the user.

prim.h

Constants for primitives are defined and a SAP-dependent primitive header file is included (p_**rlp**.h).

p_ra.h

This header file is generated by the CCD compiler. It includes the C-struct type definitions for the primitives of the service access point RA. This header file is included by prim.h.

p_rlp.h

This header file is generated by the CCD compiler. It includes the C-struct type definitions for the primitives of the service access point RLP. This header file is included by prim.h.

ral1int.h

The header contains definitions of the Layer 1 functional interface.

stddefs.h

This header file contains several standard definitions used by the protocol-stack entities.

string.h

This header file is a the standard string header from the target compiler. It defines string and memory functions.

tok.h

Prototypes and some constants for the parse function of the TOK module are defined in this header file.

vsi.h (*)

Prototypes for the virtual system interface are defined in this header file. Some parameters and the return types of these function can be changed by the user for integration into a specific target system.

3.2 Dynamic Configuration

Dynamic configuration means changing the behavior of the protocol-stack entity at run-time. This is carried out by sending a string with a dedicated format as described in Test Facilities [C_8410.003]. An additional feature is to request the old configuration. This feature can be switched off by an option defined in custom.h.
The dynamic configuration string is a parameter of the pei_config () function, which is part of the protocol stack entity interface (PEI).

TIMER_SET =<timer, value>
The timer mode TIMER_SET defines a new timer value instead of the original start value.

TIMER_RESET =timer
The default timer mode is TIMER_RESET which affects does not manipulate the start value.

TIMER_SPEED_UP =<timer, factor>
TIMER_SPEED_UP is used to speed up a timer by the given factor. The start value is divided by the factor. The minimum time is one unit.

TIMER_SLOW_DOWN = <timer, factor>
The opposite mode is TIMER_SLOW_DOWN. The start value is increased by the given factor.

TIMER_SUPPRESS = <timer>
TIMER_SUPPRESS is used to suppress the timer start.

3.3 Custom Specific Functions

Custom specific functions are implemented in the module rlp_csf.c. Functions in this module may be replaced by customer functions. However, functions parameters may not be changed.
The purpose of custom-specific functions is to provide a mechanism for configuring the protocol-stack entity at run-time by a source outside the protocol stack entity, for example, non-erasable memory.

GLOBAL BOOL csf_init_timer (void)
This function initializes the timer pool. The timer pool allocates a number of timer resources. This timer resources are allocated to instances on demand.

GLOBAL void csf_close_timer (void)
All timer resources are closed. This function is carried during shutdown or reset.

GLOBAL void csf_alloc_timer (UBYTE id, T_RLP_DATA * rlp_data, T_VSI_TVALUE value)
This function allocates one timer from the timer pool and starts this timer.

GLOBAL void csf_free_timer (T_VSI_THANDLE handle)
This function frees one timer. The timer is stopped and returned to the timer pool.

GLOBAL BOOL csf_vdb_timeout (T_VSI_THANDLE handle, T_RLP_DATA ** rlp_data, USHORT * timer)
After time-out, the corresponding instance is searched. The timer is returned to the timer pool.

3.4 Monitoring

The monitor struct includes the relevant physical parameters of the protocol-stack entity. The parameters are updated continuously. This way the environment can always access the protocol stack parameters. These parameters are used to create monitor reports about a display or test system, to create statistical data outside the functionality of a protocol stack but with access to protocol-stack parameters. It is acceptable to read the parameters of the monitor struct, but it is absolutely not acceptable to write to this struct. The first parameter of the monitor struct is the version of the protocol-stack entity.

The following monitor struct is defined for the protocol stack entity:

```
typedef struct
{
        T_VERSION     *version;
} T_MONITOR;
```

3.5 Resources

3.5.1 Timer

Each RLP instance uses up to 12 timers.

3.5.2 Memory

RLP needs 36 kB of ROM and 8,5 kB of RAM for static data on an ARM7 processor. RLP can hold up to 17 blocks of dynamic memory with a size of 400 bytes each (approx. 6,5 kByte).

Appendices

A. Acronyms

DS-WCDMA Direct Sequence/Spread Wideband Code Division Multiple Access

B. Glossary

International Mobile Telecommunication 2000 (IMT-2000/ITU-2000) Formerly referred to as FPLMTS (Future Public Land-Mobile Telephone System), this is the ITU's specification/family of standards for 3G. This initiative provides a global infrastructure through both satellite and terrestrial systems, for fixed and mobile phone users. The family of standards is a framework comprising a mix/blend of systems providing global roaming. <URL: http://www.imt-2000.org/>