



Technical Document - Confidential

GSM PROTOCOL STACK

G23

DL - DATA LINK LAYER

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1. Initial version
2. New WCS template
3. English check

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- [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
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1.3 Terms

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 reference of G23 components, please refer to the Product Description [C_8410.001]. For detailed information regarding 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 DL object in target systems. It lists the headers involved and describes how to link DL with other components. The customer specific functions included are listed and described.

3 Structure

3.1 Headers

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

ccdapi.h (*)

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

dl.h

This header contains constants for the data link layer and the prototypes of the component

cnf_dl.h (*)

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

custom.h (*)

This header 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 supported traces, the communication method (by copying primitives or by exchanging references of primitives), the custom specific primitive header, etc.

cus_dl.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.

gsm.h

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

mconst.cdg

This header is generated by the CCD compiler. It includes all message identifiers and some constants needed by the entities.

message.h

Constants for messages are defined. DL messages are coded and decoded by low level functions of CCD.

mon_dl.h

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

pconst.cdg

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

pei.h (*)

Prototypes for the protocol stack entity interface are defined in this header. Some parameters and the return type of this function are changeable by the user.

prim.h

Constants for primitives are defined and service access point dependent primitive header files are included (p_ph.h, p_dl.h and p_md.h).

p_dl.h

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

p_md.h

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

p_ph.h

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

stddefs.h

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

string.h

This header is 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.

vsi.h (*)

Prototypes for the virtual system interface are defined in this header. Some parameters and the return types of these functions are changeable by the user for integration into a specific target system.

3.2 Dynamic Configuration

Dynamic configuration means to change 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 may 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). The keywords for the dynamic configurations are changeable by the static configuration mechanism.

N200 = <chan_sapi, value>

The configuration N200 is used to redefine the retransmission counter N200. The default value depends on the channel used.

VS = <chan_sapi, value>

The configuration VS manipulates the send variable V(S) on the defined channel.

VR = <chan_sapi, value>

The configuration VR manipulates the receive variable V(R) on the defined channel.

VA = <chan_sapi, value>

The configuration VA manipulates the acknowledge variable V(A) on the defined channel.

UA_IGNORE = <chan_sapi, value>

To force repetition of sending SABM or DISC frames, it is possible to ignore incoming UA frames on the defined channel. The number of ignored frames is defined by the parameter value.

RR_IGNORE = <chan_sapi, value>

To force repetition of sending I frames, it is possible to ignore incoming RR frames on the defined channel. The number of ignored frames is defined by the parameter value.

I_IGNORE = <chan_sapi, value>

To force repetition of received frames it is possible to ignore incoming I frames on the defined channel. The number of ignored frames is defined by the parameter value.

ADDR_FIELD = value

To force an error situation it is possible to create a frame content, which is sent with the right timing on the defined channel (see configuration SEND_FRAME). With this configuration, it is possible to define the address field of this frame.

CTRL_FIELD = value

To force an error situation, it is possible to create a frame content, which is sent with the right timing on the defined channel (see configuration SEND_FRAME). With this configuration, it is possible to define the control field of this frame.

LENGTH_FIELD = value

To force error situation it is possible to create a frame content, which is send with the right timing on the defined channel (see configuration SEND_FRAME). With this configuration it is possible to define the length field of this frame.

INFO_FIELD = value

To force error situation it is possible to create a frame content, which is send with the right timing on the defined channel (see configuration SEND_FRAME). With this configuration it is possible to define the information field of this frame.

SEND_FRAME = chan

To force error situation it is possible to create a frame content, which is send with the right timing on the defined channel.

3.3 Custom Specific Functions

The idea behind this custom specific function is to have a mechanism to configure the protocol stack entity at run-time by a source outside the protocol stack entity, for example, a non-erasable memory.

At the moment, no custom specific functions are defined for DL.

3.4 Monitoring

The monitor struct includes relevant physical parameters of the protocol stack entity. The parameters are updated continuously. This way the environment always has the possibility of accessing parameters of the protocol stack. These parameters are used to create monitor reports about a display or test system, to create statistical data, etc. 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 the monitor 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;
```

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/>>