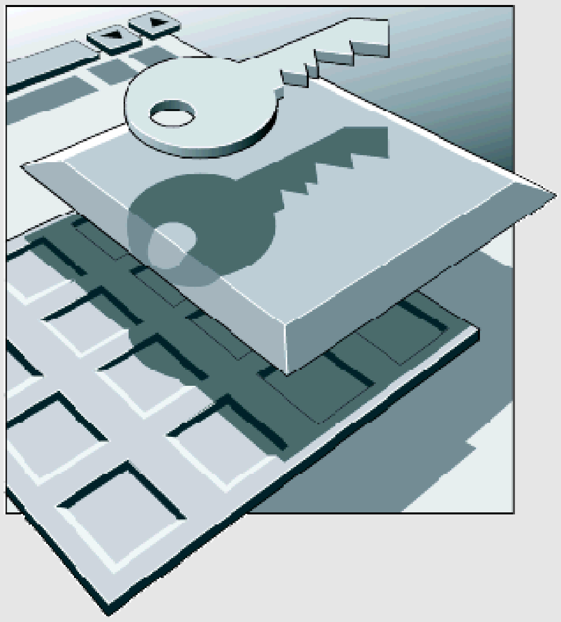
DCN Next Generation
Open Interface Release 2.4

BOSCH



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General Description

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1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the general remote interface aspects for any application to be remotely controlled on the CCU by third party software.

1.2 Scope

This Software Requirements Specification describes the general aspects for the remote interface. It is meant for developers who want to use this remote interface to control applications present in the CCU.

With the ‘Download and Licensing Tool’, the remote interface must be enabled. Definitions, Acronyms and Abbreviations

ACK	Acknowledge (of a packet)
ACN	Audio Communication Network
ASCII	American Standard for Character Information Interchange
AT	Attendance Registration
AVS	Allegiant Video Switcher
CC	Automatic Camera Control
CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system
DB	Delegate Database
DCC	Direct Camera Control
DCN	Digital Congress Network
FIFO	First In First Out
IC	Intercom
IN	Simultaneous Interpretation
DCN-CCU	Commercial Type Number of the CCU
DCN-CCUB	Commercial Type Number of the basic CCU
DCN-NCO	Commercial Type Number of the NCO
LD	Text/Status Display
LSB	Least Significant Byte
MCCU	Multi CCU. A DCN NG system consisting of multiple slave CCU and one master CCU (running on an NCO)
MD	Message Distribution
Message-data	Data transmitted along with a specific message-type. The data is needed to fulfill the purpose of the message.
Message-type	Specifies the purpose of the message (e.g. remote function call, etc.)
MM	Microphone Management
MSB	Most Significant Byte
MV	Multi Voting
NAK	Negative acknowledge (of a packet)
NCO	Network Controller, acts as MCCU
NG	Next Generation
PC	Personal Computer
PCB	Printed Circuit Board
PV	Parliamentary Voting
Remote Controller	Device (e.g. PC) connected to the CCU which remotely controls a part of the applications present in the CCU
RFS	Remote Function Services
SC	System Configuration
SI	System Installation

SM	Synoptic Microphone Control
ST	Startup DCN Next Generation
VD	Video Display
VT	Voting application
TCP	Transmission Control Protocol
IP	Internet Protocol
UTP	Unshielded Twisted Pair
STP	Shielded Twisted Pair

Definition RS-232 signals

CD	Carrier Detect
Rx	Received Data
Tx	Transmitted Data
DTR	Data Terminal Ready
GND	signal Ground
DSR	Data Set Ready
RTS	Request To Send
CTS	Clear To Send
RI	Ring Indicator

Definition ASCII characters used

CR	Carriage Return ASCII character	(value 0x0D)
ESC	Escape ASCII character	(value 0x1B)
'$'	Dollar sign	(value 0x24)
'?'	Question mark	(value 0x2F)
'#'	Number symbol	(value 0x23)
'@'	At character	(value 0x40)

1.3 References

SRS_MMINF	MM Remote Interface Description	Du020903
SRS_VTINF	VT Remote Interface Description	Du040905
SRS_SCSIINF	SC and SI Remote Interface Description	Du010934

This document should be referenced as [SRS_INF].

1.4 Overview

Chapter 2 describes the general system setup to control the CCU using third party hardware. This chapter mainly handles the hardware aspects of the interface.

Chapter 3 describes the format of the data message exchanged between the remote controller and the CCU.

Chapter 4 describes the two protocols, which can be used for communication between the remote controller and the CCU.

Chapter 5 describes how the remote functions are handled within the CCU. This can result in specific errors, which are independent of the purpose of the remote function.

Appendix A gives an overview of the configuration settings for the protocol and the serial communication port.

Appendix B gives an overview of the constants used in combination with the remote functions described in this document.

Appendix C gives an overview of the possible general errors, which could be returned upon a remote function.

2. SYSTEM SETUP

To interface with applications present in the CCU, we will use a serial port present on the CCU (in case of a multi-CCU system, the serial port or the Ethernet port of the master CCU is used).

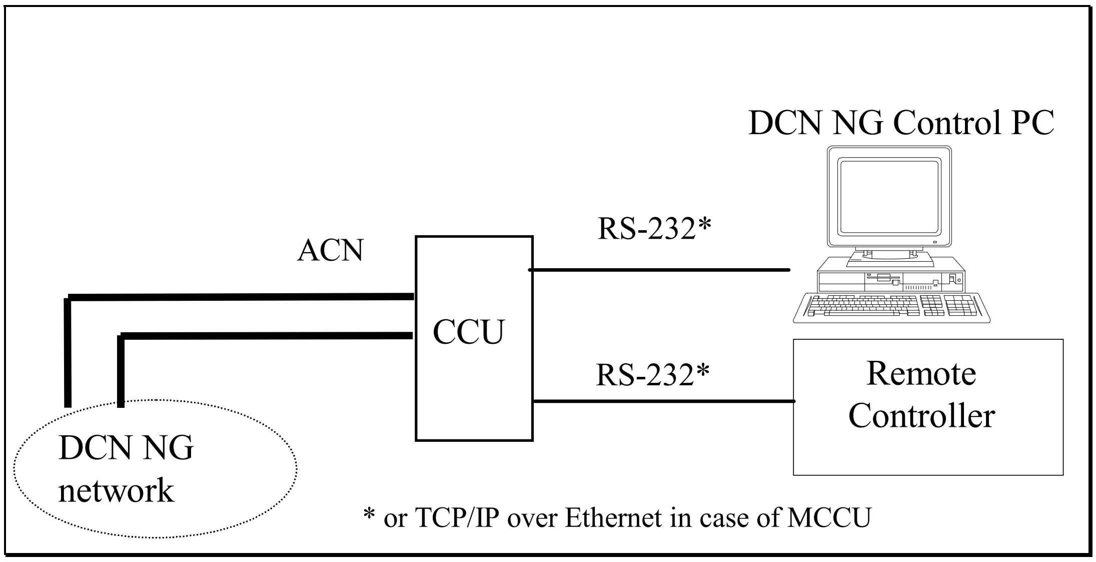

Figure 1 Hardware configurations remote controls

The device (PC, embedded controller, etc.) connected to a serial port (or Ethernet port in case of MCCU) is the second controlling system to the CCU[1]. This device is called remote controller in the remaining part of the document.

The PC on the top-right in Figure 1 is the DCN NG control PC. A control PC can be connected via one of the serial ports (as shown in the figure) or via Ethernet (only to a master CCU in case of a multi-CCU system). The remote controller on the right controls an application remotely using the serial line of the CCU. This remote controller can be, for instance, a mimic panel, a computer that controls and presents voting results, etc.

Third parties can build their own remote controller software to serve several SW-applications. Each SW-application on the remote controller can control the corresponding application on the CCU using the remote interface protocol.

2.1 Use of serial and TCP/IP port

The communication between the CCU and the remote controller is message based (remote functions and update notification). The messages are transported as binary streams of bytes.

The remote control interface must be configured according to the specifications in Appendix A.

[1] We assume that the DCN NG Control PC connected to a serial port is the primary controller for the CCU. The remote controller is then the secondary controller. Only one remote controller is needed to control remotely. Both controllers may be present and operate concurrent, controlling different parts of the CCU.

2.2 Requirements

As mentioned above the remote controller can be connected to a serial port of the CCU and the TCP/IP port of the NCO. For the remote controller the following hardware requirements are needed for the systems[2]:

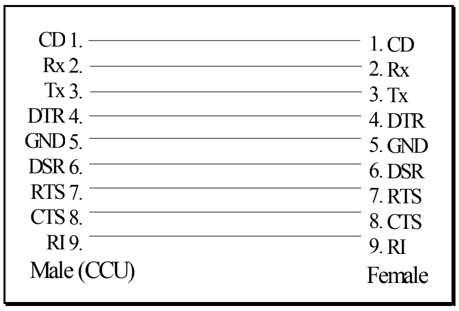

Figure 2 1 to 1 RS232 cable

⇒ *Single CCU system (LBB4100/00)*:
This type of CCU has 2 serial ports. An RS-232 cable with 1 to 1 wiring (RS-232 extension cable, see Figure 2) is used to connect the CCU to the remote controller. Note that these CCUs use hardware handshaking with the CTS and RTS signals. All other signals are internally chained together in the CCU to form the appropriate signals for the remote controller.

The serial port settings used for the communication on a single CCU system are described in Appendix A.1.

⇒ *Multi CCU system (LBB4501/00)*:
This type of CCU has 1 TCP/IP port. An UTP or STP cable is used to connect the master CCU-NCO to the remote controller.
The TCP/IP port number used for the communications is described in Appendix A.2.

2.3 Hardware connection

2.3.1 CCU

The hardware connection is made by connecting the remote controller to the CCU by using a serial cable as described in §2.2 (dependant of the system used). The hardware connection is also shown in Figure 1. The maximum cable length between the CCU and the remote controller may be approximately 2 meter. When longer distances are needed we advise the use RS422 or Current Loop.

2.3.2 NCO

The hardware connection between the NCO and remote controller is made by using an UTP or STP cable. The maximum cable length between the NCO and the remote controller is 100 meter. When longer distances are needed we advise the use of a repeater which ensures the transmission between two systems.

[2] Assumed is that both sides of the cable are equipped with RS-232 9-pole D-connectors for serial communication.

3. MESSAGE FORMAT

The communication used between the remote controller and the CCU is based on messages. This chapter describes the format of the message and the different message types used to transport data between the remote controller and the CCU.

3.1 Conventions

In the sections and chapters below several structures are defined. To prevent problems these structures are defined using standard data types, which have defined sizes and usage. The following data types will be used:

BOOLEAN	: a 1 byte unsigned value with the range 0...1 (FALSE and TRUE).
CHAR	: a 1 byte type representing ASCII characters. Strings are represented as an array of CHAR and are terminated with a zero (‘\0’) character.
BYTE	: a 1 byte unsigned value with the range 0...255.
SBYTE	: a 1 byte signed value with the range -128...127.
WORD	: a 2 byte unsigned value with the range 0...65535.
SWORD	: a 2 byte signed value with the range -32768...32767.
DWORD	: a 4 byte unsigned value with the range 0...(2^{32}-1).
SDWORD	: a 4 bytes signed value with the range -(2^{31})...(2^{31}-1).

Note that all number representation in the data are presented in little-endian[3] format.

3.2 Serial line message layout

The message format has the following layout:

Type	Length	Data

Defined as a structure definition:

```
typedef struct
{
    BYTE  byType;        // Message Type
    WORD  wLength;       // Message Length
    BYTE  byData []; // Message Data
} T_MESSAGE;
```

where:

byType	Defines the “message-type”. Currently the following types are defined for communication with the CCU: • MDSM_REMOTEPROCEDURE_REQ • MDSM_REMOTEPROCEDURE_RSP • MDSM_NOTIFY
wLength	Defines the actual length of the data present in the array following. Only this amount of data of the ‘byData’ array is transmitted. (limit = 5000, see §4.1.2.4)
byData []	Data array holding the “message data” as transmitted along with the message-type. This data represents a structure which format is explained below together with the different message-types.

[3] Little endian is a storage mechanism where the least significant byte is stored on the lowest address, followed by the more significant bytes. E.g. a WORD is represented in memory as two consecutive bytes where the LSB is stored on the lowest address and the MSB on the next address.

3.2.1 Format of type MDSC_REMOTEPROCEDURE_REQ

Remote functions are messages, which are always transmitted to the CCU. The message type must be equal to the value ‘MDSC_REMOTEPROCEDURE_REQ’.

The “message data” transmitted for a remote function follows the following format:

```
typedef struct
{
    WORD      wFnId;          // function identifier
    REQSTRUC  tStructure;     // function parameters if any!
} RSMT_REMOTEPROCEDURE_REQ;
```

where:

wFnId	The function identifier.
tStructure	A structure containing the parameters needed to process the function defined by the function identifier (if any).

The ‘wFnId’ and the ‘tStructure’ are tightly coupled. Therefore the parameter structure is not defined strictly with the basic types, but a special type is used to identify that the structure depends on the function identifier.

The actual structure definition to be sent along with the remote function is not described in this document. The structures are presented along with the definition of the remote function in the interface documents for the application.

After the remote function request is sent to the CCU, the CCU will always send back a response upon the reception of a remote function (see §3.2.2). The remote controller should wait for the response to be sure that the function ended successfully before sending another remote function to the CCU.

Note that the CCU does not generate this kind of messages.

3.2.2 Format of type MDSC_REMOTEPROCEDURE_RSP

Upon a receipt of a remote function the CCU shall process the requested function and create a response as result of that function. The message type will be equal to the value ‘MDSC_REMOTEPROCEDURE_RSP’.

The message data received for the response of a remote function follows the following format:

```
typedef struct
{
    WORD      wFnId;          // function identifier
    WORD      wError;         // return error-code from the function
    RSPSTRUC  tStructure;     // response information if any!
} RSMT_REMOTEPROCEDURE_RSP;
```

where:

wFnId	The function identifier. The same value as passed with the remote function request.
wError	The return error-code of the function called. Note that if this value is non-zero, the content of the ‘tStructure’ parameter is not valid[4].
tStructure	A structure containing the response information after the processing of the remote function (if any).

The ‘wFnId’ and the ‘tStructure’ are tightly coupled. Therefore the response information structure is not defined strictly with the basic types, but a special type is used to identify that the structure depends on the function identifier.

[4] Upon error the ‘wError’ field is filled with an error code (see Appendix C), which references the source of the error. Depending on the location of the error the ‘tStructure’ data may not be present. Therefore do not use the ‘tStructure’ data when ‘wError’ is not equal to zero.
When the error code has not been described, the error must be reported.

The actual structure definition to be received after handling a remote function request is not described in this document. The structures are presented along with the definition of the remote function in the interface documents for the application.

3.2.3 Format of type MDSC_NOTIFY

Upon a status change the CCU reports this change by sending an update notification to the remote controller. It is up to the remote controller to use the information received from the CCU. The CCU sends the information to the remote controller and does not expect any reply from the remote controller on these notifications.

The update notifications are always coming from the CCU and are only sent to the remote controller if he has registered for an application[5]. The message type will be equal to the value 'MDSC_NOTIFY'.

The message data received along the update notification follows the following format:

```
typedef struct
{
    WORD        wFnId;          // notification identifier
    NTFSTRUC    tStructure;     // update information if any!
} RSMT_NOTIFY;
```

where:

wFnId	The notification identifier.
tStructure	A structure containing the update information.

The 'wFnId' and the 'tStructure' are tightly coupled. Therefore the parameter structure is not defined strictly with the basic types, but a special type is used to identify that the structure depends on the notification identifier.

The actual structure definition to be sent along with the update notification is not described in this document. The structures are presented along with the definition of the update notification in the interface documents for the application.

3.2.4 Format of type MDSC_COMMUNICATION_PARAMS

The 'Full' feature protocol has several parameters, which control the functioning of the protocol. Some of these parameters can be changed remotely to get better timing values depending on the system used for the remote controller.

E.g. when the communication must be able to switch from remote controller 1 to remote controller 2 (when the first refuses work) without losing the communication, It could be desirable that the heart-beat time is larger than the switch-time.

The communication parameters can be changed using this message type. The message data received along the communication parameters follows the following format:

```
typedef struct
{
    WORD  wFnId;
    WORD  wHeartbeatTime;
    WORD  wNrRetries;
    WORD  wRetryTime;
} RSMT_COMMUNICATION_PARAMS;
```

where:

wFnId	The function identification to set the communication parameters. This parameter must be set to the value RSMC_SET_COMMUNICATION_PARAMS for setting the communication parameters.
wHeartbeatTime	The heartbeat time in seconds to be used. Valid values are in

[5] Registration for an application is done by calling a 'start application' remote function call. This function call enables the transmission of update notification for that application. The update can be stopped again by calling the 'stop application' remote function call.

	the range 0-1000. The value 0 (zero) implies that the heartbeat check will be turned off. Note that heartbeat message is still allowed (for synchronisation purposes).
wNrRetries	The number of retries to be done before the packet will be discarded. Valid values are in the range 0-10. Note that this count includes the retransmission upon the reception of a NAK-packet.
wRetryTime	The time between the retries in seconds when no responses are received. Valid values are in the range 1-100.

Note that this message will only be accepted if the message is transmitted over the serial line.

As a response upon the reception of this message the CCU will return the same message to the remote controller with the newly set values of the parameters (if accepted). The 'wFnId' value is set to the value RSMC_RSP_COMMUNICATION_PARAMS. If any of the parameters is rejected, the original value (before the call) is returned to the remote controller.

3.3 Ethernet message layout

Each message must have this layout:

MessageType	Length	Data

Defined in (c-style) structure format:

```
struct {
    DWORD  dwMessageType;    // Message Type
    DWPRD  dwLength;         // Message Length
    BYTE   byData[];         // Message Data (length - 8 bytesError!
Reference source not found.)
};
```

Where:

dwMessageType	The "message-type", which describes the content of the actual data passed.
dwLength	The total length of the message in number of bytes, including the sizes of the message-type and length. The length must match the actual transmitted size of bytes. Since the *MessageType* and the *length* are always present, the minimum size of the message is 8 bytes. The maximum size of a message is 8000 bytes.
byData	Data corresponding to the description of the message-type. The data represents a structure which format is explained hereafter together with the message-type.

3.3.1 Format of type MESSAGETYPE_OIP_KeepAlive

Purpose:

The heartbeat message is a special message, which can be sent to the DCN NG System at any time. In normal circumstances the heartbeat message is transmitted every 5 seconds (when nothing else to transmit). The message is used to notify the DCN NG System that your system is still alive. The DCN NG System also sends heartbeat messages to indicate that the DCN NG System is still operational. You must check if two successive messages are received within 15 seconds.

Note that the heartbeat message is similar to the notification messages.

Parameter structure:

```
struct {
    DWORD         dwMessageType;
    DWORD         dwLength;
    DWORD         dwReserved1;
    DWORD         dwReserved2;
} OIP_KeepAlive;
```

Where:

dwMessageType	The message type indicator for the heartbeat message. Constant value `MESSAGETYPE_OIP_KeepAlive` (See Appendix B).
dwLength	The total length of the Heartbeat message (16 bytes for this message).
dwReserved1	Session sequence number. Currently the *reserved1* is not used and should be set to the value zero (0).
dwReserved2	Message sequence number. Currently the *reserved2* is not used and should be set to the value zero (0).

3.3.2 Format of type MESSAGETYPE_OIP_ResponseProtocolError

Purpose:

Any message sent towards the DCN NG System is checked against its boundaries (message size, string size, validity of the message-type, not logged in …). In case a mismatch is detected regarding the size, a universal error response message is returned. Response message as described in section 3.3.3 cannot be used, because the received message is not decoded nor processed.

Parameter structure:

```
struct {
    DWORD         dwMessageType;
    DWORD         dwLength;
    DWORD         dwReserved1;
    DWORD         dwReserved2;
    DWORD         dwErrorCode;
    DWORD         dwErrorPosition;
} OIP_ResponseProtocolError;
```

Where:

dwMessageType	The message type indicator for the message. Constant value `MESSAGETYPE_OIP_ResponseProtocolError` (See Appendix B).
dwLength	The total length of the Heartbeat message (24 bytes for this message).
dwReserved1	Session sequence number. Currently the *reserved1* is not used and should be set to the value zero (0).
dwReserved2	Message sequence number. Currently the *reserved2* is not used and should be set to the value zero (0).
dwErrorCode	The error code of the received message. For the possible error codes see Appendix C.

dwErrorPosition	The byte offset in the message stream, where the fault is detected.

Related messages:

Any message received by the DCN NG System and is not conform the message guideline as described in 3.3.

3.3.3 Format of type MESSAGETYPE_OIP_Dcn

Command messages can be sent to control the DCN NG System. Commands always result in a response from the DCN NG System. The expected response is referenced with each command or the generic response `MESSAGETYPE_OIP_ResponseProtocolError` is returned in case the message is corrupted. Each command message starts with a fixed number of fields, which are presented below in structure format.

NOTE:
In the time between the transmission of the command message and the reception of the response message, the DCN NG System can receive notification messages.

```
struct {
    BYTE             byMessageTypeHeader;     /* Fixed value 0x43 */
    WORD             wFnId;
    BYTE             byDcnMsgType;
} OIP_DCN_MSGTYPE


struct {
    OIP_DCN_MSGTYPE  tMessageType;
    DWORD            dwLength;
    DWORD            dwReserved1;
    DWORD            dwReserved2;
    BYTE              byData[];
} OIP_Dcn;
```

Where:

byMessageTypeHeader	Message type header byte with a fixed value of 0x43.
wFnId	The function identifier.
byDcnMsgType	Is equal to the byType value described in 3.2. Currently the following types are defined for communication with the NCO: • MDSM_REMOTEPROCEDURE_REQ • MDSM_REMOTEPROCEDURE_RSP • MDSM_NOTIFY
dwLength	The total length of the command structure.
dwReserved1	Session sequence number. Currently the *reserved1* is not used and should be set to the value zero (0)
dwReserved2	Message sequence number. Currently the *reserved2* is not used and should be set to the value zero (0).
byData	Data corresponding to the description of the message-type. The data represents a structure which format is explained hereafter together with the message-type.

3.3.4 Buffer overflow

Purpose:

Messages ready for transmission from the DCN NG System are queued. In case the receive speed of the connected system is too low, the queue may overflow (dependant on the number of generated events, resource update, etc.). Since the queue consumes internal DCN NG System resources, overflow detection is present, which disconnects the communication interface when the queue overflows its limit.

This may result in a loss of received events.

4. PROTOCOL DESCRIPTION

4.1 Serial Line Protocol Description

The message described in the previous chapter must be transmitted between the CCU and the remote controller. The transmission mechanism uses a protocol to detect errors on the communication line.

For the serial communication there are three protocols available:

- *a 'terminal' protocol*
  This is not actually a protocol used for data communication. This setting is used to connect a standard ASCII terminal. This setting may be needed for services purposes.
  The terminal protocol is not further explained in this document.
- *a 'camera' protocol*
  This protocol is only used for communication with Allegiant Video-switchers or AutoDome Cameras by the DCN NG. This protocol is not further explained in this document.
- *a 'full' feature protocol*
  This includes error detection and retransmissions of messages. Also the communication is checked using the heartbeat mechanism. For details see §4.1.2.
- *a 'simple' feature protocol*
  This is the simplified protocol which only checks for transmission errors. The performance overhead and memory usage is low. For details see §4.1.3.

Note that Appendix A explains how the different protocols could be selected on the LBB4100 and the master CCU of a Multi CCU system (LBB4501).

4.1.1 Data packet format

The actual communication between the CCU and the remote controller is done on packet base. The data packet used has the following format:

Header	Message	ChkSum

The protocol only performs actions when a valid header is received. All bytes received before the header are ignored. The specific header format of the packet is described along with the protocol (§4.1.2 and §4.1.3).

The message in the packet is the actual data to be exchanged between the remote controller and the CCU. The general format and various types are described in §3.2.
Note that the message also includes the length of the message-data. This length combined with the fixed length of the header is used for the checksum calculation.

The package is terminated with a checksum section, which holds the checksum over all data inside the header and message. The Checksum is described along with the protocol (§4.1.2.2 and §4.1.3.3).

4.1.2 'Full' feature protocol

The 'Full' feature protocol is meant to be used within large DCN NG systems. The protocol provides a full functioning protocol including retransmissions and communication checks. Due to the great need of memory the 'Full' feature protocol is only present on the master-CCU of a multi-CCU system.

The 'Full' feature protocol has the following features:

⇒ Unique header detection possible using escape handling (see §4.1.2.3).

⇒ Protocol supports related ACK and NAK messages. Only 1 message is sent in advance so the use of ACK and NAK may be related, because they always react on the last message transmitted.

ACK and NAK packets follow the general data packet format without the message information. The ACK and NAK header formats are described in §4.1.2.1.

⇒ A message is expected to be sent as one block. The CCU checks if each byte is received within 50 ms of the previous byte. If not, a NAK-packet will be sent.

⇒ Upon reception of a NAK-packet the last transmitted message is resent again.

⇒ Each message includes a sequence number. The receiver may use this sequence to order the messages received.

⇒ When no ACK-packet is received within 2 seconds after completion of the transmission the packet will be retransmitted. A total of 2 retransmissions will be done before the transmission of the packet will be cancelled.

⇒ Connection check is done using heartbeat (see §4.1.2.4.4). Any packet received is seen as a valid heartbeat. When a heartbeat time-out occurs, communication will be stopped. All pending packets/messages will be discarded.
On the CCU the application will be notified that the communication with the remote controller is lost.

⇒ Communication parameters can be set using the special message type MDSC_COMMUNICATION_PARAMS (see §3.2.4)

Restrictions:

∗ After sending a message the system waits for the acknowledge. This decreases the throughput of the communication.

4.1.2.1 Header format

The header format has the following layout:

Escape	Headertype	Sequence

Defined as a structure definition:

```
typedef struct
{
    BYTE  byEscape;      // fixed constant value 0xC8
    BYTE  byHeaderType;
    BYTE  bySequence;
} RSMT_HEADER;
```

where:

byEscape	Escape byte used for recognition of the header. This escape byte forms together with the header type a unique combination and defines the purpose of the packet. More information about the escape byte can be found in §4.1.2.3.
byHeaderType	Type identification of the packet. This value defines the purpose of the packet. The different header types are described in §4.1.2.1.1.
bySequence	Sequence information where the packet is acting on. The usage of this sequence number is explained in §4.1.2.1.1.

As shown in the structure definition the header has a fixed length and forms a leader to recognise the start-point of a packet. The sequence number holds a unique (Modula 128) number.

4.1.2.1.1 Packet type definitions

The ‘Full’ feature protocol knows several header types, which are used to acknowledge messages transmitted. The following header types are defined:

‘$’ The packet holds message data. The total packet format is as described in §4.1.1. The sequence number passed in the header is used to identify the

	packet. That sequence number must be used to acknowledge the packet.
'@'	Defines the acknowledge packet (ACK). The packet only consists of the header and the checksum. No data is present within this packet. This packet acknowledges the data-message identified with the sequence number passed within the header.
'#'	Defines the negative acknowledge packet (NAK). The packet only consists of the header and the checksum. No data is present within this packet. This packet requests a retransmission of the data-message identified with the sequence number passed within the header. More information about the NAK-packet handling is given in §4.1.2.2.
'?'	Defines the heartbeat packet. The sequence number passed is the number of the next packet to be transmitted. The receiver side should use this number to synchronize the expected sequence number. The heartbeat message is used to check the communication (see §4.1.2.4.4).

All other types are assumed to be transmission errors and will trigger the transmission of a NAK-packet.

4.1.2.2 Checksum calculation

The packet is terminated with a checksum section, which holds the checksum over all data inside the header and message. The checksum section for the 'Full' data protocol has the layout:

correction	checksum

Defined as a structure definition:

```
typedef struct
{
    BYTE  byCorrection;
    BYTE  byChecksum;
} RSMT_CHECKSUM;
```

Where:

byCorrection	A correction value for the checksum to ensure that the calculated checksum never becomes equal to the escape-byte value (0xC8), see §4.1.2.3. The possible value for this byte will be either 0x00 or 0x13. No other possible values are allowed.
byChecksum	The calculated checksum over the header, the message data and the correction byte. The calculation sequence is described below.

The Checksum is calculated using the following sequence:

1. Fill the correction byte with the value 0x00.
2. Sum all bytes over the header, the message and the correction byte.
3. Take modulo 256 of the calculated checksum and do a bitwise invert of the checksum.
4. Check the checksum against the escape value (0xC8). When equal:
    a. Fill the correction byte with the value 0x13.
    b. Subtract the old correction value (0x00) and add the new correction value (0x13) to the sum value as calculated in step 2
    c. Take modulo 256 of the calculated checksum and do a bitwise invert of the checksum. The result is never equal to the escape value.

This calculated checksum is sent along with the packet. The receiver executes only the action 2 and 3 and verifies the calculated checksum with the received checksum.

4.1.2.3 Escape Byte handling

To identify the header uniquely within a stream of bytes is difficult, because the data may also hold the same sequence as the header. Therefore an escape byte is used to make the header unique. The escape byte holds the value 0xC8. Because the data to be transmitted could also contain the escape value, this implies that the data must be scanned to translate the escape value into an escape sequence.

The ‘full’ feature protocol uses the 0xC8 byte value as escape sequence. This escape sequence is always followed by another character-byte, which informs the actual function of the bytes. The following character-bytes (header type) are defined:

0xC8	The 0xC8 byte is defined. This sequence is mostly used within the message if the message contains the 0xC8-byte (converted during message preparation).
‘$’	The escape sequence defines the header of a new data packet. The header will be followed by a message and a checksum section.
‘@’	The escape sequence defines a acknowledge packet
‘#’	The escape sequence defines a negative acknowledge packet
‘?’	The escape sequence defines a heartbeat packet
others....	Invalid escape sequence. The packet is assumed to have errors and therefore is ignored (after transmission of a NAK-message).

Note: The byte extension used for the escape-byte is not used for the checksum calculation. The escape sequences should be first detected, solved and then the checksum should be calculated.

4.1.2.4 Protocol handling

The communication between the CCU and the remote controller is done using a RS-232 interface. The data is checked for errors using the checksum received and an acknowledge message is sent according to the result.

Figure 3 shows the state transition diagram of the ‘Full’ feature protocol. Note that in the figure the heartbeat mechanism is not present. The heartbeat time-out can be seen as an exit from the state transition diagram.

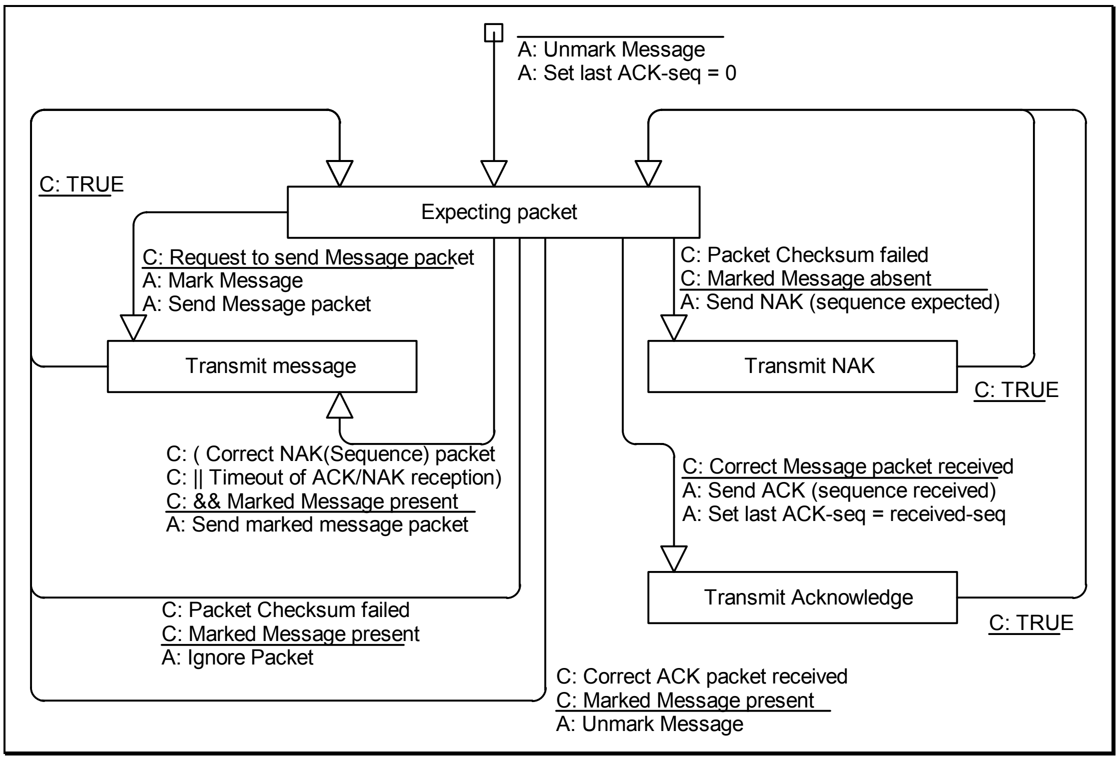
A: Unmark Message
A: Set last ACK-seq = 0
C: TRUE
Expecting packet
C: Request to send Message packet
A: Mark Message
A: Send Message packet
Transmit message
C: (Correct NAK(Sequence) packet
C: || Timeout of ACK/NAK reception)
C: && Marked Message present
A: Send marked message packet
C: Packet Checksum failed
C: Marked Message present
A: Ignore Packet
C: Packet Checksum failed
C: Marked Message absent
A: Send NAK (sequence expected)
Transmit NAK
C: TRUE
C: Correct Message packet received
A: Send ACK (sequence received)
A: Set last ACK-seq = received-seq
Transmit Acknowledge
C: TRUE
C: Correct ACK packet received
C: Marked Message present
A: Unmark Message

Figure 3 State transition diagram 'Full' feature protocol

For the protocol the following items are of importance:

- Before accepting any data-messages a heartbeat packet must be received first. Because the heartbeat includes the sequence number of the next data packet, the receiver can only check if the received data packet is in sequence after the reception of a heartbeat.
- The sequence number coming along with the message must be used to detect if a message is received twice (same sequence number).
- Each message is sent with a checksum. After each message sent, the transmitter waits for the (negative) acknowledge from the receiver.
- Upon reception of a message, the checksum is checked and a response (ACK or NAK packet) is sent back according to the result.
- After sending a message the transmitter waits for a valid ACK or NAK message. Any incorrect message received before the ACK message will be ignored.
- The sending side retransmits the message upon reception of a negative acknowledge or after a time-out time.
- A maximum of 2 retries will be done (either on time-out or on reception of negative acknowledge).
- The maximum message length is limited to 5000 bytes to detect transmission errors in the length field of the message (see §4.1.2.4.3).
- The connection-check will be performed using a heartbeat mechanism (see §4.1.2.4.3).
- The maximum delay between two bytes may be 50 ms.

4.1.2.4.1 Negative Acknowledge handling

When an invalid checksum is received a NAK-packet should be transmitted to request a retransmission of the packet. To help the sending side the receiver should sent along with the packet the sequence number expected. This sequence number can have the following values:

- *An expected sequence number*
  The receiving side is expecting either a data-packet or a heartbeat message. In this case the receiving side has no pending message (see Figure 3 where no message is marked), so no acknowledge is expected.
  The sending side of the communication line responds on this NAK-packet by retransmitting the data-packet. When no data-packet is pending a heartbeat should be retransmitted.

The sequence number passed is the packet sequence, which the receiver size expects to be received. This number can be wrong if the received packet is out of number synchronization.

4.1.2.4.2 Timing values

This section presents the different value and time-limits needed for handling the protocol.

Description	Value
The maximum delay between two consecutive bytes of a message	50 ms
The number of outstanding messages for which the transmitter is waiting for acknowledge.	1
The number of retries applied before discarding the message. This number includes the number of retransmissions after the reception of NAK packets.	2
The time to start a retry of a message. (The time is measured after the last byte of the packet is sent)	2 sec.
The time between two consecutive heartbeat's transmissions. Note that any message is a valid heartbeat.	5 sec.
The time for heartbeat time-out. The time without receiving any packet.	10 sec.
The maximum message data length	5000 bytes
Typical remote function execution time (exclusive the time needed for transmission of the data).	< 0,5 sec.

Note that the timing value for the ‘heartbeat-time’, the ‘retry-time’ and the ‘number of retries’ can be changed by sending the special message-type MDSC_COMMUNICATION_PARAMS. The layout for that message type is described in §3.2.4.
The values given in the table are the default value for the communication parameters.

Note that setting the communication parameters with excessive values could lead to malfunction of the protocol.

4.1.2.4.3 Special Conditions

Using the protocol described above. Special attention must be taken for the following points:

- *Transmission errors in the length field of a message*

This kind of error can result in very long message-data (length received much larger than actual transmitted). This results in losing information over several blocks.
With help of the limited length, any length above this limit can be rejected, followed by a negative acknowledge. Also is stated that a packet should be sent as a continuous stream (§4.1.2). Therefore when during the reception of a message the transmission is halted, the message may be considered having errors.

- *Simultaneously transmission on both sides*

This kind of problem arises when both sides of the communication line sent a message and one of the messages fails due to transmission errors (see Figure 4). In this case the badly received request-message is assumed to be an ACK-packet. This packet will be ignored. Then the actual ACK-packet is received and accepted. The remote controller still has a message waiting for an acknowledge. Therefore after the time-out a retry of the request-message transmission will take place.

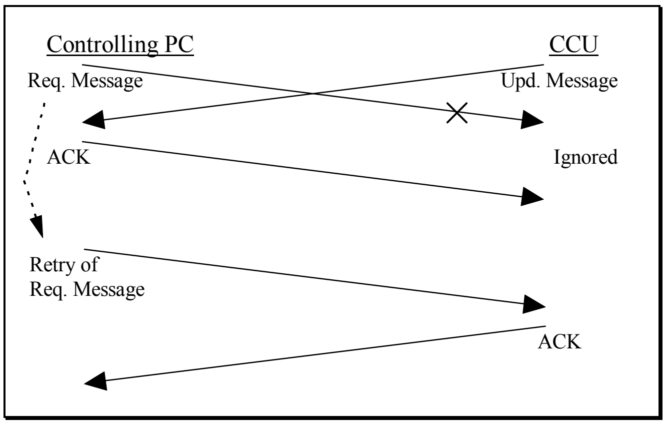

Figure 4 Simultaneous transmission with error

If, by some circumstances (as shown in Figure 4), a message is received correctly twice, the sequence number must be checked to see if the difference between the previously received message and this sequence is positive. If not, then the message may be assumed to be received a second time.

- *Receiving checksum error in expected ACK-packet*

The receiver side of the communication line ignores the packet. Using this kind of error occurs during a burst of errors on the communication line. By ignoring the packet, the communication line gets time to recover from the errors burst. After a timeout on the sending-side the packet will be retransmitted and shall be received correctly.

4.1.2.4.4 Heartbeat for connection checking

During the connection, we like to know if the connection is still valid. To control the validity of the connection a heartbeat check is included in the protocol.

The heartbeat mechanism includes the transmission of sync-packets to the other side every 5 seconds. The receiver must check if he has received a message within 10 seconds. If not, then the receiver may assume that the connection is lost. The heartbeat check time should be reset whenever a message (of any type) is received.

Note that during many message transmissions the transmission of the heartbeat message may be omitted, because any message received from the CCU is valid to be used as heartbeat.

4.1.3 'Simple' feature protocol

The 'Simple' feature protocol is meant to be used with small DCN NG systems. The protocol is designed to use a minimum amount of memory on the CCU.

The 'simple' feature protocol handling incorporated the following features:

⇒ Header and Message data is checked against a checksum, which is sent directly after the message (according the layout as described in §4.1.1).

⇒ On reception of a bad checksum the CCU will send a NAK-message.

⇒ A message is expected to be sent as one block. The CCU checks if each byte is received within 50 ms of the previous byte. If not, a NAK will be sent.

⇒ Messages sent by the remote controller are not acknowledged, because each Remote Function Call should result in a response.

The ‘simple’ feature protocol has also limitations, which are:

* There is no communication check. A link-failure cannot be detected by the CCU[6].
* There is no acknowledgement of the packets received (i.e. no ACK-packets).
* The CCU does no retransmission of messages. The NAK-messages are ignored.
* The header structure is not uniquely identified.

When the CCU receives a packet with an incorrect checksum, the CCU transmits a NAK-packet back to the remote controller (The NAK-packet is defined as a message type, which is described in §4.1.3.4). The remote controller then knows that his packet is received with errors and can transmit the packet again.

Note that the CCU keeps no history about the packets sent to the remote controller. This implies that the CCU cannot handle any NAK-packets sent by the remote controller and will therefore ignore the received NAK-packets.

4.1.3.1 Timing values

This section presents the different value and time limits needed for handling the ‘Simple’ protocol.

Description	Value
The maximum delay between two consecutive bytes of a message	50 ms
The maximum message data length	5000 bytes
Typical remote function execution time (exclusive the time needed for transmission of the data).	< 0,5 sec.

4.1.3.2 Header format

The header format has the following layout:

ESC	‘$’	CR

The header has a fixed length and forms a leader to recognize the start-point of a message. **Note** that all fields are defined as single bytes.

4.1.3.3 Checksum calculation

The packet is terminated with a checksum byte, which holds the checksum over all data inside the header and message. The Checksum is calculated using the following sequence:

- Sum all bytes over the header and the message.
- Take modulo 256 of the calculated checksum and do a bitwise invert of the checksum.

This calculated checksum is sent along with the packet. The receiver executes the same calculation and verifies the calculated checksum with the received checksum.

4.1.3.4 NAK Message definition

The ‘simple’ feature protocol has no special packets for sending the negative acknowledge. Therefore the NAK is implemented as a special message type. The total packet format follows the layout as described in §4.1.1.

The type present in the message defines the negative acknowledge and has the value MDSC_NAK. The data-bytes are not used for the NAK message, which implies that the length is set to zero.

[6] This implies that the CCU remains in the remote controlled state when the communication fails.

The packet tells the transmitting side of the connection that the last transmitted packet is received with errors (checksum failure).

Note that when the CCU is expecting the header of a packet, all received data will be ignored till the complete header is seen. This can happen when the length of a packet is corrupted. (e.g. actual length sent equals 1000 bytes, length received 10 bytes. Result is a checksum failure and a lot of extra bytes not belonging to a packet).

4.2 Ethernet Protocol Description

4.2.1 Open interface protocol

4.2.1.1 Set-up a connection

After DCN NG has been started, the network controller listens to port *9451*. The set-up of the TCP/IP connection must originate from your system using the IP address of the network controller and port *9451*. The connection between the DCN NG System and your System is based on a stream connection. This implies that messages may be transferred using multiple packets.

4.2.1.2 Heartbeat

After the connection between your system and DCN NG has been established, the network controller of DCN NG starts the heartbeat checks of your system. The network controller checks if a message is received within 15 seconds after the last message. When the time between two messages is more than 15 seconds, the network controller considers the connection to be broken and closes the TCP/IP connection to your system.

It is advised to also run heartbeat checks of DCN NG on your system. To signal that the connection is still present, you must transmit a "`MESSAGETYPE_OIP_KeepAlive`" message (refer to section 3.3.1) to the network controller every 5 seconds when no other messages are ready for transmission.

4.2.1.3 Timing values

This section presents the different value and time-limits needed for handling the protocol.

Description	Value
Transmit timeout for transmission heartbeat message	5 seconds
Check timeout to verify whether a message is received (reset after each message reception)	15 seconds
Maximum command response time	10 seconds
Minimum message size (message-type + length)	8 bytes
Maximum message size	8000 bytes

4.3 Remote function execution

Beside the protocol used for transmitting the data between the remote controller and the CCU, the CCU executes the remote function requests. In this section the execution of the remote functions is explained to give an overview about the generation of updates during the execution.

The remote controller can sent a remote function request to the CCU. After the transmission the remote controller must wait for the response coming from the CCU.

During the execution of that remote function in the CCU, the internal state of e.g. microphones changes. This results in the generation of update notifications, which are transmitted to the remote controller immediately. After the completion of the remote function execution the response of that function is sent back to the remote controller. This flow of messages to and from the CCU is shown in Figure 5 (two notification messages between the request and the response).

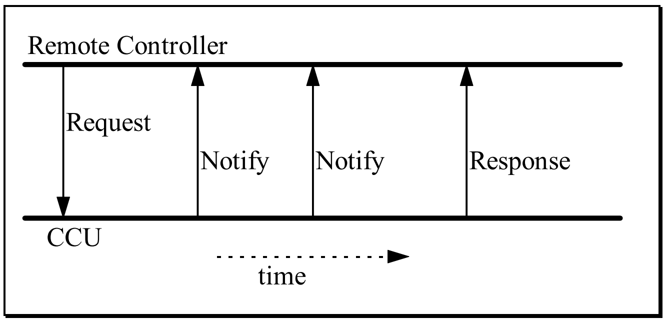

Figure 5 Message flow during a Remote function

The typical time between the request made and the response received is less than 0,5 seconds.

In the sequence described there is only one remote function request in execution on the CCU. The remote controller waits for the completion of that remote function. The remote controller can expect the following ending states of the remote request:

- The actual response of the remote function. The remote function is ended and there were no transmission errors.
- The NAK packet. This implies that the CCU had a checksum error found after the reception of the remote function request. The remote controller should respond on this NAK message by sending again the same request.
- A time-out of the request pending. This means that the CCU does not respond any more.

The remote controller must wait upon the completion of his remote function request. But in rare circumstance it is possible that there are two remote function requests pending. In that case the CCU handles both remote function requests after each other (order is maintained).

4.4 Control flow with multiple remote controller's

In a DCN NG-system as shown in Figure 1 (CCU with both a remote controller and the DCN NG Control PC connected), there are up to three locations where events can be generated. The locations are:

- The actual units. E.g. microphone keys, soft-keys (voting).
- The DCN NG Control PC connected using the RS-232 interface (or Ethernet in case of a master CCU-NCO). This DCN NG Control PC uses Remote Function calls to trigger functionality.
- The remote controller connected using the RS-232 interface (or Ethernet in case of a master CCU-NCO). This Remote Controller also uses Remote Function calls to trigger functionality.

To get a fully operational system both the DCN NG Control PC and the remote controller must register themselves to the CCU, so they will receive update messages from the CCU.

Events coming from a unit are processed. During the processing, notifications are generated and sent to all registered controllers. In the system mentioned above, both the DCN NG Control PC and the Remote Controller will receive the same update notifications if they are registered to the same application.

Remote functions coming from either the DCN NG Control PC or the Remote Controller initiate a function in the CCU. During the function processing, notifications are generated and sent to both the DCN NG Control PC and the Remote Controller. In this way both remote controllers get the update information about the actions performed on request of the DCN NG Control PC or the Remote Controller. (see also Figure 5).
Note that all remote functions are stored in a FIFO queue before execution. This means that

when both controllers call a remote function, both remote functions will be executed one after another (the time difference depends which function will be executed first).

5. REMOTE FUNCTIONS

5.1 Remote function handling

On the CCU all incoming remote functions are handled by the Remote Function Services (RFS). During start-up of the system applications register their remote controllable functions at the Remote Function Services.

When a remote function request is received by the CCU, that request is passed to the RFS sublink. If the function is available, the data structure will be prepared for the response data. During this process general failures may occur. The RFS sublink handles these failures by returning an empty response (only containing the function identifier and the error-code, no extra data). The error-code informs the remote controller which general failure has occurred.

Possible error codes are:

RFSE_BADFUNCTIONID	The remote function is not available
RFSE_ALLOCFAILED	Response space allocation failure
RFSE_NOACCESSPERMISSION	The remote function is not authorized

These error-codes are described in Appendix C.

5.2 Simultaneous operation from Control PC and Remote Controller

In some cases it is possible to have the same application running on the DCN Next Generation Control PC and (simultaneously) having that application running on a remote controller. Some applications can only be active on one place at a time. In the table below all possible combinations are depicted. All legal combinations are marked +. All illegal combinations are marked -. If an illegal combination is created, the proper working of DCN is not guaranteed anymore.

Remote Interface apps				Contro l	PC	apps	>					
V	ST	SM/MM	IN	DB	SI	PV/MV	AT	IC	LD	MD	CC	VD
SI	+	-	-	-	-	-	-	-	-	-	-	-
DB	+	-	+	-	-	-	-	-	+	+	-	-
SC	+	+	+	+	-	+	+	+	+	+	+	+
MM	+	+	+	+	-	+	+	+	+	+	+	+
CC	+	+	+	+	-	+	+	+	+	+	-	+
IN Control	+	+	-	+	-	+	+	+	+	+	+	+
IN Monitorin g	+	+	+	+	+	+	+	+	+	+	+	+
VT	+	+	+	+	-	-	+	+	+	+	+	+
LD	+	+	+	+	-	+	+	+	-	+	+	+
MD	+	+	+	+	-	+	+	+	+	+	+	+
AT	+	+	+	+	-	+	-	+	+	+	+	+
IC Control	+	-	+	+	-	-	-	-	+	+	+	+
IC Monitorin	+	+	+	+	+	+	+	+	+	+	+	+

g												

APPENDIX A. PROTOCOL, SERIAL PORT & TCP/IP SETTING

A.1. Protocol Settings Single CCU (DCN-CCU or DCN-CCUB)

In this Single CCU configuration two serial ports are available. Both ports can be individually configured.

The default settings for both serial ports are:

- 8 data bits
- No parity check
- 1 stop bit

Port 1
The baudrate for port 1 can be set by setting Dip-Switches 3+4 of as shown in the following table:

Switch		Baudrate	Remark
3	4		
off	off	9.6k	
off	on	19.2k	
on	off	57.6k	
on	on	115.2k	**Default**

The protocol for port 1 can be set by setting Dip-Switches 1+2 as shown in the following table:

Switch		Protocol	Remark
1	2		
off	off	Simple	The serial port is used with the '**Simple**' feature protocol as described in §4.1.3.
off	on	Terminal	The serial port is used with an ASCII interface. Expected is a terminal to do diagnostics on the CCU.
on	off	Full	The serial port is used with the '**Full**' feature protocol as described in §4.1.2. **(Default)**
on	on	Camera control	The serial port is used for connection to an Allegiant Video Switcher (AVS) or AutoDome camera (DCC).

Port 2
The baudrate for port 2 can be set by setting Dip-Switches 7+8 of as shown in the following table:

Switch		Baudrate	Remark
7	8		
off	off	9.6k	
off	on	19.2k	**Default**
on	off	57.6k	
on	on	115.2k	

The protocol for port 2 can be set by setting Dip-Switches 5+6 as shown in the following table:

Switch		Protocol	Remark
5	6		
off	off	Simple	The serial port is used with the '**Simple**' feature protocol as described in §4.1.3.
off	on	Terminal	The serial port is used with an ASCII interface. Expected is a terminal to do diagnostics on the CCU.
on	off	Full	The serial port is used with the '**Full**' feature protocol as described in §4.1.2.
on	on	Camera control	The serial port is used for connection to an Allegiant Video Switcher (AVS) or AutoDome camera (DCC). **(Default)**

Note that it is possible to select the 'Full' feature protocol on both ports. This is however not recommended due to processing power and memory limitations.

A.2. TCP/IP port setting MCCU-Master (DCN-NCO)

The TCP/IP port number used for the communication between the NCO and the remote controller is fixed set to the following value:

Tcp/Ip Port number	9451	Dune Open Interface protocol port

APPENDIX B. VALUES OF THE DEFINES

In this document some definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MDSC_NAK                       2
#define MDSC_REMOTEPROCEDURE_REQ       3
#define MDSC_REMOTEPROCEDURE_RSP       4
#define MDSC_NOTIFY                    5
#define MDSC_COMMUNICATION_PARAMS      15

#define RSMC_SET_COMMUNICATION_PARAMS  0x0001
#define RSMC_RSP_COMMUNICATION_PARAMS  0x0002

#define MKWORD(LSB,MSB)  ((WORD)(((WORD)(MSB)<<8) | (WORD)(LSB)) )

#define MESSAGETYPE_OIP_KeepAlive                    0x00447027
#define MESSAGETYPE_OIP_ResponseProtocolError        0x00447020
```

APPENDIX C. ERROR CODES

Responses returned upon a remote function request contain a error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Remote Function Services Error code / Explanation	Value (hex.)
RFSE_BADFUNCTIONID The remote function called is not registered by the Remote Function Services. Either the function does not exist or the CCU is operating in a wrong mode.	10901 (0x2A95)
RFSE_ALLOCFAILED The requested data-area for the function response could not be allocated. The CCU went out of memory during the remote function call.	10904 (0x2A98)
RFSE_NOACCESSPERMISSION The remote function called is not authorized for use, meaning no license key enabling use of the remote interface function is present on the CCU.	10907 (0x2A9B)
IPME_INVALID_MESSAGELENGTH The overall message length of the data is too small (below 8 bytes) or too large (above 8000 bytes). Please not that this error code is used only in conjunction with the MESSAGETYPE_OIP_ResponseProtocolError message.	4485152 (0x00447 020)

System Configuration, System Installation and Database

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for system configuration and system installation for the DCN NG system. The document specifies the interface between the CCU and third party software.

1.2 Scope

This Software Requirements Specification describes the current state of the remote interface for system configuration and system installation. It is meant to give an overview of the possibilities the remote interface offers to control the system configuration and system installation applications, present in the CCU, remotely. The Interface can be used to build a system configuration and system installation user interface.

For a complete description of the Remote Interface Set-up can be referred to [SRS_INF].

Only SC & SI & DB functions specified in this document are supported in the remote interface of DCN NG.

The interfaces (such as functions identifiers, arguments, values of defines, error/return codes) described in this document need to stay compatible with regards to earlier releases.

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a Single-CCU system or a Multi-CCU system.
DB	Delegate database application
DCN NG	Digital Congress Network Next Generation
DDI	Dual Delegate Interface
SC	System Configuration
SI	System Installation
SCCU	Single-CCU
OMF File	An executable file in a special format that can be programmed or downloaded into the ReadOnlyMemory on the CCU
TCB	Trunc Communication Board
MTB	Multi Trunc Board
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

[SRS_INF]	General Remote Interface Description	Du010933

This document must be referenced as [SRS_SCSIINF].

1.5 Overview

Chapter 2 gives a brief explanation on System Configuration, System Installation and Delegate database application. Also a short description of the different CCU system modes is given in this chapter. For system configuration, the remote functions and update notifications are described in chapters 3 and 4. For system installation, the remote functions and update notifications are described in chapters 4.8. For delegate database the remote functions are described in chapter 6.3.

Appendix A gives an overview of the constants used in combination with the remote functions and update notifications described in this document.

Appendix B gives an overview of the possible errors that could be returned upon execution of a remote function and a description what went wrong

Appendix C shows some examples on typical System Configuration or System Installation topics.

2. SC, SI AND DB

2.1 Introduction

The System Configuration, System Installation and Delegate Database Remote Interface is part of the DCN NG software which allows another controlling entity, not being the DCN NG Control PC, to use the System Configuration, System Installation and Database applications.

2.2 Remote SC, SI and DB functions

System Configuration (SC) is the application that monitors the hardware configuration of the congress system and the link between hardware items and user information. Typical SC issues are, e.g. checking the communication status, determining the system mode and replacing units.

System Installation (SI) is the application that allows for assigning seatnumbers to units to create a one to one link between a unique user chosen identifier and a congress unit in the conference hall.

The Database (DB) application allows users to compile a comprehensive database of information relating to participants at a conference or meeting.

Maintaining the system configuration or performing a system installation with a remote interface is done by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of remote functions and update notifications is described in [SRS_INF]. [SRS_INF] also defines the protocol and hardware conditions concerning the remote interface. This document gives the set of remote functions and the set of update notifications concerning SC, SI and DB. The relation between remote function and update notifications is given in the description of each separate remote function.

The system configuration and system installation process however, are also influenced by the actions of the users performed upon the actual units. Actions such as pressing the microphone button or disconnecting a unit from the system also results in update notifications being sent to the remote controller. The relation between unit/user events and update notifications can be found in the user event matrices in sections 4.1.2 en 6.1.1.

2.2.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Availability**
  CCU System modes in which the function is available. See section 2.3.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here.
- **Response structure from the function**
  The output information returned by the function called. This information is only valid when the ‘wError’ field of the received response information equals SC_E_NOERROR, SI_E_NOERROR or DB_E_NOERROR.
- **Error codes returned**
  The error values returned in the ‘wError’ field of the response information. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications, which are generated during the execution of the remote function. When there are no notifications generated, then this part will be omitted.

Related functions
The related function in conjunction with the function described. It refers to other remote functions and to related update notifications.

2.3 System Modes

To understand the SC and SI functions, one should have some knowledge on the behavior of the CCU depending on the various so-called system modes. This section gives a brief, although complete, description of these modes.

The CCU system as a whole is always running in one of the system modes. Each application on the CCU has its own behavior in each system mode. The purpose of the system mode is to have a clear division of functions and an easy way of separating them. It should be impossible for instance to start the installation mode while the CCU is still booting, i.e. the CCU is in the Init-mode.

The following system modes are used:

Init	One time mode after start-up of the CCU. The CCU can start with default data (defined as ‘cold start’), or with data the last time used (so called ‘warm start’).
Config	In this system mode the DCN NG configuration can be changed, for instance installing units, assigning seat numbers, assigning audio channels etc.
Congress	This is the 'normal' system mode. In this mode most applications will do their work, for instance starting a voting round, turning on a microphone, interpreting etc.
Maintenance	In this system mode the DCN NG system can be maintained, for instance testing microphones, testing audio channels, factory testing and equalization.
Download	In this system mode new CCU software can be downloaded.
Down	One time system mode just before shutdown of the CCU.

Figure 1 below gives an overview of possible system mode changes.

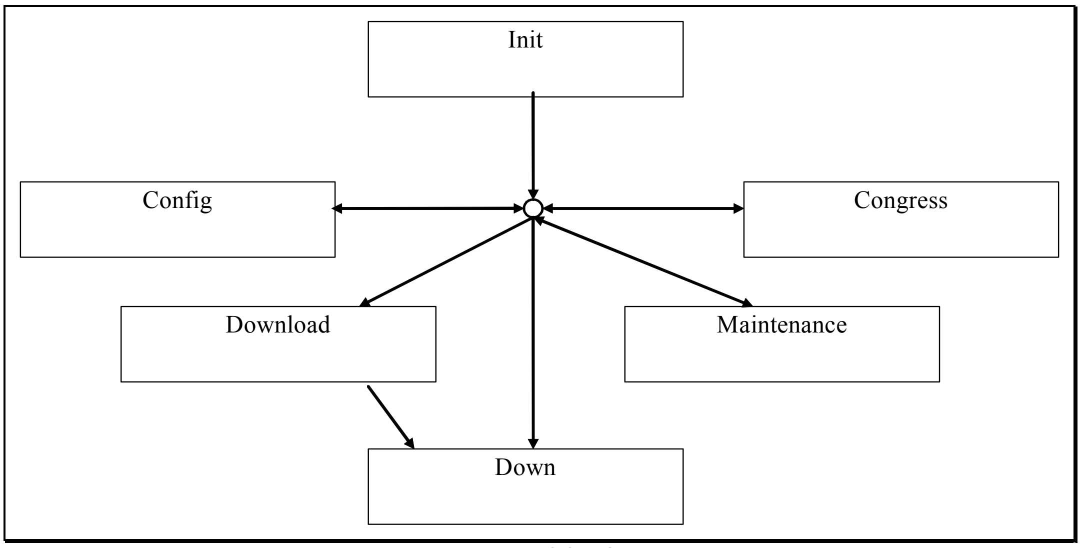

Figure 1: CCU System modes

Some remote functions are supported in more than one system mode, or in an other mode than the congress system mode.

3. SYSTEM CONFIGURATION (SC) FUNCTIONS

3.1 Introduction

The system configuration functions described in this section are needed to query the set-up of the DCN NG-system from the CCU. The system configuration functions allow the remote controller to monitor any changes in the DCN NG system configuration. This chapter defines the set of remote functions for system configuration.

3.2 SC_C_CHECK_LINK

Purpose
Function, which does no execution on the CCU. This function is to check the communication link between the CCU and the remote controller. When executed, the function returns immediately. Therefore quickly returning SC_E_NOERROR to the remote controller when there is a connection.

Availability
This function is available in CCU system mode's init, maintenance, config and congress.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes
SC_E_NOERROR

3.3 SC_C_START_APP

Purpose
Indicates the CCU that the remote controller wants update notifications from the SC application inside the CCU. After receiving this function the CCU increments the update ‘use’ count. As long as the update use count is greater than zero, the CCU will send update notifications to the remote controller.

The returned update use count can be used to detect if the remote controller is connected too often.

When you omit the execution of this remote function, you can still execute remote functions, but no update messages will be send to the remote controller.

Availability
This function is available in CCU system modes config and congress.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances
```

where:

wNrOfInstances	The value of the update use count for the SC application at the end of the function handling. It contains the number of times a remote PC has been connected over the same communication medium. E.g. the first time the function SC_C_START_APP is called, it contains the value 1.

Error codes returned
SC_E_NOERROR

Related functions
SC_C_STOP_APP

3.4 SC_C_STOP_APP

Purpose
Indicates the CCU that the remote controller no longer requires updates from the SC application inside the CCU. After receiving this function the CCU decrements the update 'use' count. As long as the update use count is greater than zero, the CCU remains sending the update notifications to the remote controller.

Note that: Upon communication lost this function will be activated, if SC_C_START_APP was activated. The activation of this function is repeated till the update use count becomes zero.

Availability
This function is available in CCU system modes config and congress.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has the same response structure as the remote function SC_C_START_APP (section 3.3).

Error codes returned
SC_E_NOERROR

Related functions
SC_C_START_APP

3.5 SC_C_GET_CCU_VERSIONINFO

Purpose
This function is used to query the CCU version information. Usually this will be the first function called after start-up of the remote controller to check the correct version of the CCU software.

Availability
This function is available in CCU all system modes.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD            tOperatingMode;
    CHAR            szSwVersion [SC_C_MAX_VERSION_LENGTH];
    BYTE            byMajorVersionOfDownloadedSw;
    BYTE            byMinorVersionOfDownloadedSw;
    BYTE            byMajorVersionOfResidentSw;
    BYTE            byMinorVersionOfResidentSw;
    BYTE            bySystemMode;
    BYTE            byReservedForSwInfo [SC_C_MAX_SOFTWARE_INFO];
    SC_T_CCU_TYPE   tCCUType;
    BYTE            byTCBVersion;
    BYTE            byReservedForHwInfo [SC_C_MAX_HARDWARE_INFO];
    CHAR            szSWRelNum[VERSION_C_LENGTH];
} SC_T_CCU_VERSION_INFO;
```

where:

tOperatingMode	The current operating mode of the CCU. It gives information about the environment the CCU is functioning. The value is an 'OR' mask of the following settings: • SC_C_STANDALONE

	• SC_C_EXTENDED • SC_C_SINGLETRUNC • SC_C_MULTITRUNC • SC_C_MASTER • SC_C_SLAVE
szSwVersion	The current operating mode of the CCU in readable text. The string is zero ('\0') terminated. If e.g. it is a Single CCU running extended software, this string would read: "EXTENDED SingleTrunc Version".
byMajorVersionOfDownloadedSw, byMinorVersionOfDownloadedSw	The major and minor version numbers of the downloaded software (OMF-file). If no downloaded software is present, then both will be zero. If e.g. the downloaded software is DCN NG 1.0, byMajorVersionOfDownloadedSw will be '1' and byMinorVersionOfDownloadedSw will be '0'
byMajorVersionOfResidentSw, byMinorVersionOfResidentSw	The major and minor version numbers of the resident software (Boot-software). If e.g. the resident software is of version 2.1, byMajorVersionOfResidentSw will be '2' and byMinorVersionOfResidentSw will be '1'.
bySystemMode	The Current System Mode of the CCU. Value according to following type: • DCNC_SM_DOWN • DCNC_SM_INIT • DCNC_SM_CONFIG • DCNC_SM_CONGRESS • DCNC_SM_MAINTENANCE • DCNC_SM_DOWNLOAD
byReservedForSwInfo	Reserved space for extra software information.
tCCUType	Type of CCU connected to. Value according to following type: • SC_C_DCN_CCU • SC_C_DCN_CCUB
byTCBVersion	Hardware version of the Trunk Communication Board inside the CCU.
byReservedForHwInfo	Reserved space for extra hardware information.
szSWRelNum	Software version number as ASCII string. The string is zero ('\0') terminated. This is the string representation of byMajorVersionOfDownloadedSw plus byMinorVersionOfDownloadedSw, e.g. if the version of the downloaded software is 1.0, this string will read "1.0"

Error codes returned
SC_E_NOERROR

3.6 SC_C_GET_CCU_CONFIG <deprecated>

Purpose
Retrieve information about all units connected to the congress network. This function returns for each unit connected its unit-number and type.

Availability
This function is available in CCU system mode congress.
Do not use this function because this function becomes deprecated in next major release.

Parameter structure for the function

The parameter structure is the same as SC_C_GET_CCU_CONFIG_PROPERTY.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD             wNumberOfSlaveCCUs;
    WORD             wNumberOfUnitsConnected;
    WORD             wNumberOfUnits;
    SC_T_UNIT_DATA   tUnitData [SC_C_CLUSTER_MAX];
} SC_T_CCU_CONFIGURATION;
```

where the SC_T_UNIT_DATA is defined as:

```
typedef struct
{
    WORD    wUnitId;
    BYTE    byUnitType;

} SC_T_UNIT_DATA;
```

The respons structure is almost the same as SC_C_GET_CCU_CONFIG_PROPERTY with the exception of the SC_T_UNIT_DATA structure which does not contain the wUnitProperties which is available in SC_T_UNIT_DATA_PROPERTY.

For explanation of the parameters see SC_C_GET_CCU_CONFIG_PROPERTY.

Error codes returned
SC_E_NOERROR

3.7 SC_C_GET_CCU_CONFIG_PROPERTY

Purpose
Retrieve information about all units connected to the congress network. This function returns for each unit connected its unit-number, type and capabilities of the unit.

Availability
This function is available in CCU system mode congress.

Parameter structure for the function
The function requires the following structure as parameter:

```
WORD    wClusterIndex;
```

where:

wClusterIndex	Determines which cluster is to be returned as response. Zero (0) to retrieve the first cluster of SC_C_CLUSTER_MAX units. One (1) for the second cluster of SC_C_CLUSTER_MAX units, etc. When the cluster is not completely filled, then that cluster is the last cluster available. All cluster indexes greater than this one will have an empty tUnitData array. However, the other three elements of the response structure will still contain correct data.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD                        wNumberOfSlaveCCUs;
    WORD                        wNumberOfUnitsConnected;
    WORD                        wNumberOfUnits;
    SC_T_UNIT_DATA_PROPERTY     tUnitData [SC_C_CLUSTER_MAX];
} SC_T_CCU_CONFIGURATION;
```

where the SC_T_UNIT_DATA_PROPERTY is defined as:

```
typedef struct
{
    WORD    wUnitId;
    BYTE    byUnitType;
    WORD    wUnitProperties
} SC_T_UNIT_DATA_PROPERTY;
```

where:

wNumberOfSlaveCCUs
The number of Slave-CCU's connected within a Multi-CCU system, which ranges from 0 to 16. In case of a Single-CCU system this number will be zero.

wNumberOfUnitsConnected
The actual number of units present in the system, even if the total number is larger than the maximum size of the 'tUnitData' array. wNumberOfUnitsConnected ranges from 0 to DBSC_MAX_ACT_UNIT.
When there are more units than the size of the 'tUnitData' structure, the structure is completely filled and the unit data for the other units must be queried by using another clusterindex. This number will be the same for all clusters requested.

wNumberOfUnits The number of units present in the tUnitData array. Only this amount of array elements is transmitted. This number will be limited to the upper bound of the tUnitData array-size.

tUnitData [] Array holding the unit-information of each unit. Each array element is defined as a SC_T_UNIT_DATA structure. The elements of this structure are described below.

wUnitId The unit identifier of a unit. Also called unit-number.

byUnitType The type of the unit, which is on of the following:

- DCNC_UNIT_VOTING
- DCNC_UNIT_INTEGRUS4
- DCNC_UNIT_INTEGRUS8
- DCNC_UNIT_INTEGRUS16
- DCNC_UNIT_INTEGRUS32
- DCNC_UNIT_DATA_COMM
- DCNC_UNIT_NG_INTERPRETER
- DCNC_UNIT_CCU_CONTROL
- DCNC_UNIT_DATA_COMM_RS232
- DCNC_UNIT_2000_DELEGATE
- DCNC_UNIT_2000_CHAIRMAN

- DCNC_UNIT_AUDIO_IO
- DCNC_UNIT_AUDIO_IO_DIGITAL
- DCNC_UNIT_COBRANET
- DCNC_UNIT_DISC_DELEGATE
- DCNC_UNIT_DISC_DELEGATE_DUAL
- DCNC_UNIT_DISC_CHAIRMAN
- DCNC_UNIT_DUAL_MIC
- DCNC_UNIT_FLUSH_CHR_NODISPLAY
- DCNC_UNIT_FLUSH_DEL_NODISPLAY

	• DCNC_UNIT_ENTRANCE • DCNC_UNIT_EXIT • DCNC_UNIT_AMBIENT_MIC **Note** that future unit extensions of the DCN NG system can lead to new unit-type, not presented in this list. **Note** that not all of these units are supported in the first releases of DCN NG (see 1.2).

wUnitProperties	Holds the properties of a unit. This can be a combination of the following.
	`DCNC_HAS_MIC`
	`DCNC_HAS_AUX`
	`DCNC_HAS_KEYS`
	`DCNC_HAS_CARD`
	`DCNC_HAS_DISPLAY`
	`DCNC_HAS_GRAPHICAL_DISPLAY`
	`DCNC_HAS_INTERCOM`
	`DCNC_HAS_EXTERNAL`
	`DCNC_HAS_BOOTH_DESK`
	`DCNC_HAS_HELP`
	`DCNC_HAS_SPEAKSLOWLY`
	`DCNC_HAS_BATTERY`
	`DCNC_HAS_QUALITY_LEVEL`
	`DCNC_HAS_DATACHANNEL_SUPPORT`
	`DCNC_HAS_MOST_INTERFACE`
	`DCNC_HAS_NEED_FOR_CARD_SETTINGS`

Error codes returned
SC_E_NOERROR

3.8 SC_C_REQ_SERIAL_NR

Purpose
Retrieve the serial number of the master controller.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wNrOfUnits;
    UNITID  tUnitList[DBSC_MAX_UNIT];
} SC_T_UNIT_LIST;
```

where:

wNrOfUnits	The number of unit list entries actual present in the tUnitList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_UNIT.
tUnitList[]	Array holding the list of unit ids. UnitId 0x0000 will return the serial number of the master controller

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_UNIT_SERIAL_NR

3.9 SC_C_GET_SLAVE_NODES

Purpose
Retrieve the slave nodes of the unit. This will be only applicable when the unit runs in SI_C_OPERATION_MODE_MULTI.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
```
    DWORD           dwSerialNr;
```

where:

dwSerialNr	The serial number of a unit, where in the

Response structure from the function
The function returns the following structure:

```
    typedef struct
    {
        WORD                       wNrOfSlaveNodes;
        DWORD                      dwSerialNr[DBSC_MAX_UNIT];
    } SC_T_SERIALNR_LIST;
```

where:

wNrOfSlaveNodes	The number of slave nodes present in the dwSerialNr array. Only this amount of array elements is transmitted. This number will be limited to the upper bound of the dwSerialNr array-size.
dwSerialNr []	Array holding the serial number of each slave node.

Error codes returned
SC_E_NOERROR

Related functions
SC_C_GET_SERIAL_NUMBER

3.10 SC_C_GET_JOINED_UNIT_IDS

Purpose
Retrieve the unit identification(s) of the unit. A unit can have one or multiple unit identifications.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
```
    DWORD           dwSerialNr;
```

where:

dwSerialNr	The serial number of a unit

Response structure from the function
```
    typedef struct
    {
        WORD    wNrOfUnits;
        UNITID  tUnitList[DBSC_MAX_UNIT];
    } SC_T_UNIT_LIST;
```

where:

wNrOfUnits	The number of unit list entries actual present in the tUnitList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_UNIT.
tUnitList[]	Array holding the list of unit ids.

Error codes returned
SC_E_NOERROR

Related functions
SC_C_GET_SERIAL_NUMBER

4. SYSTEM CONFIGURATION (SC) NOTIFICATIONS

4.1 Introduction

This chapter defines the set of update notifications concerning SC send by the CCU.

4.1.1 Update Notification item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

In the previous chapter a description is given of each remote function with a summary of update notifications being the result of executing that function. However, update notifications are also the results of user actions done on the actual units or CCU's. This section gives unit/user event matrices for the SC application in which the possible user events are linked with the corresponding update notification(s) depending on the system set-up. For some events also the required remote functions to continue SC monitoring and maintaining are given.

The update notifications themselves are described in the remaining sections of this chapter. The recommended functions from the SI group are described in chapter 4.8.

UNIT-EVENT MATRIX

Single-CCU System *(Remote Controller connected as specified in [SRS_INF])*

Event	Update Notification	Continue with remote function
Switch On CCU	SC_C_CCU_REBOOT	SC_C_START_APP *Recommended before continuing: SC_C_GET_CCU_VERSIONINFO SC_C_GET_CCU_CONFIG SI_C_START_INSTALL and run installation as described in example-1 in Appendix C*
Connect a unit	SC_C_CONNECT_UNIT	*Recommended before continuing: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Disconnect a unit	SC_C_DISCONNECT_UNIT	

Multi-CCU System *(Remote Controller connected to the Master as specified in [SRS_INF])*

Event	Update Notification	Continue with remote function
Switch On a Slave CCU, while Master CCU is still off	<None>	
Switch On Master CCU	SC_C_CCU_REBOOT	SC_C_START_APP *Recommended before continuing: SC_C_GET_CCU_VERSIONINFO SC_C_GET_CCU_CONFIG SI_C_START_INSTALL and run installation as described in example-1 in Appendix C*

Event	Update Notification	Continue with remote function
Switch On a Slave CCU	SC_C_CONNECT_SLAVE_CCU and a few seconds later for every unit connected to that Slave CCU separately SC_C_CONNECT_UNIT	*Recommended before continuing on the unit connect updates: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Switch Off a Slave CCU	SC_C_DISCONNECT_SLAVE_CCU	
Connect a Unit	SC_C_CONNECT_UNIT	*Recommended before continuing: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Disconnect a Unit	SC_C_DISCONNECT_UNIT	

***Single-Multi System**, i.e. a Multi CCU system but one or more of the Slave CCU's configured to run in Single Mode*

Event	Update Notification	Continue with remote function
Remote Controller connected to CCU-A, a CCU configured to run in Single CCU mode		
Switch On CCU-A	SC_C_CCU_REBOOT	SC_C_START_APP *Recommended before continuing: SC_C_GET_CCU_VERSIONINFO SC_C_GET_CCU_CONFIG SI_C_START_INSTALL and run installation as described in example-1 in Appendix C*
Switch On the Master CCU	<None>	
Switch On another CCU (Slave or Single-Mode)	<None>	
Disconnect another CCU (Slave or Single-Mode)	<None>	
Connect a unit to CCU-A.	SC_C_CONNECT_UNIT	*Recommended before continuing: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Disconnect a unit from CCU-A.	SC_C_DISCONNECT_UNIT	
Connect a unit to another CCU (Slave or Single-Mode).	<None>	
Disconnect a unit from another CCU (Slave or Single-Mode).	<None>	
Remote Controller connected to the Master CCU		
Switch On CCU-A	<None>	
Switch On the Master CCU.	SC_C_CCU_REBOOT	SC_C_START_APP *Recommended before continuing: SC_C_GET_CCU_VERSIONINFO SC_C_GET_CCU_CONFIG SI_C_START_INSTALL and run installation as described in example-1 in Appendix C*
Switch On a Slave CCU	SC_C_CONNECT_SLAVE_CCU	*Recommended before continuing on*

Event	Update Notification	Continue with remote function
	and a few seconds later for every unit connected to that Slave CCU separately SC_C_CONNECT_UNIT	*the unit connect updates: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Switch On another Single-Mode CCU	<None>	
Switch Off a Slave CCU	SC_C_DISCONNECT_SLAVE_CCU	
Switch Off another Single-Mode CCU	<None>	
Connect a unit to CCU-A.	<None>	
Disconnect a unit from CCU-A.	<None>	
Connect a unit to a Slave CCU.	SC_C_CONNECT_UNIT	*Recommended before continuing: SI_C_START_INSTALL and run installation as described in example-2 in Appendix C*
Disconnect a unit from a Slave CCU.	SC_C_DISCONNECT_UNIT	
Connect a unit to another Single-Mode CCU.	<None>	
Disconnect a unit from another Single-Mode CCU.	<None>	

4.2 SC_C_CCU_REBOOT

Purpose

Notifies the remote controller that the CCU has restarted. This notification is always send at start-up of the CCU and is the only notification message send by the CCU till the update request function SC_C_START_APP is executed.

This notification should be monitored to detect a restart of the CCU. The remote controller should take appropriate actions to restore the settings.

Notify structure with this update

The update comes with the same structure as used for the response of the remote function SC_C_GET_CCU_VERSIONINFO (section 3.5).

4.3 SC_C_CONNECT_UNIT

Purpose

Notifies the remote controller that a new unit has connected to the CCU. The remote controller can use this notification to add this unit to its functionality.

Notify structure with this update

The update uses the following structure:

```
SC_T_UNIT_DATA       tUnitData;
```

where:

tUnitData	Information about the unit that is connected. The elements present in the structure are defined in section 3.6.

4.4 SC_C_DISCONNECT_UNIT

Purpose

Notifies the remote controller that a unit has lost his connection with the CCU (i.e. the unit is disconnected from the ACN-trunk or MOST-trunk). This notification informs the remote controller that the unit is no longer available.

Notify structure with this update

The update comes along with the same structure as defined in section 4.3.

4.5 SC_C_CONNECT_SLAVE_CCU

Purpose

Notifies the remote controller that a slave-CCU has connected to the master-CCU.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    BYTE              bySlaveId;
    WORD              wFillLevel;
    SC_T_UNIT_DATA    tConnectedUnits[SC_C_CLUSTER_MAX];
} SC_T_CCU_CONNECT;
```

where:

bySlaveId	The identification number of the slave-CCU involved.
wFillLevel	The number of units present in the tConnectedUnits array. Only this amount of array elements is transmitted.
tConnectedUnits	A list of units that are connected to the slave in question. This means that all units reported in the list are also connected. Each list element is defined as a SC_T_UNIT_DATA structure which is defined in section 3.6. Note: Although the list is defined with SC_C_CLUSTER_MAX elements, only the maximum number of units possible for one slave will be transmitted.

Currently the wFillLevel parameter will always be zero. Due to the nature of the units and the control flow used with the CCU (slave and master), each unit will connect itself using the notification SC_C_CONNECT_UNIT. Therefore no units are reported in this list. Future extension in the software could build a list of units connected to a slave. That list should then be reported in the tConnectedUnits list.

4.6 SC_C_DISCONNECT_SLAVE_CCU

Purpose

Notifies the remote controller that the master-CCU has lost connection to one of his slave-CCU's. Along with this notification a list of all units connected to that slave is send. This notification tells the remote controller that the listed units are no longer available.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    BYTE              bySlaveId;
    WORD              wFillLevel;
    SC_T_UNIT_DATA    tDisconnectedUnits[SC_C_CLUSTER_MAX];
} SC_T_CCU_DISCONNECT;
```

where:

bySlaveId	The identification number of the slave-CCU involved.
wFillLevel	The number of units present in the tDisconnectedUnits array.

	Only this amount of array elements is transmitted.
tDisconnectedUnits	A list of units that are connected to the slave in question at the moment of disconnecting the slave. This means that all units reported in the list are also disconnected. Each list element is defined as a SC_T_UNIT_DATA structure which is defined in section 3.6.
	Note: Although the list is defined with SC_C_CLUSTER_MAX elements, only the maximum number of units possible for one slave will be transmitted.

This notification differs from SC_C_CONNECT_SLAVE_CCU such that *wFillLevel* and the *tDisconnectedUnits* array **do** inform the remote controller about units being disconnected together with this Slave-CCU. This implies that the units listed in the 'tDisconnectedUnits' do **not** notify themselves as disconnected with SC_C_DISCONNECT_UNIT.

4.7 SC_C_CCU_MODE_CHANGE

Purpose

Notifies the remote controller that the CCU changed its operation mode. For more information about the different modes see 3.5.

Notify structure with this update

```
typedef struct
{
    WORD    wCurrentMode;
    WORD    wNewMode;
} SC_T_CCU_MODE_CHANGE;
```

where:

wCurrentMode	The current CCU system mode, so before the mode change. Possible system mode values are defined in the bySystemMode field of the structure used within the function SC_C_GET_CCU_VERSIONINFO (see section 3.5).
wNewMode	The new CCU system mode, so after the mode change.

4.8 SC_C_UNIT_SERIAL_NR

Purpose

Notifies the remote controller the serial number of the unit. This notification is send after SC_C_REQ_UNIT_SERIAL_NR is executed.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    UNITID          tUnitId;
    DWORD           dwSerialNr;
} SC_T_UNIT_SERIAL_NR;
```

where:

tUnitId	The unit identifier of a unit.
dwSerialNr	Serial number of the unit
	When the serial number of unit is unknown the first two bytes will be 0xFF. This 'serial number' is valid until configuration changes.

5. SYSTEM INSTALLATION (SI) FUNCTIONS

5.1 Introduction

The system installation functions provide functionality to connect unit identification with the seat numbers used within the congress-hall. This process is also called seat-assignment. This chapter defines the set of remote functions needed for system installation. Each description is according to the definition given in section 2.2.1.

5.2 SI_C_START_INSTALL

Purpose
Start the installation mode. The remote controller can choose between 2 modes of installation, which are:

Mode	Description
SI_C_GLOBAL_INSTALL_MODE	Global installation mode. When activating this mode, the CCU stops all applications running and only runs the installation application. When the function is successfully executed, the CCU has changed the system mode from congress to config. Entering the system mode config enables the update notification SI_C_REGISTER_UNIT, which informs the remote controller about someone pressing a soft-key on a unit. The remote controller must use this notification message to link the unit with a seat. By pressing a soft-key on all units in order of the seat-numbers the remote controller can build a list of units with the seat-numbers as index. An example using this mode is presented in Appendix C.
SI_C_OPERATIONAL_INSTALL_MODE	Operational installation mode. During this mode all applications keep on running. The CCU remains in the congress mode. No special update notification for registration will be enabled. The remote controller must select a proposed unit and the seat-number must be searched to link them together.

To finish the installation the remote controller must execute the function SI_C_STOP_INSTALL.

Availability
This function is available in CCU system mode congress.

Parameter structure for the function
The function requires the following information as parameter:

```
WORD    wInstallMode;
```

where:

wInstallMode	The installation mode to be used. This parameter can have one of the following values: • SI_C_GLOBAL_INSTALL_MODE • SI_C_OPERATIONAL_INSTALL_MODE

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_ALREADY_STARTED
SI_E_MODE_CHANGE_FAILED

Update Notifications
SC_C_CCU_MODE_CHANGE (if the remote controller is registered to receive SC update notifications, i.e. it has called SC_C_START_APP)

Related functions
SI_C_STOP_INSTALL
SI_C_SELECT_UNIT

5.3 SI_C_STOP_INSTALL

Purpose
This function stops the installation started with the function SI_C_START_INSTALL. The CCU will return to congress mode if that is not the current system mode. The selected units will be deselected.

Note that: Upon communication loss this function will be activated, if SI_C_START_INSTALL was activated.

Availability
This function is available in CCU system mode config.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_NOT_IN_CONTROL

Update Notifications
SC_C_CCU_MODE_CHANGE (if the remote controller is registered to receive SC update notifications, i.e. it has called SC_C_START_APP)

Related functions
SI_C_START_INSTALL
SI_C_SELECT_UNIT

5.4 SI_C_SELECT_UNIT

Purpose
Select a unit for linking to a seat by means of flashing all LED’s on the unit. Only one unit can be selected at the same time. When the second unit is selected the first unit is deselected automatically before the selection of the second.

This function will only select a unit if the unit selected represents an installable unit. An installable unit is a unit, which can be assigned with a seat number.

Installable unit types are
DCNC_UNIT_VOTING
DCNC_UNIT_2000_DELEGATE
DCNC_UNIT_2000_CHAIRMAN

DCNC_UNIT_DISC_DELEGATE
DCNC_UNIT_DISC_DELEGATE_DUAL
DCNC_UNIT_DISC_CHAIRMAN
DCNC_UNIT_DUAL_MIC

DCNC_UNIT_FLUSH_CHR_NODISPLAY

DCNC_UNIT_FLUSH_DEL_NODISPLAY

When called during the installation mode SI_C_GLOBAL_INSTALL_MODE the microphone of the unit will be turned on as long as the unit is selected.

Availability
This function is available in CCU system modes config and congress.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD        wUnitId;
    BOOLEAN     bSelectOn;
} SI_T_SELECT_UNIT;
```

where:

wUnitId	The unit identifier of the unit selected.
bSelectOn	TRUE: All LED's of the unit will be flashing. FALSE: All LED's of the unit will be off

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_INVALID_UNITTYPE
SI_E_WRONG_PARAMETER
SI_E_NO_UNIT_SELECTED

Related functions
SI_C_START_INSTALL
SI_C_STOP_INSTALL

5.5 SI_C_SET_MASTER_VOL

Purpose
Sets the master audio volume. The audio loudness of the delegate loudspeakers, lineout and rec-out can be changed.

Availability
This function is available in CCU system modes config and congress.

Parameter structure for the function
```
WORD        wMasterVolume;
```

where:

wMasterVolume	The new overall volume setting for the system. A number in the range 0..25 (default `DCNC_DEFAULT_MASTERVOLUME`). In this range, a zero value means mute all delegate loudspeakers. The values 1 up untill 25 correspond with an audio amplification of -12dB up untill 12dB in steps of 1 dB.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER

5.6 SI_C_SET_EXT_CONTACT

Purpose

Sets the usage of the external present contact. The external present contact can be used to register present or used as a fraud contact.

Availability
This function is available in CCU system mode config.

Parameter structure for the function
```
SI_T_EXT_CONTACT    byExtContact;
```

where:

byExtContact	The usage of the external present contact which can be `SI_C_NO_FUNCTION, SI_C_PRESENT or SI_C_FRAUD.`
SI_T_EXT_CONTACT	**typedef** BYTE SI_T_EXT_CONTACT;

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR

Related functions
SI_C_GET_EXT_CONTACT

5.7 SI_C_GET_EXT_CONTACT

Purpose
Gets the usage of the external present contact.

Availability
This function is available in CCU system mode config and congress.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
```
SI_T_EXT_CONTACT    byExtContact;
```

where:

byExtContact	The usage of the external present contact which can be SI_C_NO_FUNCTION, SI_C_PRESENT or SI_C_FRAUD. Default behavior is SI_C_NO_FUNCTION
SI_T_EXT_CONTACT	**typedef** BYTE SI_T_EXT_CONTACT;

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_EXT_CONTACT

5.8 SI_C_SET_MICROPHONE_GAIN

Purpose
Adapts the microphone sensitivity of a unit.

Availability
This function is available in CCU system modes config, congress and maintenance.

Parameter structure for the function

```
WORD        wUnitId;
WORD        wGain;
```

where:

wUnitId	The unit identifier of a unit. Also called unit-number.
wGain	The microphone sensitivity/gain setting for the unit in the range 0..15. The values 0 up until 15 correspond with a microphone sensitivity setting change of -6dB up until 9dB in steps of 1 dB. The default value of the microphone sensitivity is DCNC_MICROPHONE_GAIN_DEFAULT.

Response structure from the function

The function has no response parameters.

Error codes returned

SI_E_NOERROR
SI_E_WRONG_PARAMETER
SI_E_UNIT_NOT_FOUND
SI_E_INVALID_UNITTYPE

Related functions

SI_C_GET_MICROPHONE_GAIN

5.9 SI_C_GET_MICROPHONE_GAIN

Purpose

Gets the microphone sensitivity of a unit.

Availability

This function is available in CCU system modes config, congress and maintenance.

Parameter structure for the function

```
WORD        wUnitId;
```

where:

wUnitId	The unit identifier of a unit. Also called unit-number.

Response structure from the function

```
WORD        wGain;
```

where:

wGain	The current microphone sensitivity/gain setting for the unit in the range 0..15.

Error codes returned

SI_E_NOERROR
SI_E_UNIT_NOT_FOUND
SI_E_INVALID_UNITTYPE

Related functions

SI_C_SET_MICROPHONE_GAIN

5.10 SI_C_RESET_MICROPHONE_GAIN

Purpose

Resets the microphone sensitivity of all units to the default gain setting.

Availability
This function is available in CCU system modes config, congress and maintenance.

Parameter structure for the function
The function has no input parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_NO_UNITS_FOUND

5.11 SI_C_REQ_OPERATION_MODE

Purpose
Request the operation mode of all units in the parameter list. After executing this function, a notification will be send for each known unit.

Availability
This function is available in system mode: CONFIG.

Parameter structure for the function
This function requires the structure SI_T_SERIALNR_LIST as parameter. This structure is defined in section xxx.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_OPERATION_MODE

Update notifications
SI_C_OPERATION_MODE

5.12 SI_C_SET_OPERATION_MODE

Purpose
Set the operation mode of the unit.

Availability
This function is available in system mode: CONFIG.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    DWORD                      dwSerialNr;
    BYTE                       byMode;
} SI_T_OPERATION_MODE;
```

where:

dwSerialNr	The serial number of a unit
byMode	The operation mode of the unit which is one of the following: • SI_C_OPERATION_MODE_MULTI • SI_C_OPERATION_MODE_SINGLE

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER
SI_E_NOT_CONTROL_UNIT

Related functions
SI_C_REQ_OPERATION_MODE

Update notifications
SI_C_OPERATION_MODE

5.13 SI_C_REQ_SLAVE_ID

Purpose
Request the slave identification of the unit. After executing this function, a notification will be send for each known unit.

Availability
This function is available in system mode: CONFIG.

Parameter structure for the function
This function requires the structure SI_T_SERIALNR_LIST as parameter. This structure is defined in section xxx.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_SLAVE_ID

Update notifications
SI_C_SLAVE_ID

5.14 SI_C_SET_SLAVE_ID

Purpose
Set the slave identification of the unit.

Availability
This function is available in system mode: CONFIG.

Parameter structure for the function
The function requires the following structure as parameter:

```
    SI_T_SLAVE_ID    tSlaveId;
```

where:

dwSerialNr	The serial number of a unit
dwSlaveId	The slave identification of the unit, with the values 0 until and including 31.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER
SI_E_NOT_CONTROL_UNIT

Related functions
SI_C_REQ_SLAVE_ID

Update notifications
SI_C_SLAVE_ID

6. SYSTEM INSTALLATION (SI) NOTIFICATIONS

6.1 Introduction

This chapter defines the set of update notifications concerning SI send by the CCU. Each description is according to the definition given in section 4.1.1.

6.1.1 Unit/user event relations

As for the SC application, update notifications for SI are also the results of user actions done on the actual units. This section gives a unit/user event matrix for the SI application in which the possible user events are linked with the corresponding update notification(s). For some events also the required remote functions to continue the System Installation process are given.

The update notifications themselves are described in the remaining sections of this chapter.

UNIT-EVENT MATRIX

Event	Update Notification	Continue with remote function
Installation not yet started		
Press a Soft-key on a unit	<None>	
Started Installation with SI_C_START_INSTALL (SI_C_GLOBAL_INSTALL_MODE)		
Press a Soft-key on a unit	SI_C_REGISTER_UNIT	SI_C_SELECT_UNIT *See example-1 in Appendix C*
Started Installation with SI_C_START_INSTALL (SI_C_OPERATIONAL_INSTALL_MODE)		
Press a Soft-key on a unit	<None>	

6.2 SI_C_REGISTER_UNIT

Purpose

Notifies the remote controller that during global installation (which implies that the CCU is in config mode, see SI_C_START_INSTALL section 5.2) a soft key is pressed on an installable unit. An installable unit is a unit, which can be assigned with a seat number.

An overview of installable unit types is given in section 5.4.

The remote controller should use this update to assign a seat number to the unit identifier given with this update notification.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    WORD    wUnitId;
    BYTE    byUnitType;
} SI_T_UNIT_STRUCT;
```

where:

wUnitId	The unit identifier of a unit. Also called unit-number.
byUnitType	• The type of the unit. The different unit types possible are the installable unit types given in section 5.4.

6.3 SI_C_OPERATION_MODE

Purpose

Notifies the remote controller the operation mode of the unit. This notification is send after the operation mode of the unit has been changed.

Notify structure with this update

The update comes with the structure SI_T_OPERATION_MODE as defined in section xxx.

6.4 SI_C_SLAVE_ID

Purpose

Notifies the remote controller the slave identification of the unit. This notification is send after the slave identifivation of the unit has been changed.

Notify structure with this update

The update comes with the structure SI_T_SLAVE_ID as defined in section xxx.

7. DELEGATE DATABASE (DB) FUNCTIONS

7.1 Introduction

The system configuration functions allow users to compile a comprehensive database of information relating to participants at a conference or meeting. This chapter defines the set of remote functions for system configuration.

7.2 DB_C_START_APP

Purpose
Indicate the CCU that the remote controller wants to communicate with the delegate database in the CCU.

When the execution of this remote function is omitted, all other remote database functions have no effect and will return the error DB_E_APP_NOT_STARTED.

Availability
This function is available in CCU system mode congress.

Parameter structure for the function
The function requires the following structure as parameters.

```
typedef struct
{
    BYTE byControlType;
} DB_T_APP_CONTROL;
```

where:

byControlType	Identify that the remote controller likes to perform actions on the database of the CCU. Valid values are:		
	•	DB_C_CONTROL	The remote controller likes to have control over the database of the CCU.

Note that the second start of the application (without a stop) always results in an error.

Response structure from the function
The function has no response parameters.

Error codes returned
DB_E_NOERROR
DB_E_INCONTROL_OTHER_CHANNEL
DB_E_INCONTROL_THIS_CHANNEL
DB_E_ILLEGAL_CONTROL_TYPE

Related functions
DB_C_STOP_APP

7.3 DB_C_STOP_APP

Purpose
Indicate the CCU that the remote controller no longer requires to access the database inside the CCU. A call to this function does not clear the database. The database present remains active till the CCU is restarted or accessed by the database functions (after first calling DB_C_START_APP).

Note that: Upon communication loss this function will be activated, if DB_C_START_APP was activated.

Availability
This function is available in CCU system mode congress.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
DB_E_NOERROR
DB_E_APP_NOT_STARTED
DB_E_NOT_INCONTROL
related functions
DB_C_START_APP

7.4 DB_C_MAINT_CCU

Purpose
The delegate database in the CCU can be changed using this remote function.

Availability
This function is available in CCU system mode congress. However, if another application is making use of the delegate database inside the CCU, e.g. Voting or Access Control, this function will return the error code DB_E_DELEGATE_DATA_BLOCKED

Parameter structure for the function
```
typedef struct
{
    BOOLEAN              bFirstCluster;
    BOOLEAN              bLastCluster;
    BYTE             byPinSize;
    WORD             wFillLevel;
    DB_T_PERDELEGATE     DelCluster[DB_C_MAX_N_DL_DEL_REC];
} DB_T_CCUMAINREC ;
```

with DB_T_PERDELEGATE defined as:

```
typedef struct
{
    WORD    lDelId;
    DWORD   lCard;
    DWORD   lPin;
    WORD    wUnitNr;
    BYTE    byDeskLang;
    DWORD   lVWeight;
    BOOLEAN bMicAut;
    BOOLEAN bVotingAut;
    BOOLEAN bInterAut;
    CHAR    szSLine [DBSC_NCHAR_SCREENLINE];
} DB_T_PERDELEGATE;
```

where:

bFirstCluster	Indicates if this block is the first cluster.
bLastCluster	Indicates if this block is the last cluster.
byPinSize	Indicated current pin code size. Possible values are 3, 4 and 5
wFillLevel	The DelCluster array is filled with wFillLevel entries.
DelCluster;	If an item in this array has an invalid value, the error DB_E_WRONG_PARAMETER is returned. The following items per array entry are available:
lDelId	Delegate identification number. A unique number in the range 1..DBSC_MAX_DELEGATE. It is recommended to use DelegateId’s in an increasing order, starting from 1.
lCard	Delegate card code. A unique number in the range 1..MAX_CARD_CODE or DB_C_NO_CARD. This is the numeric code present on the identification card handed over to the delegate and which is to be used in combination with attendance registration and

	access control.
lPin	Delegate pin code. A numeric value in the range 111...55555[1]. PIN codes or DB_C_NO_PIN are used for attendance registration and access control, but do not have to be unique.
wUnitNr	The unit number that the delegate is assigned to by default. This unit number must equal UnitId retrieved with SC_C_GET_CCU_CONFIG or equal to DCNC_UNASSIGNED_UNIT.
byiDeskLang	Delegate display language. One of: • DCNC_VER_ENGLISH • DCNC_VER_FRENCH • DCNC_VER_GERMAN • DCNC_VER_ITALIAN • DCNC_VER_SPANISH • DCNC_VER_SIXTH • DCNC_VER_DEFAULT
lVWeight	Delegate vote weight. A value in the range 1..MAX_VOTE_WEIGTH to be used by the voting application.
bMicAut	TRUE: this delegate has microphone authorization. FALSE: this delegate has no micro. authorization
bVotingAut	TRUE: this delegate has voting authorization. FALSE: this delegate has no voting authorization
bInterAut	TRUE: this delegate has intercom authorization. FALSE: this delegate has no intercom authorization.
szSLine	Delegate screen line. A string to represent a delegate e.g. on a Hall Display.

If more than DB_C_MAX_N_DL_DEL_REC records should be send to the CCU, more calls of this remote function will be needed. In this case the '*bFirstCluster*' and '*bLastCluster*' indicate the start and termination of the complete delegate database download.

Response structure from the function
The function has no response parameters.

Error codes returned
DB_E_NOERROR
DB_E_SET_PINSIZE_FAILED
DB_E_DELEGATE_LIST_TOO_BIG
DB_E_INSERT_DELEGATE_FAILED
DB_E_UPDATE_DELEGATE_FAILED
DB_E_DELEGATE_DATA_BLOCKED
DB_E_PENDING_REQUEST
DB_E_APP_NOT_STARTED
DB_E_WRONG_PARAMETER
DB_E_NOT_INCONTROL

Related functions
DB_C_START_APP
DB_C_DOWNLOAD_CCU
DB_C_CLEAR_CCU
DB_C_CCU_APPLY_ONE

[1] Although the PIN code is identified as a variable of the type 'long', the real PIN code is a 6-based number. This means that only digits 1 - 5 are allowed to be part of the PIN code. Besides, the PIN code also depends on the iPinSize variable. If e.g. iPinSize is 3, the possible values for lPin range from 111 to 555. If iPinSize is 5 then lPin ranges from 11111 to 55555. So, lPin must always contain iPinSize digits in the range 1..5.

7.5 DB_C_DOWNLOAD_CCU

Purpose
The delegate database in the CCU can be filled using this remote function.

Availability
This function is available in CCU system mode congress.

Parameter structure for the function
The same structures are used as in the function DB_C_MAINT_CCU.

Response structure from the function
The function has no response parameters.

Error codes returned
DB_E_NOERROR
DB_E_SET_PINSIZE_FAILED
DB_E_DELEGATE_LIST_TOO_BIG
DB_E_INSERT_DELEGATE_FAILED
DB_E_UPDATE_DELEGATE_FAILED
DB_E_DELEGATE_DATA_BLOCKED
DB_E_PENDING_REQUEST
DB_E_APP_NOT_STARTED
DB_E_WRONG_PARAMETER
DB_E_NOT_INCONTROL

Related functions
DB_C_START_APP
DB_C_MAINT_CCU
DB_C_CLEAR_CCU
DB_C_CCU_APPLY_ONE

7.6 DB_C_CLEAR_CCU

Purpose
This function clears the delegate database in the CCU.

Availability
This function is available in CCU system mode congress. As with DB_C_MAINT_CCU this function returns the error DB_E_DELEGATE_DATA_BLOCKED if another application is currently using the delegate database in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
DB_E_NOERROR
DB_E_DELEGATE_DATA_BLOCKED
DB_E_PENDING_REQUEST
DB_E_APP_NOT_STARTED
DB_E_NOT_INCONTROL

Related functions
DB_C_START_APP
DB_C_MAINT_CCU
DB_C_DOWNLOAD_CCU
DB_C_CCU_APPLY_ONE

7.7 DB_C_CCU_APPLY_ONE

Purpose

With this function it is possible to add or update just one record in the delegate database in the CCU.

Note that using this function you can only add or update a record of an existing database on the CCU. You cannot create a database using this function.

The delegateId as present in the structure is used to determine if the record will be added or updated:

- When the delegateId is not present in the database, the record will be added to the database.
- When the delegateId already exist in the database, the record of that delegate will be updated. Only the following fields may be changed:

wUnitNr	Unit number where the delegate resides
byDesklang	Desk language of the delegate
lVWeight	Voting weight of the delegate
bMicAut	Microphone authorization
bVotingAut	Voting authorization
bInterAut	Intercom authorization
szSline	The screen line of the delegate

All other fields of the structure must have the same value as the information stored in the database.

Availability

This function is available in CCU system mode congress.

Parameter structure for the function

DB_T_PERDELEGATE	tDelegate (for description see section 7.4)

Response structure from the function

The function has no response parameters.

Error codes returned

DB_E_NOERROR
DB_E_UPD_DEL_UNIT_IN_USE
DB_E_UPD_DEL_CARD_CHANGED
DB_E_UPD_DEL_PIN_CHANGED
DB_E_UPDATE_DELEGATE_FAILED
DB_E_INSERT_DELEGATE_FAILED
DB_E_NO_DATABASE
DB_E_APP_NOT_STARTED
DB_E_WRONG_PARAMETER
DB_E_NOT_INCONTROL

Related functions

DB_C_START_APP
DB_C_MAINT_CCU
DB_C_DOWNLOAD_CCU
DB_C_CLEAR_CCU

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values.

The values are presented in ‘C’-syntax and are grouped on related purpose.

```
#define DCNC_APP_DB  3
#define DCNC_APP_SI  17
#define DCNC_APP_SC  16

#define DB_C_START_APP                MKWORD (1,DCNC_APP_DB)
#define DB_C_STOP_APP                 MKWORD (2,DCNC_APP_DB)
#define DB_C_MAINT_CCU                MKWORD (3,DCNC_APP_DB)
#define DB_C_CLEAR_CCU                MKWORD (4,DCNC_APP_DB)
#define DB_C_CCU_APPLY_ONE            MKWORD (5,DCNC_APP_DB)
#define DB_C_DOWNLOAD_CCU             MKWORD (6,DCNC_APP_DB)

#define SC_C_GET_CCU_VERSIONINFO      MKWORD (6,DCNC_APP_SC)
#define SC_C_START_APP                MKWORD (7,DCNC_APP_SC)
#define SC_C_STOP_APP                 MKWORD (8,DCNC_APP_SC)
#define SC_C_CONNECT_UNIT             MKWORD (9,DCNC_APP_SC)
#define SC_C_DISCONNECT_UNIT          MKWORD (10,DCNC_APP_SC)
#define SC_C_GET_CCU_CONFIG           MKWORD (12,DCNC_APP_SC)
#define SC_C_CONNECT_SLAVE_CCU        MKWORD (13,DCNC_APP_SC)
#define SC_C_DISCONNECT_SLAVE_CCU     MKWORD (14,DCNC_APP_SC)
#define SC_C_CCU_REBOOT               MKWORD (15,DCNC_APP_SC)
#define SC_C_CCU_MODE_CHANGE          MKWORD (16,DCNC_APP_SC)
#define SC_C_CHECK_LINK               MKWORD (18,DCNC_APP_SC)
#define SC_C_GET_CCU_CONFIG_PROPERTY  MKWORD (51,DCNC_APP_SC)
#define SC_C_REQ_SERIAL_NR            MKWORD (53,DCNC_APP_SC)
#define SC_C_GET_SLAVE_NODES          MKWORD (54,DCNC_APP_SC)
#define SC_C_GET_JOINED_UNIT_IDS      MKWORD (55,DCNC_APP_SC)
#define SC_C_UNIT_SERIAL_NR           MKWORD (56,DCNC_APP_SC)


#define SI_C_SELECT_UNIT              MKWORD (1,DCNC_APP_SI)
#define SI_C_START_INSTALL            MKWORD (4,DCNC_APP_SI)
#define SI_C_STOP_INSTALL             MKWORD (5,DCNC_APP_SI)
#define SI_C_REGISTER_UNIT            MKWORD (9,DCNC_APP_SI)
#define SI_C_SET_MASTER_VOL           MKWORD (10,DCNC_APP_SI)

#define SI_C_SET_EXT_CONTACT          MKWORD (13, DCNC_APP_SI)
#define SI_C_GET_EXT_CONTACT          MKWORD (14, DCNC_APP_SI)
#define SI_C_SET_MICROPHONE_GAIN      MKWORD (15, DCNC_APP_SI)
#define SI_C_GET_MICROPHONE_GAIN      MKWORD (16, DCNC_APP_SI)
#define SI_C_RESET_MICROPHONE_GAIN    MKWORD (17, DCNC_APP_SI)

#define SI_C_REQ_OPERATION_MODE       MKWORD (30, DCNC_APP_SI)
#define SI_C_SET_OPERATION_MODEMKWORD (31, DCNC_APP_SI)
#define SI_C_REQ_SLAVE_ID             MKWORD (32, DCNC_APP_SI)
#define SI_C_SET_SLAVE_ID             MKWORD (33, DCNC_APP_SI)
#define SI_C_OPERATION_MODE           MKWORD (34, DCNC_APP_SI)
#define SI_C_SLAVE_ID                 MKWORD (35, DCNC_APP_SI)


/* Defines for external contact */
#define SI_C_NO_FUNCTION              0
#define SI_C_PRESENT                  1
#define SI_C_FRAUD                    2

#define DBSC_MAX_ACT_UNIT             512 SCCU system
#define DBSC_MAX_DELEGATE             DBSC_MAX_ACT_UNIT
#define DBSC_NCHAR_SCREENLINE         33



#define     DCNC_TYPE_DELEGATE                0x00
#define     DCNC_TYPE_CHAIRMAN                0x10
#define     DCNC_SUBTYPE_CONCENTUS            0x00
#define     DCNC_SUBTYPE_FLUSH                0x01
#define     DCNC_SUBTYPE_FLUSH_DUAL           0x02
#define     DCNC_SUBTYPE_DISC                 0x03
#define     DCNC_SUBTYPE_DISC_DUAL            0x04

#define     DCNC_SUBTYPE_VOTING               0x09
```

```
#define     DCNC_TYPE_ENTRANCE                      0x30
#define     DCNC_TYPE_EXIT                          0x40
#define     DCNC_TYPE_AMBIENT_MIC                   0x50
#define     DCNC_TYPE_INTERPRETER                   0x60
#define     DCNC_SUBTYPE_DESK                       0x00
#define     DCNC_SUBTYPE_AAEX                       0x01
#define     DCNC_SUBTYPE_DAEX                       0x02
#define     DCNC_SUBTYPE_CIN                        0x03
#define     DCNC_TYPE_DDB                           0x70
#define     DCNC_SUBTYPE_PASSIVE_DDB                0x00
#define     DCNC_SUBTYPE_ACTIVE_DDB                 0x01
#define     DCNC_SUBTYPE_RS232                      0x02
#define     DCNC_TYPE_CHANNELSELECTOR               0x80
#define     DCNC_SUBTYPE_PASSIVE                    0x00
#define     DCNC_SUBTYPE_4CHANNEL                   0x01
#define     DCNC_SUBTYPE_8CHANNEL                   0x02
#define     DCNC_SUBTYPE_16CHANNEL                  0x03
#define     DCNC_SUBTYPE_32CHANNEL                  0x04

#define DCNC_UNIT_VOTING                   (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_VOTING)
#define DCNC_UNIT_INTEGRUS4                (DCNC_TYPE_CHANNELSELECTOR |
                                            DCNC_SUBTYPE_4CHANNEL)
#define DCNC_UNIT_INTEGRUS8                (DCNC_TYPE_CHANNELSELECTOR |
                                            DCNC_SUBTYPE_8CHANNEL)
#define DCNC_UNIT_INTEGRUS16               (DCNC_TYPE_CHANNELSELECTOR |
                                            DCNC_SUBTYPE_16CHANNEL)
#define DCNC_UNIT_INTEGRUS32               (DCNC_TYPE_CHANNELSELECTOR |
                                            DCNC_SUBTYPE_32CHANNEL)
#define DCNC_UNIT_DATA_COMM                (DCNC_TYPE_DDB |
                                            DCNC_SUBTYPE_ACTIVE_DDB)
#define DCNC_UNIT_NG_INTERPRETER           (DCNC_TYPE_INTERPRETER |
                                            DCNC_SUBTYPE_DESK)
#define DCNC_UNIT_DATA_COMM_RS232          (DCNC_TYPE_DDB |
                                            DCNC_SUBTYPE_RS232)
#define DCNC_UNIT_2000_DELEGATE            (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_CONCENTUS)
#define DCNC_UNIT_2000_CHAIRMAN            (DCNC_TYPE_CHAIRMAN |
                                            DCNC_SUBTYPE_CONCENTUS)
#define DCNC_UNIT_AUDIO_IO                 (DCNC_TYPE_INTERPRETER |
                                            DCNC_SUBTYPE_AAEX)
#define DCNC_UNIT_AUDIO_IO_DIGITAL         (DCNC_TYPE_INTERPRETER |
                                            DCNC_SUBTYPE_DAEX)
#define DCNC_UNIT_COBRANET                 (DCNC_TYPE_INTERPRETER |
                                            DCNC_SUBTYPE_CIN)
#define DCNC_UNIT_DISC_DELEGATE            (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_DISC)
#define DCNC_UNIT_DISC_DELEGATE_DUAL       (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_DISC_DUAL)
#define DCNC_UNIT_DISC_CHAIRMAN            (DCNC_TYPE_CHAIRMAN |
                                            DCNC_SUBTYPE_DISC)
#define DCNC_UNIT_DUAL_MIC                 (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_FLUSH_DUAL)
#define DCNC_UNIT_FLUSH_CHR_NODISPLAY (DCNC_TYPE_CHAIRMAN |
                                            DCNC_SUBTYPE_FLUSH)
#define DCNC_UNIT_FLUSH_DEL_NODISPLAY (DCNC_TYPE_DELEGATE |
                                            DCNC_SUBTYPE_FLUSH)
#define DCNC_UNIT_ENTRANCE                 (DCNC_TYPE_ENTRANCE)
#define DCNC_UNIT_EXIT                     (DCNC_TYPE_EXIT)
#define DCNC_UNIT_AMBIENT_MIC              (DCNC_TYPE_AMBIENT_MIC)


#define  DCNC_VER_ENGLISH                  0
#define  DCNC_VER_FRENCH                   1
#define  DCNC_VER_GERMAN                   2
#define  DCNC_VER_ITALIAN                  3
#define  DCNC_VER_SPANISH                  4
#define  DCNC_VER_SIXTH                    5  (depending on downloaded OMF-file)
#define DCNC_VER_DEFAULT                   0xFF (Unit uses Default language)

#define DCNC_MICROPHONE_GAIN_DEFAULT       6

#define DCNC_DEFAULT_MASTERVOLUME         12
```

```
#define DB_C_NO_PIN                     0
#define DB_C_NO_CARD                    0
#define DCNC_UNASSIGNED_UNIT            0xFFFF


#define SC_C_DCN_CCU                    1
#define SC_C_DCN_CCUB                   2

#define  SC_C_STANDALONE                0x01
#define  SC_C_EXTENDED                  0x02
#define  SC_C_SINGLETRUNC               0x04
#define  SC_C_MULTITRUNC                0x08
#define  SC_C_MASTER                    0x10
#define  SC_C_SLAVE                     0x20

#define  SI_C_GLOBAL_INSTALL_MODE       1
#define  SI_C_OPERATIONAL_INSTALL_MODE 2

#define  DB_C_CONTROL                   1

#define  SC_C_MAX_HARDWARE_INFO         50
#define  SC_C_CLUSTER_MAX               1500
#define  SC_C_MAX_SOFTWARE_INFO         29
#define  SC_C_MAX_VERSION_LENGTH        50

#define  SI_C_OPERATION_MODE_SINGLE     0
#define  SI_C_OPERATION_MODE_MULTI      1

#define  DB_C_MAX_N_DL_DEL_REC          50
#define  VERSION_C_LENGTH               11
#define  MAX_CARD_CODE                  999999999
#define  MAX_VOTE_WEIGTH                99999999

#define  DCNC_SM_DOWN                   0
#define  DCNC_SM_INIT                   1
#define  DCNC_SM_CONFIG                 2
#define  DCNC_SM_CONGRESS               3
#define  DCNC_SM_MAINTENANCE            4
#define  DCNC_SM_DOWNLOAD               5

#define  TRUE                           1
#define  FALSE                          0

#define DCNC_HAS_MIC                      0x0001
#define DCNC_HAS_AUX                      0x0002
#define DCNC_HAS_KEYS                     0x0004
#define DCNC_HAS_CARD                     0x0008
#define DCNC_HAS_DISPLAY                  0x0010
#define DCNC_HAS_GRAPHICAL_DISPLAY        0x0020
#define DCNC_HAS_INTERCOM                 0x0040
#define DCNC_HAS_EXTERNAL                 0x0080
#define DCNC_HAS_BOOTH_DESK               0x0100
#define DCNC_HAS_HELP                     0x0200
#define DCNC_HAS_SPEAKSLOWLY              0x0400
#define DCNC_HAS_BATTERY                  0x0800  /* For wireless units */
#define DCNC_HAS_QUALITY_LEVEL            0x1000  /* For wireless units */
#define DCNC_HAS_DATACHANNEL_SUPPORT      0x2000
#define DCNC_HAS_MOST_INTERFACE           0x4000
#define DCNC_HAS_NEED_FOR_CARD_SETTINGS 0x8000
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

System Configuration Error code / Explanation	Value (hex.)
SC_E_NOERROR The execution of the remote function was successful.	0 (0x00)

System Installation Error code / Explanation	Value (hex.)
SI_E_NOERROR The execution of the remote function was successful.	0 (0x00)
SI_E_INVALID_UNITTYPE The selected unit represents no seat. For example the entry exit unit and interpreter desks.	4353 (0x1101)
SI_E_ALREADY_STARTED System installation has already been started.	4354 (0x1102)
SI_E_NOT_IN_CONTROL The remote function is not allowed, because this remote controller has no control over the system installation.	4355 (0x1103)
SI_E_WRONG_PARAMETER The value of a parameter passed in a function call is invalid (out of range).	4356 (0x1104)
SI_E_NO_UNIT_SELECTED No unit has been selected.	4357 (0x1105)
SI_E_NO_UNITS_FOUND There could not be found any unit.	4368 (0x1110)
SI_E_UNIT_NOT_FOUND The unit does not exist.	4371 (0x1113)
SI_E_NO_CONTROL_UNIT The unit is not a control unit.	4372 (0x1114)

Database Query Services Error code / Explanation	Value (hex.)
DB_E_NOERROR The execution of the remote function was successful.	0 (0x00)
DB_E_SET_PINSIZE_FAILED	10401 (0x28A1)

Database Query Services Error code / Explanation	Value (hex.)
Setting a new size for the PIN Code into the Delegate Database failed.	
DB_E_DELEGATE_LIST_TOO_BIG	10402 (0x28A2)
The wFillLevel parameter in DB_C_MAINT_CCU has a value larger then DB_C_MAX_N_DL_DEL_REC.	
DB_E_INSERT_DELEGATE_FAILED	10403 (0x28A3)
Inserting the current DB_T_PERDELEGATE structure into the Delegate Database failed.	
DB_E_UPDATE_DELEGATE_FAILED	10404 (0x28A4)
Updating the delegate database with the current DB_T_PERDELEGATE structure failed.	
DB_E_UPD_DEL_PIN_CHANGED	10405 (0x28A5)
Update failed because the PIN code changed.	
DB_E_UPD_DEL_CARD_CHANGED	10406 (0x28A6)
Update failed because the card code is changed.	
DB_E_UPD_DEL_UNIT_IN_USE	10407 (0x28A7)
Update of database failed because someone else is already using the proposed default seat.	
DB_E_PENDING_REQUEST	10408 (0x28A8)
Setting/updating the Delegate Database failed because a delegate with a pending Request to Speak was tried to delete from the database.	
DB_E_DELEGATE_DATA_BLOCKED	10409 (0x28A9)
Updating the delegate database with the current DB_T_PERDELEGATE structure failed.	
DB_E_NO_DATABASE	10410 (0x28AA)
The use of function DB_C_CCU_APPLY_ONE is not possible, because currently there is no database present in the CCU.	
DB_E_APP_NOT_STARTED	10411 (0x28AB)
The remote controller has not called the DB_C_START_APP yet. Therefore any remote function call to access the database fails with this error.	
DB_E_INCONTROL_THIS_CHANNEL	10412 (0x28AC)
The database is already under control by this remote controller (on the same channel). Probably you have called the DB_C_START_APP function twice.	
DB_E_INCONTROL_OTHER_CHANNEL	10413 (0x28AD)
The DB_C_START_APP function could not finish successfully because the database is already controlled by another remote controller using another channel.	
DB_E_ILLEGAL_CONTROL_TYPE	10414 (0x28AE)

Database Query Services Error code	Explanation	Value (hex.)
	The control-type passed to the function DB_C_START_APP is not within range of valid values (see appendix 6.3 for the correct control-type values).	
DB_E_NOT_INCONTROL	The remote function is not allowed, because this remote controller has no control over the delegate database.	10415 (0x28AF)
DB_E_WRONG_PARAMETER	Settings or a combination of settings is not correct.	10417 (0x28B1)

APPENDIX C. EXAMPLES

In the examples below the remote functions and update notifications, that are defined in this document as constant values for the wFnId parameter of the message (see [SRS_INF]), are presented as functions described in a ‘C’ syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function is assumed that the function will create his structure, transport the parameters to the CCU and waits for the result information coming from the CCU.

For both the remote functions as the update notifications the same names are used as their identifier, but without the constant mark “C” and using mixed case names. So, e.g. remote function SC_C_CONNECT_UNIT shall be referenced as function as:

SC_Connect_Unit (SC_T_UNIT_DATA tUnitData);

C.1. Assigning seats using global installation

This example shows how the remote controller can assign his seats to the unit-numbers present in the conference hall.

Assumed is that the conference hall has a number of seats numbered starting with 1. For this proposed installation one person must walk through the conference hall and press one of the soft-keys on the units in order of the seats (starting with seat 1). On each unit a soft-key is only pressed once.

For this seat assignment the global installation mode of the CCU will be used. therefore we start with activating that mode.

```
error = SI_Start_Install (SI_C_GLOBAL_INSTALL_MODE);
if (error != SI_E_NOERROR)
{
 /* do error handling */
}
```

After this function the CCU is in global installation mode, all displays are off and no applications are running.

We now initialize the current seat and unit-number, assuming seatnumbers are chosen to be purely numeric:

```
wCurrentSeatNumber = 1;
```

The system is now ready to accept the key-presses on the units in order of the seats. When a soft-key is pressed the CCU sends a notification. During the processing of that function we select the unit where the key is pressed, and assign the current seat number to the provided unit number.

This result in the following function:

```
void SI_Register_Unit (SI_T_UNIT_STRUCT *tUnitStruct)
{
 /* First turn off the previous selected unit */
 /* ........ */

 error = SI_Select_Unit (tUnitStruct->wUnitId, TRUE);
 if (error != SI_E_NOERROR)
 {
     /* do error handling */
 }

 /* assign the current seat to the unit */
 MyAssignSeat (wCurrentSeatNumber, tUnitStruct->wUnitId);

 /* Increment to the next seat */
 wCurrentSeatNumber = wCurrentSeatNumber + 1;

 /* and save the unitId to turn off during the assignment of the next seat
*/
 /* ........ */
}
```

Note that this function is only an example to shown how the interaction between update notifications and remote functions can appear. For instance, when you press a soft-key the second time, this function will fail. Better is to look if the selected unit has already a seat assigned. If not, the assign and increment, if assigned, just keep the assignment.

When done with all seats present in the conference hall, we can leave the global installation mode. This is done using the following sequence:

```
/* first turn off the last selected unit */
/* ........ */

error = SI_Stop_Install ();
if (error != SI_E_NOERROR)
{
 /* do error handling */
}
```

This ends the global seat assignment. The remote controller has now a complete list of all seats and their corresponding unit-numbers.

C.2. Replacing defective units during operation

This example shows how the remote controller can assign a seat to a unit in the conference hall, which is replaced by a new unit (due to failure of the old unit).

Assumed is that previously all units have been assigned a seat-number on the remote controller. After detection that a unit fails, the following actions are performed by the technical staff of the conference hall:

1. The defective unit is removed from the system. Note that disconnecting the unit also may disconnect other (chained) units.
2. A new unit is inserted into the unit-chain and connected to the system.
3. The new unit is de-initialized, and initialized again to be sure that the added unit has no address conflict with other units.

During these actions the following notifications are reported to the remote controller (assumed is that the application SC is registered by the CCU:

- Microphone off notifications if any of the disconnected units has their microphone on or had a pending request (present in the Request To Speak list).
- SC_C_DISCONNECT_UNIT for all units in the chain disconnected. The remote controller remembers these units to disable the functionality.
- SC_C_CONNECT_UNIT for all units connected. Most of the unit-numbers are known in the disconnect-list and can be restored (e.g. the functionality will be enabled). The new unit(s) connected to the system is not known.

For these units the remote controller must start the operational installation mode. The operational installation mode is activated using the following remote function request:

```
error = SI_Start_Install (SI_C_OPERATIONAL_INSTALL_MODE);
if (error != SI_E_NOERROR)
{
 /* do error handling */
}
```

After this the CCU has enabled the operational installation mode. The remote controller can start the sequence to assign the new unit-numbers to seats not yet assigned.

```
while (there are new units and unassigned seats)
{
 WORD wUnitId;

 wUnitId = First_new_unit_available;

 /* select the unit */
 error = SI_Select_Unit (wUnitId, TRUE);
 if (error != SI_E_NOERROR)
 {
      /* do error handling */
 }

 /* Let the operater determine which seat should be assigned to the
selected
    unit. Normally the operator will view which unit is flashing, checks
the
    seat-number and pass the seat-number found to the remote controller.

    The seat-number is stored in the variable 'wSeatNumber'
 */
 /* assign the current seat to the unit */
 MyAssignSeat (wSeatNumber, wUnitId);

 /* assignment finished, deselect the unit */
 error = SI_Select_Unit (wUnitId, FALSE);
 if (error != SI_E_NOERROR)
 {
      /* do error handling */
 }
}
```

After this sequence handling the newly added units are again assigned to seats. This also finished the operational installation mode, so we can leave the installation mode.

```
error = SI_Stop_Install ();
if (error != SI_E_NOERROR)
{
 /* do error handling */
}
```

The remote controller can now continue with operation.

Microphone Management

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for microphone management between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the remote interface for microphone management. It is meant for developers who want to use this remote interface to control the microphone management application, present in the CCU, remotely. The Interface can be used to build a Microphone Management User interface or a Synoptic Microphone User interface.

For a complete description of the System Set-up can be referred to [SRS_INF].

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
ACN	Audio Communication Network
DCNNG	Digital Congress Network Next Generation
MM	Microphone Management
SC	System Configuration
SI	System Installation
RTS list	Request To Speak list
SPK list	Speakers list
NBK list	Notebook list (list of chairmen and special assigned delegates)
CR list	Comment Request list. An extra type of request to speak list to offer delegates the possibility to request for a comment on the current speaker. On the units and on the Control PC a comment is indicated as ‘Response’
CS list	Comment Speakers list. An extra type of speakers list in which delegates can be placed to make a comment on the current speaker.
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
remote controller	Device (e.g. PC) connected to the CCU which remotely controls a part of the applications present in the CCU.

1.4 References

This document should be referenced as [SRS_MMINF].

[SRS_INF]	General Remote Interface Description	Du010933
[SRS_SCSIINF]	System Config and System Installation Remote Interface	Du010934

1.5 Overview

Chapter 2 describes the Microphone Management Remote Interface in general.

Chapter 3 and chapter 4 describe respectively, the remote functions and the update notifications which can be used to control the microphones of the units connected to the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible error’s, which could be returned upon a remote function.

Appendix C gives an example on using the remote interface for Microphone Management.

2. MICROPHONE MANAGEMENT FOR A REMOTE INTERFACE

2.1 Introduction

The Microphone Management Remote Interface is part of the DCNNG software, which allows for another controlling entity outside the CCU, not being the DCNNG Control PC, to use the Microphone Management application.

2.2 Remote Microphone Management Control

Microphone Management is the application that allows for controlling the microphones in the conference hall. Typical control issues are e.g.: turning a Microphone On, adding a delegate to the RTS list, changing the Operation Mode etc.

Controlling microphones with a remote interface is by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of Remote Functions and Update Notifications is described in [SRS_INF]. [SRS_INF] also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are up to three locations in a full-connected CCU where MM can be influenced. These locations are:

- The remote interface or the remote controller (customer build client or DCNNG Control PC) uses the TCP/IP interface. The remote controller makes Remote Function calls for microphone management.
- The actual units that handle their microphone keys.

To get a full operational system both the DCNNG control PC and the remote controller must register themselves to the CCU, so they will receive update messages from the CCU.

Remote functions coming from either the DCNNG control PC or the remote controller initiates in the CCU an update of the internal lists. During the update, notifications are generated and sent to both the DCNNG control PC and the remote controller. In this way both remote controllers get the update information about the actions performed on either the DCNNG control PC or the remote controller.

During the processing of remote functions on the CCU, the update messages are created and transmitted. This implies that the response information of a remote function can be received after the reception of an update notification. The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned. The notifications received during the wait for the response may be processed directly.

Requests coming from a unit are processed and the lists updated. During the update, notifications are generated and sent to all registered PC’s. In the system mentioned above, both the DCNNG control PC and the remote controller will receive the same update notifications.

This document gives the set of Remote Functions and the set of Update Notifications concerning Microphone Management. The relation between Remote Function, sent by the remote controller, and Update Notifications is given in the description of each separate Remote Function. The relation between unit events and Update Notifications is given in section 4.1.2. At last, there is a relation between remote functions sent by the DCNNG control PC and update notifications. Since both remote controller and DCNNG control PC receive all update notifications, the set of update notifications therefore also contains those that are the result of a remote function from the DCNNG control PC.

2.3 Microphone List and Mode Management

Handling the microphones in the system is basically a way of managing the various microphone lists identified inside the CCU and choosing the appropriate operation mode. The

Microphone Management application has five microphone lists, which will be explained in the table below:

List	Explanation
Notebook	The notebook contains units having special privileges for turning on their microphone. This list always contains the Chairman units in the system. Other units can only be added to the notebook from within the MM application on a DCNNG Control PC. The notebook exists in all operation modes.
Speakers list	The speakers list contains the normal delegate units that are currently allowed to speak. Note that this does not mean that those units have their microphone switched on. Depending on the operation mode it is possible that a unit is in the speakers list with its microphone switched off. The speakers list exists in all operation modes except for the mode Delegate with Voice activation.
Request to Speak list	The request to speak list contains the unit/delegate combinations that requested to have their microphone switched on so they can speak. Depending on the operation mode an unit/delegate is automatically promoted to the speakers list or by means of an operator action. The request to speak list exists in the modes Operator with Request list, Operator with Request and Response list and Delegate with Request list.
Comment Request list	The comment request list, or response request list, contains the unit/delegate combinations. A delegate, who responses immediate on the current speaker, will come in the comment list. This comment request list is to prevent them from being added at the end of the normal request to speak list and thus loosing the urgency of the response. The comment request list is only available in the mode Operator with Request and Response list.
Comment Speakers list	The comment speakers list, or response speakers list, contains the units that are promoted from the comment request list to make their response (i.e. they are allowed to speak now). Promoting a unit from the comment request list to the comment speakers list can only be done by means of an operator action. The comment speakers list is only available in the mode Operator with Request and Response list.

In the table below the operation modes are identified by the value used in the remaining part of this document. This table also describes the enabling/disabling of sets of remote functions and update notifications as result of choosing a specific operation mode.

Mode	Mode description & Group enable/disable
OPERATOR WITH REQUEST LIST equals *MM_C_OPERATOR_WITH_REQ_LIST*	Manual mode. The operator (using the remote controller) controls the RTS list. Delegates are always added to the RTS list and the operator determines which delegate may speak. Special features are to disable the cancel of an request and to turn off the microphone by the delegates (see section 3.2.7) • enables all RTS functions/notifications • enables all SPK functions/notifications • disables all CR functions/notifications • disables all CS functions/notifications
DELEGATE WITH REQUEST LIST equals *MM_C_DELEGATE_WITH_REQ_LIST*	Open delegate mode. Either the operator or the delegates can do all functions. When a delegate turns his microphone off and there are still delegates present in the RTS list, then an automatic shift will take place. Special features are to disable the cancel of an request. • enables all RTS functions/notifications • enables all SPK functions/notifications • disables all CR functions/notifications • disables all CS functions/notifications
DELEGATE WITH OVERRIDE equals *MM_C_DELEGATE_WITH_OVERRIDE*	Override mode. In this mode there is no RTS-list. Whenever a delegate presses his micro-button, he is directly able to speak. When the SPK list was full, then the oldest speaker will be removed to make place for the new delegate. • disables all RTS functions/notifications • enables all SPK functions/notifications • disables all CR functions/notifications • disables all CS functions/notifications
DELEGATE WITH VOICE ACTIVATION equals *MM_C_DELEGATE_WITH_VOICE*	Voice mode. The CCU automatic focus on the delegate currently speaking. In this mode there is no RTS list and SPK list. Also none of the chairmen microphones will be notified. • disables all RTS functions/notifications • disables all SPK functions/notifications • disables all CR functions/notifications • disables all CS functions/notifications • disables all microphone on/off functions
OPERATOR WITH REQUEST AND RESPONSE LIST equals *MM_C_OPERATOR_WITH_COMMENT_LIST* *DELEGATE WITH PUSH TO TALK*	Comment mode. The operator (using the remote controller) controls the RTS and CR lists. Delegates are always added to the RTS list for normal requests and to the CR list for responses. The operator determines which delegate may speak and/or make a response. In this mode the maximum number of active microphones must be set to 1. Special features are to disable the cancel of an request and to turn off the microphone by the delegates (see section 3.2.7) • enables all RTS functions/notifications • enables all CR functions/notifications • enables all SPK functions/notifications • enables all CS functions/notifications Push to talk mode. In this mode there is no RTS-list.

Equals *MM_C_DELEGATE_WITH_PUSHTOTALK*	Whenever a delegate presses his micro-button, he is directly able to speak in case the SPK list is not full. • disables all RTS functions/notifications • enables all SPK functions/notifications • disables all CR functions/notifications • disables all CS functions/notifications

The SPK functions and notifications mentioned in the table are described in respectively, sections 3.3 and 4.3.

The CS functions and notifications mentioned in the table are described in respectively, sections 3.4 and 4.4.

The RTS functions and notifications mentioned in the table are described in respectively, sections 3.5.4 and 4.6.

The CR functions and notifications mentioned in the table are described in respectively, sections 3.7 and 4.7.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the various remote functions needed to perform microphone management on the system.

3.1.1 Preconditions

The remote functions for the MM application acting on any of the microphone lists always use the UnitId to perform the requested functionality. For the Request to speak list or Comment Request list functions also a DelegateId is required. This UnitId and DelegateId must be retrieved respectively set, using the appropriate functions of the SC/SI Remote Interface as described in [SRS_SCSIINF].

3.1.2 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the 'wError' field of the received response information equals MM_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the 'wError' field of the response information for this remote function. All different error codes are described in appendix 0.
- **Update notifications**
  The update notifications, which are generated during the execution of the remote function. When there are no notifications generated, then this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications.

3.2 MM General functions

3.2.1 MM_C_START_MM

Purpose

Indicates the CCU that the remote controller wants updates notifications from the MM application inside the CCU. After receiving this function the CCU increments the update use count. As long as the update use count is greater than zero, the CCU will sent update notifications to the remote controller. Update notifications are sent upon state changes due to actions from the control PC(s) and all microphone actions on the units.

When you omit the execution of this remote function, you can still execute remote functions, but no update notifications will be sent to the remote controller.

Parameter structure for the function

The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
    WORD     wNrOfInstances
```

where:

wNrOfInstances	The value of the update use count for the MM application at the end of the function handling. It contains the number of times a remote PC has connected over the same communication medium. E.g. the first time the MM_C_START_MM function is called, it contains the value 1.

Error codes returned
MM_E_NOERROR
MM_E_OPEN_CLOSE_FAILED

Related functions
MM_C_STOP_MM

3.2.2 MM_C_STOP_MM

Purpose
Indicates the CCU that the remote controller no longer requires updates from the MM application inside the CCU. After receiving this function the CCU decrements the update use count. As long as the update use count is still greater than zero, the CCU remains sending the update notifications to the remote controller.

A call to this function when the update use count is already zero will keep the use count to zero and nothing shall happen.

When the use count reaches zero then the microphone management application inside the CCU returns to its stand-alone operation. This return involves a change in the following settings of the MM-application:

Setting Parameter	Section	Destination of change
wOperationMode	3.2.5	When the operation mode is MM_C_OPERATOR_WITH_REQ_LIST or MM_C_OPERATOR_WITH_COMMENT_LIST the mode will be changed to MM_C_DELEGATE_WITH_REQ_LIST. All other modes will remain active.
wActiveMics	3.2.6	When the number of active microphones is 3, this will be extended to 4. This implies also changes of the SPK and RTS lists.
bAllowMicroOff	3.2.7	This value is set to TRUE. Note that this value is only used in the modes MM_C_OPERATOR_WITH_REQ_LIST and MM_C_OPERATOR_WITH_COMMENT_LIST.

All other MM-settings remain active while functioning in stand-alone mode.

Note that: Upon communication lost this function will be activated, if MM_C_START_MM was activated. The activation of this function is repeated till the update use count becomes zero.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has the same response structure as the remote function MM_C_START_MM (section 3.2.1).

Error codes returned
MM_E_NOERROR
MM_E_OPEN_CLOSE_FAILED

Related functions
MM_C_START_MM

3.2.3 MM_C_START_MON_MM

Purpose
Function to start the monitoring behavior of the Microphone Management application. It is not allowed/possible to control settings of Microphone Management.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances
```

where:

wNrOfInstances	The value of the update use count for the MM application at the end of the function handling. It contains the number of times a remote PC has connected over the same communication medium. E.g. the first time the MM_C_START_MON_MM function is called, it contains the value 1.

Error codes returned
MM_E_NOERROR

Related functions
MM_C_STOP_MM
MM_C_STOP_MON_MM

3.2.4 MM_C_STOP_MON_MM

Purpose
Function to stop monitoring the behavior of the Microphone Management application.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the same response structure as the remote function MM_C_START_MON_MM (section 3.2.3)

Error codes returned
MM_E_NOERROR

Related functions
MM_C_START_MM
MM_C_START_MON_MM

3.2.5 MM_C_SET_MIC_OPER_MODE

Purpose
This function allows the remote controller to change the microphone operation-mode.

Parameter structure for the function
The function requires the following structure as parameter:

```
WORD    wOperationMode;
```

where:

wOperationMode	The operation mode of the MM application which is one of the

following:

- MM_C_OPERATOR_WITH_REQ_LIST
- MM_C_DELEGATE_WITH_REQ_LIST
- MM_C_DELEGATE_WITH_OVERRIDE
- MM_C_DELEGATE_WITH_VOICE
- MM_C_OPERATOR_WITH_COMMENT_LIST
- MM_C_DELEGATE_WITH_PUSHTOTALK

If the operation mode is set to MM_C_OPERATOR_WITH_COMMENT_LIST, the maximum number of active microphones will be set to 1 if not done by the operator.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE (unknown mode selected)

Update notifications
MM_C_SET_MIC_OPER_MODE_ON_PC
and various SPK, CS, RTS and/or CR updates depending on the difference between the old and new mode set.

3.2.6 MM_C_SET_ACTIVE_MICS

Purpose
This function allows the remote controller to change the maximum number of active microphones (SPK list length).

When the number of active microphones is increased, the created (empty) places will be filled with entries coming from the RTS list if the selected mode equals MM_C_DELEGATE_WITH_REQ_LIST.

When the number of active microphones is reduced, the following rules are applied if the number of speakers in the SPK list is greater than the final size.

- If there are speakers in the list with their microphone off, then first of these will be removed.
- When there are only speakers in the list with their microphone on, the first unit in the list will be turned off and removed from the list

When the microphone operation-mode equals MM_C_OPERATOR_WITH_COMMENT_LIST and the maximum number of active microphones is increased to more than 1 an error is returned.

Parameter structure for the function
The function requires the following structure as parameter:

```
WORD    wActiveMics;
```

where:

wActiveMics	The number of active microphones, which can be on at the same time. Valid values are in the range 1…4.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MAX_ACT_MICS

Update notifications
MM_C_SET_ACTIVE_MICS_ON_PC
and various SPK, CS, RTS and/or CR updates depending on the change in size of the speakers list length.

3.2.7 MM_C_GET_SETTINGS

Purpose
Retrieve the general settings from the MM-application. This function can be used to get the initial state of the operation mode and the number of active microphones as set using the button on the front panel of the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD    wOperationMode;
    WORD    wActiveMics;
    WORD    wMaxRTSListLen;
    BOOLEAN bAllowCancelRequests;
    BOOLEAN bAllowMicroOff;
    WORD    wAttentionTone;
    BOOLEAN bAmbientMicCtrl;
    BOOLEAN reserved;
    BOOLEAN bPrioCancelAll;
} MM_T_CCU_GLOBAL_SETTINGS;
```

where:

wOperationMode	The operation mode of the MM application which is one of the following: • MM_C_OPERATOR_WITH_REQ_LIST • MM_C_DELEGATE_WITH_REQ_LIST • MM_C_DELEGATE_WITH_OVERRIDE • MM_C_DELEGATE_WITH_VOICE • MM_C_OPERATOR_WITH_COMMENT_LIST • MM_C_DELEGATE_WTH_PUSHTOTALK For more information about the different modes see section 3.2.5.
wActiveMics	The number of active delegate microphones, which can be on at the same time (chairman micro’s are not counted). Range 1…4
wMaxRTSListLen	The maximum Request To Speak list length. Range: 0…100.
bAllowCancelRequest	TRUE: A Delegate is able to cancel a request to speak using the Micro-key on the unit. FALSE: A Delegate is not able to cancel a request to speak. (This parameter is only valid within the operation modes MM_C_OPERATOR_WITH_REQ_LIST, MM_C_DELEGATE_WITH_REQ_LIST and MM_C_OPERATOR_WITH_COMMENT_LIST). ***Note****: A Delegate is always able to cancel a comment request*
bAllowMicroOff	TRUE: A Delegate is able to turn off the microphone on the unit. FALSE: A Delegate is not able to turn off the microphone. This implies that the remote controller can only turn off the micro (only valid for the operation modes MM_C_OPERATOR_WITH_REQ_LIST and MM_C_OPERATOR_WITH_COMMENT_LIST).
wAttentionTone	The following attention tones settings are available: MM_C_ATTENTION_OFF: No attention is generated when the priority key is pressed.

	MM_C_ATTENTION_TONE1 or MM_C_ATTENTION_TONE2 or MM_C_ATTENTION_TONE3: An attention tone (tone 1, 2 or 3) is generated when the priority key is pressed on a chairman-unit.
bAmbientMicCtrl	TRUE: The ambient microphone control is enabled. Ambient mic. control means that the ambient mic. is turned on when the last microphone of all units in the conference hall is switched off and it is turned off when the first microphone is switched on. FALSE: The ambient microphone control is disabled, i.e. the ambient mic. will always be switched off.
bPrioCancelAll	TRUE: The microphone of delegates will stay off after the prio of the chairman is released. FALSE: The microphones of delegates will be turned on after the prio of the chairman is released.

Error codes returned
MM_E_NOERROR

Related functions
MM_C_SET_SETTINGS

3.2.8 MM_C_SET_SETTINGS

Purpose
Set the general operating settings of the MM-application.

If the operation mode is set to MM_C_OPERATOR_WITH_COMMENT_LIST, the value for maximum number of active microphones will be omitted and the maximum number of active microphones will be set to 1.

Parameter structure for the function
The structure to be passed along with this function is the same structure as the structure received during the remote function MM_C_GET_SETTINGS (see 3.2.7).

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_ILLEGAL_MAX_ACT_MICS
MM_E_ILLEGAL_MAX_RTS_LIST_LEN
MM_E_RTS_LIST_CHANGED
MM_E_DELETE_RTS_LIST_FAILED
MM_E_NOT_IN_CONTROL

Update notifications
MM_C_SET_SETTINGS_ON_PC
and various SPK, CS, RTS and/or CR updates depending on the settings made.

Related functions
MM_C_GET_SETTINGS

3.3 MM Speaker list functions

This section describes the functions to manipulate the speakers list.

3.3.1 MM_C_SET_MICRO_ON_OFF

Purpose

Control the microphone of a unit. This function gives the ability to turn the microphone of a unit on or off. To describe the functionality included with this function several cases of this function are described in the table below:

Case	Action performed
Delegate unit micro on	The unit is appended to the SPK list if possible.
Delegate unit micro off	The units' microphone is turned off, but the unit still remains in the SPK list. To remove the speaker also from the SPK list, use the remote call MM_C_SPK_REMOVE (see section 3.3.3).
Delegate unit micro on (already in the SPK list)	The units' microphone is turned on. The unit remains in the SPK list.
Chairman unit micro on	The units' microphone is turned on.
Chairman unit micro off	The units' microphone is turned off.

Parameter structure for the function

The function requires the following structure as parameter:

```
typedef struct
{
    WORD     wUnitId;
    BOOLEAN  bMicroOn;
} MM_T_MICRO_ONOFF;
```

where:

wUnitId	Unit Identifier. Unit identifiers can be retrieved from the system using the remote functions for System Config [SRS_SCSIINF].
bMicroOn	TRUE to turn the microphone on, FALSE to turn the microphone off

Response structure from the function

The function has no response parameters.

Error codes returned

MM_E_NOERROR
MM_E_SPEAKERS_LIST_FULL
MM_E_INSERT_SPEAKERS_LIST_FAILED
MM_E_NOT_IN_SPL_OR_NOB
MM_E_UNIT_NOT_CONNECTED
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_ILLEGAL_MICRO_TYPE

Update notifications

MM_C_SPK_APPEND_ON_PC	(delegate micro on and added to SPK)
MM_C_MICRO_ON_OFF	(micro on/off and already in SPK)

Related functions

MM_C_SPK_APPEND
MM_C_SPK_REMOVE

3.3.2 MM_C_SPK_APPEND

Purpose

Add a unit to the end of the speakers list on the CCU. The addition of a unit to the SPK list automatically implies that the microphone will be turned on.

Note that this function always adds the unit to the speakers list. Even if this unit is a chairman. A good practice is to use the remote function MM_C_SET_MICRO_ON_OFF for managing the microphones state.

When the unit is already present in the SPK list, an error is reported and the current microphone status of the unit is unchanged.

The CS list, if present, will be cleared.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wUnitId;
} MM_T_SPK;
```

where:

wUnitId	Unit Identifier

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_ILLEGAL_MICRO_TYPE
MM_E_UNIT_ALREADY_PRESENT
MM_E_SPEAKERS_LIST_FULL
MM_E_INSERT_SPEAKERS_LIST_FAILED
MM_E_UNIT_NOT_CONNECTED

Update notifications
MM_C_SPK_APPEND_ON_PC

Related functions
MM_C_SPK_REMOVE

3.3.3 MM_C_SPK_REMOVE

Purpose
Removes a speaker from the SPK list on the CCU. A removal of a unit from the SPK list automatically implies that the units microphone will be turned off.

Parameter structure for the function
This function requires the structure MM_T_SPK as parameter. This structure is defined in section 3.3.2.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_UNIT_NOT_PRESENT
MM_E_DELETE_SPEAKERS_LIST_FAILED

Update notifications
MM_C_SPK_REMOVE_ON_PC

Related functions
MM_C_SPK_APPEND

3.3.4 MM_C_SPK_CLEAR

Purpose
Clear all entries in the SPK list on the CCU. All delegate microphones are turned off. The chairmen microphones remain in the same state.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR

Update notifications
MM_C_SPK_CLEAR_ON_PC

Related functions
MM_C_SPK_APPEND

3.3.5 MM_C_SPK_GET

Purpose
Retrieve the complete contents of the Speakers list as present in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD    wNrOfSpk;
    MM_T_SPK_MICRO   tSpkList[DBSC_MAX_SPEAKERLIST];
} MM_T_CCU_SPKLIST;
```

Where the MM_T_SPK_MICRO is defined as:

```
typedef struct
{
    WORD    wUnitId;
    BOOLEAN bMicroOn;
} MM_T_SPK_MICRO;
```

where:

wNrOfSpk	The number of SPK list entries actual present in the tSpkList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_SPEAKERLIST.
tSpkList []	Array holding the SPK list information. Each array element is defined as a MM_T_SPK_MICRO structure, which is defined below.

wUnitId	Unit identifier
bMicroOn	TRUE if the microphone is currently on FALSE if the microphone is currently off

Error codes returned
MM_E_NOERROR

Related functions
MM_C_SPK_APPEND

3.4 MM Comment Speaker list functions

This section describes the functions to manipulate the comment speakers list. Note that a Comment Speaker can only be generated by shifting a Comment Request using the MM_C_SHIFT_CR function (see also section 3.7.3).

3.4.1 MM_C_CS_REMOVE

Purpose
Removes a speaker from the CS list on the CCU. A removal of a unit from the CS list automatically implies that the units' microphone will be turned off.

Parameter structure for the function
This function requires the structure MM_T_SPK as parameter. This structure is defined in section 3.3.2.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_UNIT_NOT_PRESENT
MM_E_UNKNOWN_UNIT

Update notifications
MM_C_CS_REMOVE_ON_PC

3.4.2 MM_C_CS_GET

Purpose
Retrieve the complete contents of the Comment Speakers list as present in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD               wNrOfCS;
    MM_T_SPK_MICRO     tCSList[DBSC_MAX_DELCS];
} MM_T_CCU_CSLIST;
```

where:

wNrOfCS	The number of CS list entries actual present in the tCSList array. This value never exceeds the constant DBSC_MAX_DELCS.
tCSpkList []	Array holding the CS list information. Each array element is defined as a MM_T_SPK_MICRO structure, which is defined in 3.3.5.

Error codes returned
MM_E_NOERROR

3.5 MM Notebook list functions

This section describes the functions to manipulate the Notebook list.

3.5.1 MM_C_NBK_REMOVE

Purpose
Remove one entry from the Notebook as present in the CCU.

Parameter Structure for the function
The function requires the MM_T_NBK structure for input. This structure is defined in section 4.5.1.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_DELETE_NOTEBOOK_FAILED

Update notifications
MM_C_NBK_REMOVE_ON_PC

Related Functions
MM_C_NBK_SET
MM_C_NBK_GET

3.5.2 MM_C_NBK_CLEAR

Purpose
Clear the complete contents of the Notebook list

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR

Update notifications
MM_C_NBK_SET_ON_PC

Related Functions
MM_C_NBK_SET

3.5.3 MM_C_NBK_GET

Purpose
Retrieve the complete contents of the Notebook list as present in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD      wNrOfNbk;
    MM_T_NBK_MICRO   tNbkList[DBSC_MAX_NOTEBOOKLIST];
} MM_T_CCU_NBKMICROLIST;
```

Where the MM_T_NBK_MICRO is defined as:

```
typedef struct
{
    WORD     wUnitId;
    WORD     wMicroType;
    BOOLEAN  bMicroOn;
} MM_T_NBK_MICRO;
```

where:

wNrOfNbk	The number of NBK list entries actual present in the tNbkList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_NOTEBOOKLIST.
tNbkList [ ]	Array holding the NBK list information. Each array element is defined as a MM_T_NBK_MICRO structure, which is defined below.

wUnitId	Unit Identifier
wMicroType	The type of microphone handling for the notebook entry. The following microphone types are valid for the notebook entries: • MM_C_VIP_CHAIRMAN • MM_C_VIP_KEY • MM_C_VIP_OPERATOR • MM_C_VIP_VOICE

- MM_C_VIP_VCHAIR
- MM_C_CHAIRMAN_NO_AC
- MM_C_KEY_NO_AC
- MM_C_OPERATOR_NO_AC
- MM_C_VOICE_NO_AC
- MM_C_VCHAIR_NO_AC
- MM_C_VIP_PTTCHAIRMAN
- MM_C_VIP_PTT
- MM_C_VIP_PTTCHAIRMAN_NO_AC
- MM_C_VIP_PTT_NO_AC

bMicroOn	TRUE if the microphone is currently on FALSE if the microphone is currently off

In a typical, stand alone, configuration the notebook contains only the chairman units, which appear as MM_C_VIP_CHAIRMAN entries in the notebook list. Other type of notebook entries can only be added using a DCNNG Control PC.

Error codes returned
MM_E_NOERROR

3.5.4 MM_C_NBK_SET

Purpose
Set the complete contents of the Notebook list

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD        wNrOfNbk;
    MM_T_NBK    tNbkList[DBSC_MAX_NOTEBOOKLIST];
} MM_T_CCU_NBKLIST;
```

Where the MM_T_NBK is defined as:

```
typedef struct
{
    WORD    wUnitId;
    WORD    wMicroType;
} MM_T_NBK;
```

where:

wNrOfNbk	The number of NBK list entries actual present in the tNbkList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_NOTEBOOKLIST.
tNbkList [ ]	Array holding the NBK list information. Each array element is defined as a MM_T_NBK_MICRO structure, which is defined below.

wUnitId	Unit Identifier
wMicroType	The type of microphone handling for the notebook entry. The following microphone types are valid for the notebook entries:

- MM_C_VIP_CHAIRMAN
- MM_C_VIP_KEY
- MM_C_VIP_OPERATOR
- MM_C_VIP_VOICE
- MM_C_VIP_VCHAIR
- MM_C_CHAIRMAN_NO_AC
- MM_C_KEY_NO_AC
- MM_C_OPERATOR_NO_AC

- MM_C_VOICE_NO_AC
- MM_C_VCHAIR_NO_AC
- MM_C_VIP_PTTCHAIRMAN
- MM_C_VIP_PTT
- MM_C_VIP_PTTCHAIRMAN_NO_AC
- MM_C_VIP_PTT_NO_AC

In a typical, stand-alone, configuration the notebook contains only the chairman units, which appear as MM_C_VIP_CHAIRMAN entries in the notebook list. Other type of notebook entries can only be added using a DCNNG Control PC.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_DELETE_NOTEBOOK_FAILED
MM_E_INSERT_NOTEBOOK_FAILED
MM_E_UPDATE_NOTEBOOK_FAILED

Update notifications
MM_C_NBK_SET_ON_PC

Related Functions
MM_C_NBK_GET

3.6 MM Request to Speak list functions

This section describes the functions to manipulate the RTS list. The RTS list is a list of delegates with their unit identifications, which are waiting to get speech-time.

Both the UnitId and the DelegateId are present in the RTS list, because using access-control with cards and free seating, allows a delegate to leave its unit (taking out his card) and go to another unit (inserting his card again). During these actions a pending request of that delegate must remain in the RTS list and while the card is not in the system the unit of the delegate is unknown.

For manipulation of the RTS list a special structure is used to identify a RTS list entry. The structure is defined as follows:

```
typedef struct
{
    WORD    wUnitId;
    WORD    wDelegateId;
} MM_T_RTS;
```

where:

wUnitId	Unit Identifier. Must be unique in the RTS list
wDelegateId	Delegate Identifier. May also have the value DBSC_EMPTY_DELEGATE, when the delegate is unknown. Delegate identifiers can be set in the system using the remote functions for System Config [SRS_SCSIINF].

When a RTS list entry is passed with one of the RTS functions the CCU tries to complete the RTS information passed. This means that when only the ‘wUnitId’ is provided, the CCU will search the correct delegate and when only the ‘wDelegateId’ is provided; the CCU will search for the correct unit. Assumed is that not provided elements are filled with the according DBSC_EMPTY_UNIT or DBSC_EMPTY_DELEGATE value.

When both elements of the structure have empty values or the unit and the delegate contradict each other, all functions (except MM_C_SHIFT, see section 3.6.6) generate an error (MM_E_UNKNOWN_UNITID_AND_DELID or MM_E_UNITID_DELID_MISMATCH).

3.6.1 MM_C_RTS_APPEND

Purpose
Add a delegate/unit combination to the RTS list on the CCU.

Parameter structure for the function
This function requires the structure MM_T_RTS as parameter. This structure is defined in section 3.6.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_UNKNOWN_UNITID_AND_DELID
MM_E_UNIT_ALREADY_PRESENT
MM_E_UNIT_NOT_CONNECTED
MM_E_UNITID_DELID_MISMATCH
MM_E_RTS_LIST_FULL
MM_E_INSERT_RTS_LIST_FAILED
MM_E_ILLEGAL_MICRO_TYPE

Update notifications

MM_C_RTS_INSERT_ON_PC	
MM_C_RTS_FIRST_ON_PC	(if appended delegate becomes the first in the list)

Related functions
MM_C_RTS_REMOVE
MM_C_RTS_CLEAR

3.6.2 MM_C_RTS_REMOVE

Purpose
Remove one delegate/unit combination from the RTS list on the CCU.

Parameter structure for the function
This functions requires the structure MM_T_RTS as parameter. This structure is defined in section 3.6.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_RTS_LIST_EMPTY
MM_E_UNKNOWN_UNITID_AND_DELID
MM_E_UNIT_NOT_PRESENT
MM_E_UNITID_DELID_MISMATCH
MM_E_DELETE_RTS_LIST_FAILED

Update notifications

MM_C_RTS_REMOVE_ON_PC	
MM_C_RTS_FIRST_ON_PC	(if removed delegate was the first in the list)

Related functions
MM_C_RTS_APPEND
MM_C_RTS_CLEAR

3.6.3 MM_C_RTS_CLEAR

Purpose
Clear all pending requests in the system. This includes clearing all entries in the RTS list, and clearing all entries in the CR list, if present.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR

Update notifications
MM_C_RTS_CLEAR_ON_PC
MM_C_RTS_CLEAR_COMMENT_ON_PC

Related functions
MM_C_RTS_APPEND
MM_C_RTS_REMOVE

3.6.4 MM_C_RTS_GET

Purpose
Retrieve the complete contents of the Request To Speak list as present in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD      wNrOfRts;
    MM_T_RTS tRtsList[DBSC_MAX_DELRTS];
} MM_T_CCU_RTSLIST;
```

where:

wNrOfRts	The number of RTS list entries actual present in the tRtsList array. Only this amount of array elements are transmitted. This value never exceeds the constant DBSC_MAX_DELRTS.
tRtsList [ ]	Array holding the RTS list information. Each array element is defined as a MM_T_RTS structure which is defined in section 3.6.

Error codes returned
MM_E_NOERROR

Related functions
MM_C_RTS_SET

3.6.5 MM_C_RTS_SET

Purpose
Set a new RTS list on the CCU. The current RTS list will be cleared and the provided RTS list will be made current.

Parameter structure for the function
The function needs as parameter a list of RTS entries as defined as response structure by the function MM_C_RTS_GET (section 3.6.4). The same structure received by the function MM_C_RTS_GET must be transmitted by this function.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_ILLEGAL_MIC_OPER_MODE

MM_E_RTS_LIST_TOO_BIG
MM_E_UNKNOWN_UNITID_AND_DELID
MM_E_INSERT_RTS_LIST_FAILED
MM_E_UNITID_DELID_MISMATCH
MM_E_ILLEGAL_MICRO_TYPE

Update notifications
MM_C_RTS_SET_ON_PC

Related functions
MM_C_RTS_GET

3.6.6 MM_C_SHIFT

Purpose
Perform a shift function, i.e. promote a delegate from the RTS list to the Speakers list. The shift differs from other RTS list or Speakers list functions in such a way that the promoted delegate is always added to the speakers list, whether this list is full or not. Besides, the CS list and CR list if present are also cleared. This includes the following steps:

1. Clear the CR list and the CS list if the mode is MM_C_OPERATOR_WITH_COMMENT_LIST
2. Remove the indicated RTS entry from the RTS list. When the indicated entry does not exist in the RTS list, then the removal is skipped and the entry provided will be used. Note that the latter also holds when the operation mode is MM_C_DELEGATE_WITH_OVERRIDE (see also 3.2.5).
3. Look if there is an entry free in the SPK list. If not, then a free entry will be created using on of the following rules:
    - If there are SPK entries with their microphone <u>off</u>, then first of these will be removed.
    - When there are only SPK entries with their microphone <u>on</u>, the first unit in the list will be turned off and removed from the list
4. Create from the RTS entry a SPK entry and add this to the SPK list.

Parameter structure for the function
The function requires the structure MM_T_RTS as parameter. This structure is defined in section 3.6.

Normally the provided RTS list entry defines which delegate/unit combination is candidate to shift to the speakers list.

When the provided RTS is filled with empty values (wUnitId = DBSC_EMPTY_UNIT and wDelegateId = DBSC_EMPTY_DELEGATE), the first RTS entry present in the RTS list is used. If there are no RTS entries present or when the operation mode is MM_C_DELEGATE_WITH_OVERRIDE, nothing happens.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_UNIT_NOT_CONNECTED
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_RTS_LIST_EMPTY
MM_E_UNITID_DELID_MISMATCH
MM_E_UNKNOWN_UNITID_AND_DELID

Update notifications
MM_C_CR_CLEAR_ON_PC
MM_C_CS_CLEAR_ON_PC
MM_C_SPK_REMOVE_ON_PC
MM_C_RTS_REMOVE_ON_PC

MM_C_SPK_APPEND_ON_PC
MM_C_RTS_FIRST_ON_PC

3.7 MM Comment Request list functions

This section describes the functions to manipulate the CR list. The Comment Request list is a list of delegates with their unit identifications, which are waiting to get speech-time to respond to the current speaker. This comment request list is to prevent the delegate from being added at the end of the normal RTS list.

Comment Requests are identified by the same MM_T_RTS structure as normal RTS entries.

Comment Requests show the same behavior in combination with access-control and cards as normal RTS entries.

3.7.1 MM_C_CR_REMOVE

Purpose
Remove one delegate/unit combination from the CR list on the CCU.

Parameter structure for the function
This functions requires the structure MM_T_RTS as parameter. This structure is defined in section 3.6.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_UNIT_NOT_PRESENT

Update notifications
MM_C_CR_REMOVE_ON_PC

Related functions
MM_C_CR_GET

3.7.2 MM_C_CR_GET

Purpose
Retrieve the complete contents of the CR list as present in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD        wNrOfCR;
    MM_T_RTS    tCRList[DBSC_MAX_DELCR];
} MM_T_CCU_CRLIST;
```

where:

wNrOfCR	The number of CR list entries actual present in the tCRList array. This value never exceeds the constant DBSC_MAX_DELCR.
tCRList [ ]	Array holding the CR list information. Each array element is defined as a MM_T_RTS structure which is defined in section 3.6.

Error codes returned
MM_E_NOERROR

Related functions
MM_C_RTS_CLEAR_COMMENT

3.7.3 MM_C_SHIFT_CR

Purpose
Perform a shift function on the CR list, i.e. promote a delegate from the CR list to the CS list. The shift differs from other Comment Request list or Speakers list functions in such a way that the promoted delegate is always added to the comment speakers list, whether this list is full or not. Besides, of all units present in the SPK list the microphones will be turned off. This includes the following steps:

1. Remove the indicated Comment Request entry from the CR list. When the indicated entry does not exist in the CR list an error is returned.
2. Turn off the microphones off all entries in the SPK list.
3. Look if there is an entry free in the CS list. If not, then removing the first unit in the CS list will create a free entry.
4. Create from the Comment Request entry a SPK entry and add this to the CS list.

If however, the delegate was already present in the normal speakers list, then the Comment Request entry is removed from the CR list and the microphone of the entry in the SPK list is switched on again.

Note: Currently the operation mode MM_C_OPERATOR_WITH_COMMENT_LIST is only allowed with a maximum number of active speakers of 1. Also the CS list has currently a maximum length of 1. This means that when a comment request is shifted, the microphone of the current speaker in the SPK list is switched off and the current speaker in the CS list, if present, is removed to make place for the shifted CR entry.

Parameter structure for the function
The function requires the structure MM_T_RTS as parameter. This structure is defined in section 3.6.

Response structure from the function
The function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_NOT_PRESENT
MM_E_UNIT_NOT_CONNECTED
MM_E_ILLEGAL_MIC_OPER_MODE
MM_E_UNKNOWN_UNITID_AND_DELID

Update notifications
MM_C_CR_REMOVE_ON_PC
MM_C_CS_REMOVE_ON_PC
MM_C_CS_APPEND_ON_PC

3.8 MM Speechtime functions

This section describes the functions to manipulate the speech-time.

There is no synchronization between different controllers, e.g. Remote Control and Control-PC. The last controller, which is used, is the active one.

It is the responsibility of the controller to invoke the different functions when necessary. The CCU won't do this for you. The controller should check the speech-time for each individual speaker and invoke the relevant speech-time function.

3.8.1 MM_C_SET_SPEECHTIME_SETTINGS

Purpose
This function stores the speech-time settings in the CCU.

Parameter structure for the function
This function requires the following structure as parameter:

```
typedef struct
{
    WORD    wSpeechTimeLimit;
    BOOLEAN bTimerOn;
    BOOLEAN bHoldOnChairPriority;
    BOOLEAN bShowRemainingTime;
    BOOLEAN bLedFollowMicLed;
} MM_T_SET_SPEECHTIME_SETTINGS;
```

where:

wSpeechTimeLinit	Speech time limit in minutes
bTimerOn	TRUE: use the speech timer FALSE: don't use the speech timer
bHoldOnChairPriority	TRUE: hold timer if one or more Chairman press their Prio button. FALSE: don't hold timer.
bShowRemainingTime	TRUE: down counting timer. FALSE: up counting timer.
bLedFollowMicLed	TRUE: the LED ring of the microphone follows the flashing microphone LED in the last minute of speech. FALSE: The LED ring does NOT follow the flashing mode of the microphone LED.

Response structure from the function
This function has no response parameters.

Error codes returned
MM_E_NOERROR

Update notifications
MM_C_TIMER_ON_OFF

Related functions
MM_C_LAST_MINUTE_WARNING
MM_C_TIME_FINISHED_WARNING

3.8.2 MM_C_LAST_MINUTE_WARNING

Purpose
This function is used to inform a particular unit that it is in his last minute of speaking.

Parameter structure for the function
This function has one parameter:

```
WORD    wUnitId;
```

where:

wUnitId	The unit on which to place the message.

Response structure from the function
This function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_UNKNOWN_UNIT

Related functions
MM_C_SET_SPEECHTIME_SETTINGS
MM_C_TIME_FINISHED_WARNING

3.8.3 MM_C_TIME_FINISHED_WARNING

Purpose
This function is used to inform a particular unit that its time to speak is run out.

Parameter structure for the function
This function has one parameter:

```
WORD    wUnitId;
```

where:

wUnitId	The unit on which to place the message.

Response structure from the function
This function has no response parameters.

Error codes returned
MM_E_NOERROR
MM_E_UNKNOWN_UNIT

Related functions
MM_C_SET_SPEECHTIME_SETTINGS
MM_C_LAST_MINUTE_WARNING

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the MM application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

As we have mentioned in section 2.2, update notifications are not only the results of remote functions generated by the remote controller, but can also be the results of unit/user events. To understand these relationships, a unit-event matrix is given in this section. It is assumed that the remote controller is used with a stand-alone configuration (i.e. no DCNNG Control PC connected), so only a distinction between chairman and delegate[1] is made.

In the unit-event matrix for each event the corresponding update notifications are given, depending on the operational mode and the type of unit/user. For the Voice Activated mode there are no update notifications generated at all, so this mode isn't mentioned in the table either. The update notifications themselves are described in the remaining sections of this chapter.

Note that the input events for Microphone and/or Request to Speak are initiated by pressing the Micro button on a Delegate and/or Chairman unit and the input event for Priority is initiated by pressing the Priority button on a chairman unit. The input events for Comment Requests can only occur in the operation mode MM_C_OPERATOR_WITH_COMMENT_LIST. In that mode the main menu[2] and the speakers menu of the delegate units have assigned softkey 3 to the response (i.e. comment) option. This implies that this response option is only available when the unit has the main menu or the MM menus as current menu. Thus, if a voting round is running, or a message is being read, the comment option is not available.

[1] When speaking of chairman or delegate we really mention the user in the conference hall acting on a chairman unit and on a delegate unit respectively
[2] On units having softkeys but no display the working is equal as if it were units with display and always showing the main menu.

UNIT-EVENT MATRIX

Input event	Operational Mode			
C: Chairman *D: Delegate*	*Delegate with Req.List*	*Operator with Req.List*	*Operator with Request an Response List*	*Delegate with Override and Delegate with Push to Talk*
C: Microphone On	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON
C: Microphone Off	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON
C: Priority On	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON
C: Priority Off	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON	MM_C_MICRO_ON_OFF MM_C_NR_CHAIR_MICS_ON
D: Request to Speak	If the speakers list is not full: MM_C_SPK_APPEND_ON_PC else, if the RTS list is not full: MM_C_RTS_INSERT_ON_PC and if it is also the first in the RTS list: MM_C_RTS_FIRST_ON_PC	if the RTS list is not full: MM_C_RTS_INSERT_ON_PC and if it is also the first in the RTS list: MM_C_RTS_FIRST_ON_PC	if the RTS list is not full: MM_C_RTS_INSERT_ON_PC and if it is also the first in the RTS list: MM_C_RTS_FIRST_ON_PC	If the speakers list is not full: MM_C_SPK_APPEND_ON_PC else: MM_C_SPK_REMOVE_ON_PC MM_C_SPK_APPEND_ON_PC
D: Cancel Req. to Speak	MM_C_RTS_REMOVE_ON_PC and if it was the first in the RTS list: MM_C_RTS_FIRST_ON_PC	MM_C_RTS_REMOVE_ON_PC and if it was the first in the RTS list: MM_C_RTS_FIRST_ON_PC	MM_C_RTS_REMOVE_ON_PC and if it was the first in the RTS list: MM_C_RTS_FIRST_ON_PC	N/A.
D: Microphone Off	MM_C_SPK_REMOVE_ON_PC	MM_C_MICRO_ON_OFF	MM_C_MICRO_ON_OFF	MM_C_SPK_REMOVE_ON_PC
D: Comment Request	N/A.	N/A.	if the CR list is not full: MM_C_CR_ADD_ON_PC	N/A.
D: Cancel Comment Request	N/A.	N/A.	MM_C_CR_REMOVE_ON_PC	N/A.
C: Cancel all speakers	MM_C_RTS_CLEAR_ON_PC MM_C_SPK_CLEAR_ON_PC	MM_C_RTS_CLEAR_ON_PC MM_C_SPK_CLEAR_ON_PC	MM_C_RTS_CLEAR_ON_PC MM_C_CR_CLEAR_ON_PC MM_C_SPK_CLEAR_ON_PC MM_C_CS_CLEAR_ON_PC	MM_C_SPK_CLEAR_ON_PC
C: Cancel all requests	MM_C_RTS_CLEAR_ON_PC	MM_C_RTS_CLEAR_ON_PC	MM_C_RTS_CLEAR_ON_PC MM_C_CR_CLEAR_ON_PC	<None>

Note that a delegate does not really turns on its microphone, but he makes a Request to speak. Depending on the operation mode and the current lists, he is added to the SPK list or the RTS list. On this Request-to-Speak-event also a remark has to be made if the unit/delegate is in the Speakerslist but with the microphone off (which is possible with the function MM_C_SET_MICRO_ON_OFF, see section 3.3.1). In that case for all operation modes a MM_C_SPK_REMOVE_ON_PC update notification is first given for the current unit after which the update notifications according to the event matrix are generated.

4.2 MM General notifications

4.2.1 MM_C_SET_MIC_OPER_MODE_ON_PC

Purpose
Notifies the remote controller that the microphone operation-mode has changed on the CCU.

Notify structure with this update
The update comes with a structure as defined in section 3.2.5.

4.2.2 MM_C_SET_ACTIVE_MICS_ON_PC

Purpose
Notifies the remote controller that the number of active microphones has changed on the CCU.

Notify structure with this update
The update comes with a structure as defined in section 3.2.6.

4.2.3 MM_C_SET_SETTINGS_ON_PC

Purpose
Notifies the remote controller that there is a change in the global settings on the CCU.

Notify structure with this update
The update comes with a structure as defined in section 3.2.7

4.3 MM Speaker list notifications

The Microphone Management speaker list notifications reports the changes in the speakers list.

4.3.1 MM_C_MICRO_ON_OFF

Purpose
Notifies the remote controller that a microphone of a unit is turned on or off. This notification will be sent when a delegate turns its microphone on or off.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    WORD    wUnitId;
    WORD    wMicroId;
    WORD    wPrioId;
} MM_T_MICRO_ONOFF_ON_PC;
```

where:

wUnitId	Unit Identifier
wMicroId	Passes the status of the microphone. This parameter can be one of the following values: • MM_C_PC_MIC_ON • MM_C_PC_MIC_OFF

- MM_C_PC_MIC_NONE

wPrioId	Passes the prio-status of the chairman unit. This priority information indicates to the remote controller that the delegate units can be muted due to a priority key pressed on this chairman-unit. Although the microphone is turned on, the delegate can not yet speak. This parameter can be one of the following values: • MM_C_PC_PRIO_ON • MM_C_PC_PRIO_OFF • MM_C_PC_PRIO_NONE

The 'NONE' values of the parameters 'wMicroId' and 'wPrioId' indicate that the specific parameter is not used.

Examples
To illustrate the values of the parameters 'wMicroId' and 'wPrioId' the following value for these parameters are returned with the events:

	wMicroId	wPrioId
Delegate micro ON	MM_C_PC_MIC_ON	MM_C_PC_PRIO_NONE
Delegate micro OFF	MM_C_PC_MIC_OFF	MM_C_PC_PRIO_NONE
Chairman micro ON (no Prio)	MM_C_PC_MIC_ON	MM_C_PC_PRIO_NONE
Chairman micro OFF (no Prio)	MM_C_PC_MIC_OFF	MM_C_PC_PRIO_NONE
Chairman prio ON (no micro)	MM_C_PC_MIC_ON	MM_C_PC_PRIO_ON
Chairman prio OFF (no micro)	MM_C_PC_MIC_OFF	MM_C_PC_PRIO_OFF
Chairman prio ON (with micro on)	MM_C_PC_MIC_NONE	MM_C_PC_PRIO_ON
Chairman prio OFF (with micro on)	MM_C_PC_MIC_NONE	MM_C_PC_PRIO_OFF
Chairman prio ON (with other prio on)	MM_C_PC_MIC_ON	MM_C_PC_PRIO_ON
Chairman prio OFF (with other prio on)	MM_C_PC_MIC_OFF	MM_C_PC_PRIO_OFF

4.3.2 MM_C_NR_CHAIR_MICS_ON

Purpose
Notifies the remote controller that there are still chairmen, which have pressed their micro or priority key on the unit.

Note: This notification is used to handle speech-time correctly (controlled by the DCNNG-control PC). E.g. the delegates' speech-time must be held when at least one chairman is speaking.

Notify structure with this update
The update comes with the following structure:

```
    WORD    wNrOfChairMicsOn;
```

where:

wNrOfChairMicsOn	The number of chairmen, which are speaking.

4.3.3 MM_C_SPK_SET_ON_PC

Purpose
Notifies the remote controller that the CCU has a complete new list of SPK entries.

Notify structure with this update
The update comes with the structure defined in 3.3.5.

4.3.4 MM_C_SPK_CLEAR_ON_PC

Purpose
Notifies the remote controller that the SPK list is cleared.

Notify structure with this update
The update does not have any additional parameters.

4.3.5 MM_C_SPK_APPEND_ON_PC

Purpose
Notifies the remote controller that a unit is added to the SPK list.

Notify structure with this update
The update comes with the following structure:

```
MM_T_SPK     tSpkAdd;
```

where:

tSpkAdd	The speaker who is added to the speakers list. The structure MM_T_SPK is defined in section 3.3.2.

4.3.6 MM_C_SPK_REMOVE_ON_PC

Purpose
Notifies the remote controller that a unit is removed from the SPK list (including turning off the microphone).

Notify structure with this update
The update comes with the following structure:

```
MM_T_SPK     tSpkRemove;
```

where:

tSpkRemove	The speaker who is removed from the speakers list. The structure MM_T_SPK is defined in section 3.3.2.

4.3.7 MM_C_SPK_INSERT_ON_PC

Purpose
Notifies the remote controller that a speaker is inserted before another speaker.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    MM_T_SPK     tSearchSpk;
    MM_T_SPK     tNewSpk;
} MM_T_SPK_INSERT;
```

where:

tSearchSpk	The speaker entry to search for. The new Speaker entry ('tNewSpk') shall be inserted before this Speaker.
tNewSpk	The Speaker entry to be added to the list.

4.3.8 MM_C_SPK_REPLACE_ON_PC

Purpose
Notifies the remote controller that a speaker is replaced by another speaker.

Notify structure with this update
The update comes along with the following structure:

```
typedef struct
{
    MM_T_SPK     tCurrSpk;
```

```
        MM_T_SPK     tNewSpk;
    } MM_T_SPK_REPLACE;
```

where:

tCurrSpk	The SPK entry to search for. This SPK entry is replaced by the new value given in the parameter 'tNewSpk'.
tNewSpk	The SPK entry holding the new contents.

4.4 MM Comment Speaker list notifications

The Microphone Management comment speaker list notifications report the changes in the comment speakers list.

4.4.1 MM_C_CS_CLEAR_ON_PC

Purpose
Notifies the remote controller that the CS list is cleared.

Notify structure with this update
The update does not have any additional parameters.

4.4.2 MM_C_CS_ADD_ON_PC

Purpose
Notifies the remote controller that a unit is added to the CS list.

Notify structure with this update
The update comes with the following structure:

```
MM_T_SPK     tCSpkAdd;
```

where:

tCSpkAdd	The speaker who is added to the comment speakers list. The structure MM_T_SPK is defined in section 3.3.2.

4.4.3 MM_C_CS_REMOVE_ON_PC

Purpose
Notifies the remote controller that a unit is removed from the SPK list (including turning off the microphone).

Notify structure with this update
The update comes with the following structure:

```
MM_T_SPK     tCSpkRemove;
```

where:

tCSpkRemove	The speaker who is removed from the comment speakers list. The structure MM_T_SPK is defined in section 3.3.2.

4.5 MM Notebook list notifications

The Microphone Management notebook notifications report the remote controller the changes in the NBK-list.

4.5.1 MM_C_NBK_REMOVE_ON_PC

purpose
Notifies the remote controller that a notebook unit is removed from the NBK list.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    WORD    wUnitId;
    WORD    wMicroType;
} MM_T_NBK;
```

where:

wUnitId	Unit identifier
wMicroType	The type of microphone handling for the notebook entry as defined in 3.5.3

4.5.2 MM_C_NBK_SET_ON_PC

purpose
Notifies the remote controller that the CCU has a complete new notebook list. Note that all chairmen units will be included inside the notebook list.

Notify structure with this update
The update comes with the structure defined as response structure in section 3.5.3.

4.6 MM Request to Speak list notifications

The Microphone Management request to speak notifications report the remote controller the changes in the RTS-list.

4.6.1 MM_C_RTS_SET_ON_PC

Purpose
Notifies the remote controller that the CCU has a complete new list of request to speak delegates/units.

Note that this notification implies a change of the first RTS entry in the list.

Notify structure with this update
The update comes with the structure defined in 3.6.4.

4.6.2 MM_C_RTS_CLEAR_ON_PC

Purpose
Notifies the remote controller that the RTS list is cleared.

Notify structure with this update
The update does not have any additional parameters.

4.6.3 MM_C_RTS_REMOVE_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is removed from the RTS list.

Notify structure with this update
The update comes along with a MM_T_RTS structure, which indicates the delegate/unit combination to be removed. The structure MM_T_RTS is defined in section 3.6.

4.6.4 MM_C_RTS_FIRST_ON_PC

Purpose
Notifies the remote controller which delegate/unit combination is the first in the list. When the UnitId and DelegateId fields of the structure are filled with DBSC_EMPTY_UNIT and DBSC_EMPTY_DELEGATE respectively, the first RTS entry becomes invalid. The last results into a empty RTS list.

Note that this notification invalidates the previous notification about the first RTS list entry.

Notify structure with this update
The update comes with the following structure:

```
MM_T_RTS     tRtsFirst;
```

where:

tRtsFirst	The RTS list entry, which is now at the top of the RTS list.

4.6.5 MM_C_RTS_INSERT_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is inserted in the RTS list before another RTS entry. This notification is sent for both an insertion between two RTS entries as a append of a RTS entry to the end of the RTS.

Notify structure with this update
The update comes along with the following structure:

```
typedef struct
{
    MM_T_RTS     tSearchRts;
    MM_T_RTS     tNewRts;
} MM_T_RTS_INSERT;
```

where:

tSearchRts	The RTS entry to search for. The new RTS entry (‘tNewRts’) shall be inserted before this RTS entry. When the elements of the entry are filled with empty values, then the entry ‘tNewRts’ will be added to the end of the list.
tNewRts	The RTS entry to be added to the list.

Note that an append of the new RTS entry will be done when the elements of this parameter are filled with empty values like:

```
tSearchRts.wUnitId = DBSC_EMPTY_UNIT;
tSearchRts.wDelegateId = DBSC_EMPTY_DELEGATE;
```

4.6.6 MM_C_RTS_REPLACE_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is replaced by a new RTS entry.

Notify structure with this update
The update comes along with the following structure:

```
typedef struct
{
    MM_T_RTS     tCurrRts;
    MM_T_RTS     tNewRts;
} MM_T_RTS_REPLACE;
```

where:

tCurrRts	The RTS entry to search for. This RTS entry is replaced by the new value given in the parameter ‘tNewRts’.
tNewRts	The RTS entry holding the new contents.

4.7 MM Comment Request list notifications

The Microphone Management Comment Request notifications report the remote controller the changes in the CR list.

4.7.1 MM_C_CR_CLEAR_ON_PC

Purpose
Notifies the remote controller that the CR list is cleared.

Notify structure with this update
The update does not have any additional parameters.

4.7.2 MM_C_CR_ADD_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is added to the CR list.

Notify structure with this update
The update comes along with a MM_T_RTS structure, which indicates the delegate/unit combination to be removed. The structure MM_T_RTS is defined in section 3.6.

4.7.3 MM_C_CR_REMOVE_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is removed from the CR list.

Notify structure with this update
The update comes along with a MM_T_RTS structure, which indicates the delegate/unit combination to be removed. The structure MM_T_RTS is defined in section 3.6.

4.7.4 MM_C_CR_REPLACE_ON_PC

Purpose
Notifies the remote controller that a delegate/unit combination is replaced by a new CR entry.

Notify structure with this update
The update comes along with a MM_T_RTS_REPLACE structure, which indicates the delegate/unit combination to be removed, and the delegate/unit combination to be added. The structure MM_T_RTS_REPLACE is defined in section 4.6.6.

4.8 MM Speechtime notifications

The Microphone Management speechtime notifications report the remote controller the changes in the Speechtime setting.

4.8.1 MM_C_TIMER_ON_OFF

Purpose
Notifies the controller that there is a change in using/not using of the speech timer.

Notify structure with this update
The update does not have any additional parameters.

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MKWORD(lb,hb)           ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_MM             0


#define MM_C_MICRO_ON_OFF                 ( MKWORD (1 , DCNC_APP_MM) )
#define MM_C_CHAIR_MICS_ON                ( MKWORD (2 , DCNC_APP_MM) )
#define MM_C_TIMER_ON_OFF                 ( MKWORD (3 , DCNC_APP_MM) )
#define MM_C_RTS_SET_ON_PC                ( MKWORD (4 , DCNC_APP_MM) )
#define MM_C_RTS_CLEAR_ON_PC              ( MKWORD (5 , DCNC_APP_MM) )
#define MM_C_RTS_REMOVE_ON_PC             ( MKWORD (6 , DCNC_APP_MM) )
#define MM_C_RTS_INSERT_ON_PC             ( MKWORD (7 , DCNC_APP_MM) )
#define MM_C_RTS_REPLACE_ON_PC            ( MKWORD (8 , DCNC_APP_MM) )
#define MM_C_NBK_SET_ON_PC                ( MKWORD (9,  DCNC_APP_MM) )
#define MM_C_NBK_CLEAR_ON_PC              ( MKWORD (10, DCNC_APP_MM) )
#define MM_C_NBK_REMOVE_ON_PC             ( MKWORD (11, DCNC_APP_MM) )
#define MM_C_SPK_SET_ON_PC                ( MKWORD (12, DCNC_APP_MM) )
#define MM_C_SPK_CLEAR_ON_PC              ( MKWORD (13, DCNC_APP_MM) )
#define MM_C_SPK_APPEND_ON_PC             ( MKWORD (14, DCNC_APP_MM) )
#define MM_C_SPK_REMOVE_ON_PC             ( MKWORD (15, DCNC_APP_MM) )
#define MM_C_SPK_INSERT_ON_PC             ( MKWORD (16, DCNC_APP_MM) )
#define MM_C_SPK_REPLACE_ON_PC            ( MKWORD (17, DCNC_APP_MM) )
#define MM_C_SET_MIC_OPER_MODE_ON_PC      ( MKWORD (18, DCNC_APP_MM) )
#define MM_C_SET_ACTIVE_MICS_ON_PC        ( MKWORD (19, DCNC_APP_MM) )
#define MM_C_RTS_FIRST_ON_PC              ( MKWORD (20, DCNC_APP_MM) )
#define MM_C_SET_SETTINGS_ON_PC           ( MKWORD (21, DCNC_APP_MM) )
#define MM_C_CR_CLEAR_ON_PC               ( MKWORD (22, DCNC_APP_MM) )
#define MM_C_CR_ADD_ON_PC                 ( MKWORD (23, DCNC_APP_MM) )
#define MM_C_CR_REMOVE_ON_PC              ( MKWORD (24, DCNC_APP_MM) )
#define MM_C_CR_REPLACE_ON_PC             ( MKWORD (25, DCNC_APP_MM) )
#define MM_C_CS_CLEAR_ON_PC               ( MKWORD (26, DCNC_APP_MM) )
#define MM_C_CS_ADD_ON_PC                 ( MKWORD (27, DCNC_APP_MM) )
#define MM_C_CS_REMOVE_ON_PC              ( MKWORD (28, DCNC_APP_MM) )


#define MM_C_START_MM                     ( MKWORD (30, DCNC_APP_MM) )
#define MM_C_STOP_MM                      ( MKWORD (31, DCNC_APP_MM) )
#define MM_C_GET_SETTINGS                 ( MKWORD (32, DCNC_APP_MM) )
#define MM_C_SET_SETTINGS                 ( MKWORD (33, DCNC_APP_MM) )
#define MM_C_SET_MICRO_ON_OFF             ( MKWORD (34, DCNC_APP_MM) )
#define MM_C_SHIFT                        ( MKWORD (35, DCNC_APP_MM) )
#define MM_C_RTS_SET                      ( MKWORD (36, DCNC_APP_MM) )
#define MM_C_RTS_GET                      ( MKWORD (37, DCNC_APP_MM) )
#define MM_C_RTS_CLEAR                    ( MKWORD (38, DCNC_APP_MM) )
#define MM_C_RTS_REMOVE                   ( MKWORD (39, DCNC_APP_MM) )
#define MM_C_RTS_INSERT                   ( MKWORD (40, DCNC_APP_MM) )
#define MM_C_NBK_SET                      ( MKWORD (42, DCNC_APP_MM) )
#define MM_C_NBK_GET                      ( MKWORD (43, DCNC_APP_MM) )
#define MM_C_NBK_CLEAR                    ( MKWORD (44, DCNC_APP_MM) )
#define MM_C_NBK_REMOVE                   ( MKWORD (45, DCNC_APP_MM) )
#define MM_C_SPK_GET                      ( MKWORD (46, DCNC_APP_MM) )
#define MM_C_SPK_CLEAR                    ( MKWORD (47, DCNC_APP_MM) )
#define MM_C_SPK_APPEND                   ( MKWORD (48, DCNC_APP_MM) )
#define MM_C_SPK_REMOVE                   ( MKWORD (49, DCNC_APP_MM) )
#define MM_C_SET_MIC_OPER_MODE            ( MKWORD (52, DCNC_APP_MM) )
#define MM_C_SET_ACTIVE_MICS              ( MKWORD (53, DCNC_APP_MM) )
#define MM_C_SET_SPEECHTIME_SETTINGS      ( MKWORD (59, DCNC_APP_MM) )
#define MM_C_LAST_MINUTE_WARNING          ( MKWORD (60, DCNC_APP_MM) )
#define MM_C_TIME_FINISHED_WARNING        ( MKWORD (61, DCNC_APP_MM) )
#define MM_C_RTS_APPEND                   ( MKWORD (62, DCNC_APP_MM) )
#define MM_C_CR_REMOVE                    ( MKWORD (64, DCNC_APP_MM) )
#define MM_C_SHIFT_CR                     ( MKWORD (65, DCNC_APP_MM) )
#define MM_C_CR_GET                       ( MKWORD (66, DCNC_APP_MM) )
#define MM_C_CS_REMOVE                    ( MKWORD (67, DCNC_APP_MM) )
#define MM_C_CS_GET                       ( MKWORD (68, DCNC_APP_MM) )
#define MM_C_START_MON_MM                 ( MKWORD (69, DCNC_APP_MM) )
#define MM_C_STOP_MON_MM                  ( MKWORD (70, DCNC_APP_MM) )
#define MM_C_GET_SETTINGS                 ( MKWORD (32, DCNC_APP_MM) )
#define MM_C_SET_SETTINGS                 ( MKWORD (33, DCNC_APP_MM) )
```

```
#define MM_C_PC_MIC_ON                    1
#define MM_C_PC_MIC_OFF                   2
#define MM_C_PC_MIC_NONE                  3
#define MM_C_PC_PRIO_ON                   1
#define MM_C_PC_PRIO_OFF                  2
#define MM_C_PC_PRIO_NONE                 3


#define MM_C_VIP_CHAIRMAN              1  /* Chairman */
#define MM_C_VIP_KEY                   2  /*
                                           * Delegate set as Key activated
                                           * notebooker
                                           */
#define MM_C_VIP_OPERATOR              3  /*
                                           * Delegate set as Operator
                                           * activated notebooker
                                           */
#define MM_C_VIP_VOICE                 4  /*
                                           * Delegate set as Voice
                                           * activated notebooker
                                           */
#define MM_C_VIP_VCHAIR                5  /* Chairman set as Voice activated
                                          */
#define MM_C_CHAIRMAN_NO_AC            6  /*
                                           * Chairman exclude from Access
                                           * Control
                                           */
#define MM_C_KEY_NO_AC                 7  /*
                                           * Key Activated Delegate
                                           * excluded from Access Control
                                           */
#define MM_C_OPERATOR_NO_AC            8  /*
                                           * Operator Activated Delegate
                                           * excluded from Access Control
                                           */
#define MM_C_VOICE_NO_AC               9  /*
                                           * Voice Activated Delegate
                                           * excluded from Access Control
                                           */
#define MM_C_VCHAIR_NO_AC             10  /*
                                           * Voice Activated Chairman
                                           * excluded from Access Control
                                           */
#define MM_C_VIP_PTTCHAIRMAN          11  /*
                                           * Chairman as push to talk
                                           * notebooker
                                           */
#define MM_C_VIP_PTT                  12  /*
                                           * Delegate as push to talk
                                           * notebooker
                                           */
#define MM_C_VIP_PTTCHAIRMAN_NO_AC    13  /*
                                           * Chairman as push to talk
                                           * notebooker excluded from
                                           * access control
                                           */
#define MM_C_VIP_PTT_NO_AC            14  /*
                                           * Delegate as push to talk
                                           * notebooker excluded from
                                           * access control
                                           */




#define MM_C_OPERATOR_WITH_REQ_LIST           0
#define MM_C_DELEGATE_WITH_REQ_LIST           1
#define MM_C_DELEGATE_WITH_OVERRIDE           2
#define MM_C_DELEGATE_WITH_VOICE              3
```

```
#define MM_C_OPERATOR_WITH_COMMENT_LIST       4
#define MM_C_DELEGATE_WITH_PUSHTOTALK         5

#define DBSC_MAX_SPEAKERLIST                  4
#define DBSC_MAX_NOTEBOOKLIST                15
#define DBSC_MAX_DELRTS                     100
#define DBSC_MAX_DELCR                        5
#define DBSC_MAX_DELCS                        1

#define DBSC_EMPTY_UNIT                   (0xFFFF)
#define DBSC_EMPTY_DELEGATE               (0xFFFF)

#define MM_C_ATTENTION_OFF                0
#define MM_C_ATTENTION_TONE1              1
#define MM_C_ATTENTION_TONE2              2
#define MM_C_ATTENTION_TONE3              3
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain a error field (‘wError’). In this appendix an overview is given of the possible errors and their values.

Microphone Management Error code Explanation	Value
MM_E_NOERROR The execution of the remote function was successful.	0
MM_E_UNKNOWN_UNIT The UnitId is unknown in the CCU.	2
MM_E_OPEN_CLOSE_FAILED The internal database on the CCU was not able to update the total use count for the MM application.	5
MM_E_UNIT_ALREADY_PRESENT The unit to be added to the list (RTS or SPK) is already present in that list.	6
MM_E_NOT_PRESENT The record to search for in the list (Comment Request) is not present in the list.	8
MM_E_UNIT_NOT_PRESENT The unit to search for in the list (RTS or SPK) is not present in the list.	9
MM_E_NOT_IN_SPL_OR_NOB You tried to turn off a microphone of a unit, which was not present in either the speakers list or the notebook list.	15
MM_E_ILLEGAL_MAX_ACT_MICS The number provided for the maximum number of active microphones is illegal with respect to the current Operation Mode. Valid value for the mode MM_C_OPERATOR_WITH_COMMENT_LIST is 1. Valid values for the mode MM_C_DELEGATE_WITH_VOICE are within the range 2..4 and for all other modes in the range 1...4.	17
MM_E_ILLEGAL_MIC_OPER_MODE The function requested is illegal for the current operation mode. The function is not executed.	18
MM_E_UNKNOWN_UNITID_AND_DELID You have provided a RTS list entry with both elements (UnitId and DelegateId) set to empty values (DBSC_EMPTY_UNIT, DBSC_EMPTY_DELEGATE). At least one of the elements must be defined to fulfill the function.	19
MM_E_DELETE_RTS_LIST_FAILED A delete of a RTS list entry in the internal database failed. Probably illegal values for either the elements UnitId or DelegateId are passed.	21
MM_E_INSERT_RTS_LIST_FAILED The CCU was not able to insert the RTS list entry into the internal database. Probably illegal values for either the elements UnitId or DelegateId are passed.	22
MM_E_RTS_LIST_FULL The RTS list is full. No more RTS entries can be added using the function MM_C_RTS_APPEND.	24
MM_E_RTS_LIST_CHANGED During a reduction of the maximum length of the RTS list, the database was unable to retrieve the last RTS list entry. The actual	25

Microphone Management Error code Explanation	Value
length is not changed. To recover this error; clear the RTS list, set the new RTS list length and set the new contents in the RTS list.	
MM_E_RTS_LIST_EMPTY The RTS list is empty; therefore the function cannot be fulfilled. E.g. remove on a RTS list entry on an empty RTS list.	26
MM_E_ILLEGAL_MAX_RTS_LIST_LEN The maximum length provided for the RTS list is out of range. Valid values for the RTS list length are within the range 0..100.	27
MM_E_RTS_LIST_TOO_BIG The RTS list provided is too big to store it. None of the RTS entries provided is put into the RTS list and the old RTS list remains active.	28
MM_E_DELETE_SPEAKERS_LIST_FAILED A delete of a SPK list entry in the internal database failed. Probably an illegal value for the element UnitId is passed.	31
MM_E_INSERT_SPEAKERS_LIST_FAILED The CCU was not able to insert the SPK list entry into the internal database. Probably an illegal value for the element UnitId is passed.	32
MM_E_SPEAKERS_LIST_FULL The SPK list is full. No more SPK entries can be added using the function MM_C_SPK_APPEND.	34
MM_E_ILLEGAL_MICRO_TYPE This unit is also present in the Notebook and has a microtype that is not allowed in the speakers list.	47
MM_E_UNIT_NOT_CONNECTED The unit is not connected to the system (any more).	48
MM_E_UNITID_DELID_MISMATCH The unit and delegate do not match with each other according to the database on the CCU.	49
MM_E_NOT_IN_CONTROL The remote function is not allowed, because this remote controller has no control over the microphone management application.	50

APPENDIX C. EXAMPLES

In the example below the remote functions and update notifications, that are defined in this document as constant values for the wFnId parameter of the message (see [SRS_INF]), are presented as functions described in a ‘C’ syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function is assumed that the function will create his structure, transport the parameters to the CCU and waits for the result information coming from the CCU.

For both the remote functions as the update notifications the same names are used as their identifier, but without the constant mark “C” and using mixed case names. So, e.g. remote function MM_C_SET_SETTINGS shall be referenced as function as:

MM_Set_Settings (MM_T_CCU_GLOBAL_SETTINGS tMMSettings);

Appendix C.1 Microphone Management Control

This example shows the minimum steps to be taken for controlling the MM application.

First we have to start the MM application inside the CCU.

```
WORD    wNrOfInstances;

error = MM_Start_MM(&wNrOfInstances);
if (error != MM_E_NOERROR)
{
    /* do error handling */
}
else
{
    switch (wNrOfInstances)
    {
        case 0 :/* something went wrong with registering for remote
interface
                so, do error handling */
            break;
        case 1 :/* OK */
            break;
        default : /* 2 or more. This means there are more remote controllers
            identified by the CCU. Stop as many times as needed */
            WORD wNewNumber;
            do
            {
                MM_Stop_MM(&wNewNumber);
            } while (wNewNumber > 1);
            break;
    }
}
```

If there are no errors on starting the MM application the next thing we are interested in are the settings. Assume that we want the system to operate in a Operator with RTS list mode, 4 active mics and a maximum RTS list length of 50. The first thing to do is retrieve the current settings, then check them against the wanted settings and, if they are not the same, set the new settings.

The results in the following control flow:

```
/* declare variables */
MM_T_CCU_GLOBAL_SETTINGS tMMSettings;
BOOLEAN         bMustSend = FALSE;

/* retrieve the current settings */
MM_Get_Settings(&tMMSettings);

/* and check if they are what we want */
if (tMMSettings.wOperationMode != MM_C_OPERATOR_WITH_REQ_LIST)
{
    tMMSettings.wOperationMode = MM_C_OPERATOR_WITH_REQ_LIST;
    bMustSend = TRUE;
}
if (tMMSettings.wActiveMics != 4)
```

```
    {
        tMMSettings.wActiveMics = 4);
        bMustSend = TRUE;
    }
    if (tMMSettings.wMaxRTSListLen != 50)
    {
        tMMSettings.wMaxRTSListLen = 50;
        bMustSend = TRUE;
    }

    /* Set new settings if we have to */
    if (bMustSend)
    {
        error = MM_Set_Settings(&tMMSettings);
        if (error != MM_E_NOERROR)
        {
            /* do error handling */
        }
    }
```

Setting new settings also results in an update notification, so the last thing to do is to check if our settings are accepted by the CCU.

Therefore, we need the following function:

```
void MM_Set_Settings_On_Pc(MM_T_CCU_GLOBAL_SETTINGS tNotifiedSettings)
{
    BOOLEAN bIdentical = FALSE;

/* assume we have a user defined function to compare both settings structures
*/
    bIdentical = MyCompareSettings(tNotifiedSettings, tMMSettings);

    if (bIdentical == FALSE)
    {
        /*
           If they are not the same:
           Either update your local settings with the CCU settings
           or try to set them again
        */
    }
}
```

Once the settings are known, we could retrieve the current notebook-, speakers- and RTS list and wait for the updates to monitor the microphone status in the conference hall, or send remote functions to influence that status.

When the congress is finished we must tell the CCU that we stopped monitoring the MM application, using the following function:

```
WORD    wNrOfInstances;

error = MM_Stop_MM(&wNrOfInstances);
if (error != MM_E_NOERROR)
{
    /* do error handling */
}
else
{
    switch (wNrOfInstances)
    {
        case 0 :/* OK */
            break;
        default : /* 1 or more. This means there are still remote controllers
            identified by the CCU. Stop as many times as needed */
            WORD wNewNumber;
            do
            {
                MM_Stop_MM(&wNewNumber);
            } while (wNewNumber != 0);
            break;
    }
}
```

This ends controlling the MM application. The remote controller and CCU can now safely be switched off.

Camera Control

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for Camera Control Interpretation between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the current state of the remote interface for Camera Control. It is meant to give an overview of the possibilities the remote interface offers to control the Camera Control application, present in the CCU, remotely. The Interface can be used to build a Camera Control User interface.

1.3 Definitions, Acronyms and Abbreviations

CC	Camera Control
CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
MCCU	Multi-CCU system.
SCCU	Single-CCU system.
ACN	Audio Communication Network
DCN	Digital Congress Network
DCN NG	Digital Congress Network Next Generation
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

This document should be referenced as [SRS_CCINF].

[SRS_INF]	General Remote Interface Description	DU010933
[SRS_MMINF]	MM Remote Interface Description	DU020903

1.5 Overview

Chapter 2 describes the Camera Control Remote Interface in general.

Chapter 3 and chapter 4 describe respectively, the remote functions and the update notifications which can be used to control the sending of update notifications by the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible errors that could be returned upon invocation of a remote function.

Appendix C gives an example on using the remote interface for Camera Control.

2. CAMERA CONTROL FOR A REMOTE INTERFACE

2.1 Introduction

The Camera Control Remote Interface is part of the DCN Next Generation software that allows for another controlling entity outside the CCU, not being the DCN Next Generation Control PC, to use the Camera Control application.

2.2 Remote Camera Control Control

Camera Control is the application that allows configuration of Automatic Camera Control. Typical configuration issues are e.g.: setting camera assignments, setting camera acticity, setting global settings etc. More details on the complete CC application can be found in the user manual.

Configuring Camera Control with a remote interface is achieved by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of Remote Functions and Update Notifications is described in [SRS_INF]. also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are at the moment two locations in a fully connected CCU where CC can be influenced. These locations are:

- A remote controller (which can be the control PC) connected using an Ethernet (in case of MCCU) or RS-232 (in case of SCCU) connection. This remote controller uses Remote Function calls to configure Camera Control.
- Chairman or delegate units influence Camera Control indirectly: if their microphone is activated and a camera was assigned to their position, the camera is activated.

To get a fully operational system the remote controller must register itself to the CCU, in order for it to receive update messages from the CCU.

Remote functions coming from the remote controller can indirectly initiate update notifications in the CCU. Note that these update notifications are actually generated in connected camera equipment. Depending on the fact whether or not camera equipment is connected to the CCU, and on which type of equipment is connected, update notifications may be sent to the CCU. The CCU then forwards these to the remote controller.

Since the update notifications are only generated indirectly, they will always be received after the reception of response information of a remote function. The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned.

Events coming from a unit (chairman or delegate) are processed and the CCU is updated. Although there are no events that directly lead to generating and sending notifications, there are unit events that can indirectly lead to notifications. Again note that it depends on the type of equipment used and its connection state whether or not the notifications are sent. The notifications are sent on by the CCU to the registered remote controller.

This document gives the set of Remote Functions and the set of Update Notifications concerning Camera Control. The relation between Remote Function, sent by the remote controller, and Update Notifications is given in the description of each separate Remote Function. The (indirect) relation between unit events and Update Notifications is given in section 4.1.2.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the remote functions used to configure the Camera Control application on the CCU.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the ‘wError’ field of the received response information equals CC_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the ‘wError’ field of the response information for this remote function. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications that are generated during the execution of the remote function. When there are no notifications generated, this part will be omitted. Note that for CC, all update notifications are generated indirectly and therefore will not always be sent.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications. When there are no related functions, this part will be omitted.

3.2 CC General functions

3.2.1 CC_C_START_CAMERA_APP

Purpose
This function indicates the CCU that the remote controller wants to communicate with the CC application inside the CCU. After receiving this function the CCU gives the control of CC to the remote controller. It is now impossible for another remote controller (e.g. DCNNG Control PC) to gain control of the application. After this function has been called, the remote controller will receive update notifications from the CC application (see section 4.1.2).

When the execution of this function is omitted, all other remote functions (except CC_C_GET_GLOBAL_SETTINGS and CC_C_SEND_DATA) will have no effect and will return an error code (CC_E_NOT_INCONTROL).

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_INCONTROL_OTHER_CHANNEL
CC_E_INCONTROL_THIS_CHANNEL

Related functions
CC_C_STOP_CAMERA_APP

3.2.2 CC_C_STOP_CAMERA_APP

Purpose
Indicate the CCU that the remote controller no longer requires to communicate with the CC application inside the CCU. After receiving this function the CCU takes over the control of CC. The remote controller will no longer receive update notifications.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL

Related functions
CC_C_START_CAMERA_APP

3.2.3 CC_C_SET_CAMERA_ACTIVITY

Purpose
Indicates the CCU whether or not camera activity must be activated. When activated, the CCU transmits control commands to the connected camera equipment. If de-activated, the CCU does not transmit these control commands.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BOOLEAN bCameraActivity;
} CC_T_CAMERA_ACTIVITY;
```

where:

bCameraActivity	TRUE: Camera activity is activated FALSE: Camera activity is de-activated

Response structure from the function
The function has no response parameters

Error codes returned
CC_E_NOERROR
CC_E_NOT_IN_CONTROL

Update notifications
CC_C_RECEIVE_DATA

3.2.4 CC_C_SET_GLOBAL_SETTINGS

Purpose
Sets the global settings of the CC application.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BOOLEAN bCameraOverrideMode;
    BYTE    byMovementTime;
    BYTE    byNumOfAudienceMon;
    BYTE    bySeatTextMode;
    BYTE    byCameraControlType;
} CC_T_GLOBAL_SETTINGS;
```

where:

bCameraOverrideMode	TRUE: Camera override mode is activated, meaning a newly switched on microphone automatically activates the camera covering its position FALSE: Camera override mode is de-activated, meaning the camera of a newly switched on microphone is only activated when the current microphone is switched off
byMovementTime	Specifies the camera movement time in unit 'half-a-second'. To hide camera movement (as a preposition camera moves from one position to the next), the overview camera can be activated and displayed during the movement. This parameter specifies the period for which the camera movement is hidden. This parameter can have value 0-254 (i.e. 0-127 seconds). If this parameter has value 255, the error CC_E_INVALID_PARAMETER is returned, but only when wCameraControlType is equal to CC_C_ALLEGIANT_VIDEO_SWITCHER (in all other cases the value of byMovementTime is not used).
byNumOfAudienceMon	Specifies the number of audience monitors that must show the images coming from the (active) camera, if applicable. This number is excluding the operator monitor. This parameter can have value 1-4. If it has another value, the error CC_E_INVALID_PARAMETER is returned, but only when wCameraControlType is equal to CC_C_ALLEGIANT_VIDEO_SWITCHER (in all other cases the value of byMovementTime is not used).
bySeatTextMode	Defines the seat text mode (if applicable), which defines what text is shown on the audience monitors and the operator monitors. Refer to [USERDOC_CC] for details. The mode can be one of the following: • CC_C_SCREEN_LINE The screenline as defined in the Delegate Database software is shown on one line of 16 characters • CC_C_SCREEN_LINE_DOUBLE The screenline as defined in the Delegate Database software is shown on two lines of 16 characters • CC_C_SEAT_TEXT The first line of the seat text configured for the camera (see CC_C_SET_CAMERA_ASSIGNMENT) is shown on one line of 16 characters • CC_C_SEAT_TEXT_DOUBLE Both lines of the seat text configured for the camera (see CC_C_SET_CAMERA_ASSIGNMENT) is shown on two lines of 16 characters If this parameter has another value, the error CC_E_INVALID_PARAMETER is returned, but only when wCameraControlType is equal to CC_C_ALLEGIANT_VIDEO_SWITCHER (in all other cases the value of byMovementTime is not used).
byCameraControlType	Defines the type of camera control used (i.e. the type of equipment connected to the CCU that interfaces to the

cameras). This can be one of the following:

- CC_C_NO_CAMERA_CONTROL_TYPE
  No equipment is used to control the cameras, i.e. camera control is not possible
- CC_C_ALLEGIANT_VIDEO_SWITCHER
  An Allegiant Video Switcher is used to control the cameras
- CC_C_DIRECT_CAMERA_CONTROL
  One AutoDome camera is used to control the camera positions (the CCU directly interfaces to the camera)

If this parameter has another value, the error CC_E_INVALID_CONTROL_TYPE is returned

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL
CC_E_INVALID_CONTROL_TYPE
CC_E_INVALID_PARAMETER

Related functions
CC_C_GET_GLOBAL_SETTINGS
CC_C_SET_CAMERA_ASSIGNMENT

3.2.5 CC_C_GET_GLOBAL_SETTINGS

Purpose
This function gets the global settings of the CC application. Note that this function can be called even when the remote controller is not in control of the CC application (CC_C_START_CAMERA_APP has not been called).

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The structure returned by this function is the same structure as sent with the remote function CC_C_GET_GLOBAL_SETTINGS (see 3.2.4).

Error codes returned
CC_E_NOERROR

Related functions
CC_C_SET_GLOBAL_SETTINGS
CC_C_SET_CAMERA_ASSIGNMENT

3.2.6 CC_C_SET_CAMERA_ASSIGNMENT

Purpose
This function sets the camera assignment of one or more connected cameras.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD                           wLength;
    CC_T_INDEXED_CAMERA_ASSIGNMENT tIndexedCameraAssignment[
                                   CC_C_MAX_CAMERA_ASSIGNMENT_CLUSTER];
} CC_T_SET_CAMERA_ASSIGNMENT;
```

where CC_T_INDEXED_CAMERA_ASSIGNMENT is defined as:

```
typedef struct
{
    UNITID                 wUnitId;
    CC_T_CAMERA_ASSIGNMENT tCameraAssignment;
} CC_T_INDEXED_CAMERA_ASSIGNMENT;
```

where CC_T_CAMERA_ASSIGNMENT is defined as:

```
typedef struct
{
    WORD wCameraNumber;
    BYTE byPreposNumber;
    CHAR szSeatText_1[CC_C_MAX_SEAT_TEXT_LEN];
    CHAR szSeatText_2[CC_C_MAX_SEAT_TEXT_LEN];
} CC_T_CAMERA_ASSIGNMENT;
```

where:

wLength	The number of cameras for which an assignment is set in this structure. The assignment of these cameras can be found in tIndexedCameraAssignment[0] up and until tIndexedCameraAssignment[wLength-1]. This parameter must be in the range 0 - CC_C_MAX_CAMERA_ASSIGNMENT_CLUSTER. If it is outside this range, the error CC_E_INVALID_UNITID is returned.
tIndexedCameraAssignment	Array holding the camera assignment information. Only the first wLength items actually hold relevant information, the rest can be ignored. Each array element is defined as a CC_T_INDEXED_CAMERA_ASSIGNMENT structure, which is defined below.
wUnitId	Unit identifier of the unit (delegate or chairman) to which the camera is assigned. If this identifier is equal to CC_C_OVERVIEW_ID, the assignment of the overview camera will be set. If this parameter is larger than or equal to DBSC_MAX_UNIT, the error CC_E_INVALID_UNITID is returned.
tCameraAssignment	Camera information and settings belonging to the camera assignment. The content of this structure is defined below.
wCameraNumber	Identifier of the camera (as it is known on the connected equipment). This parameter can have value 1-DBSC_MAX_CAMERA. If it is outside of this range, the error CC_E_INVALID_CAMERA_NUMBER is returned.
byPreposNumber	The preposition of the camera. This preposition is assigned to the unit with unit identifier wUnitId. If this parameter is equal to 0 or DBSC_EMPTY_PREPOS, the camera is a fixed camera (i.e. has no prepositions, only one fixed position). Therefore this parameter can have value 0-DBSC_MAX_PREPOSITION or DBSC_EMPTY_PREPOS. If it is outside of this range, the error CC_E_INVALID_PARAMETER is returned.
szSeatText_1	First line of the seat text configured for the camera. Note that this parameter may or may not be used depending on the global setting bySeatTextMode (see CC_C_SET_GLOBAL_SETTINGS). This is a NULL terminated string.
szSeatText_2	Second line of the seat text configured for the camera. Note that this parameter may or may not be used depending on the global setting bySeatTextMode (see

CC_C_SET_GLOBAL_SETTINGS). This is a NULL terminated string.

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL
CC_E_INVALID_UNITID
CC_E_INVALID_CAMERA_NUMBER
CC_E_INVALID_PARAMETER

Related functions
CC_C_SET_GLOBAL_SETTINGS
CC_C_GET_GLOBAL_SETTINGS

3.2.7 CC_C_CLEAR_CAMERA_ASSIGNMENTS

Purpose
This function clears all camera assignments in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters..

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL

3.2.8 CC_C_SET_CAMERA_ID

Purpose
This function sets the ID of one or more cameras.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD                   wLength;
    CC_T_INDEXED_CAMERA_ID tIndexedCameraID[
                           CC_C_MAX_CAMERA_ID_CLUSTER];
} CC_T_SET_CAMERA_ID;
```

where CC_T_INDEXED_CAMERA_ID is defined as:

```
typedef struct
{
    UNITID          wCameraNumber;
    CC_T_CAMERA_ID tCameraID;
} CC_T_INDEXED_CAMERA_ID;
```

where CC_T_CAMERA_ID is defined as:

```
typedef struct
{
    CHAR szCameraID[CC_C_MAX_CAMERA_ID_LEN];
} CC_T_CAMERA_ASSIGNMENT;
```

where:

wLength	The number of cameras for which the ID is set in this structure. The details and IDs of these cameras can be found in tIndexedCameraID[0] up and until tIndexedCameraID[wLength-1]. This parameter must be in the range 0 - CC_C_MAX_CAMERA_ID_CLUSTER. If it is outside this range, the error CC_E_INVALID_CAMERA_NUMBER is

	returned.
tIndexedCameraID	Array holding the camera ID information. Only the first wLength items actually hold relevant information, the rest can be ignored. Each array element is defined as a CC_T_INDEXED_CAMERA_ID structure, which is defined below.
wCameraNumber	Identifier of the camera (as it is known on the connected equipment). This parameter can have value 1-DBSC_MAX_CAMERA. If this parameter is outside of this range, the error CC_E_INVALID_CAMERA_NUMBER is returned.
tCameraID	Structure holding the actual camera ID. The content of this structure is defined below.
szCameraID	The camera ID, which is a NULL terminated string.

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL
CC_E_INVALID_CAMERA_NUMBER

3.2.9 CC_C_CLEAR_CAMERA_IDS

Purpose
This function clears all camera IDs in the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters..

Error codes returned
CC_E_NOERROR
CC_E_NOT_INCONTROL

3.2.10 CC_C_SEND_DATA

Purpose
This function can be used to send data to the camera equipment connected to the CCU (Allegiant Video Switcher or an AutoDome Camera). If sending the data fails, error CC_E_INVALID_PORT_OUT is returned. Note that this function can be called even when the remote controller is not in control of the CC application (CC_C_START_CAMERA_APP has not been called).

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD wLength;
    BYTE byData[CC_C_MAX_DATA_LEN];
} CC_T_DATA_FRAME;
```

where:

wLength	Defines the size of the data sent, i.e. the data is found in byData[0] up and until byData[wLength-1]. This parameter must be in the range 0 - CC_C_MAX_DATA_LEN.
byData	Array holding the actual data. Only the first wLength items actually hold relevant information, the rest can be ignored.

Response structure from the function
The function has no response parameters.

Error codes returned
CC_E_NOERROR
CC_E_INVALID_PORT_OUT

Update notifications
CC_C_RECEIVE_DATA

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the CC application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

As mentioned in section 2.2, update notifications are not only the result of remote functions generated by the remote controller, but can also be the result of (interpreter) unit/user events. It was also mentioned in section 2.2 that the relation between the unit/user events and the update notifications is indirect (i.e. asynchronous).

This section gives information about the events coming from a unit/user and the possible processing done for the events. In the table below an overview is made about the events and the possible actions performed. Note that it depends on the type of equipment used and its connection state whether or not the notifications are sent.

Event	**CC_C_RECEIVE_DATA**
Microphone on (delegate/chairman)	X
Microphone off (delegate/chairman)	X

4.2 CC General notifications

4.2.1 CC_C_RECEIVE_DATA

Purpose
This notification sends data received from the connected equipment to the remote controller.

Notify structure with this update
The update comes with the same structure as described in 3.2.10 (CC_T_DATA_FRAME).

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of defines are used, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MKWORD(lb,hb)            ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_CC              21


#define CC_C_START_CAMERA_APP                ( MKWORD ( 1, DCNC_APP_CC) )
#define CC_C_STOP_CAMERA_APP                 ( MKWORD ( 2, DCNC_APP_CC) )
#define CC_C_SET_CAMERA_ACTIVITY             ( MKWORD ( 3, DCNC_APP_CC) )
#define CC_C_SET_GLOBAL_SETTINGS             ( MKWORD ( 4, DCNC_APP_CC) )
#define CC_C_CLEAR_CAMERA_ASSIGNMENTS        ( MKWORD ( 5, DCNC_APP_CC) )
#define CC_C_SET_CAMERA_ASSIGNMENT           ( MKWORD ( 6, DCNC_APP_CC) )
#define CC_C_SEND_DATA                       ( MKWORD ( 7, DCNC_APP_CC) )
#define CC_C_CLEAR_CAMERA_IDS                ( MKWORD ( 8, DCNC_APP_CC) )
#define CC_C_SET_CAMERA_ID                   ( MKWORD ( 9, DCNC_APP_CC) )
#define CC_C_GET_GLOBAL_SETTINGS             ( MKWORD (10, DCNC_APP_CC) )


#define CC_C_RECEIVE_DATA                    ( MKWORD (16, DCNC_APP_CC) )


#define CC_C_SCREEN_LINE                     0
#define CC_C_SEAT_TEXT                       1
#define CC_C_SCREEN_LINE_DOUBLE              2
#define CC_C_SEAT_TEXT_DOUBLE                3


#define CC_C_NO_CAMERA_CONTROL_TYPE          0
#define CC_C_ALLEGIANT_VIDEO_SWITCHER        1
#define CC_C_DIRECT_CAMERA_CONTROL           2


#define CC_C_MAX_CAMERA_ASSIGNMENT_CLUSTER   100
#define CC_C_MAX_CAMERA_ID_CLUSTER           10
#define CC_C_MAX_SEAT_TEXT_LEN               17
#define CC_C_MAX_CAMERA_ID_LEN               17
#define CC_C_MAX_DATA_LEN                    60


#define CC_C_OVERVIEW_ID                     ((UNITID) 0x0000)


#define DBSC_MAX_UNIT                        576
#define DBSC_EMPTY_PREPOS                    255
#define DBSC_MAX_CAMERA                      256
#define DBSC_MAX_PREPOSITION                 99
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Camera Control Error code Explanation	Value (hex.)
CC_E_NOERROR The execution of the remote function was successful.	0 (0x00)
CC_E_INCONTROL_THIS_CHANNEL The CC application is already controlled by this remote controller (on the same channel). Probably the CC_C_START_CAMERA_APP is called for the second time.	5377 (0x1501)
CC_E_INCONTROL_OTHER_CHANNEL The CC application is already controlled by another remote controller (on another channel).	5378 (0x1502)
CC_E_NOT_INCONTROL The remote controller does not control the application (did not call CC_C_START_CAMERA_APP).	5379 (0x1503)
CC_E_INVALID_UNITID A unit identifier passed as parameter in the function is invalid.	5380 (0x1504)
CC_E_INVALID_CAMERA_NUMBER A camera number passed as parameter in the function is invalid.	5381 (0x1505)
CC_E_INVALID_PORT_OUT Sending data to the connected camera equipment failed.	5382 (0x1506)
CC_E_INVALID_CONTROL_TYPE The control type passed as a parameter in the function is invalid.	5383 (0x1507)
CC_E_INVALID_PARAMETER A parameter passed in the function is invalid.	5384 (0x1508)

APPENDIX C. EXAMPLES

In the example below the remote functions and update notifications, that are defined in this document as constant values for the *wFnId* parameter of the message (see [SRS_INF]), are presented as functions described in a 'C' syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function it is assumed that the function will create its structure, transport the parameters to the CCU and wait for the result information coming from the CCU.

For both the remote functions and the update notifications the same names are used as their identifier, but without the constant mark "C" and using mixed case names. So, e.g. remote function CC_C_START_CAMERA_APP shall as function be referenced as:

CC_Start_Camera_App (void);

Appendix C.1 Controlling CC application

This example shows the minimum steps to be taken for controlling the CC application

First we have to start controlling the CC application on the CCU.

```
typedef struct
{
    WORD wLength;
    BYTE byData[CC_C_MAX_DATA_LEN];
} CC_T_DATA_FRAME;

typedef struct
{
    BOOLEAN byCameraActivity;
} CC_T_CAMERA_ACTIVITY;

WORD                wError;

wError = CC_Start_Camera_App();
switch (wError)
{
    case CC_E_INCONTROL_THIS_CHANNEL:
        /* I have the CC app already under control */
        /* Is that correct? Has the remote controller restarted? */
        /* For the moment assume to be correct and continue */
        break;

    case CC_E_INCONTROL_OTHER_CHANNEL:
        /* Another remote controller has control over the CC application */
        /* report error and terminate */
        ........
        break;

    case CC_E_NOERROR:
        /* function ended succesfully */
        break;

    default:
        /* some unexpected error occurred, report the error */
        ........
        break;
}
```

We have now established communication with the CC application on the CCU. Since controlling has now started, update notifications may arrive. Therefore, we need the following functions:

```
void CC_Receive_Data(CC_T_DATA_FRAME tDataFrame)
{
    /* Handle data of tDataFrame */
}
```

Assume that we want to activate camera activity. We then need the following functions and control flow:

```
CC_T_CAMERA_ACTIVITY tCameraActivity;
tCameraActivity.bCameraActivity = TRUE;
WORD wError;

wError = CC_Set_Camera_Activity(&tCameraActivity);
if (wError != CC_E_NOERROR)
{
    /* do error handling */
}
```

We can now send remote functions to configure camera control.

When we no longer need to be able to send remote functions and receive update notifications we can stop the communication with the CC application using the function:

```
wError = CC_Stop_Camera_App();
if (wError != CC_E_NOERROR)
{
    /* do error handling */
}
```

This ends remotely controlling the CC application.

Simultaneous Interpretation

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for Simultaneous Interpretation between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the current state of the remote interface for Simultaneous Interpretation. It is meant to give an overview of the possibilities the remote interface offers to control the Simultaneous Interpretation application, present in the CCU, remotely. The Interface can be used to build a Simultaneous Interpretation User interface.

The Software Requirements Specification IN Remote Interface Description is based on the functionality described in [SRS_IN].

For a complete description of the Remote Interface Set-up can be referred to [SRS_INF].

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
MCCU	Multi-CCU system.
SCCU	Single-CCU system.
ACN	Audio Communication Network
DCN	Digital Congress Network
DCN NG	Digital Congress Network Next Generation
IN	Simultaneous Interpretation
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

[SRS_INF]	General Remote Interface Description	DU010933
[SRS_MMINF]	MM Remote Interface Description	DU020903
[SRS_IN]	Software Requirements Specification Simultaneous Interpretation	DU030901

This document should be referenced as [SRS_ININF].

1.5 Overview

Chapter 2 describes the Simultaneous Interpretation Remote Interface in general.

Chapter 3 and chapter 3.2.19 describe respectively, the remote functions and the update notifications which can be used to control the sending of update notifications by the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible errors that could be returned upon invocation of a remote function.

Appendix C gives an example on using the remote interface for Simultaneous Interpretation.

2. SIMULTANEOUS INTERPRETATION FOR A REMOTE INTERFACE

2.1 Introduction

The Simultaneous Interpretation Remote Interface is part of the DCN Next Generation software that allows for another controlling entity outside the CCU, not being the DCN Next Generation Control PC, to use the Simultaneous Interpretation application.

2.2 Remote Simultaneous Interpretation Control

Simultaneous Interpretation is the application that allows preparation and monitoring over the functionality of the interpreter desks. Typical control issues are e.g.: setting a desk configuration, changing the interlock mode, changing the channel languages etc. More details on the complete IN application can be found in the user manual.

Controlling Simultaneous Interpretation with a remote interface is achieved by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of Remote Functions and Update Notifications is described in [SRS_INF]. [SRS_INF] also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are at the moment two locations in a fully connected CCU where IN can be influenced. These locations are:

- A remote controller (which can be the control PC) connected using an Ethernet (in case of MCCU) or RS-232 (in case of SCCU) connection. This remote controller uses Remote Function calls to control Simultaneous Interpretation.
- The actual interpreter units that handle their interpreter desk control keys.

To get a fully operational system the remote controller must register itself to the CCU, in order for it to receive update messages from the CCU.

Remote functions coming from the remote controller can initiate an update in the CCU. During the update, notifications are generated and sent to the remote controller.

During the processing of remote functions on the CCU, the update messages are created and transmitted. This implies that the response information of a remote function can be received after the reception of an update notification. The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned. The notifications received during the wait for the response may be processed directly. See [SRS_INF] for details on this mechanism.

Events coming from a unit (interpreter desk) are processed and the CCU is updated. Although there are no events that directly lead to generating and sending notifications, there are unit events that indirectly lead to notifications. These notifications are sent to the registered remote controller.

This document gives the set of Remote Functions and the set of Update Notifications concerning Simultaneous Interpretation. The relation between Remote Function, sent by the remote controller, and Update Notifications is given in the description of each separate Remote Function. The (indirect) relation between unit events and Update Notifications is given in section 4.1.2.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the remote functions used to control the Simultaneous Interpretation application on the CCU.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the 'wError' field of the received response information equals IN_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the 'wError' field of the response information for this remote function. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications that are generated during the execution of the remote function. When there are no notifications generated, this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications. When there are no related functions, this part will be omitted.

3.2 IN General functions

3.2.1 IN_C_SIGNAL_CCU

Remarks
This function is exported in the IN remote interface for compatible reasons only! Use IN_C_START_IN_APP / IN_C_STOP_IN_APP instead. This function will not be supported from version 3.0.

Purpose
Function to update the controller state on the CCU. Depending on the state the database system setting StandAloneIN is updated, a timer for controller update messages is inserted or deleted, a configuration notification and/or a states notification is forced. When a timer is inserted, a states notification is sent every time this timer times out.

Parameter structure for the function
The function requires the following structure as parameter:

```
struct
{
    WORD  wDummy;
    WORD  wPCActive;
}
```

where:

wDummy	Dummy value, not used in the function.
wPCActive	The controller state. This controller state is a bit-shifted version (8-bit left shift) of one of the states IN_C_STANDALONE or IN_C_WITHPC. In case of IN_C_STANDALONE, the database system setting StandAloneIN is set to FALSE and the timer for controller update messages is deleted. In case of IN_C_WITHPC StandAloneIN is set to TRUE, an update timer is inserted and both a configuration and states notification is sent.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances
```

where:

wNrOfInstances	The value of the update use count for the IN application at the end of the function handling. It contains the number of times a remote controller (other than the remote PC) has connected over the same communication medium. Therefore the first time the IN_C_START_MON_IN function is called, it contains the value 1.

Error codes returned
IN_E_NOERROR

Update notifications
IN_C_CHAN_STATUS
IN_C_CCU_CONFIG

3.2.2 IN_C_START_IN_APP

Purpose
Indicates the CCU that the remote controller wants to communicate with the IN application inside the CCU. After receiving this function the CCU gives the control of IN to the remote controller. It is now impossible for another remote controller (e.g. DCNNG Control PC) to gain control of the application. After this function has been called, the remote controller will receive update notifications from the IN application (see section 4.1.2).

When the execution of this function is omitted, all other remote functions (except the other start and stop functions) will have no effect and will return an error code (IN_E_APP_NOT_STARTED).

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the IN application at the end of the function handling. It contains the number of times a remote controller has connected over the same communication medium. E.g. the first time the IN_C_START_IN_APP function is called, it contains the value 1. Note that calling IN_C_START_MON_IN will also increase this update use count.

Error codes returned
IN_E_NOERROR
IN_E_INCONTROL_OTHER_CHANNEL
IN_E_INCONTROL_THIS_CHANNEL

Update notifications
IN_C_CCU_CONFIG
IN_C_CHAN_STATUS
IN_C_LANGUAGE_LIST
IN_C_FLASHING_MIC_ON
IN_C_SPEAKSLOWLY_SIGN
IN_C_HELP_SIGN

Related functions
IN_C_STOP_IN_APP

3.2.3 IN_C_STOP_IN_APP

Purpose
Indicate the CCU that the remote controller no longer requires to communicate with the IN application inside the CCU. After receiving this function the CCU takes over the control of IN. The remote controller will no longer receive update notifications.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the IN application at the end of the function handling. It contains the number of times a remote controller is connected over the same communication medium. E.g. when there is only one connection registered for the IN application prior to calling the IN_C_STOP IN_APP function, the value of wNrOfInstances will be 0 when the function returns. Note that calling IN_C_STOP_MON_IN will also decrease this update use count.

Error codes returned
IN_E_NOERROR
IN_E_NOT_IN_CONTROL

Related functions
IN_C_START_IN_APP

3.2.4 IN_C_START_MON_IN

Purpose
Function to start the monitoring behavior of the Simultaneous Interpretation application. It is not allowed/possible to control settings of Simultaneous Interpretation.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the IN application at the end of the function handling. It contains the number of times a remote controller has connected over the same communication medium. E.g. the first time the IN_C_START_MON_IN function is called, it contains the value 1. Note that calling IN_C_START_IN_APP also increases this update use count.

Error codes returned
IN_E_NOERROR

Update notifications
IN_C_CCU_CONFIG
IN_C_CHAN_STATUS
IN_C_LANGUAGE_LIST
IN_C_FLASHING_MIC_ON
IN_C_SPEAKSLOWLY_SIGN
IN_C_HELP_SIGN

Related functions
IN_C_STOP_MON_IN

3.2.5 IN_C_STOP_MON_IN

Purpose
Function to stop monitoring the behavior of the Simultaneous Interpretation application.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the IN application at the end of the function handling. It contains the number of times a remote controller is connected over the same communication medium. E.g. when there is only one connection registered for the IN application prior to calling the IN_C_STOP_MON_IN function, the value of wNrOfInstances will be 0 when the function returns. Note that calling IN_C_STOP_IN_APP will also decrease this update use count.

Error codes returned
IN_E_NOERROR

Related functions
IN_C_START_MON_IN

3.2.6 IN_C_DESK_UPDATE

Purpose
This function updates an interpreter desk configuration in the CCU with a new configuration from the remote controller. It only changes data for one desk. If a microphone is on, it will be turned off first. The desk gets a download and will be brought up in its default state. The default B out channel is the lowest channel enabled. If no interpreter with the specified booth/desk combination can be found an error is returned. An interpreter unit that is being installed when this function is called will leave its installation menu.

Parameter structure for the function
The function requires the following structure as parameter:

```
struct
{
    WORD  wBoothNr;
    WORD  wDeskNr;
    WORD  wAChannel;
    DWORD dwfBChannelSet;
};
```

where:

wBoothNr	Booth number of the interpreter desk. Range: 1..31
wDeskNr	Desk number of the interpreter desk. Range: 1..6
wAChannel	The A out channel of the interpreter desk. Range: 1..current number of IN channels (which is maximally DBSC_MAX_INTERPRT_CHANNELS)
dwfBChannelSet	Double word (32 bits), of which the bits indicate which channels are enabled for the B out channel of the interpreter desk. The least significant bit stands for channel 1. If a bit is equal to 1, the channel it stands for is enabled for the B out channel.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED
IN_E_UNKNOWN_INTSEAT

3.2.7 IN_C_BOOTH_UPDATE

Purpose
This function updates an interpreter booth configuration in the CCU with a new configuration from the remote controller. It only changes the auto relay flag for one booth. All microphones in the booth will be turned off first. The auto relay flag is then set. No download takes place. If the booth cannot be found an error is returned. An interpreter unit that is being installed when this function is called will leave its installation menu.

Parameter structure for the function
The function requires the following structure as parameter:

```
struct
{
    WORD  wBoothNr;
    WORD  wAutoRelay;
};
```

where:

wBoothNr	Booth number of the booth that needs to be updated. Range: 1..31
wAutoRelay	Auto relay flag. If the high byte part of this parameter is not equal to 0 (e.g. the parameter has a hexadecimal value 0x0100), the booth will be an auto relay booth. If the high byte part of this parameter is equal to 0 (e.g. the parameter has a hexadecimal value 0x0000), the booth will not be an autorelay booth.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED
IN_E_UNKNOWN_BOOTH_NR

3.2.8 IN_C_UPDATE_LCK

Remarks

This function is exported in the IN remote interface for compatible reasons only!
Use IN_C_UPDATE_LOCK instead. *This function will not be supported from version 3.0.*

Purpose

This function changes both lock modes and the engaged Led indication. The database is updated, all microphones are turned off, the unit in install mode will leave its installation menu and all configuration data is downloaded, except for the language list. If the slave configuration does not allow one of the interlock modes an error is returned.

Parameter structure for the function

The function requires the following structure as parameter:

```
struct
{
    WORD     wWithin;
    WORD     wBetween;
    BOOLEAN  bNormalEngaged;
};
```

where:

wWithin	Interlock mode within a booth, which can be one of the following values: • IN_C_NONEMODE • IN_C_OVERRIDE • IN_C_INTERLOCK
wBetween	Interlock mode between booths, see *wWithin* for the possible values. Next to these the following interlock mode is also possible: • IN_C_OVERRIDE_ON_B_ONLY
bNormalEngaged	Engaged Led indication: TRUE stands for normal mode. If the microphone of an interpreter desk in a booth is switched on (first desk), the engaged LED (of the output channel of the active desk) will light up on all other interpreter desks of that booth. FALSE stands for alternative mode. In this case, the engaged LED of the other interpreter desk in the booth will not light up. It will be flashing when another interpreter desk in the booth also activates its microphone, but this happens in normal mode too.

Response structure from the function

The function has no response parameters.

Error codes returned

IN_E_NOERROR
IN_E_INTERLOCK_NOT_ALLOWED
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED

3.2.9 IN_C_UPDATE_LOCK

Purpose

This function changes both lock modes and the engaged Led indication. The database is updated, all microphones are turned off, the unit in install mode will leave its installation menu and all configuration data is downloaded, except for the language list. If the slave configuration does not allow one of the interlock modes an error is returned.

Parameter structure for the function
The function requires the following structure as parameter:

```
struct
{
    BYTE     byWithin;
    BYTE     byBetween;
    BOOLEAN  bNormalEngaged;
};
```

where:

byWithin	Interlock mode within a booth, which can be one of the following values: • IN_C_NONEMODE • IN_C_OVERRIDE • IN_C_INTERLOCK
byBetween	Interlock mode between booths, see *byWithin* for the possible values. Next to these the following interlock mode is also possible: • IN_C_OVERRIDE_ON_B_ONLY
bNormalEngaged	Engaged Led indication: TRUE stands for normal mode. If the microphone of an interpreter desk in a booth is switched on (first desk), the engaged LED (of the output channel of the active desk) will light up on all other interpreter desks of that booth. FALSE stands for alternative mode. In this case, the engaged LED of the other interpreter desk in the booth will not light up. It will be flashing when another interpreter desk in the booth also activates its microphone, but this happens in normal mode too.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_INTERLOCK_NOT_ALLOWED
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED

3.2.10 IN_C_LOAD_INT_DB

Purpose
This function changes the whole installation of the IN application. If the slave configuration does not allow the installation data, nothing happens and an error is returned. If the installation data is allowed, it changes the autorelay booths, the interlock modes, the channel languages and the number of channels and per interpreter desk the incoming and outgoing channels and which B out channels are enabled. The whole application is stopped and restarted in a default situation after all data is updated and downloaded to the desk. If the passed parameters exactly correspond to the current situation in the CCU, nothing happens and IN_E_NOERROR is returned.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    DWORD            dwfAutoSet;
    BYTE             byBetweenLock;
    BYTE             byWithinLock;
    BYTE             byMaxChans;
    BYTE             byChannels[DBSC_MAX_INTERPRT_CHANNEL];
    IN_T_DESKCONFIG  tDeskConf[DBSC_MAX_INTBOOTH][DBSC_MAX_DESK_PER_BOOTH];
```

```
        BOOLEAN          bNormalEngaged;
    } IN_T_DB_DATA;
```

where the IN_T_DESKCONFIG is defined as:

```
    typedef struct
    {
        BOOLEAN  bInstalled;
        UNITID   wUnitId;
        BYTE     byIncoming;
        BYTE     byOutgoing;
        CHAR     cOutSelect;
        DWORD    dwfBChannelSet;
    } IN_T_DESKCONFIG;
```

in which a UNITID is defined as:

```
    typedef WORD UNITID;
```

where:

dwfAutoSet	Autorelay flag. The bits of this DWORD indicate which booths are autorelay booths. The least significant bit stands for booth 1. If a bit is equal to 1, the corresponding booth is an autorelay booth.
byBetweenLock	Interlock mode between booths, which can be one of the following values: • IN_C_NONEMODE • IN_C_OVERRIDE • IN_C_INTERLOCK • IN_C_OVERRIDE_ON_B_ONLY
byWithinLock	Interlock mode within a booth, see *byBetweenLock* for the possible values, except for the IN_C_OVERRIDE_ON_B_ONLY interlock mode.
byMaxChans	The number of assigned channels. Range: 1..DBSC_MAX_INTERPRT_CHANNEL.
byChannels[]	Array with language per channel. Only the first *byMaxChans* values of this array are used.
bNormalEngaged	Engaged Led indication: TRUE stands for normal mode. If the microphone of an interpreter desk in a booth is switched on (first desk), the engaged LED (of the output channel of the active desk) will light up on all other interpreter desks of that booth. FALSE stands for alternative mode. In this case, the engaged LED of the other interpreter desk in the booth will not light up. It will be flashing when another interpreter desk in the booth also activates its microphone, but this happens in normal mode too.
tDeskConf[][]	Matrix holding the desk configuration. Each matrix element is defined as an IN_T_DESKCONFIG structure that is defined below. The position in the matrix defines the desk and booth number of the unit (interpreter desk). Adding the value 1 to the indexes of the matrix retrieves the booth and desk number, e.g. tDeskConf[2][3] hold the data of the interpreter desk located in booth 3 with desk number 4.

bInstalled	TRUE if the interpreter desk is installed FALSE if the interpreter desk is not installed. In this case all other parameters of this IN_T_DESKCONFIG structure are discarded.
wUnitId	Unit Identifier. Valid values are 1..231 and 233..242 (note that the unit identifier must be unique for every active unit, i.e. not only for interpreter desks). If there is

	no unit assigned to the desk and booth number this identifier belongs to (see tDeskConf explanation), it must have the value DCNC_UNASSIGNED_UNIT. The mapping of unit identifiers to booth and desk numbers must be the same as the mapping received in the last IN_C_CHAN_STATUS notification (see 4.2.1 - tIntMics). If this is not the case, the error IN_E_INCORRECT_DESK_CONFIG will be returned.
byIncoming	The incoming channel of the interpreter desk. This value is ignored, floor is set as incoming channel of the interpreter desk (to start in a default situation).
byOutgoing	The A out channel of the interpreter desk. Range: 1..byMaxChans
cOutSelect	'A' if the A out channel of the interpreter desk is active 'B' if the B out channel of the interpreter desk is active. Note that this parameter is case sensitive, i.e. if it is 'a' or 'b' the error code IN_E_WRONG_PARAMETER will be returned.
dwfBChannelSet	Double word (32 bits), of which the bits indicate which channels are enabled for the B out channel of the interpreter desk. The least significant bit stands for channel 1. If a bit is equal to 1, the channel it stands for is enabled for the B out channel.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_INTERLOCK_NOT_ALLOWED
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED
IN_E_INCORRECT_DESK_CONFIG

Related functions
IN_C_DESK_UPDATE
IN_C_BOOTH_UPDATE
IN_C_UPDATE_LCK

3.2.11 IN_C_CHANNEL_UPDATE

Purpose
This function changes the channel languages and the number of channels. The whole application is stopped and restarted in a default situation after the channel data is updated and downloaded to the desk.

Parameter structure for the function
The function requires the following structure as parameter:

```
IN_T_CHANNELLANG  tChannelLang;
```

where IN_T_CHANNELLANG is defined as:

```
typedef BYTE  IN_T_CHANNELLANG[DBSC_MAX_INTERPRT_CHANNELS];
```

where:

tChannelLang	Array holding the channel languages. This array can hold up to DBSC_MAX_INTERPRT_CHANNELS channel languages. If the array holds less channel languages, this is marked by an array value equal to the constant IN_C_NOMORE_CHANNELS. All values in the array after this

special value are ignored (this way the number of channels is determined). The range of the channel languages is 1..DBSC_MAX_LANGNAME. Also note that the range of the number of channels is 1..DBSC_MAX_INTERPRT_CHANNELS. Therefore if the constant IN_C_NOMORE_CHANNELS is found in tChannelLang[0] (implying the number of channels is equal to 0), the error code IN_E_WRONG_PARAMETER will be returned.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_WRONG_PARAMETER
IN_E_APP_NOT_STARTED

3.2.12 IN_C_DOWNLOAD_LANGLIST

Purpose
This function sends a new language list from the remote controller to the CCU. If it is not the standard English or French list the database is updated. If the language list number changes or if the new one is not the standard English or French list all desks are downloaded for configuration and language list data. All microphones are turned off in that case and the units are brought back in a default state.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD                  wVersionOfLangList;
    struct IN_T_LANGLIST  tLangList[DBSC_MAX_LANGNAME];
} IN_T_RF_LANGLIST;
```

where the struct IN_T_LANGLIST is defined as:

```
struct IN_T_LANGLIST
{
    WORD    wAudioLangId;
    CHAR    szLangName[DBSC_NCHAR_LANGNAME];
    CHAR    szLangAbbr[DBSC_NCHAR_LANGABBR];
};
```

where:

wVersionOfLangList	Version of the language list. This can be one of the following constants: • IN_C_ENG_LANG_LIST_ID (standard English list) • IN_C_FR_LANG_LIST_ID (standard French list) • IN_C_ORG_LANG_LIST_ID[1] (original language list) • IN_C_CUS_LANG_LIST_1_ID (custom language list 1) • IN_C_CUS_LANG_LIST_2_ID (custom language list 2) • IN_C_CUS_LANG_LIST_3_ID (custom language list 3)
tLangList	Array holding the actual language list information. Each array element is defined as an IN_T_LANGLIST structure that is defined below. This array is only read and stored when *wVersionOfLangList* is not equal to IN_C_ENG_LANG_LIST or

[1] Is the default value when wVersionOfLangList argument is incorrect.

	IN_C_FR_LANG_LIST_ID, else it is discarded.
wAudioLangId	The Identifier of the audio language. This parameter is ignored, the actual identifier is derived from the array index of tLangList by adding 1 to this index. E.g. the identifier of the audio language in tLangList[2] is 3.
szLangName	Name of the audio language. This must be a null terminated string (i.e. maximum length of the name is (DBSC_NCHAR_LANGNAME – 1) characters followed by the '\0' character).
szLangAbbr	Abbreviation of the audio language. This must be a null terminated string (i.e. maximum length is (DBSC_NCHAR_LANGABBR – 1) characters followed by the '\0' character).

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Update notifications
IN_C_LANGUAGE_LIST

3.2.13 IN_C_SET_FLASH_MIC_ON

Purpose
This function is used to configure the interpreter desks concerning the microphone button ring when engaged. The microphone button ring can be set to be flashing or non-flashing (stays on) when engaged.

Parameter structure for the function
The function requires the following structure as parameter:

```
BOOLEAN  bFlashingWhenEngaged;
```

where:

bFlashingWhenEngaged	TRUE if the microphone button ring must be flashing when engaged FALSE if the microphone button ring must not be flashing when engaged.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Update notifications
IN_C_FLASHING_MIC_ON

3.2.14 IN_C_SET_FLOOR_DIST

Purpose
This function is used to configure the interpreter desks concerning distribution of the floor signal on the outgoing channel in case no interpretation is performed. There are two possibilities: either the floor signal is distributed, or no signal is distributed.

Parameter structure for the function
The function requires the following structure as parameter:

```
BOOLEAN  bFloorDistribution;
```

where:

bFloorDistribution	TRUE if the floor signal must be distributed on the outgoing channel when no interpretation is performed FALSE if no signal must be distributed on the outgoing channel when no interpretation is performed.

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Update notifications
IN_C_FLOOR_DISTRIBUTION

Related functions
IN_C_GET_FLOOR_DIST

3.2.15 IN_C_GET_FLOOR_DIST

Purpose
This function is used to retrieve the current setting concerning distribution of the floor signal on the outgoing channel in case no interpretation is performed. There are two possibilities: either the floor signal is distributed, or no signal is distributed.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
BOOLEAN  bFloorDistribution;
```

where:

bFloorDistribution	TRUE if the floor signal is distributed on the outgoing channel when no interpretation is performed FALSE if no signal is distributed on the outgoing channel when no interpretation is performed.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Related functions
IN_C_SET_FLOOR_DIST

3.2.16 IN_C_SET_SPEAKSLOWLY_SIGN

Purpose
This function is used to configure the interpreter desks concerning the enabling of speak slowly signaling. There are two possibilities: either the function is disabled or enabled.

Parameter structure for the function
The function requires the following structure as parameter:

```
BOOLEAN  bSpeakSlowlySign;
```

where:

bSpeakSlowlySign	TRUE if speak slowly signaling must be enabled FALSE if speak slowly signaling must be disabled

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Update notifications
IN_C_SPEAKSLOWLY_SIGN

Related functions
IN_C_GET_SPEAKSLOWLY_SIGN

3.2.17 IN_C_GET_SPEAKSLOWLY_SIGN

Purpose
This function is used to retrieve the interpreter desks configuration concerning the enabling of speak slowly signaling. There are two possibilities: either the function is disabled or enabled.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
BOOLEAN  bSpeakSlowlySign;
```

where:

bSpeakSlowlySign	TRUE if speak slowly signaling is enabled. FALSE if speak slowly signaling is disabled.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Related functions
IN_C_SET_SPEAKSLOWLY_SIGN

3.2.18 IN_C_SET_HELP_SIGN

Purpose
This function is used to configure the interpreter desks concerning the enabling of help signaling. There are two possibilities: either the function is disabled or enabled.

Parameter structure for the function
The function requires the following structure as parameter:

```
BOOLEAN  bHelpSign;
```

where:

bHelpSign	TRUE if help signaling must be enabled FALSE if help signaling must be disabled

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Update notifications
IN_C_HELP_SIGN

Related functions
IN_C_GET_HELP_SIGN

3.2.19 IN_C_GET_HELP_SIGN

Purpose
This function is used to retrieve the interpreter desks configuration concerning the enabling of help signaling. There are two possibilities: either the function is disabled or enabled.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
BOOLEAN  bHelpSign;
```

where:

bHelpSign	TRUE if help signaling is enabled. FALSE if help signaling is disabled.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED

Related functions
IN_C_SET_HELP_SIGN

3.2.20 IN_C_ASSIGN_UNIT

Purpose
This function is used to assign unit(s) to the given booth and desk numbers.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD                wNrOfUnits;
    IN_T_UNIT_ASSIGN    tUnitAssignList[DBSC_MAX_INTSEAT];
} IN_T_UNIT_ASSIGN_LIST;
```

where the IN_T_UNIT_ASSIGN is defined as:

```
typedef struct
{
    UNITID              tUnitId;
    BYTE                byBooth;
    BYTE                byDesk;
} IN_T_UNIT_ASSIGN;
```

where:

wNrOfUnits	The number of unit list entries actual present in the tUnitAssignList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_INTSEAT.
tUnitAssignList []	Array holding the list of unit assignments.
wUnitId	Unit Identifier of the interpreter
byBooth	The assigned booth number, with the values 0…30
byDesk	The assigned desk number, with the value 0…5

Response structure from the function
The function has no response parameters.

Error codes returned
IN_E_NOERROR
IN_E_APP_NOT_STARTED
IN_E_WRONG_PARAMETER

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the IN application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

As we have mentioned in section 2.2, update notifications are not only the result of remote functions generated by the remote controller, but can also be the result of (interpreter) unit/user events. It was also mentioned in section 2.2 that the relation between the unit/user events and the update notifications is indirect (i.e. asynchronous).

This section gives information about the events coming from a unit/user or a remote controller and the processing done for the events. In the table below an overview is made about the events and the actions performed.

Event	**IN_C_CCU_CONFIG**	**IN_C_CHAN_STATUS**	**IN_C_FLASHING_MIC_ON**	**IN_C_FLOOR_DISTRIBUTION**	**IN_C_LANGUAGE_LIST**	**IN_C_SPEAKSLOWLY_SIGN**	**IN_C_HELP_SIGN**
Start remote control (i.e. call to IN_C_START_IN_APP[2])	X	X	X	X	X	X	X
Stop remote control (i.e. call to IN_C_STOP_IN_APP[3])	-	-	-	-	-	-	-
Start remote monitoring (i.e. call to IN_C_START_MON_IN)	X	X	X	X	X	X	X
Stop remote monitoring (i.e. call to IN_C_STOP_MON_IN)	-	-	-	-	-	-	-
CCU receives a new language list from the remote controller (i.e. call to IN_C_DOWNLOAD_LANGLIST)	-	-	-	-	X	-	-
Configuration of the interpreter desks concerning the microphone bar when engaged has changed (i.e. call to IN_C_SET_FLASH_MIC_ON)	-	-	X	-	-	-	-
Configuration of the interpreter desks concerning distribution of the floor signal on the outgoing channel in case no interpretation is performed has changed (i.e. call to IN_C_SET_FLOOR_DIST)	-	-	-	X	-	-	-
Configuration of the interpreter desks concerning the enabling of speak slowly signaling has changed (i.e. call to IN_C_SET_SPEAKSLOWLY_SIGN)	-	-	-	-	-	X	-
Configuration of the interpreter desks concerning the enabling of help signaling has changed (i.e. call to IN_C_SET_HELP_SIGN)	-	-	-	-	-	-	X
Microphone on	-	X	-	-	-	-	-
Microphone off	-	X	-	-	-		
Select A as active out channel[4]	-	X/-	-	-	-		

[2] These update events will also occur when using IN_C_SIGNAL_CCU function with arguments IN_C_WITH_PC.
[3] These update events will also occur when using IN_C_SIGNAL_CCU function with arguments IN_C_STAND_ALONE.

Event	IN_C_CCU_CONFIG	IN_C_CHAN_STATUS	IN_C_FLASHING_MIC_ON	IN_C_FLOOR_DISTRIBUTION	IN_C_LANGUAGE_LIST	IN_C_SPEAKSLOWLY_SIGN	IN_C_HELP_SIGN
Select B as active out channel[4]	-	X/-	-	-	-		
Start install mode[4]	-	X/-	-	-	-		
Stop install mode[5]	X/-	X	X/-	-	-	X/-	X/-
Select floor signal as incoming channel[4]	-	X/-	-	-	-		
Select relay signal as incoming channel[4]	-	X/-	-	-	-		
Select autorelay signal as incoming channel[4]	-	X/-	-	-	-		

[4] This action only leads to the shown notification if the microphone of the interpreter desk is turned on when the action is performed. If the microphone is off, performing the action will not lead to any update notifications.
[5] If the CCU controls the IN application (i.e. no remote controller connected), the interpreter desks have a full installation menu. Therefore more settings than present in the IN_C_CHAN_STATUS notification can be changed. Due to this reason the IN_C_CCU_CONFIG, IN_C_FLASHING_MIC_ON. IN_C_SPEAKSLOWLY_SIGN and IN_C_HELP_SIGN update notification are also sent, but only when there is no remote controller.

4.2 IN General notifications

4.2.1 IN_C_CHAN_STATUS

Purpose
Notifies the remote controller of a status update.

Notify structure with this update
The update comes with the following structure:

```
struct
{
    BOOLEAN          bConnectChanges;
    IN_T_MICSTAT     tIntMics;
    IN_T_ACTIVECHAN  tInActiveChan;
    IN_T_CHANNELS    tAChannels;
    IN_T_CHANNELS    tBChannels;
    IN_T_CHANNELS    tInChannels;
};
```

where the structures IN_T_MICSTAT, IN_T_ACTIVECHAN and IN_T_CHANNELS are defined as:

```
typedef struct
{
    UNITID   wUnitId;
    BOOLEAN  bMicStatus;
} IN_T_MICSTAT[DBSC_MAX_INTBOOTH][DBSC_MAX_DESK_PER_BOOTH];

typedef CHAR IN_T_ACTIVECHAN[DBSC_MAX_INTBOOTH][DBSC_MAX_DESK_PER_BOOTH];

typedef BYTE IN_T_CHANNELS[DBSC_MAX_INTBOOTH][DBSC_MAX_DESK_PER_BOOTH];
```

in which a UNITID is defined as:

```
typedef WORD UNITID;
```

where:

bConnectChanges	TRUE if there was a change in connected units (i.e. interpreter desks were connected or disconnected) since the last status update FALSE if there was no change in connected units since the last update.
tIntMics	Matrix holding the microphone status information of the connected interpreter desks. Each matrix element is defined as an IN_T_MICSTAT structure that is defined below. Every element holds the information of one particular desk in one particular booth. The position in the matrix defines the desk and booth number of the unit (interpreter desk). Adding the value 1 to the indexes of the matrix retrieves the booth and desk number, e.g. tIntMics[0][1] hold the data of the interpreter desk located in booth 1 with desk number 2.
tInActiveChan	Matrix holding the active out channels of the connected units. The value of the matrix elements is either 'A' or 'B'.
tAChannels	Matrix holding the A out channels of the connected units.
tBChannels	Matrix holding the B out channels of the connected units.
tInChannels	Matrix holding the incoming channels of the connected units.

wUnitId	Unit Identifier. If there is no unit assigned to the desk and booth number this identifier belongs to, it will have the value DCNC_UNASSIGNED_UNIT.
bMicStatus	TRUE if the microphone of the unit is on FALSE if the microphone of the unit is off.

4.2.2 IN_C_CCU_CONFIG

Purpose

Notifies the remote controller of a configuration update.

Notify structure with this update

The update comes with the following structure:

```
struct
{
    BYTE              byBetweenLock;
    BYTE              byWithinLock;
    BYTE              byMaxChans;
    WORD              wVerLangList;
    IN_T_CHANNELLANG  tChanLang;
};
```

where the structure IN_T_CHANNELLANG is defined as:

```
typedef BYTE IN_T_CHANNELLANG[DBSC_MAX_INTERPRT_CHANNEL];
```

where:

byBetweenLock	Interlock mode between booths, which can be one of the following values: • IN_C_NONEMODE • IN_C_OVERRIDE • IN_C_INTERLOCK • IN_C_OVERRIDE_ON_B_ONLY
byWithinLock	Interlock mode within a booth, see *byBetweenLock* for the possible values, except for the IN_C_OVERRIDE_ON_B_ONLY interlock mode
byMaxChans	The number of assigned channels. Range: 1..DBSC_MAX_INTERPRT_CHANNEL.
wVerLangList	Version of the language list. This can be one of the following constants: • IN_C_ENG_LANG_LIST_ID (standard English list) • IN_C_FR_LANG_LIST_ID (standard French list) • IN_C_ORG_LANG_LIST_ID (original language list) • IN_C_CUS_LANG_LIST_1_ID (custom language list 1) • IN_C_CUS_LANG_LIST_2_ID (custom language list 2) • IN_C_CUS_LANG_LIST_3_ID (custom language list 3)
tChanLang	Array with language per channel. Only the first *byMaxChans* values of this array are useful, the rest of the elements hold the default value IN_C_DEF_LANG. If the channel languages have been set using IN_C_CHANNEL_UPDATE (see 3.2.11), the channel languages shown in this array are equal to the values passed in IN_C_CHANNEL_UPDATE. E.g. if the channel language 1 was passed for channel 1 in IN_C_CHANNEL_UPDATE (tChannelLang[0] = 1), channel language 1 will also be shown for channel 1 in this structure (tChanLang[0] = 1). Range: 1..DBSC_MAX_LANGNAME.

4.2.3 IN_C_FLASHING_MIC_ON

Purpose
Notifies the remote controller of the flashing microphone button ring setting.

Notify structure with this update
The update comes with the following structure:

```
BOOLEAN bFlashingWhenEngaged
```

where:

bFlashingWhenEngaged	TRUE if the microphone button ring flashes when engaged FALSE if the microphone button ring does not flash when engaged.

4.2.4 IN_C_FLOOR_DISTRIBUTION

Purpose
Notifies the remote controller of the floor distribution setting.

Notify structure with this update
The update comes with the following structure:

```
BOOLEAN bFloordistribution
```

where:

bFloorDistribution	TRUE if the floor signal is distributed on the outgoing channel when no interpretation is performed FALSE if no signal is distributed on the outgoing channel when no interpretation is performed.

4.2.5 IN_C_LANGUAGE_LIST

Purpose
Notifies the remote controller of a language list update.

Notify structure with this update
The update comes with the following structure:

```
struct
{
    WORD                   wVersionOfLangList;
    struct IN_T_LANGLIST   tLangList[DBSC_MAX_LANGNAME];
};
```

where the struct IN_T_LANGLIST is defined as:

```
struct IN_T_LANGLIST
{
    WORD    wAudioLangId;
    CHAR    szLangName[DBSC_NCHAR_LANGNAME];
    CHAR    szLangAbbr[DBSC_NCHAR_LANGABBR];
};
```

where:

wVersionOfLangList Version of the language list. This can be one of the following constants:

- IN_C_ENG_LANG_LIST_ID (standard English list)
- IN_C_FR_LANG_LIST_ID (standard French list)
- IN_C_ORG_LANG_LIST_ID (original language list)
- IN_C_CUS_LANG_LIST_1_ID (custom language list 1)
- IN_C_CUS_LANG_LIST_2_ID (custom language list 2)
- IN_C_CUS_LANG_LIST_3_ID (custom language list 3)

tLangList	Array holding the actual language list information. Each array element is defined as an IN_T_LANGLIST structure that is defined below. If the version of the language list is IN_C_ENG_LANG_LIST_ID or IN_C_FR_LANG_LIST_ID, this array will be filled with dummy values (i.e. all language identifiers are 0 and all strings are empty). If the version of the language list is IN_C_ORG_LANG_LIST_ID, the array can also be filled with dummy values. This is the case, if the version of the language list was set by an interpreter desk in its install menu (in which case the predefined original language list is used). In case the original language list was downloaded by a remote controller (see IN_C_DOWNLOAD_LANGLIST in 3.2.12), the array will contain the downloaded language list information.

wAudioLangId	The Identifier of the audio language.
szLangName	Name of the audio language.
szLangAbbr	Abbreviation of the audio language.

4.2.6 IN_C_SPEAKSLOWLY_SIGN

Purpose

Notifies the remote controller of the status of speak slowly signaling.

Notify structure with this update

The update comes with the following structure:

```
BOOLEAN bSpeakSlowlySign
```

where:

bSpeakSlowlySign	TRUE if speak slowly signaling is enabled. FALSE if speak slowly signaling is disabled.

4.2.7 IN_C_HELP_SIGN

Purpose

Notifies the remote controller of the status of help signaling.

Notify structure with this update

The update comes with the following structure:

```
BOOLEAN bHelpSign
```

where:

bHelpSign	TRUE if help signaling is enabled. FALSE if help signaling is disabled.

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of defines are used, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MKWORD(lb,hb)           ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_IN             2


#define IN_C_CHAN_STATUS                 ( MKWORD ( 1, DCNC_APP_IN) )
#define IN_C_CCU_CONFIG                  ( MKWORD ( 2, DCNC_APP_IN) )
#define IN_C_FLASHING_MIC_ON             ( MKWORD ( 3, DCNC_APP_IN) )
#define IN_C_FLOOR_DISTRIBUTION          ( MKWORD ( 4, DCNC_APP_IN) )
#define IN_C_LANGUAGE_LIST               ( MKWORD ( 5, DCNC_APP_IN) )
#define IN_C_SPEAKSLOWLY_SIGN            ( MKWORD ( 6, DCNC_APP_IN) )
#define IN_C_HELP_SIGN                   ( MKWORD ( 7, DCNC_APP_IN) )


#define IN_C_DESK_UPDATE                 ( MKWORD (36, DCNC_APP_IN) )
#define IN_C_BOOTH_UPDATE                ( MKWORD (37, DCNC_APP_IN) )
#define IN_C_SIGNAL_CCU                  ( MKWORD (38, DCNC_APP_IN) )
#define IN_C_UPDATE_LCK                  ( MKWORD (39, DCNC_APP_IN) )
#define IN_C_LOAD_INT_DB                 ( MKWORD (40, DCNC_APP_IN) )
#define IN_C_CHANNEL_UPDATE              ( MKWORD (41, DCNC_APP_IN) )
#define IN_C_DOWNLOAD_LANGLIST           ( MKWORD (50, DCNC_APP_IN) )
#define IN_C_SET_FLASH_MIC_ON            ( MKWORD (51, DCNC_APP_IN) )
#define IN_C_SET_FLOOR_DIST              ( MKWORD (52, DCNC_APP_IN) )
#define IN_C_GET_FLOOR_DIST              ( MKWORD (53, DCNC_APP_IN) )
#define IN_C_START_MON_IN                ( MKWORD (54, DCNC_APP_IN) )
#define IN_C_STOP_MON_IN                 ( MKWORD (55, DCNC_APP_IN) )
#define IN_C_START_IN_APP                ( MKWORD (56, DCNC_APP_IN) )
#define IN_C_STOP_IN_APP                 ( MKWORD (57, DCNC_APP_IN) )
#define IN_C_SET_SPEAKSLOWLY_SIGN        ( MKWORD (68, DCNC_APP_IN) )
#define IN_C_GET_SPEAKSLOWLY_SIGN        ( MKWORD (69, DCNC_APP_IN) )
#define IN_C_SET_HELP_SIGN               ( MKWORD (70, DCNC_APP_IN) )
#define IN_C_GET_HELP_SIGN               ( MKWORD (71, DCNC_APP_IN) )
#define IN_C_UPDATE_LOCK                 ( MKWORD (73, DCNC_APP_IN) )


#define IN_C_NONEMODE                    0
#define IN_C_OVERRIDE                    1
#define IN_C_INTERLOCK                   2
#define IN_C_OVERRIDE_ON_B_ONLY          3


#define IN_C_ENG_LANG_LIST_ID            1
#define IN_C_FR_LANG_LIST_ID             2
#define IN_C_ORG_LANG_LIST_ID            3
#define IN_C_CUS_LANG_LIST_1_ID          4
#define IN_C_CUS_LANG_LIST_2_ID          5
#define IN_C_CUS_LANG_LIST_3_ID          6


#define IN_C_NOMORE_CHANNELS             255
#define IN_C_DEF_LANG                    1


#define DBSC_MAX_INTERPRT_CHANNEL        31
#define DBSC_MAX_INTBOOTH                31
#define DBSC_MAX_DESK_PER_BOOTH          6
#define DBSC_MAX_INTSEAT                 (DBSC_MAX_INTBOOTH *
                                         DBSC_MAX_DESK_PER_BOOTH)
#define DBSC_MAX_LANGNAME                53
#define DBSC_NCHAR_LANGNAME              13
#define DBSC_NCHAR_LANGABBR              4


#define IN_C_STANDALONE                  0
#define IN_C_WITHPC                      1


#define DCNC_UNASSIGNED_UNIT             ((UNITID) 0xFFFF)
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Simultaneous Interpretation Error code	Explanation	Value (hex.)
IN_E_NOERROR	The execution of the remote function was successful.	0 (0x00)
IN_E_UNKNOWN_INTSEAT	The combination Booth and Desk was not recognized as an interpreter seat in the system.	514 (0x202)
IN_E_INTERLOCK_NOT_ALLOWED	The requested interlock mode is not allowed in the current configuration.	528 (0x210)
IN_E_INCONTROL_THIS_CHANNEL	The IN application is already controlled by this remote controller (on the same channel). Probably the IN_C_START_IN_APP is called for the second time.	529 (0x211)
IN_E_INCONTROL_OTHER_CHANNEL	The IN_C_START_IN_APP function could not finish because the IN application is already controlled by another remote controller using another channel.	530 (0x212)
IN_E_NOT_IN_CONTROL	The IN_C_STOP_IN_APP function cannot function, because this remote controller does not control the IN application.	531 (0x213)
IN_E_WRONG_PARAMETER	The value of a parameter passed in a function call is invalid (out of range).	532 (0x214)
IN_E_APP_NOT_STARTED	Indicates that no remote controller has taken over the IN application control from the CCU (and therefore the remote controller is not allowed to call the remote function).	533 (0x215)
IN_E_INCORRECT_DESK_CONFIG	Indicates that the desk configuration is incorrect, i.e. the mapping of unit identifiers to booth and desk numbers passed in the remote function does not correspond to the actual mapping inside the CCU.	534 (0x216)
IN_E_UNKNOWN_BOOTH_NR	Booth is not known in the system.	535 (0x217)

APPENDIX C. EXAMPLES

In the example below the remote functions and update notifications, that are defined in this document as constant values for the *wFnId* parameter of the message (see [SRS_INF]), are presented as functions described in a 'C' syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function it is assumed that the function will create its structure, transport the parameters to the CCU and wait for the result information coming from the CCU.

For both the remote functions and the update notifications the same names are used as their identifier, but without the constant mark "C" and using mixed case names. So, e.g. remote function IN_C_START_IN_APP shall as function be referenced as:

IN_Start_IN_App (void);

Appendix C.1 Simultaneous Interpretation Control

This example shows the minimum steps to be taken for controlling the IN application

First we have to start controlling the IN application on the CCU.

```
typedef struct
{
    BOOLEAN          bConnectChanges;
    IN_T_MICSTAT     tIntMics;
    IN_T_ACTIVECHAN  tInActiveChan;
    IN_T_CHANNELS    tAChannels;
    IN_T_CHANNELS    tBChannels;
    IN_T_CHANNELS    tInChannels;
} IN_T_CHAN_STATUS;

typedef struct
{
    BYTE              byBetweenLock;
    BYTE              byWithinLock;
    BYTE              byMaxChans;
    WORD              wVerLangList;
    IN_T_CHANNELLANG  tChanLang;
} IN_T_CCU_CONFIG;

typedef struct
{
    WORD    wAudioLangId;
    CHAR    szLangName[DBSC_NCHAR_LANGNAME];
    CHAR    szLangAbbr[DBSC_NCHAR_LANGABBR];
} IN_T_LANGLIST;

typedef struct
{
    WORD                   wVersionOfLangList;
    struct IN_T_LANGLIST   tLangList[DBSC_MAX_LANGNAME];
} IN_T_LANGUAGE_LIST;

IN_T_CHAN_STATUS     tChanStatus;
IN_T_CCU_CONFIG      tCcuConfig;
IN_T_LANGUAGE_LIST   tLanguageList;
BOOLEAN              bFlashingWhenEngaged;
BOOLEAN              bFloordistribution;
BOOLEAN              bSpeakSlowlySign;
BOOLEAN              bHelpSign;
WORD                 wNrOfInstances;
WORD                 wError;

/* wNrOfInstances will hold the nr of remote controllers connected */
wError = IN_Start_IN_App(&wNrOfInstances);
switch (wError)
{
    case IN_E_INCONTROL_THIS_CHANNEL:
        /* I have the IN app already under control */
        /* Is that correct? Has the remote controller restarted? */
        /* For the moment assume to be correct and continue */
```

```
                break;

            case IN_E_INCONTROL_OTHER_CHANNEL:
                /* Another remote controller has control over the IN application */
                /* report error and terminate */
                ........
                break;

            case IN_E_NOERROR:
                /* function ended succesfully, check wNrOfInstances /
                if (wNrOfInstances == 0)
                {
                    /* do error handling, this should be impossible /
                }
                else
                {
                    /*
                     * IN app is started by this remote controller. Note
                     * that wNrOfInstances can be larger than 1 since
                     * remote monitors may also have registered
                     * via IN_C_START_MON_IN. Continue normal operation.
                     */
                }
                break;

            default:
                /* some unexpected error occurred, report the error */
                ........
                break;
        }
```

We have now established communication with the IN application on the CCU. Since controlling has now started, we could wait for the updates to monitor the interpreter desks status updates. Therefore, we need the following functions:

```
void IN_Chan_Status(IN_T_CHAN_STATUS tNotifiedChanStatus)
{
    /* copy the values of tNotifiedChanStatus to tChanStatus */
}

void IN_Ccu_Config(IN_T_CCU_CONFIG tNotifiedCcuConfig)
{
    /* copy the values of tNotifiedCcuConfig to tCcuConfig /
}

void IN_Flashing_Mic_On(BOOLEAN bNotifiedFlashingWhenEngaged)
{
    bFlashingWhenEngaged = bNotifiedFlashingWhenEngaged;
}

void IN_Floor_Distribution(BOOLEAN bNotifiedFloordistribution)
{
    bFloordistrubution = bNotifiedFloordistribution;
}

void IN_Language_List(IN_T_LANGUAGE_LIST tNotifiedLanguageList)
{
    /* copy values of tNotifiedLanguageList to tLanguageList */
}
void IN_SpeakSlowly_Sign(BOOLEAN bNotifiedSpeakSlowlySign)
{
    bSpeakSlowlySign = bNotifiedSpeakSlowlySign;
}
void IN_Help_Sign(BOOLEAN bNotifiedHelpSign)
{
    bHelpSign = bNotifiedHelpSign;
}
```

Assume that we want a system with an interlock mode between booths IN_C_OVERRIDE and a normal engaged Led indication. We can check these settings after having received the update notifications and change them if needed. Therefore we need the following functions and control flow:

```
        if (tCcuConfig.byBetweenLock != IN_C_OVERRIDE)
        {
            IN_T_UPDATE_LCK tUpdateLck;
            tUpdateLck.wWithin = (WORD)tCcuConfig.byWithinLock;
            tUpdateLck.byBetween = IN_C_OVERRIDE;
            tUpdateLck.bEngaged = TRUE;
            WORD wError;

            wError = IN_Update_Lck(&tUpdateLck);
            if (wError != IN_E_NOERROR)
            {
                /* do error handling */
            }
            else
            {
                /* update local administration */
                tCcuConfig.byBetweenLock = IN_C_OVERRIDE;
            }
        }
```

Once the settings are known, we could wait for the updates to monitor the interpreter desks status updates, or send remote functions to influence that status.

When we no longer need to be able to send remote functions and receive update notifications we can stop the communication with the IN application using the function:

```
        wError = IN_Stop_IN_App(&wNrOfInstances);
        if (wError != IN_E_NOERROR)
        {
            /* do error handling */
        }
```

This ends remotely controlling the IN application. Note that the value of wNrOfInstances can still be larger than 0, if there still are registered remote monitors.

Voting

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the SW interface for parliamentary voting between the *DCN Next Generation* system and third party software.

1.2 Scope

This Software Requirements Specification describes the remote interface for parliamentary voting. It is meant for developers who want to use this SW interface to control the voting application, present in the *DCN Next Generation* system, remotely.

For a complete description of the Remote Interface Set-up can be referred to [SRS_INF].

The Software Requirements Specification VT Remote Interface Description is based on the functionality described in [SRS_VT].

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
DCNNG	Digital Congress Network Next Generation
NPPV	Ne Prennent pas Poart an Vote, delegate is present and does not want to take part with the current voting round.
LCD	Liquid Crystal Display
LED	Light Emitting Diode
PC	Personal Computer
remote controller	Device (e.g. PC) connected to the CCU that remotely controls one or more of the applications present in the CCU.
RFS	Remote Function Services
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the DCNNG system.
VT	Voting application
SC	System Configuration
SI	System Installation
AT	Attendance Registration

1.4 References

[SRS_INF]	General Remote Interface Description	DU010933
[SRS_SCSIINF]	SC & SI Remote Interface Description	DU010934
[SRS_ATINF]	AT Remote Interface Description	DU100902
[SRS_VT]	Software Requirement Specification Common Voting	DU040904

This document should be referenced as [SRS_VTINF].

1.5 Overview

Chapter 2 describes how the voting application in the *DCN Next Generation* system functions.

Chapter 3 and chapter 4 describes respectively, the remote functions and the update notifications which can be used to control the voting of the *DCN Next Generation*-units.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible errors that could be returned upon a remote function.

Appendix C gives some examples how to manage voting rounds remotely.

2. INTERNAL FUNCTIONING VOTING APPLICATION

The voting application present in the CCU is set up as an engine capable of handling parliamentary kind of voting's. For all voting rounds to be carried out, you can identify common aspects for each different kind of voting.

The voting application uses the common aspects to control the voting requested. Some of these common aspects are:

- Subject of the voting
- The kind of the voting (e.g. parliamentary voting with "Yes", "No" & Abstain" answers)
- General setting (e.g. voting time limit, etc.)

More details on the complete parliamentary voting application can be found in the appropriate user manuals.

2.1 Voting subject

The Voting subject is controlled by the remote function VT_C_DOWNLOAD_SUBJECT. This remote function passes the subject text along with a motion number as subject identifier to the CCU. The CCU in his turn uses the motion number to identify the subject handled.

2.2 Voting kind

The voting kind determines the kind of voting to run by the voting application. The voting kind is controlled by the remote function VT_C_SET_VOTINGPARAMS. This remote function passes the kind of the voting (e.g. "parliamentary"), the number of answer options (e.g. "3"), the answer menu settings (e.g. "Yes, Abstain, No"), etc. to the CCU. More parameters to complete the identification of the voting kind must be passed to the CCU. A complete list of parameters can be found at the remote function description in section 3.2.8.

2.3 General Voting setting

The general voting settings are mostly common for multiple voting rounds (done over different kind of voting's). These settings include settings like:

- ***Voting time limit***
  Shows how many minutes and seconds the delegates have to complete their vote.
- ***Voting LED's***
  Shows the vote done using the LED's on the delegate's unit or use one of the secret voting sequences available.
- ***First vote counts***
  Informs that the first vote entered (TRUE) or the last vote entered (FALSE) by the delegate counts.

Detailed information about all the general voting settings can be found at the description for the remote function VT_C_SET_GLOBAL_SETTINGS (section 3.2.9).

2.4 Communication settings

Not mentioned by the common aspects are the communication settings. These settings are used to control how the communication of the results should take place. The results can be sent to the remote controller using update notification (VT_C_RESULTSNOTIFY), or the results are not automatically sent to the remote controller. In the latter case the remote controller must collect the results using remote function (VT_C_GET_RESULTS).

Besides the selection of collecting the results (automatic of manual), these settings also includes the way results could be received. A selection can be made to receive the results compressed or normal. The next section explains the compressed result structure in more depth.

2.4.1 Result structure format definition

As stated in the communication settings the results could be received normally or compressed. For both communication settings the same structure is used.

```
typedef struct
{
    WORD    wVotingNumber;
    DWORD   dwNrOfPresent;
    DWORD   dwNrOfNotVoted;
    DWORD   dwNrOfVotes [VT_C_MAX_ANSWER_OPTIONS];
    WORD    wFillLevel;
    BOOLEAN bCompressed;
    BYTE    byDelegateVotes [VT_C_MAX_RESULT_DELEGATE];
} VT_T_RESULT_REC;
```

where:

wVotingNumber	The voting number as set during the VT_C_DOWNLOAD_SUBJECT remote function. The value VT_C_STANDALONE_VOTING indicates that no subject was downloaded before the start of the voting.
dwNrOfPresent	Total number of delegates which are present for the voting round. Range 0-DBSC_MAX_DELEGATE.
dwNrOfNotVoted	Total number of delegates which have not voted yet. For the record: these delegates are present for the voting. So dwNrOfNotVoted <= dwNrOfPresent.
dwNrOfVotes	Array with in each array-element the total of casted votes for that answer-option, whereby the last item in the array holds the total voting weight of the not voters. The total is calculated by taking the sum of the delegates who have casted this particular vote multiplied by their vote-weight.
wFillLevel	Highest array index available in the ‘byDelegateVotes’ array. Range 0-VT_C_MAX_RESULT_DELEGATE.
bCompressed	Inform that the ‘byDelegateVotes’ is compressed or not. Possible values are:

TRUE	The array is compressed and holds the results of two delegates in each array-element.
FALSE	The array is not compressed. One delegate-information in each array-element.

byDelegateVotes

Array containing the vote per delegate. The index is based on the DelegateId - 1. When the results are not compressed, each element contains the vote of one delegate. If the results are compressed, each element contains the vote of two delegates. The high nibble of the element contains the vote of an even DelegateId and the low nibble of the element contains the vote of an uneven DelegateId.

Note that for this array only the number of array-elements as stored in the parameter ‘wFillLevel’ is actual transmitted between the CCU and the remote controller.

Note when using compressed results, the lower nibble of the possible answer values is also taken. This means that the ‘nibble’-value 0xE means VT_C_VOTE_NOT_VOTED and ‘nibble’-value 0xF means VT_C_VOTE_UNASSIGNED.

Due to the limitation of the data-length of the structure both communication settings have their restrictions, which are:

Normal	The ‘byDelegateVotes’ holds for each element (read byte) the vote-result of one delegate. This means that the structure can hold information for VT_C_MAX_RESULT_DELEGATE delegates. When there are more delegates in the system you cannot use this way of receiving.

Compressed	The ‘byDelegateVotes’ holds for each element (read byte) the vote-result of two (2) delegates. Using the compressed way of receiving results the structure can hold 2 * VT_C_MAX_RESULT_DELEGATE delegates, which is large enough to hold all delegates. However the vote-result is now stored in the upper or lower nibble of a byte. This implies that the total number of possible answers is limited to 14 answers (2 answer values are always reserved for ‘not-present’ and ‘present-and-not-voted’). This limitation of the number of answers inhibits certain voting-kinds, which are not discussed further in this document. Note that the parliamentary type of voting only uses 3 answer-options.

As a result of both restrictions we can take the conclusion that we cannot receive the voting result of voting-kinds, which use more that 14 answer options and if the system holds more than VT_C_MAX_RESULT_DELEGATE delegates.

Delegate voting result organization

The delegate voting results are organized in a list of delegate’s, whereby the DelegateId is used as index in the list. The complete list is stored in the ‘byDelegateVotes’ array using either normal or compressed storage.

Because the DelegateId is used as index within the list, the minimum length of the list is equal to the highest DelegateId present in the downloaded delegate-database. This implies that the list may contain holes in the DelegateId-numbering. For each not used DelegateId in of the delegate-database, the voting result is set to VT_C_VOTE_UNASSIGNED.

Example: The downloaded delegate-database consists of the DelegateId’s 1, 2, 3 and 8. This implies that the highest DelegateId’s is equal to 8 and therefore the list gets the length of 8 delegates. For each DelegateId not in the delegate-database (DelegateId’s 4-7) the voting result is set to VT_C_VOTE_UNASSIGNED. The other used DelegateId’s can get the following values (for Parliamentary Voting type with 3 answers):

VT_C_VOTE_NOT_VOTED	The delegate is present, but has not casted a vote (yet).
VT_C_VOTE_YES	The delegate is present and has casted the ‘Yes’ vote.
VT_C_VOTE_NO	The delegate is present and has casted the ‘No’ vote.
VT_C_VOTE_ABSTAIN	The delegate is present and has casted the ‘Abstain’ vote.
VT_C_VOTE_NPPV	The delegate is present and has chosen the ‘NPPV’ vote.

Note that for the result values only the lower nibble is used when the voting result is stored in the ‘byDelegateVotes’ array using the compressed storage form.

2.5 Default settings voting application

As mentioned in the sections above, setting of the voting application can be changed using remote functions. But after successfully executing the VT_C_START_APP remote function, the remote controller could directly start a voting round without first setting the subject and/or voting parameters (global and voting kind).

In this particular case the voting is started with the settings as present during the standalone operation of the voting application. During power-on of the *DCN Next Generation*-system all settings will get their default values. When a remote controller already had called remote voting functions, some setting still have their last values as set by that remote controller (see also §2.5.1). The default (power-on) values for the remote functions are:

Voting subject: The voting number is set to zero and the subject text and legend texts are set to empty strings. In C-source lines:

```
wVotingNumber = VT_C_STANDALONE_VOTING;
szVotingSubject = "";
szLegendSubject = "";
```

This means that there is no subject text available on the unit LCD’s. More information about the parameters can be found in section 3.2.7.

Voting parameters: The voting parameters consist of various parameters which have the following default values:

```
wVotingMenu = VT_C_MENU_YES_NO_ABSTAIN;
wNrOfAnswerOptions = 3;
```

```
bOpenVoting = FALSE;
wInterimResultType = VT_C_INT_RES_NONE;
```

More information about the parameters can be found in section 3.2.8.

General voting settings

The general voting settings consists of many parameters which have the following default values:

```
wVotingLedMode = VT_C_LED_SHOWVOTE;
wPresentVotes = VT_C_100_PRESENT_KEY;
bShowVoteTimer = FALSE;
wVoteTimerLimit = 0;
bReserved1 = FALSE;
bAutoAbstain = FALSE;
bReserved2 = TRUE;
bVoteWeightingOn = FALSE;
bReserved3 = FALSE;
bFirstVoteCount = FALSE;
```

More information about the parameters can be found in section 3.2.9.

2.5.1 Standalone settings

During startup of the *DCN Next Generation*-system (power-on) the voting settings are set to their initial values as described in §2.5.

However, when the *DCN Next Generation*-system was controller by a Remote Controller, and new settings were enabled. After stopping the voting application (Call to function VT_C_STOP_APP) some voting settings remain active during the standalone period. These settings are:

Parameters	Value
VT_C_SET_GLOBAL_SETTING remote function	
wVotingLedMode	This setting remains unchanged.
wPresentVotes	In case VT_C_100_AUTHORISED_VOTES was selected, the value of ‘wPresentVotes’ will change to VT_C_100_VALID_VOTES. For the others of ‘wPresentVotes’, the settings remains unchanged.
bFirstVoteCounts	This setting remains unchanged.

All other settings will return to their default values as described in §2.5.

The settings remain valid until either the power is turn off, or a remote controller is started, which changes the settings.

2.6 Allowed settings without delegate-database present

The standard use of the voting application will be in combination with a downloaded delegate-database.

However, it is possible to start a voting round without a downloaded delegate-database. In this case the parameter value ranges are limited, because some settings require the presence of a delegate-database.

In the table below an overview is given of the parameters with reduced setting due to the absence of the delegate-database. The table shows the parameters of the remote functions VT_C_SET_VOTINGPARAMS and VT_C_SET_GLOBAL_SETTINGS. When a parameter is not present in the table, the value range, as described with the remote function, remains valid.

Parameters	Value
VT_C_SET_VOTINGPARAMS remote function	
bOpenVoting	Only a closed voting is valid, therefore FALSE
wInterimResultType	VT_C_INT_RES_NONE VT_C_INT_RES_TOTAL VT_C_INT_RES_TOTAL_PC_ONLY
VT_C_SET_GLOBAL_SETTING remote function	

wPresentVotes	VT_C_100_PRESENT_KEY VT_C_100_VALID_VOTES VT_C_100_PRESENT_KEY_AND_FRAUD VT_C_100_EXTERNAL_PRESENT
bVoteWeightingOn	FALSE

Note that when no delegate-database is present in the *DCN Next Generation*-system and other parameter settings are used, the remote function returns with the error-code VT_E_NO_NAMESFILE.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the various remote functions available to handle the voting application. A global description of the remote function handling is described in [SRS_INF].

[SRS_INF] also gives a description about the type used within this document.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here.
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the 'wError' field of the received response information equals VT_E_NOERROR.
- **Error codes returned**
  The error values returned in the 'wError' field of the received response information. All possible error codes are described in appendix 0.
- **Update notifications**
  The update notifications which are generated after the execution of the remote function. When there are no notifications generated, then this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications.

3.2 Voting functions

3.2.1 VT_C_START_APP

Purpose
Indicate the CCU that the remote controller wants to communicate with the VT application inside the CCU. After receiving this function the CCU gives the control for VT to the remote controller.

When you omit the execution of this remote function, all other remote functions will have no effect and will return an error (VT_E_APP_NOT_STARTED).

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BOOLEAN      bResultNotify;
    BOOLEAN      bReserved;
    WORD         wViewTimeAfterStop;
} VT_T_COMCONTROL;
```

where:

bResultNotify	Informs the voting application to send update notifications for the interim results processed. The following settings are valid:	
	TRUE	When Update notifications are created, they will be sent to the remote controller using update notifications.
	FALSE	No update notifications are sent to the remote controller. The remote controller can however

	collect the result using remote functions.
bReserved	Must be FALSE
wViewTimeAfterStop	The time in seconds that the “End of voting” text remains on the display of the delegate units. After this time the current main menu (e.g. Microphone menu) becomes active again. The value-range is 0-200 seconds.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_INCONTROL_OTHER_CHANNEL
VT_E_INCONTROL_THIS_CHANNEL

Related functions
VT_C_STOP_APP

3.2.2 VT_C_STOP_APP

Purpose
Indicate the CCU that the remote controller no longer requires to communicate with the VT application inside the CCU. After receiving this function the CCU takes over the control for VT.

If a voting is running, the CCU will stop the voting.

All Settings for the voting-kind, the global settings and subject settings are reset to their default values as described in section 2.5.

Note that: Upon communication lost this function will be activated, if VT_C_START_APP was activated.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_NOT_IN_CONTROL

Related functions
VT_C_START_APP

3.2.3 VT_C_START_VOTING

Purpose
This function starts the voting. The parameters for the voting must be set using the setting functions (VT_C_DOWNLOAD_SUBJECT, VT_C_SET_VOTINGPARAMS and VT_C_SET_GLOBAL_SETTINGS). When one or more of these remote functions are not called, the previous or default values will be used.

As a result of starting the voting the update notification will be sent to the remote controller. As long as the VT_C_STOP_VOTING remote function is not called, the CCU will send update notifications to the remote controller if the “bResultNotify” parameter of VT_T_COMCONTROL structure of the VT_C_START_APP was set to TRUE.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_RUNNING
VT_E_APP_NOT_STARTED

Update notifications
VT_C_RESULTSNOTIFY

Related functions
VT_C_STOP_VOTING
VT_C_HOLD_VOTING
VT_C_RESTART_VOTING

3.2.4 VT_C_STOP_VOTING

Purpose
This function stops the running voting round.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BOOLEAN     bShowResults;
} VT_T_SHOW_RESULTS;
```

where:

bShowResults	Indicate if the voting results will be displayed on the unit LCD's. This is only functioning, if the results are sent to the remote controller only (see remote function VT_C_SET_VOTINGPARAMS for details). Possible values are:	
	TRUE	The total-result will be sent to all units LCD's.
	FALSE	The unit LCD's only reports the sentence "End of voting".

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_NOT_RUNNING
VT_E_APP_NOT_STARTED

Related functions
VT_C_START_VOTING
VT_C_HOLD_VOTING
VT_C_RESTART_VOTING

3.2.5 VT_C_HOLD_VOTING

Purpose
This function allows the remote controller to hold a running vote round.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_NOT_RUNNING
VT_E_APP_NOT_STARTED

Related functions
VT_C_START_VOTING
VT_C_STOP_VOTING
VT_C_RESTART_VOTING

3.2.6 VT_C_RESTART_VOTING

Purpose
This function allows the remote controller to restart a voting round.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_NOT_ON_HOLD
VT_E_APP_NOT_STARTED

Update notifications
VT_C_RESULTSNOTIFY

Related functions
VT_C_START_VOTING
VT_C_STOP_VOTING
VT_C_HOLD_VOTING

3.2.7 VT_C_DOWNLOAD_SUBJECT

Purpose
This function allows the remote controller to transmit a subject to the CCU while no voting round is running.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wVotingNumber;
    CHAR    szVotingSubject[VT_C_MAX_LEN_SUBJECT];
    CHAR    szLegendSubject[VT_C_MAX_LEN_LEGEND];
} VT_T_SUBJECT_REC;
```

where:

wVotingNumber	The number of the voting which will be started. This number will be used as reference during the update notifications. The value-range is 1-9999. The value VT_C_STANDALONE_VOTING is reserved by the initial state on the CCU (no subject download received).
szVotingSubject []	Subject of the voting, which will be displayed on the unit LCD's. The subject will internally be divided into 4 lines. Each line consists of DBSC_NCHAR_SCREENLINE characters. It is the responsibility of the remote controller that each line is extended with spaces till DBSC_NCHAR_SCREENLINE characters per line.
szLegendSubject []	'Voting number' Legend. This text is put before the voting-number on the units LCD's. The purpose of this legend is to clarify the meaning of the voting number (e.g. "Motion:" or "Vote Nr:").

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_RUNNING
VT_E_APP_NOT_STARTED

3.2.8 VT_C_SET_VOTINGPARAMS

Purpose
This function allows the remote controller to set the kind of voting on the CCU for the next voting to be run. These settings can only be sent to the CCU when no voting is running.

parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD     wVotingMenu;
    WORD     wNrOfAnswerOptions;
    BOOLEAN  bOpenVoting;
    WORD     wInterimResultType;
    BOOLEAN  bCompressedResults;
} VT_T_VOTINGPARAMS;
```

where:

wVotingMenu Identify which voting menu is displayed on the unit LCD's and LED's. The setting is one of the following:

- VT_C_MENU_YES_NO
- VT_C_MENU_YES_NO_ABSTAIN
- VT_C_MENU_FOR_AGAINST
- VT_C_MENU_AUDIENCE_RESPONSE
- VT_C_MENU_123
- VT_C_MENU_ABC
- VT_C_MENU_CBA
- VT_C_MENU_YES_NO_ABSTAIN_NPPV

wNrOfAnswerOptions This parameter is coupled to wVotingMenu and identifies how many answer options are available for the chosen voting menu.

The following table gives an overview of the valid range of answer options:

Menu	**# answers / range**
VT_C_MENU_YES_NO	2
VT_C_MENU_YES_NO_ABSTAIN	3
VT_C_FOR_AGAINST	2
VT_C_AUDIENCE_RESPONSE	5
VT_C_MENU_123	1-24
VT_C_MENU_ABC	1-24
VT_C_MENU_CBA	1-24
VT_C_MENU_YES_NO_ABSTAIN_NPPV	4

bOpenVoting Identify if individual results are available during the vote round. Possible settings are:

TRUE Open voting
Individual result can be collected by the remote controller. All values of the parameter '*wInterimResultType*' are valid.

FALSE Closed voting
No individual results are available. This implies that

	the individual values of the parameter '*wInterimResultType*' are invalid.
wInterimResultType	Identify if results will be sent during the vote round and how. If interim results are available then they will be sent regularly if the 'bResultNotify' parameter of the VT_C_START_APP remote function is set to TRUE. The setting is one of the following: • VT_C_INT_RES_NONE • VT_C_INT_RES_TOTAL • VT_C_INT_RES_INDIV • VT_C_INT_RES_TOTAL_PC_ONLY • VT_C_INT_RES_INDIV_PC_ONLY See table below for explanation about setting values.
bCompressedResults	Identify if results will be sent in compressed form as described in section 2.4.1. Possible settings are: TRUE The voting results will be sent in compressed format. FALSE The voting result will be sent in normal format.

How results are displayed on the unit LCD's and when they are automatically sent to the remote controller are described in the following table:

wInterimResultType	Description
VT_C_INT_RES_NONE	Results are only available when the vote round is stopped or on hold. So when the vote round is running no interim results are shown on the unit LCD's. Also the remote controller can only collect the results when the voting is stopped or on hold.
VT_C_INT_RES_TOTAL	Only total results are available. These results will be shown on the unit LCD's during the complete vote round. The total results can be collected by the remote controller.
VT_C_INT_RES_INDIV	Individual and total results are available and the totals will be shown on the unit LCD's. The results can be collected by the remote controller This setting is only valid during an open voting.
VT_C_INT_RES_TOTAL_PC_ONLY	Total results are available, but can only be collected by the remote controller. The unit LCD's will not show any results.
VT_C_INT_RES_INDIV_PC_ONLY	Individual and total results are available, but can only be collected by the remote controller. The unit LCD's will not show any results. This setting is only valid during an open voting.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_RUNNING
VT_E_NO_NAMESFILE
VT_E_WRONG_PARAMETER
VT_E_APP_NOT_STARTED

Related functions
VT_C_START_VOTING

3.2.9 VT_C_SET_GLOBAL_SETTINGS

Purpose

This function allows the remote controller to set the global voting settings on the CCU. No voting may be running during the call to this function.

Parameter structure for the function

The function requires the following structure as parameter:

```
typedef struct
{
    WORD         wVotingLedMode;
    WORD         wPresentVotes;
    BOOLEAN      bShowVoteTimer;
    WORD         wVoteTimerLimit;
    BOOLEAN      bReserved1;            // must be set to FALSE
    BOOLEAN      bAutoAbstain;
    BOOLEAN      bReserved2;            // must be set to TRUE
    BOOLEAN      bVoteWeightingOn;
    BOOLEAN      bReserved3;            // must be set to FALSE
    BOOLEAN      bFirstVoteCount;
} VT_T_GLOBAL_SETTINGS;
```

where:

wVotingLedMode — This setting is an indication whether soft LED's on the delegate units will Remain on after casting a vote. Valid values are:

- VT_C_LED_SHOWVOTE
- VT_C_LED_SECRET_ON_OFF
- VT_C_LED_SECRET_FLASH_ON

See the table below for explanation about the setting values

wPresentVotes — This setting tells how to determine the number of participants in a voting. The setting is one of the following:

- VT_C_100_PRESENT_KEY
- VT_C_100_VALID_VOTES
- VT_C_100_AUTHORISED_VOTES
- VT_C_100_PRESENT_KEY_AND_FRAUD
- VT_C_100_EXTERNAL_PRESENT

See the table below for explanation about setting values.

bShowVoteTimer — Identify if a timer is used during the vote round. Valid values are:

TRUE	The vote timer must be displayed on each unit LCD and shall count down to zero.
FALSE	No voting timer is shown.

wVoteTimerLimit — The vote time limit. On all displays, the remaining time will be displayed. If the timer reaches 0, it's the responsibility of the remote controller to stop/hold the vote round. The range of the voting time is 0-3600 seconds

bReversed1 — Must be set to FALSE.

bAutoAbstain — Identify if the initial vote of all participating delegates automatically will change from 'Not Voted' to 'Abstain' for a Parliamentary voting with 3 answer options (No, Abstain, Yes). For all other voting kinds this flag will be ignored. Valid values are:

TRUE	The initial vote is automatically set to abstain.
FALSE	The initial vote is set to not-voted.

bReserved2 — Must be TRUE

bVoteWeightingOn — If this setting is on the votes will be weighted. Only the answer option will be weighted. The numbers of 'Present' and 'Not

	Voted' delegates are absolute. Valid values are:	
	TRUE	The voting is weighted. Each delegate uses its vote-weight as set in the downloaded names-file (see [SRS_SCSIINF]).
	FALSE	The voting is not weighted. Each delegate has the weight of 1 (one).
bReserved3	Must be set to FALSE.	
bFirstVoteCount	If this setting is set to TRUE, delegates do not have the opportunity to change their vote when they have already cast a vote for the current vote round. Note that a TRUE value of the parameter disables the value of the parameter bAutoAbstain. bAutoAbstain is then always considered to be FALSE.	

In the following table is described how the led-option operates:

wVotingLedMode	Description
VT_C_LED_SHOWVOTE	The LED's next to the softkeys represents the last casted vote done.
VT_C_LED_SECRET_ON_OFF	When a delegate casts his vote, all soft LED's will be on for about 1 second and then they will be turned off.
VT_C_LED_SECRET_FLASH_ON	When a delegate casts his vote, all soft LED's will be flashing for about 2 seconds and then they will be turned on.

In the following table is described how the number of 'Present' and 'Not Voted' delegates is determined:

wPresentVotes	Description
VT_C_100_PRESENT_KEY	**No database present:** Every unit is prompted for present **Database is present:** All delegates who have voting authorization and a unit are asked to press the present key (softkey 1) before they can vote. The number of present delegates is equal to the delegates who have pressed the present key. When a delegate has pressed his present key, the number of 'Not Voted' delegates will be increased with 1. When a delegate cast a vote, the number of 'Not Voted' will be decreased with 1.
VT_C_100_VALID_VOTES	The number of 'Present' delegates is equal to the number of delegates who have casted a vote. The number of 'Not Voted' delegates is always equal to 0.
VT_C_100_AUTHORISED_VOTES	The number of 'Present' delegates is equal to the number of delegates who have voting authorization. The number of 'Not Voted' delegates is equal to the number of 'Present ' delegates as long as nobody casts a vote. When a delegate's functionality for voting is not authorized he will not be counted for the vote round.
VT_C_100_PRESENT_KEY_AND_FRAUD	All delegates have to press both the present key and the fraud switch at the same time before actually casting a vote.

	Only delegates that pressed both keys will count.
VT_C_100_EXTERNAL_PRESENT	All delegates have to activate the external present contact before actually casting a vote. Only delegates that activated the external present contact will count.

Note that this functionality of 'wPresentVotes' depends on the use of the delegate database, the external contact and/or the attendance application, see [SRS_SCSIINF] and [SRS_ATINF] for more information.
Note: If the Attendance application is started, but nothing is activated, all delegates have voting authorization.

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_VOTE_RUNNING
VT_E_NO_NAMESFILE
VT_E_WRONG_PARAMETER
VT_E_APP_NOT_STARTED

3.2.10 VT_C_GET_RESULTS

Purpose
This function allows the remote controller to retrieve the voting results during a vote round.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the structure VT_T_RESULT_REC. This structure is defined in section 2.4.1.

Error codes returned
VT_E_NOERROR
VT_E_NO_RESULTS
VT_E_APP_NOT_STARTED

Related functions
VT_C_START_VOTING
VT_C_STOP_VOTING

3.2.11 VT_C_GET_ATTENTION_TONE

Purpose
This function allows the remote controller to retrieve the current configuration of the voting attention tone.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
BYTE    byAttentionTone;
```

where:

byAttentionTone	Configured voting attention tone, which can be one of the following values: • VT_C_ATTENTION_TONE_OFF • VT_C_ATTENTION_TONE_1 • VT_C_ATTENTION_TONE_2 • VT_C_ATTENTION_TONE_3

Error codes returned
VT_E_NOERROR
VT_E_APP_NOT_STARTED

Related functions
VT_C_SET_ATTENTION_TONE
VT_C_START_ATTENTION_TONE

3.2.12 VT_C_SET_ATTENTION_TONE

Purpose
This function allows the remote controller to set the configuration of the voting attention tone.

Parameter structure for the function
The function requires the following structure as parameter:

```
BYTE  byAttentionTone;
```

where:

byAttentionTone	New value of the voting attention tone configuration, which can be one of the following values: • VT_C_ATTENTION_TONE_OFF • VT_C_ATTENTION_TONE_1 • VT_C_ATTENTION_TONE_2 • VT_C_ATTENTION_TONE_3

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_WRONG_PARAMETER
VT_E_APP_NOT_STARTED

Related functions
VT_C_GET_ATTENTION_TONE
VT_C_START_ATTENTION_TONE

3.2.13 VT_C_START_ATTENTION_TONE

Purpose
This function allows the remote controller to start the voting attention tone. The chime configured with VT_C_SET_ATTENTION_TONE will be played.

Parameter structure for the function
The function has no additional parameters:

Response structure from the function
The function has no response parameters.

Error codes returned
VT_E_NOERROR
VT_E_APP_NOT_STARTED

Related functions
VT_C_GET_ATTENTION_TONE
VT_C_SET_ATTENTION_TONE

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications send by the CCU. All the update notifications of the VT application are listed in this chapter. A global description of notifications is described in [SRS_INF].

4.1.1 Notification item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.
- **Related functions**
  The related function in conjunction with the notification described.

4.1.2 Unit/User Event relations

The voting application controls on the CCU a voting round and passes the results back to the units, the hall-display and to the remote controller (depending on the different settings made).

This section gives information about the events coming from the units and the processing done for the events. In the table below an overview is made about the events and the actions performed.

Event	Action performed
Cast a vote Delegate/Chairman	The cast is stored in the voting application and the marker “votes_changed” is set.
1 second timer tick passed	The marker “votes_changed” is checked. When set the update notification VT_C_RESULTSNOTIFY is sent to the remote controller. Finally the marker is reset.

4.2 Voting notifications

4.2.1 VT_C_RESULTSNOTIFY

Purpose

Notify the remote controller with the total and individual results of the delegates who participate in the current running voting. These results will be sent every 2 seconds by the *DCN Next Generation* system if changes have been detected. Further it depends on parameters in the VT_C_START_APP and VT_C_SET_VOTINGPARAMS functions. In the following table is described under which circumstances this notification is sent:

Parameters	Value
VT_C_START_APP remote function	
bResultNotify	TRUE
VT_C_SET_VOTINGPARAMS remote function	
wInterimResultType	VT_C_INT_RES_TOTAL, VT_C_INT_RES_INDIV, VT_C_INT_RES_TOTAL_PC_ONLY or VT_C_INT_RES_INDIV_PC_ONLY

Note that of the ‘wInterimResultType’ setting the individual settings are only possible if also open-voting is selected. When open-voting equals false, then only the totals will be sent to the Remote Controller.

Note also that if ‘bResultNotify’ is set to TRUE this notification is sent to the Remote Controller after a hold or stop of the voting round.

Notify structure with this update
The update comes with the structure VT_T_RESULT_REC. The structure is defined in section 2.4.1
Note that only the totals are sent to the remote controller. This ‘wFillLevel’ parameter of the structure (which holds the number of individual delegate information present in the ‘byDelegateVotes’ array) holds the value zero, indicating that no individual results are present.

Related functions
VT_C_START_VOTING
VT_C_RESTART_VOTING

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in 'C'-syntax

```
#define MKWORD(lb,hb)            ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_VT              1


#define VT_C_START_APP                    ( MKWORD ( 1, DCNC_APP_VT) )
#define VT_C_STOP_APP                     ( MKWORD ( 2, DCNC_APP_VT) )
#define VT_C_START_VOTING                 ( MKWORD ( 3, DCNC_APP_VT) )
#define VT_C_STOP_VOTING                  ( MKWORD ( 4, DCNC_APP_VT) )
#define VT_C_HOLD_VOTING                  ( MKWORD ( 5, DCNC_APP_VT) )
#define VT_C_RESTART_VOTING               ( MKWORD ( 6, DCNC_APP_VT) )
#define VT_C_DOWNLOAD_SUBJECT             ( MKWORD ( 7, DCNC_APP_VT) )
#define VT_C_SET_GLOBAL_SETTINGS          ( MKWORD ( 9, DCNC_APP_VT) )
#define VT_C_SET_VOTINGPARAMS             ( MKWORD (10, DCNC_APP_VT) )
#define VT_C_GET_RESULTS                  ( MKWORD (12, DCNC_APP_VT) )
#define VT_C_GET_ATTENTION_TONE           ( MKWORD (24, DCNC_APP_VT) )
#define VT_C_SET_ATTENTION_TONE           ( MKWORD (25, DCNC_APP_VT) )
#define VT_C_START_ATTENTION_TONE         ( MKWORD (26, DCNC_APP_VT) )


#define VT_C_RESULTSNOTIFY                ( MKWORD (23, DCNC_APP_VT) )


#define VT_C_MAX_LEN_SUBJECT              142
#define VT_C_MAX_LEN_LEGEND               11
#define VT_C_MAX_ANSWER_OPTIONS           25
#define VT_C_MAX_RESULT_DELEGATE          2000


#define VT_C_VOTE_YES                     0x00
#define VT_C_VOTE_NO                      0x01
#define VT_C_VOTE_ABSTAIN                 0x02
@define VT_C_VOTE_NPPV                    0x03
#define VT_C_VOTE_FOR                     0x00
#define VT_C_VOTE_AGAINST                 0x01
#define VT_C_VOTE_DOUBLE_MINUS            0x00
#define VT_C_VOTE_MINUS                   0x01
#define VT_C_VOTE_NULL                    0x02
#define VT_C_VOTE_PLUS                    0x03
#define VT_C_VOTE_DOUBLE_PLUS             0x04
#define VT_C_VOTE_A                       0x00
#define VT_C_VOTE_1                       0x00
#define VT_C_VOTE_NOT_VOTED               0xFE
#define VT_C_VOTE_UNASSIGNED              0xFF


#define VT_C_LED_SHOWVOTE                 0
#define VT_C_LED_SECRET_ON_OFF            1
#define VT_C_LED_SECRET_FLASH_ON          2


#define VT_C_100_PRESENT_KEY              1
#define VT_C_100_VALID_VOTES              2
#define VT_C_100_AUTHORISED_VOTES         3
#define VT_C_100_PRESENT_KEY_AND_FRAUD    4
#define VT_C_100_EXTERNAL_PRESENT         5


#define VT_C_INT_RES_NONE                 0
#define VT_C_INT_RES_TOTAL                1
#define VT_C_INT_RES_INDIV                2
#define VT_C_INT_RES_TOTAL_PC_ONLY        3
#define VT_C_INT_RES_INDIV_PC_ONLY        4


#define VT_C_MENU_YES_NO                  1
#define VT_C_MENU_YES_NO_ABSTAIN          2
#define VT_C_MENU_FOR_AGAINST             3
#define VT_C_MENU_AUDIENCE_RESPONSE       4
#define VT_C_MENU_123                     5
#define VT_C_MENU_ABC                     6
```

```
#define VT_C_MENU_CBA                   7
#define VT_C_MENU_YES_NO_ABSTAIN_NPPV   8


#define VT_C_STANDALONE_VOTING          0


#define VT_C_ATTENTION_TONE_OFF         0
#define VT_C_ATTENTION_TONE_1           1
#define VT_C_ATTENTION_TONE_2           2
#define VT_C_ATTENTION_TONE_3           3


#define DBSC_NCHAR_SCREENLINE           33
#define DBSC_MAX_DELEGATE               4000
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Voting Error code Explanation	Value
VT_E_NOERROR The execution of the remote function was successful.	0
VT_E_VOTE_RUNNING Indication that a vote round is running on this moment.	276
VT_E_VOTE_NOT_RUNNING No vote round running on this moment.	277
VT_E_VOTE_NOT_ON_HOLD No vote round on hold on this moment.	278
VT_E_APP_NOT_STARTED Indicate that no remote controller has taken over the voting control from the CCU.	286
VT_E_WRONG_PARAMETER Settings or a combination of settings is not correct.	287
VT_E_INCONTROL_OTHER_CHANNEL The VT_C_START_APP function could not finish because the voting application is already controlled by another remote controller using another channel.	288
VT_E_INCONTROL_THIS_CHANNEL The voting application is already controlled by this remote controller (on the same channel). Probably you have called the VT_C_START_APP function twice.	289
VT_E_NOT_IN_CONTROL The VT_C_STOP_APP function cannot function, because this remote controller has no control for the voting application.	290
VT_E_NO_RESULTS The collection of results using the remote function VT_C_GET_RESULTS failed. This can happen if never a vote-round was started or the interim-result-setting was set to VT_C_INT_RES_NONE.	291
VT_E_NO_NAMESFILE The combination of settings passed to the remote function requires that a delegate-database is downloaded into the CCU. Refer to §2.6 for the possible settings when no delegate-database is present.	292

APPENDIX C. EXAMPLES

In the examples below the remote functions are seen as functions, which can be called. The parameters passed to the function form the input parameter structure. When a function returns information, the parameter list is finished with a structure parameter to store the information into.

For every function is assumed that the function will create his structure, transport the parameters to the CCU and waits for the result information coming from the CCU.

For update notifications is assumed that the examples create a (update) function that will be called whenever the CCU has sent the notification.

For both the remote functions as the update notifications the same names are used as their identifier, but without the constant mark "C", some "_" and using mixed case names.

For example remote function VT_C_RESTART_VOTING shall be referenced as function as:

VT_RestartVoting ();

Appendix C.1 Running a vote round without update notifications

In this example we consider to have prepared a voting script holding multiple parliamentary voting motions. Each motion is of the same kind with the following settings:

- Parliamentary with answer options "Yes", "Abstain" and "No"
- The results will be collected using remote functions (initial we do not use the update notifications) using compressed results.
- The first vote casted counts
- No voting timer will be used
- The Attendance application inside the CCU must decide which delegate may cast his vote[1]. This means that only authorized delegates may vote.
- The casted vote may not be visible by means of the soft-LED's. After a vote the LED's must flash for several seconds and all LED's must be turned on.

For the simplicity of this example we assume that there is no chairman unit present in the congress hall (or if present, it will not be used to start or stop the voting). That is all controlling of the voting will be done by the remote controller.

Declaration of parameters

For the C-example code we need parameters. In this part we declare the parameters used.

```
WORD  wError;
```

Connecting to the voting application

First the remote controller must get the control of the VT application. Because we do not use the update notifications, we directly can reduce the number of updates by turning off the automatic result updates coming from the voting application. The time for showing the text "End of voting" after the stop of a voting round will be set to 20 seconds. This results in the following function call:

```
WORDwError;
VT_T_COMCONTROL  tComControl;

tComControl.bResultNotify      = FALSE;
tComControl.bReserved          = FALSE;      /* must be FALSE */
tComControl.wViewTimeAfterStop = 20;

wError = VT_StartApp (&tComControl);
switch (wError)  /* Check the possible errors */
{
    case VT_E_INCONTROL_THIS_CHANNEL:
    /* I have the voting app already under control */
    /* Is that correct? Is the remote controller restarted? */
    /* For the moment assume to be correct and continue */
```

[1] Note that the interface to enable the attendance application is <u>not</u> described in this document. For information about the attendance application and the use of the attendance interface see [SRS_ATINF].

```
        break;

        case VT_E_INCONTROL_OTHER_CHANNEL:
        /* Another remote controller has control over the voting application */
        /* report error and terminate */
        .........
        break;

        case VT_E_NOERROR:
        /* function ended succesful, continue */
        break;

        default:
        /* some unexpected error occurred. */
        /* report the error */
        .........
        break;
    }
```

We have now established communication with the voting application on the CCU and can start with the preparation of the voting session.

Preparing the voting

For the preparation of the voting we must set the global settings, the voting parameters and the subject of the first voting round to be started.
The setting of the global parameters is done in the code below:

```
    VT_T_GLOBAL_SETTINGS tGlobalSettings;

    tGlobalSettings.wVotingLedMode    = VT_C_LED_SECRET_FLASH_ON;
    tGlobalSettings.wPresentVotes     = VT_C_100_AUTHORISED_VOTES;     /* AT decides
    who */
    tGlobalSettings.bShowVoteTimer    = FALSE;    /* we do not use the vote timer */
    tGlobalSettings.wVoteTimerLimit   = 0;
    tGlobalSettings.bReserved1        = FALSE;    /* Must be FALSE */
    tGlobalSettings.bAutoAbstain      = FALSE;    /* We are using firstVoteCounts, so
    false */
    tGlobalSettings.bReserved2        = TRUE;     /* Must be TRUE */
    tGlobalSettings.bVoteWeightingOn  = FALSE;    /* Everyone has the weight 1 */
    tGlobalSettings.bReserved3        = FALSE;    /* Must be FALSE */
    tGlobalSettings.bFirstVoteCount   = TRUE;     /* the first cast of a delegate
    counts */

    wError = VT_SetGlobalSettings (&tGlobalSettings);
    if (wError != VT_E_NOERROR)
    {
        /* do error handling */
    }
```

The second part of the preparation is setting the voting kind as used during all the vote rounds.

```
    VT_T_VOTINGPARAMS    tVotingControl;
    WORD                 wIndex;

    tVotingControl.wVotingMenu        = VT_C_MENU_YES_NO_ABSTAIN;
    tVotingControl.wNrOfAnswerOptions = 3;        /* Yes, No and Abstain */
    tVotingControl.bOpenVoting        = TRUE;     /* Individual results */
            /* Only send the results to the remote controller */
    tVotingControl.wInterimResultType = VT_C_INT_RES_INDIV_PC_ONLY;
    tVotingControl.bCompressedResults = TRUE;     /* results must be compressed */

    wError = VT_SetVotingParams (&tVotingParams);
    if (wError != VT_E_NOERROR)
    {
        /* do error handling */
    }
```

These two calls finish the preparation for the voting session. We can now start each vote round till the session is completed.

Running each vote round

For running the vote round we expect an external function present which collects the subject text for the next voting. This external function returns TRUE if a new subject has been found and returns FALSE when no more subjects are present. As subject legend we will use the fixed text “Voting”.

For controlling the time mechanism and the interaction with the operator we use another two external functions. The first function returns TRUE when a second has passed and the second function returns TRUE when the operator has decided to stop the vote-round.

Another external function is assumed to store the voting result. This function accepts the voting results as used for collecting the results from the CCU.

The function declarations are:

```
    extern BOOLEAN MyFunction_GetSubject (WORD *wVotingNumber, CHAR *szSubject);
    extern BOOLEAN MyFunction_SecondTick (void);
    extern BOOLEAN MyFunction_OkToStopVoting (void);
    extern void MyFunction_StoreResults (VT_T_RESULT_REC *tResults);
```

Because we are going to run multiple voting rounds, we must set up a looping mechanism:

```
    VT_T_SUBJECT_REC     tSubject;
    VT_T_RESULT_REC      tResults;

        /* start the loop to run all voting rounds */
    while (MyFunction_GetSubject (tSubject.wVotingNumber, tSubject.szVotingSubject))
    {
```

We have now received the voting number and the voting subject. All we have to do is extend the structure with the legend and pass the information to the CCU.

```
        strcpy (tSubject.szLegendSubject, "Voting");

        wError = VT_DownloadSubject (&tSubject);
        If (wError != VT_E_NOERROR)
        {
            /* do error handling */
        }
```

The subject is downloaded to the CCU. The CCU is now ready to start this voting round.
Let's start the voting.

```
        wError = VT_StartVoting ();       /* no parameters */
        If (wError != VT_E_NOERROR)
        {
            /* do error handling */
        }
```

The voting round is running.
During the run of the vote round the program must wait for the operator to stop the voting. In the mean time we collect the voting results from the CCU and store them.

```
        while ( ! MyFunction_OkToStopVoting ())
        {
            if (MyFunction_SecondTick ())
            {
                    /* collect the interim results */
                wError = VT_GetResults (&tResults);
                If (wError != VT_E_NOERROR)
                {
                    /* do error handling */
                }
                    /* store the results */
                MyFunction_StoreResults (&tResults);
            }
        }
```

Note that after the collection of the results the voting-number present in the result-structure should be the same as set during the download of the subject.

The vote round should be finished by stopping the VT application on the CCU. We do not allow that the results are shown on the units LCD's, so no show-results.

```
        wError = VT_StopVoting (FALSE);          /* no parameters */
        If (wError != VT_E_NOERROR)
        {
            /* do error handling */
        }
```

After successful completion the final results are ready on the CCU to be collected. Note that the CCU sends an update notification with the final results (if activated). But in this example we have stated that we do not use the update notifications. Therefore we collect the final result using the remote function.

```
        wError = VT_GetResults (&tResults);
        If (wError != VT_E_NOERROR)
        {
            /* do error handling */
        }
            /* store the results */
        MyFunction_StoreResults (&tResults);
```

This completes the vote rounds, so we can start the next vote round to complete the voting session.

```
        /* terminating the loop for each voting round */
    }
```

Terminating the voting applications

After done all vote rounds we can stop the communication with the voting application using the function:

```
    wError = VT_StopApp ();         /* no parameters */
    If (wError != VT_E_NOERROR)
    {
        /* do error handling */
    }
```

Text Status Display

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for Text & Status Display between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the current state of the remote interface for Text & Status Display. It is meant to give an overview of the possibilities the remote interface offers to control the Text & Status Display application, present in the CCU, remotely. The Interface can be used to build a Text & Status Display User interface.

The Software Requirements Specification LD Remote Interface Description is based on the functionality described in [SRS_LD].

For a complete description of the Remote Interface Set-up can be referred to [SRS_INF].

1.3 Definitions, Acronyms and Abbreviations

LD	Text & Status Display
CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
MCCU	Multi-CCU system.
SCCU	Single-CCU system.
ACN	Audio Communication Network
DCN	Digital Congress Network
DCN NG	Digital Congress Network Next Generation
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

This document should be referenced as [SRS_LDINF].

[SRS_INF]	General Remote Interface Description	DU010933
[SRS_MMINF]	MM Remote Interface Description	DU020903
[SRS_LD]	Software Requirements Specification Text & Status Display	DU080901

1.5 Overview

Chapter 2 describes the Text & Status Display Remote Interface in general.

Chapter 3 and chapter 4 describe respectively, the remote functions and the update notifications which can be used to control the sending of update notifications by the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible errors that could be returned upon invocation of a remote function.

Appendix C gives an example on using the remote interface for Text & Status Display.

2. TEXT & STATUS DISPLAY FOR A REMOTE INTERFACE

2.1 Introduction

The Text & Status Display Remote Interface is part of the DCN Next Generation software that allows for another controlling entity outside the CCU, not being the DCN Next Generation Control PC, to use the Text & Status Display application.

2.2 Remote Text & Status Display Control

Text & Status Display is the application that provides a means of displaying conference-related information on character displays located in the conference venue. Typical configuration issues are e.g.: storing display settings, clearing displays etc. More details on the complete LD application can be found in the user manual.

Configuring Text & Status Display with a remote interface is achieved by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of Remote Functions and Update Notifications is described in [SRS_INF]. [SRS_INF] also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are at the moment two locations in a fully connected CCU where LD can be influenced. These locations are:

- A remote controller (which can be the control PC) connected using an Ethernet (in case of MCCU) or RS-232 (in case of SCCU) connection. This remote controller uses Remote Function calls to configure Text & Status Display.
- Updates in applications for which LD displays text and/or status (MM, VT and MD) may lead to updates in text/status displays and/or update notifications (depending on the configuration)

To get a fully operational system the remote controller must register itself to the CCU, in order for it to receive update messages from the CCU.

Remote functions coming from the remote controller can indirectly initiate an update in the CCU. During the update, notifications are generated and sent to the remote controller.

Unit and user events causing changes in applications MM, VT and MD can lead to LD update notifications in the CCU. Depending on the configuration of LD, update notifications may be sent to the remote controller.

During the processing of remote functions on the CCU, update messages may be created and transmitted. This implies that the response information of a remote function can be received after the reception of an update notification. The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned. The notifications received during the wait for the response may be processed directly. See [SRS_INF] for details on this mechanism.

This document gives the set of Remote Functions and the set of Update Notifications concerning Text & Status Display. The (indirect) relation between Remote Function, sent by the remote controller, and Update Notifications is given in the description of each separate Remote Function. The (indirect) relation between unit events and Update Notifications (and the configuration needed to enable these updates) is given in section 4.1.2.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the remote functions used to configure the Text & Status Display application on the CCU.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfill the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the 'wError' field of the received response information equals LD_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the 'wError' field of the response information for this remote function. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications that are generated during the execution of the remote function. When there are no notifications generated, this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications. When there are no related functions, this part will be omitted.

3.2 LD General functions

3.2.1 LD_C_START_LD_APP

Purpose
This function indicates the CCU that the remote controller wants to communicate with the LD application inside the CCU. It is now impossible for another remote controller (e.g. DCNNG Control PC) to gain control of the application. After this function has been called, the remote controller will receive update notifications from the LD application (see section 4.1.2).

When the execution of this function is omitted, all other remote functions will have no effect and will return an error code (LD_E_APP_NOT_STARTED).

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters

Error codes returned
LD_E_NOERROR
LD_E_INCONTROL_OTHER_CHANNEL
LD_E_INCONTROL_THIS_CHANNEL

Related functions
LD_C_STOP_LD_APP

3.2.2 LD_C_STOP_LD_APP

Purpose
Indicate the CCU that the remote controller no longer requires to communicate with the LD application inside the CCU. After receiving this function the CCU takes over the control of LD. The remote controller will no longer receive update notifications.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
LD_E_NOERROR
LD_E_APP_NOT_STARTED

Related functions
LD_C_START_LD_APP

3.2.3 LD_C_STORE_DISPLAY_SETTING

Purpose
This function stores the settings of a display. If the settings concern an alphanumerical display, the update notification LD_C_SEND_ANUM_DATA may be sent (depending on the settings).

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD  wDisplayId;
    WORD  wFlags;
    WORD  wNrOfSpeakerLines;
    WORD  wNrOfRequestLines;
    DWORD dwReserved;
} LD_T_DISPLAY_REC;
```

where:

wDisplayId	Identifies the display for which the settings are sent. This can be one of the following: • LD_C_DISPLAY_ONE The first display, which is a numerical display • LD_C_DISPLAY_TWO The second display, which is an alphanumerical display • LD_C_DISPLAY_THREE The third display, which is an alphanumerical display • LD_C_DISPLAY_FOUR The fourth display, which is a graphical display The error LD_E_UNKNOWN_DISPLAY is returned if wDisplayId is not within the specified range.
wFlags	Bit mask indicating which application(s) must be enabled for the display. If an application is enabled, changes in the application can lead to updates on the display (see [SRS_LD] and [USERDOC_LD]). A change in enabled applications for an alphanumerical display may lead to an update notification. The bit mask can consist of (a combination of) the following flags: • LD_C_VT_FLAG_DISPLAY The VT application is enabled for the display

	• LD_C_MM_FLAG_DISPLAY The MM application is enabled for the display • LD_C_MD_FLAG_DISPLAY The MD application is enabled for the display
wNrOfSpeakerLines	Indicates how many lines of the display are used to show the speaker list. If this value is changed for an alphanumerical display, an update notification may be generated. This parameter may range from 0-LD_C_MAX_NR_OF_DISPLAY_LINES. If it is out of this range, the error LD_E_WRONG_PARAMETER is returned. Note that the added value of wNrOfSpeakerLines and wNrOfRequestLines may not exceed LD_C_MAX_NUMBER_OF_DISPLAY_LINES. The error LD_E_LINES_OVERFLOW is returned if this is detected.
wNrOfRequestLines	Indicates how many lines of the display are used to show the request-to-speak list. If this value is changed for an alphanumerical display, an update notification will be generated. This parameter may range from 0-LD_C_MAX_NUMBER_OF_DISPLAY_LINES. If it is out of this range, the error LD_E_WRONG_PARAMETER is returned. Note that the added value of wNrOfSpeakerLines and wNrOfRequestLines may not exceed LD_C_MAX_NUMBER_OF_DISPLAY_LINES. The error LD_E_LINES_OVERFLOW is returned if this is detected.
dwReserved	Reserved for (possible) future extensions. Ignored at the moment, may have any value.

Response structure from the function
The function has no response parameters

Error codes returned
LD_E_NOERROR
LD_E_APP_NOT_STARTED
LD_E_UNKNOWN_DISPLAY
LD_E_WRONG_PARAMETER
LD_E_LINES_OVERFLOW

Update notifications
LD_C_SEND_ANUM_DATA

3.2.4 LD_C_CLEAR_DISPLAY_NR

Purpose
This function clears the current request from the specified display. If another request is available (in the CCU) it will automatically be shown. If the specified display is an alphanumerical display, the update notification LD_C_SEND_ANUM_DATA may be sent.

Parameter structure for the function
The function requires the following structure as parameter:

```
WORD wDisplayId;
```

where:

wDisplayId	Identifies the display for which the current request is cleared. This can be one of the following. • LD_C_DISPLAY_ONE The first display, which is a numerical display • LD_C_DISPLAY_TWO

The second display, which is an alphanumerical display

- LD_C_DISPLAY_THREE
  The third display, which is an alphanumerical display
- LD_C_DISPLAY_FOUR
  The fourth display, which is a graphical display

The error LD_E_UNKNOWN_DISPLAY is returned if wDisplayId is not within the specified range.

Response structure from the function
The function has no response parameters.

Error codes returned
LD_E_NOERROR
LD_E_APP_NOT_STARTED
LD_E_UNKNOWN_DISPLAY

Update notifications
LD_C_SEND_ANUM_DATA

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the LD application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

As mentioned in section 2.2, update notifications may not only be the result of remote functions generated by the remote controller, but can also be the result of unit/user events. It was also mentioned in section 2.2 that the relation between the unit/user events and the update notifications is indirect (i.e. asynchronous).

This section gives information about the situations which will lead to the update notification LD_C_SEND_ANUM_DATA. The situations for all applications that can be enabled are explained. Note that the notifications are only generated for the alphanumerical displays (i.e. LD_C_DISPLAY_TWO and LD_C_DISPLAY_THREE), and they are only generated if the application is enabled for the display (see 3.2.3).

MM application

The LD update notification may be sent when:

- The speaker list changes
- The request-to-speak list changes

MD application

The LD notification may be sent when:

- A message is sent to hall displays
- A message is cleared from hall displays

VT application

The LD notification may be sent when:

- A voting session is started
- During a voting, a vote is cast (or changed)
- A voting session is stopped

4.2 LD General notifications

4.2.1 LD_C_SEND_ANUM_DATA

Purpose

This notification sends the current (updated) contents of a display to the remote controller.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    WORD  wDisplayId;
    CHAR  szData[DCNC_MAX_DISPLAYDATA_SIZE];
    WORD  wNumOfChars;
} LD_T_DISPLAY_DATA;
```

where:

wDisplayId	Identifies the display for which the settings are sent. This can be one of the following: • LD_C_DISPLAY_TWO The second display, which is an alphanumerical display • LD_C_DISPLAY_THREE The third display, which is an alphanumerical display
szData	The current (updated) text on the display.
wNumOfChars	The size of the current text on the display (in characters). The text in szData therefore is found in szData[0]-szData[wNumOfChars-1]. This parameter can have value 0-DCNC_MAX_DISPLAYDATA_SIZE.

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of defines are used, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MKWORD(lb,hb)           ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_LD             12


#define LD_C_START_LD_APP                   ( MKWORD (12, DCNC_APP_LD) )
#define LD_C_STOP_LD_APP                    ( MKWORD (13, DCNC_APP_LD) )
#define LD_C_STORE_DISPLAY_SETTING          ( MKWORD (14, DCNC_APP_LD) )
#define LD_C_CLEAR_DISPLAY_NR               ( MKWORD (11, DCNC_APP_LD) )


#define LD_C_SEND_ANUM_DATA                 ( MKWORD ( 7, DCNC_APP_LD) )


#define LD_C_DISPLAY_ONE                    0
#define LD_C_DISPLAY_TWO                    1
#define LD_C_DISPLAY_THREE                  2
#define LD_C_DISPLAY_FOUR                   3


#define LD_C_VT_FLAG_DISPLAY                0x1
#define LD_C_MD_FLAG_DISPLAY                0x2
#define LD_C_MM_FLAG_DISPLAY                0x4


#define LD_C_MAX_NR_OF_DISPLAY_LINES        10


#define DCNC_MAX_DISPLAYDATA_SIZE           512
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Text & Status Display Error code Explanation	Value (hex.)
LD_E_NOERROR The execution of the remote function was successful.	0 (0x00)
LD_E_INCONTROL_THIS_CHANNEL The LD application is already controlled by this remote controller (on the same channel). Probably the LD_C_START_LD_APP is called for the second time.	3074 (0xC02)
LD_E_INCONTROL_OTHER_CHANNEL The LD application is already controlled by another remote controller (on another channel).	3075 (0xC03)
LD_E_UNKNOWN_DISPLAY The display id passed in the remote function is unknown (i.e. not in the range LD_C_DISPLAY_ONE – LD_C_DISPLAY_FOUR).	3076 (0xC04)
LD_E_WRONG_PARAMETER A parameter passed in the remote function has an invalid value.	3077 (0xC05)
LD_E_LINES_OVERFLOW The total number of lines configured for MM display information exceeds the maximum of LD_C_MAX_NUMBER_OF_DISPLAY_LINES (i.e. the number of speaker lines added tot the number of request-to-speak lines exceeds LD_C_MAX_NUMBER_OF_DISPLAY_LINES).	3078 (0xC06)
LD_E_APP_NOT_STARTED Indicates that no remote controller has taken over the LD application control from the CCU (and therefore the remote controller is not allowed to call the remote function).	3079 (0xC07)

APPENDIX C. EXAMPLES

In the example below the remote functions and update notifications, that are defined in this document as constant values for the *wFnId* parameter of the message (see [SRS_INF]), are presented as functions described in a 'C' syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function it is assumed that the function will create its structure, transport the parameters to the CCU and wait for the result information coming from the CCU.

For both the remote functions and the update notifications the same names are used as their identifier, but without the constant mark "C" and using mixed case names (with less underscores). So, e.g. remote function LD_C_START_LD_APP shall as function be referenced as:

LD_StartLDApp (void);

Appendix C.1 Controlling LD application

This example shows the minimum steps to be taken for controlling the LD application

First we have to start controlling the LD application on the CCU.

```
typedef struct
{
    WORD  wDisplayId;
    WORD  wFlags;
    WORD  wNrOfSpeakerLines;
    WORD  wNrOfRequestLines;
    DWORD dwReserved;
} LD_T_DISPLAY_REC;

typedef struct
{
    WORD  wDisplayId;
    CHAR  ssData[DCNC_MAX_DISPLAYDATA_SIZE];
    WORD  wNumOfChars;
} LD_T_DISPLAY_DATA;

WORD wError;

wError = LD_StartLDApp();
switch (wError)
{
    case LD_E_INCONTROL_THIS_CHANNEL:
        /* I have the LD app already under control */
        /* Is that correct? Has the remote controller restarted? */
        /* For the moment assume to be correct and continue */
        break;

    case LD_E_INCONTROL_OTHER_CHANNEL:
        /* Another remote controller has control over the LD application */
        /* report error and terminate */
        ........
        break;

    case LD_E_NOERROR:
        /* function ended succesfully */
        break;

    default:
        /* some unexpected error occurred, report the error */
        ........
        break;
}
```

We have now established communication with the LD application on the CCU. Since controlling has now started, update notifications may arrive. Therefore, we need the following functions:

```
void LD_SendAnumData(LD_T_DISPLAY_DATA* ptDisplayData)
{
    /* Handle data of ptDisplayData */
}
```

Assume that we want to store display settings of LD_C_DISPLAY_TWO. We then need the following functions and control flow:

```
LD_T_DISPLAY_REC tSettings;
tSettings.wDisplayId = LD_C_DISPLAY_TWO;
/* Enable VT and MM application */
tSettings.wFlags = LD_C_VT_FLAG_DISPLAY | LD_C_MM_FLAG_DISPLAY;
tSettings.wNrOfSpeakerLines = 4;
tSettings.wNrOfRequestLines = 6;
WORD wError;

wError = LD_StoreDisplaySettings(&tSettings);
if (wError != LD_E_NOERROR)
{
    switch (wError)
    {
        case LD_E_APP_NOT_STARTED:
            /* Application not started, handle error */
            break;

        case LD_E_UNKNOWN_DISPLAY:
            /* Incorrect display, handle error */
            break;

        case LD_E_WRONG_PARAMETER:
            /* Incorrect parameter, handle error */
            break;

        case LD_E_LINES_OVERFLOW:
            /* wNrOfSpeakerLines + wNrOfRequestLines >
              LD_C_MAX_NUMBER_OF_DISPLAY_LINES */
            break;

        default:
            /* Handle unknown error */
            break;
    }
}
```

When we no longer need to be able to receive update notifications we can stop the communication with the LD application using the function:

```
wError = LD_StopLDApp();
if (wError != LD_E_NOERROR)
{
    /* do error handling */
}
```

This ends remotely controlling the LD application.

Message Distribution

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for Message Distribution between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the current state of the remote interface for Message Distribution. It is meant to give an overview of the possibilities the remote interface offers to control the Message Distribution application, present in the CCU, remotely. The Interface can be used to build a Message Distribution User interface.

The Software Requirements Specification MD Remote Interface Description is based on the functionality described in [SRS_MD].

For a complete description of the Remote Interface Set-up can be referred to [SRS_INF].

The intended audience for this document is:

- Product managers
- Software architects/developers
- Test engineers

The structure of this document is based on the structure of the original DCN remote interface descriptions (e.g. [SRS_SCSIINF]). Although this is a new document, it is based on the DCN structure in order to keep the remote interface descriptions consistent. Therefore this document is not based on and does not comply with the current SRS template.

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
DCN	Digital Congress Network
MD	Message Distribution
SC	System Configuration
SI	System Installation
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

This document should be referenced as [SRS_MDINF].

[SRS_MD]	SRS Message Distribution	DU090901
[SRS_INF]	General Remote Interface Description	DU010933
[SRS_SCSIINF]	System Config and System Installation Remote Interface	DU010934
[USERDOC_MD]	User Manual Message Distribution Application LBB 4182	9922 141 70431

1.5 Overview

Chapter 2 describes Message Distribution Remote Interface in general.

Chapter 3 and chapter 4 describe respectively the remote functions and the update notifications which can be used to control the sending of update notifications by the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible errors which could be returned upon a remote function.

Appendix C gives an example on using the remote interface for MD.

2. MESSAGE DISTRIBUTION FOR A REMOTE INTERFACE

2.1 Introduction

The Message Distribution Remote Interface is part of the DCN software which allows for another controlling entity outside the CCU, not being the DCN Control PC, to use the Message Distribution application.

2.2 Remote Message Distribution Control

The Message Distribution application provides a means of generating and distributing text messages in a DCN environment.

The message can be distributed to the following destinations:

- Delegates
- Interpreters
- Conference hall displays

The user can specify exactly which delegates or interpreters the message has to be distributed to. If the message has to be distributed to more than one destination, for example delegates and interpreters, it is sent to each destination in turn. More details on the complete MD application can be found in [SRS_MD] and the user manual [USERDOC_MD].

Using MD with a remote interface is achieved by means of calling a defined set of Remote Functions. The general concept of Remote Functions is described in [SRS_INF]. [SRS_INF] also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are up to two locations in a full-connected CCU where MD can be influenced. These locations are:

- A remote controller (which can be the control PC) connected using an Ethernet (in case of MCCU) or RS-232 (in case of SCCU) connection. This remote controller uses Remote Function calls to configure Message Distribution.
- Delegate units on which the auxiliary button is pressed, or interpreter desks on which the help or speak slowly key is pressed.

To get a fully operational system the remote controller must register itself to the CCU, in order for it to receive update messages from the CCU.

The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned.

Events coming from a unit (delegate or interpreter) are processed and the CCU is updated. Some of the events lead to update notifications. The notifications are sent on by the CCU to the remote controller.

This document gives the set of MD Remote Functions and the set of Update Notifications concerning Message Distribution. The relation between unit events and Update Notifications is given in section 4.1.2.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the various remote functions needed to use the Message Distribution functionality of the system.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfil the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the 'wError' field of the received response information equals MD_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the 'wError' field of the response information for this remote function. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications, which are generated during the execution of the remote function. When there are no notifications generated, this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications. When there are no related functions, this part will be omitted.

3.2 Message Distribution functions

3.2.1 MD_C_START_MON_MD

Purpose
Function to start the monitoring behavior of the Message Distribution application. This function must be called by the remote controller in order to receive update notifications.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the MD application at the end of the function handling. It contains the number of times a remote controller has connected over the same communication medium. E.g. the first time the MD_C_START_MON_MD function is called, it contains the value 1.

Error codes returned
MD_E_NOERROR

Related functions
MD_C_STOP_MON_MD

3.2.2 MD_C_STOP_MON_MD

Purpose

Function to stop monitoring the behavior of the Message Distribution application. Update notifications will no longer be sent to the remote controller.

Parameter structure for the function

The function has no additional parameters.

Response structure from the function

The function returns the following structure:

```
WORD    wNrOfInstances;
```

where:

wNrOfInstances	The value of the update use count for the MD application at the end of the function handling. It contains the number of times a remote controller is connected over the same communication medium. E.g. when there is only one connection registered for the MD application prior to calling the MD_C_STOP_MON_MD function, the value of wNrOfInstances will be 0 when the function returns.

Error codes returned

MD_E_NOERROR

Related functions

MD_C_START_MON_MD

3.2.3 MD_C_SEND_MESSAGE_TO_UNITS

Purpose

This function sends the message prepared on the Remote Controller to the specified list of units.

Parameter structure for the function

The function has the following parameters:

```
typedef struct
{
    DCNC_LCD_TEXT_BLOCK  tText;
    WORD                 wRcvType;
    WORD                 wDuration;
    WORD                 wNumOfUnits;
    WORD                 wUnitList[DBSC_MAX_ACT_UNIT];
} MD_T_SEND_MESS;
```

where:

tText — The message to be sent. NOTE: The fifth line is a terminating line and will not be displayed.

wRcvType — The type of units for which the message is meant. This can be one of:

- MD_C_RCV_DELEGATE: The message is meant for delegate units with LCD and softkeys. The message is sent to units of this type that are present in wUnitList. The message will not be displayed immediately.
- MD_C_RCV_INTERPRETER: The message is meant for interpreter desks. The message will be sent to interpreter desks present in wUnitList and it will not be displayed immediately.
- MD_C_RCV_HALL: The message is meant for and will only be sent to hall displays.

wDuration — Only for Hall displays: The number of seconds the message should be displayed, 0 to display permanently. This parameter

	is ignored if wRcvType is not equal to MD_C_RCV_HALL..
wNumOfUnits	The number of units present in wUnitList.
wUnitList	A list of unitIds that identifies which units should receive the message. Note that the units must be of type specified in wRcvType. If wRcvType has value MD_C_RCV_HALL, wUnitList and wNumOfUnits are ignored.

Response structure from the function
The function has no response parameters.

Error codes returned
MD_E_NOERROR
MD_E_NO_MORE_MESSAGES_ALLOWED

3.2.4 MD_C_CLEAR_MESSAGE_ON_UNITS

Purpose
This function clears all the messages on the units of the specified type.

Parameter structure for the function
The function has the following parameter:

```
WORD wRcvType;
```

where:

wRcvType The type of units for which the messages should be cleared. This can be one of:

- MD_C_RCV_DELEGATE
- MD_C_RCV_INTERPRETER
- MD_C_RCV_HALL

Response structure from the function
The function has no response parameters.

Error codes returned
MD_E_NOERROR

3.2.5 MD_C_AUX_LED_CONTROL

Purpose
This function is used to switch one or more LEDs of a delegate unit on or off. This can be used to acknowledge the press/release of the auxiliary button to the user of the delegate unit. Note that this function only influences the LEDs around the auxiliary button of a unit. The LEDs around the microphone button are not affected by this function. If this function is called for a unit that does not have an auxiliary button, the error MD_E_NO_AUX_BUTTON is returned.

Parameter structure for the function
The function has the following parameters:

```
typedef struct
{
    WORD wUnitId;
    BYTE byLedMask;
} MD_T_AUX_LED_CTL;
```

where:

wUnitId	Unit Identifier of the unit for which the LED states must be updated. Unit identifiers can be retrieved from the system using the remote functions for System Config [SRS_SCSIINF]. If the unit corresponding to the unit identifier does not have an auxiliary button, the error MD_E_NO_AUX_BUTTON is returned.

byLedMask	Bit mask identifying the state of the three delegate unit LEDs. The LEDs are defined as following: • MD_C_IN_NOTEBOOK_LED The notebook LED, a lighted amber LED-ring. • MD_C_MICRO_LED The microphone LED, a lighted red LED-ring • MD_C_RTS_LED The request to speak LED, a lighted green LED-ring. If the bit corresponding to a LED is present in the bit mask, the LED state must be ‘on’. If it is not present, the LED state must be ‘off’. E.g. if the notebook and rts LED need to be on, the bit mask (MD_C_RTSLED | MD_C_IN_NOTEBOOK_LED) must be sent. If all LEDs must be turned off, the following define can be used: • MD_C_ALL_LEDS_OFF

Response structure from the function
The function has no response parameters.

Error codes returned
MD_E_NOERROR
MD_E_NO_AUX_BUTTON

Related functions
MD_C_REQ_BUTTON_ON_OFF

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the MD application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

As mentioned in section 2.2, update notifications can be the result of unit/user events.

This section gives information about the events coming from a unit and the processing done for the events. In the table below an overview is made about the events and the actions performed.

Event	MD_C_REQ_BUTTON_ON_OFF
Press (and hold) auxiliary button (Delegate unit)	X
Release auxiliary button (Delegate unit)	X
Press (and hold) speak slowly button (interpreter desk)	X
Release speak slowly button (interpreter desk)	X
Press (and hold) help button (interpreter desk)	X
Release help button (interpreter desk)	X
Close external present contact (Delegate unit with external present contact)	X
Open external present contact (Delegate unit with external present contact)	X

4.2 MD General Notifications

4.2.1 MD_C_REQ_BUTTON_ON_OFF

Purpose

This notification informs the remote controller that a request button on a unit is pressed (and held) or released. The notification specifies which button on which unit is pressed or released. Note that the function is also used for the external present contact. In this case no buttons is pressed, but the contact is closed. The closing and opening of the contact can be performed by means of a button though (if a button is connected to the external present contact).

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    WORD    wUnitId;
    BYTE    byButtonType;
    BOOLEAN bOn;
} MD_T_REQ_BUTTON_ON_OFF;
```

where:

wUnitId	Unit Identifier of the unit on which the request button was pressed. Unit identifiers can be retrieved from the system using the remote functions for System Config [SRS_SCSIINF].

byButtonType	Identifies which button was pressed on the unit. This can be one of the following types: • MD_C_AUXILIARY_BUTTON The auxiliary button was pressed. This implies that the unit (identified by wUnitId) is a delegate unit. • MD_C_SPEAKSLOWLY_BUTTON The speak slowly button was pressed. This implies that the unit (identified by wUnitId) is an interpreter desk. • MD_C_HELP_BUTTON The help button was pressed. This implies that the unit (identified by wUnitId) is an interpreter desk. • MD_C_EXTERNAL_PRESENT_CONTACT The external present contact was closed/opened. This implies that the unit (identified by wUnitId) is a delegate unit with an external present contact.
bOn	TRUE: The button is pressed (and held), or the contact is closed FALSE: The button is released, or the contact is opened

APPENDIX A. VALUES OF THE DEFINES

In this document definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define MKWORD(lb,hb)            ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define DCNC_APP_MD             10


#define MD_C_SEND_MESSAGE_TO_UNITS        ( MKWORD (0 , DCNC_APP_MD) )
#define MD_C_CLEAR_MESSAGE_ON_UNITS       ( MKWORD (1 , DCNC_APP_MD) )
#define MD_C_START_MON_MD                 ( MKWORD (2 , DCNC_APP_MD) )
#define MD_C_STOP_MON_MD                  ( MKWORD (3 , DCNC_APP_MD) )
#define MD_C_AUX_LED_CONTROL              ( MKWORD (4 , DCNC_APP_MD) )

#define MD_C_REQ_BUTTON_ON_OFF            ( MKWORD (10, DCNC_APP_MD) )

#define MD_C_RCV_DELEGATE                0
#define MD_C_RCV_INTERPRETER             2
#define MD_C_RCV_HALL                    3

#define MD_C_AUXILIARY_BUTTON            0
#define MD_C_SPEAKSLOWLY_BUTTON          1
#define MD_C_HELP_BUTTON                 2
#define MD_C_EXTERNAL_PRESENT_CONTACT    3

#define MD_C_IN_NOTEBOOK_LED             0x1
#define MD_C_MICRO_LED                   0x2
#define MD_C_RTS_LED                     0x4
#define MD_C_ALL_LEDS_OFF                0x0

#define DCNC_MAX_DISP_CHARS              41
#define DCNC_MAX_LCD_LINES               5

#define DBSC_MAX_ACT_UNIT                576


typedef char DCNC_LCD_TEXT_BLOCK[DCNC_MAX_LCD_LINES][DCNC_MAX_DISP_CHARS]
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Message Distribution Error code Explanation	Value (hex.)
MD_E_NOERROR The execution of the remote function was successful.	0 (0x00)
MD_E_NO_MORE_MESSAGES_ALLOWED The maximum number of messages is reached (maximum is 10). Note that this holds for messages of type MD_C_RCV_DELEGATE and of type MD_C_RCV_INTERPRETER; for the type MD_C_RCV_HALL, only one message at a time is possible and a new message overwrites the previous message. Messages can be cleared by calling MD_C_CLEAR_MESSAGE_ON_UNITS with type MD_C_RCV_DELEGATE or MD_C_RCV_INTERPRETER. Note that there is only one queue of size 10, that holds whatever kind of messages are sent (any mix of messages of type MD_C_RCV_DELEGATE and MD_C_RCV_INTERPRETER is possible). In order to completely empty the queue, MD_C_CLEAR_MESSAGE_ON_UNITS must be called twice (once messages of type MD_C_RCV_DELEGATE, and once for messages of type MD_C_RCV_INTERPRETER).	2576 (0xA10
MD_E_NO_AUX_BUTTON A function relating to the auxiliary button is called for a unit that does not have an auxiliary button.	2578 (0xA12

APPENDIX C. EXAMPLES

In the example below the remote functions, that are defined in this document as constant values for the wFnId parameter of the message (see [SRS_INF]), are presented as functions described in a ‘C’ syntax. The parameter structures of these functions are according the input or output structures described in the appropriate section.

For every function it is assumed that the function will create these structures (if needed), transport the parameters to the CCU, waits for the result information coming from the CCU and deletes the created structures if not needed anymore.

For the remote functions the same names are used as their identifier, but without the constant mark “C” and using mixed case names. So, e.g. remote function MD_C_SEND_MESSAGE_TO_UNITS shall be referenced as function as:

MD_SendMessageToUnits(MD_T_SEND_MESS* ptSendMessage);

Appendix C.1 Sending a Message

This example shows the steps to be taken for using the MD application.

In this example, we will send a message to a list of interpreter units. We will assume that these units exist.

```
WORD wError;

typedef struct
{
    DCNC_LCD_TEXT_BLOCK  tText;
    WORD                 wRcvType;
    WORD                 wDuration;
    WORD                 wNumOfUnits;
    WORD                 wUnitList[DBSC_MAX_ACT_UNIT];
} MD_T_SEND_MESS;

typedef struct
{
    WORD    wUnitId;
    BYTE    byButtonType;
    BOOLEAN bOn;
} MD_T_REQ_BUTTON_ON_OFF;

typedef struct
{
    WORD wUnitId;
    BYTE byLedMask;
} MD_T_AUX_LED_CTL;

MD_T_SEND_MESS tSendMessage;
tSendMessage.wUnitList[0] = 1; // List with unit id's of interpreters.
tSendMessage.wUnitList[1] = 2;
tSendMessage.wUnitList[2] = 3;
tSendMessage.wUnitList[3] = 4;
tSendMessage.wNumOfUnits = 4;
tSendMessage.tText[0] = "Line 1";
tSendMessage.tText[1] = "Line 2";
tSendMessage.tText[2] = "Line 3";
tSendMessage.tText[3] = "Line 4";
tSendMessage.tText[4] = "";     // Fifth line is a terminating line
tSendMessage.wRcvType = MD_C_RCV_INTERPRETER; /* Send to interpreters. */
tSendMessage.wDuration = 0;     /* Only needed for hall displays */


/* Send the message to the listed interpreters. */
wError = MD_SendMessageToUnits(&tSendMessage);
if (wError != MD_E_NOERROR)
{
    /* do error handling */
}
```

If we are interested in receiving update notifications, we must register with the CCU.

```
WORD wNrOfInstances = 0;

wError = MD_StartMonMD(&wNrOfInstances);
if (wError != MD_E_NOERROR)
{
    /* do error handling */
}
else
{
    switch (wNrOfInstances)
    {
        case 0: /* Something went wrong, handle error */
            break;

        case 1: /* OK */
            break;

        default:
            /* two or more, stop rest until we have one left */
            WORD wNewNrOfInstances = 0;
            do
            {
                MD_StopMonMD(&wNewNrOfInstances);
            } while (wNewNrOfInstances > 1);
            break;
    }
}
```

Now we can receive update notifications. We need a function to receive the update.

```
    void MD_ReqButtonOnOff(MD_T_REQ_BUTTON_ON_OFF* ptReqButton)
    {
        switch (ptReqButton->byButtonType)
        {
            case MD_C_AUXILIARY_BUTTON:
                if (ptReqButton->bOn)
                {
                    /* Aux button pressed and held, switch on notebook
                      LED (and switch off other LEDs) */
                    MD_T_AUX_LED_CTL tAuxLedCtl;

                    tAuxLedCtl.wUnitId = ptReqButton->wUnitId;
                    tAuxLedCtl.byLedMask = MD_C_IN_NOTEBOOK_LED;

                    MD_AuxLedControl(&tAuxLedCtl);

                   /* handle message further */
                }
                else
                {
                    /* Aux button released, switch off notebook
                      LED (and all other LEDs) */
                    MD_T_AUX_LED_CTL tAuxLedCtl;

                    tAuxLedCtl.wUnitId = ptReqButton->wUnitId;
                    tAuxLedCtl.byLedMask = 0;

                    MD_AuxLedControl(&tAuxLedCtl);

                   /* handle message further */
                }
                break;

            case MD_C_SPEAKSLOWLY_BUTTON:
                /* Handle message */
                break;

            case MD_C_HELP_BUTTON:
                /* Handle message */
                break;
        }
    }
```

Finally if we are no longer interested in update notifications, we can deregister with the CCU.

```
    wError = MD_StopMonMD(&wNrOfInstances);
    if (wError != MD_E_NOERROR)
    {
        /* do error handling */
    }
```

Attendance Registration

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for attendance registration between the CCU and third party software.

1.2 Scope

This Software Requirements Specification describes the remote interface for attendance registration. It is meant for developers who want to use this remote interface to control the attendance registration application, present in the CCU, remotely.

All described functions will be supported in future releases. For a complete description of the System Setup can be referred to [SRS_INF].

System wide requirements are available in a system target specification, see [TS_DUNESYS].

The structure of this document is based on the structure of the original DCN remote interface descriptions. Although this is a new document, it is based on the DCN structure in order to keep the remote interface descriptions consistent. Therefore this document is not based on and does not comply with the current SRS template.

1.3 Definitions, Acronyms and Abbreviations

ACS	Access Control Services
AT	Attendance Registration
CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
DCN	Digital Congress Network
DCN NG	Digital Congress Network Next Generation
Names file	Permanent store for delegate data that are related, identifiable within DCN NG
PC	Personal Computer
Present Key	The leftmost softkey of the delegate or chairman unit (softkey 1) with 5 softkeys present, in case the settings and activation for attendance registration request for that functionality
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.

1.4 References

[SRS_ATINF]	This document	Du100902
[SRS_INF]	General Remote Interface Description	Du010933
[SRS_SCSIINF]	SC & SI Remote Interface Description	Du010934
[TS_DUNESYS]	Dune system Target Specification	DU000701

1.5 Overview

Chapter 2 describes the way attendance registration functions inside the CCU. This chapter explains the different parts of attendance registration and the influence of the events upon the state of a unit.

Chapter 3 and chapter 4 describe respectively, the remote functions and the update notifications which can be used to control the attendance of the delegates.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible error's that could be returned upon a remote function request.

Appendix C gives some examples of remote functions.

2. INTERNAL FUNCTIONING OF ATTENDANCE REGISTRATION

2.1 Introduction

The Attendance Registration application is divided into three closely related parts:

a. Attendance registration
b. Access control
c. Delegate identification

In the following section an explanation is given about the three parts.

Note that if the attendance registration application is not active in the CCU, however the authority settings as present in the delegate database are used to accept or reject actions of the delegates.
For example, when a delegate has no Voting authority, he will not be requested to cast his vote. The authority settings are part of the delegate database, which should be downloaded using the remote functions as described in [SRS_SCSIINF].

2.1.1 Attendance registration

Attendance registration is an application that allows the remote controller to keep track of the delegates present in the system. To accomplish this the delegate must register himself present by using one of the selectable options:

- Pressing his 'Present key' on his unit. (No leave option)
- Activating the external 'present' contact. (No leave option)
- Entering his PIN Code on his unit. (No leave option)
- Inserting his ID-card in his or any unit. To leave he withdraws the ID-card.
- Inserting his ID-card in the entrance-unit of the system. To leave he has to insert his ID-card in the exit-unit of the system.

One of the above options is selectable for registration of a delegate.

Note 1: Activating the external 'present' contact will act the same as pressing the 'Present key'.

Note 2: The use of the ID-card can, as an extra option, be combined with entering a pin-code.

Note 3: The ID-card insertion in a unit can be selected to be in his own unit only (fixed seating) or in any unit of the system (free seating). In the latter situation the attendance application connects the current seat to the delegate. The new seat-delegate combination is used within the system.

The attendance registration application keeps track of the delegate, which enters the system (become present) and leaves the system (become absent). The differences (if any) are reported to the remote controller every second.

2.1.2 Access Control

Access Control keeps track of the delegate's accessibility for the applications Microphone Management, Intercom and Voting as stored in the delegate database. Note that the content of the delegate database is controlled by the remote functions available in the System Configuration application. More information can be found in [SRS_SCSIINF].

A delegate can get control for an application (if he has access according to the authority settings in the delegate database) using one of the following options:

- Entering his PIN Code on his unit.
- Inserting his ID-card in his or any unit.
- Inserting his ID-card in the entrance-unit to get access for his seat as stored in the delegate database. Inserting the ID-card in the exit-unit disables the accessibility.

One of the above options is selectable for access control.

Note: The use of the ID-card can, as an extra option, be combined with entering a pin-code.

The Access Control options are set in combination with the attendance registration options.

2.1.3 Delegate Identification

This functionality provides information about what delegate is seating on which unit. Delegate Identification, i.e. location information, is available as a result of inserting ID Cards in and/or withdrawing them from units. For this functionality neither the attendance registration nor the access control process need to be active. The only restriction is that a names file should be downloaded.

When the location of a delegate is determined, the new location is sent to the remote controller. The Delegate Identification functionality keeps track of the location where a delegate is located. The differences (if any) are reported to the remote controller every second.

For Delegate Identification two definitions can be made:

• Located delegate	a delegate, which resides on a unit.
• Dislocated delegate	a delegate, which doesn't reside on a unit yet.

A delegate who is assigned a seat in the current names file is using that seat, unless that delegate inserts his card in another unit. In those cases the delegate is a located delegate. If another delegate inserts his card in that particular unit, the delegate who resides default on that unit will become a dislocated delegate.

When a delegate withdraws his card, the delegate will be assigned to his default unit if nobody else is using that unit and the delegate who has withdrawn his card has no pending request to speak, else he will become a dislocated delegate.

The delegate who is by default assigned to the unit from which the card was withdrawn will be assigned to that unit again if the delegate itself is a dislocated delegate. If the delegate is a located delegate, nobody will be assigned to that unit.

2.1.4 Combination Attendance and Access

From the previous sections it will be clear that the settings for attendance registration and access control are combined, because the ways to register and to get access are the same for both parts of the application.

Due to the combination of the settings of the two parts there are some restrictions:

- When the 'Present key' (or the external 'present' contact) is selected to gain attendance, Access Control cannot be activated.
- When delegates may sit on any chair (Free seating), attendance registration using the 'Present key' (or the external 'present' contact) is not possible. Also registration and/or Access Control using the PIN Code is not possible with this setting.

2.2 Functioning with parameters

When starting with the attendance application we must use parameters to set the different options. According to the settings made, several events can occur with the DCN NG system, which influences the presence and access of a delegate.

In this section we define the parameters and create a matrix that defines the changes when a certain event within the system occurs.

2.2.1 State definitions

The state definitions define the current state of a delegate in the DCN NG system. There will be a state definition per combination of the different settings. The following states are defined:

State item	Value set
Presence	Present or Absent
Location	Located or Anywhere
Authorization	Functioning or Blocked

Note 1: Presence is a delegate status identifying if a delegate is present or not.
Location is a delegate status, which reflects on which unit the delegate resides.

Authorization is a status identifying if a unit may be used or not by the delegate that currently resides on this unit.

Note 2: When a delegate is marked 'Functioning', the application authorization stored in the delegate database controls whether access is allowed.

2.2.2 Events definitions

The event definitions shown in the table below are all the events that can influence the presence, authorization or location of a delegate.

Event	**Explanation**
Initial / Unit connected	Initial state after activation of settings or state after unit connection
Unit disconnected	Unit disconnects
Present key	Present key pressed on presence menu (or activating the external present-contact)
PIN Code	PIN Code is successfully entered using the soft-keys This can either be: • PIN Code entered after ID Card insertion (ID Card plus PIN code control) • PIN Code entered directly (PIN Code control)
Insert card in seat	Insert Card in delegate/chairman unit, check if card is inserted in the correct unit and if no other card with the same card code is already present in another unit, check pin code if necessary
Remove card from seat	Remove card from seat after successful "Insert card in seat"
Insert card in Entrance	Insert Card in Entrance unit, check if card in no other unit, check PIN Code if necessary
Insert card in Exit	Insert Card in Exit unit, check if card in no other unit, check PIN Code if necessary

2.2.3 Parameter definitions

Besides the ability to turn on and off the two parts of the attendance application the following parameters are available for setting the options.

Parameter	**Explanation**
SeatAttend	Determine where the registration must take place. On the seat-unit or on the entrance/exit units.
SeatAccess	Determine if access is allowed on just one seat (as stored in the names file) or on any seat. Seat access 'None' means that no names file is currently opened.
ControlType	Determine how the delegate must register himself to the system. Possible options are: Present Key, Present Contact, PIN Code, ID Card and ID Card plus PIN Code.

2.2.4 Event / state matrix

The table on the next page presents the event / state matrix for the different settings of the parameters. 'Present Contact' will react the same as 'Present Key'.

Attendance	Access	Seat Attend	Seat Access	Control-Type	Initial / Unit connected	Unit Disconnected	Present Key	PIN Code	Insert Card in Seat	Remove Card from Seat	Insert Card in Entrance	Insert Card in Exit
OFF	OFF	-	-	-	Absent Anywhere Functioning	Absent Anywhere Blocked			Absent Located Functioning	Absent Anywhere Functioning		
	ON	ENTRANCE EXIT[1]	ONE_SEAT	IDCARD (_PINCODE)	Absent Located Blocked	Absent Located Blocked			Absent Located Functioning	Absent Anywhere Blocked		
			ANY_SEAT	IDCARD (_PINCODE)	Absent Anywhere Blocked	Absent Anywhere Blocked			Absent Located Functioning	Absent Anywhere Blocked		
		SEAT	ONE_SEAT	PIN CODE	Absent Located Blocked	Absent Located Blocked		Absent Located Functioning	Absent Located (No change)	Absent Anywhere (No change)		
				IDCARD (_PINCODE)	Absent Located Blocked	Absent Located Blocked			Absent Located Functioning	Absent Anywhere Blocked		
			ANY_SEAT	IDCARD (_PINCODE)	Absent Anywhere Blocked	Absent Anywhere Blocked			Absent Located Functioning	Absent Anywhere Blocked		
ON	OFF	ENTRANCE EXIT	ONE_SEAT	IDCARD (_PINCODE)	Absent Located Functioning	(No change) Located Blocked			(No change) Located Functioning	(No change) Anywhere Functioning	Present Located Functioning	Absent Located Functioning
			ANY_SEAT	IDCARD (_PINCODE)	Absent[2] Anywhere Functioning	(No change) Anywhere Blocked			(No change) Located Functioning	(No change) Anywhere Functioning	Present Anywhere Functioning	Absent Anywhere Functioning
		SEAT	NONE	PRESENT-KEY	Absent Anywhere Functioning	Absent Anywhere Blocked	Present Anywhere Functioning					
			ONE_SEAT	PRESENT-KEY	Absent Located Functioning	Absent Located Blocked	Present Located Functioning		(No change) Located Functioning	(No change) Anywhere Functioning		

Attendance	Access	Seat Attend	Seat Access	Control-Type	Initial / Unit connected	Unit Disconnected	Present Key	PIN Code	Insert Card in Seat	Remove Card from Seat	Insert Card in Entrance	Insert Card in Exit
ON	OFF	SEAT	ONE_SEAT	PIN CODE	Absent Located Functioning	Absent Located Blocked		Present Located Functioning	(No change) Located Functioning	(No change) Anywhere Functioning		
				IDCARD (_PINCODE)	Absent Located Functioning	Absent Located Blocked			Present Located Functioning	Absent Anywhere Functioning		
			ANY_SEAT	IDCARD (_PINCODE)	Absent Anywhere Functioning	Absent Anywhere Blocked			Present Located Functioning	Absent Anywhere Functioning		
	ON	ENTRANCE EXIT	ONE_SEAT	IDCARD (_PINCODE)	Absent[2] Located Blocked	(No change) Located Blocked			(No change) Located Functioning	(No change) Anywhere Functioning	Present Located Functioning	Absent Located Blocked
			ANY_SEAT	IDCARD (_PINCODE)	Absent[2] Anywhere Blocked	(No change) Anywhere Blocked			(No change)[3] Located[3] Functioning[3]	(No change) Anywhere Blocked	Present Anywhere Blocked	Absent Anywhere Blocked
		SEAT	ONE_SEAT	PIN CODE	Absent Located Blocked	Absent Located Blocked		Present Located Functioning	(No change) Located Functioning	(No change) Anywhere Functioning		
				IDCARD (_PINCODE)	Absent Located Blocked	Absent Located Blocked			Present Located Functioning	Absent Located Blocked		
			ANY_SEAT	IDCARD (_PINCODE)	Absent Anywhere Blocked	Absent Anywhere Blocked			Present Located Functioning	Absent Anywhere Blocked		

The notes mentioned in the table are:

1. There are several rows showing the same states on the same events (e.g., Attendance Off, Access On and Seat Attend on Entrance-Exit units is functional the same for both Seat Access on One-seat and Seat Access on Any-seat). Although it seems doubled information, all allowed combinations are shown, amongst others to understand the changes in settings.
2. Initial State, No change at connection of the unit.
3. The delegate must be present to come to this state, otherwise no acceptation.

Combinations of settings that are not present in the table are not allowed.

In case that no delegate database is downloaded into the CCU settings for ID-card or PIN Code are not possible. There is simply no information about which delegate has which ID-card or PIN Code.

Therefor, when no delegate database is downloaded into the CCU, only one event / state combination is legal:

Attendance	Access	Seat Attend	Seat Access	Control-Type	Initial / Unit connected	Unit Disconnected	Present Key	PIN Code	Insert Card in Seat	Remove Card from Seat	Insert Card in Entrance	Insert Card in Exit
ON	OFF	SEAT	NONE	PRESENT KEY	Absent Anywhere Functioning	Absent Anywhere Blocked	Present Anywhere Functioning					

Note that in this situation the activation of the present-key only registers the seat, because the system does not know which delegate should be seated on that seat. Thus, in this specific situation no delegate/unit information will be sent to the remote controller. Only the total number of present reports is sent.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the various remote functions needed to control the attendance registration application inside the CCU. A global description of the remote function handling is described in [SRS_INF].

The CCU can operate in multiple modes. The use of the AT remote function is restricted to the “Congress Mode”. An overview of modes can be found in [SRS_SCSIINF].

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfil the function. When the function requires no parameters, no structure is described here.
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the ‘wError’ field of the received response information equals AT_E_NOERROR.
- **Error codes returned**
  The error values returned in the ‘wError’ field of the response information. All possible error codes are described in Appendix B.
- **Update notifications**
  The update notifications that are generated during the execution of the remote function. When there are no notifications generated, then this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications.

3.2 Attendance/Access functions

3.2.1 AT_C_START_AT_APP

Purpose
Indicate the CCU that the remote controller wants to communicate with the AT application inside the CCU. Depending on the control-type passed the remote controller gets the opportunity to start attendance registration and/or access control. When no control is needed, but the remote controller likes to know which delegates are present (i.e. for microphone display information), the remote controller can monitor the presence changes from the CCU.

When you omit the execution of this remote function, all other remote functions have no effect and will return an error.

Parameter structure for the function
The function requires the following structure as parameters.

```
typedef struct
{
    BYTE byRemoteControlType;
} AT_T_APPCONTROL;
```

where:

byRemoteControlType	Identify what function the remote controller likes to perform in combination with the attendance application. Valid values are:		
	•	AT_C_APP_CONTROL	The remote controller likes to have full control over the attendance registration

	application. This full control implies the right to change the attendance registration settings.
• AT_C_APP_MONITOR	The remote controller only wants to monitor the presence changes. No control of the settings is allowed.

Note that the second start of the application (without a stop) always results in an error. This implies that you cannot change from ‘control’ to ‘monitor’ mode by calling the AT_C_START_AT_APP again. You have to call the function AT_C_STOP_AT_APP first to stop the previous mode.

Response structure from the function
The function has no response parameters.

Error codes returned
AT_E_NOERROR
AT_E_INCONTROL_OTHER_CHANNEL
AT_E_INCONTROL_THIS_CHANNEL
AT_E_INMONITOR_THIS_CHANNEL
AT_E_ILLEGAL_CONTROL_TYPE

Related functions
AT_C_STOP_AT_APP

3.2.2 AT_C_STOP_AT_APP

Purpose
Indicate the CCU that the remote controller no longer requires to communicate with the AT application inside the CCU. When the remote controller which has the control ability stops the communication, the CCU takes over the control for AT and turns attendance registration and access control off if they were still on.

Note: Upon a communication lost this function will be activated, if AT_C_START_AT_APP was activated.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
AT_E_NOERROR
AT_E_APP_NOT_STARTED

Related functions
AT_C_START_AT_APP

3.2.3 AT_C_STORE_SETTING

Purpose
This function allows the remote controller to pass the new setting for attendance registration and access control to the attendance registration application on the CCU. The attendance registration application checks the validity of the parameters passed and stores the new settings.

Note: This function may only be called if both attendance registration and access control are off. See the AT_C_ACTIVATE function (§3.2.4).

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BYTE    bySeatAttend;
    BYTE    bySeatAccess;
    BYTE    byControlType;
} AT_T_SETTINGS;
```

where:

bySeatAttend	Identify on which type of unit attendance registration will take place. The setting is one of the following: • AT_C_SEAT • AT_C_ENTRANCE_EXIT
bySeatAccess	Identify if a delegate can only use his own assigned unit or also another unit. The setting is one of the following: • AT_C_ANY_SEAT • AT_C_ONE_SEAT
byControlType	Identify how attendance registration and/or access control will take place. The setting is one of the following: • AT_C_PRESENTKEY • AT_C_PRESENTCONTACT[1] • AT_C_PINCODE • AT_C_IDCARD • AT_C_IDCARD_PINCODE

The meaning of the different parameter setting is described in §2.2.3.

Response structure from the function
The function has no response parameters.

Error codes returned
AT_E_NOERROR
AT_E_APP_NOT_STARTED
AT_E_STORE_SETTING_FAILED
AT_E_CHANGE_NOT_ALLOWED
AT_E_NOT_INCONTROL

Related functions
AT_C_ACTIVATE
AT_C_HANDLE_IDENTIFICATION

3.2.4 AT_C_ACTIVATE

purpose
This function allows the remote controller to start/stop attendance registration and/or access control. As long as attendance registration and/or access control is on, the CCU will send update notifications of type AT_C_SEND_TOTAL_REGISTRATION to the remote controller. Update notifications are sent upon state changes due to actions from the delegates on the units.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    BOOLEAN      bAttendanceOn;
    BOOLEAN      bAccessOn;
} AT_T_ACTIVATE;
```

where:

bAttendanceOn	Indication if attendance registration must be on or off
bAccessOn	Indication if access control must be on or off

Response structure from the function
The function has no response parameters.

Error codes returned
AT_E_NOERROR
AT_E_APP_NOT_STARTED
AT_E_NOT_INCONTROL
AT_E_ACTIVATION_NOT_ALLOWED

[1] Present contact can only be used when in SI the external contact is configured as present, see SRS_SCSIINF.

Update notifications
AT_C_SEND_INDIV_REGISTRATION
AT_C_SEND_TOTAL_REGISTRATION

Related Functions
AT_C_STORE_SETTING
AT_C_HANDLE_IDENTIFICATION

3.2.5 AT_C_HANDLE_IDENTIFICATION

Purpose
This function allows the remote controller to do the registration with his own equipment. After the local registration on the remote controller, he should pass the registered delegate to the DCN NG system.

The registration from the remote controller emulates the insertion of the ID-card in the entrance- or exit- unit. Therefore the ID-card code and (optional) the PIN-code must be passed along with this function.

Note that both the ID-card-codes and the PIN-codes are downloaded from the remote controller into the CCU during the download of the delegate database (see [SRS_SCSIINF] for details).

Together with the registration of the delegates, at the unit, on which the delegate resides, all LED's will be turned on if the delegate becomes present. The LED's are turned off again when the delegate is registered absent.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD     wEvent;
    WORD     wFillLevel;
    AT_T_DEL_IDENTIFICATION    tDelIdenfication [AT_C_MAX_REGISTRATION];
} AT_T_IDENTIFICATION_REC;
```

where the AT_T_DEL_IDENTIFICATION is defined as:

```
typdef struct
{
    DWORD    dwCardCode;
    WORD     wPinCode;
} AT_T_DEL_IDENTIFICATION;
```

where:

wEvent	Identify on which type of unit attendance registration will take place. The setting is one of the following: • ACSC_EVENT_INSERT_CARD_ENTRANCE • ACSC_EVENT_INSERT_CARD_EXIT	
wFillLevel	Number of delegates in *tDelIdentification* (ranges from 1 to AT_C_MAX_REGISTRATION). If more than AT_C_MAX_REGISTRATION delegates should be registered this function must be called more than once.	
tDelIdentification []	Structure containing the delegate identification.	
	dwCardCode	ID-Card code of the delegate that should be registered. Valid ID-card codes are in the range 1-MAX_CARD_CODE (the ID-card code must be unique for every delegate in the DCN NG system).
	wPinCode	PIN-code of the delegate hat should be registered. The PIN-code is only used when the 'Control-Type' is set to the value AT_C_IDCARD_PINCODE (see §3.2.3) Valid PIN-codes are in the range 111-55555, whereby each digit must be in the range of 1-5. Set the field wPinCode to 0 (zero) if PIN-codes are not

used.
The number of digits to be used is also stored into the delegate database. (PIN-codes do not have to be unique.)

This function will handle the request only if the function AT_C_STORE_SETTINGS is called before with the settings:

bySeatAttend	AT_C_ENTRANCE_EXIT
bySeatAccess	AT_C_ONE_SEAT
byControlType	AT_C_IDCARD or AT_C_IDCARD_PINCODE

and the function AT_C_ACTIVATE is called before to activate either Attendance Registration or Access Control or both.

Response structure from the function
The function has no response parameters.

Error codes returned
AT_E_NOERROR
AT_E_HANDLE_IDENTIFICATION_FAILED
AT_E_APP_NOT_STARTED
AT_E_SETTING_NOT_CORRECT
AT_E_NOT_INCONTROL
AT_E_ILLEGAL_EVENT
AT_E_ILLEGAL_ARRAY_SIZE

Update notifications
AT_C_SEND_INDIV_REGISTRATION
AT_C_SEND_TOTAL_REGISTRATION

Related functions
AT_C_STORE_SETTING
AT_C_ACTIVATE

3.2.6 AT_C_GET_INDIV_REGISTRATION

Purpose
This function allows the remote controller to retrieve the current registration status of each individual delegate. The function is meant for remote controllers who called the function AT_C_START_AT_APP with AT_C_APP_MONITOR as control type while attendance registration and/or access control was already activated.

The function enables the remote controller to create his own start-up status of the delegate registrations, which is to be used to handle the registration changes, send by the application specific update notifications.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wClusterIndex;
} AT_T_GET_REGISTRATION;
```

where:

wClusterIndex	An index that indicates which cluster of delegate registration information is to be retrieved. When wClusterIndex is 0 (zero), the response structure contains the first cluster, with a maximum of AT_C_MAX_DELEGATE, of delegate registration information. When wClusterIndex is 1 (one), the second cluster is returned etc.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    WORD    wFillLevel;
    AT_T_DEL_ATTEND  tDelegate[AT_C_MAX_DELEGATE];
} AT_T_REGISTER_INDIV;
```

where the AT_T_DEL_ATTEND is defined as:

```
typedef struct
{
    WORD    wUnitId;
    WORD    wDelegateId;
    BYTE    byAttend;
} AT_T_DEL_ATTEND;
```

where:

wFillLevel		Number of delegates in *tDelegate* (maximum of AT_C_MAX_DELEGATE) If wFillLevel is less than AT_C_MAX_DELEGATE, then the last cluster with delegate registration information is returned.
tDelegate		Structure containing the delegate information.
	wUnitId	Unit on which the delegate is located. The *wUnitId* can be the value DBSC_EMPTY_UNIT when the delegate is not located anywhere.
	wDelegateId	Delegate for which the presence status is given.
	byAttend	Presence status of the delegate. The setting is one of the following: • AT_C_NOSTATUS • AT_C_ATTEND • AT_C_LEAVE • AT_C_ATTEND_NOCHANGE • AT_C_LEAVE_NOCHANGE

How the presence status is determined can be seen in the following status diagram:

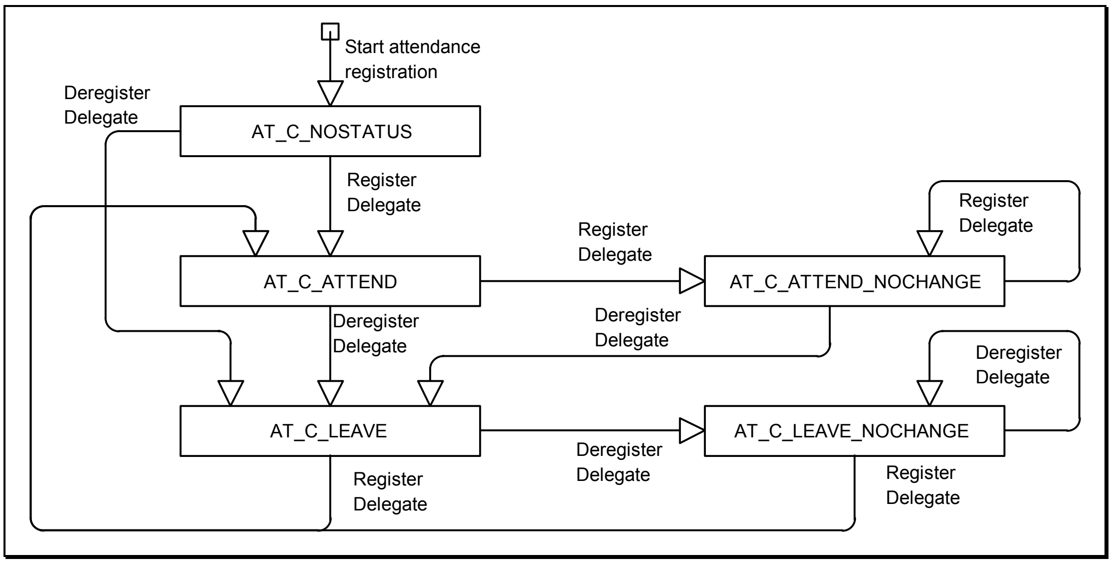

Figure 1 Presence status changes diagram

Internally it is possible that a delegate, which is already present, will be registered present again. In this case he inserts his ID-card in another unit, which implies that the delegate changed seat. This seat change is also reported to the remote controller using this update notification. His status will then be changed to AT_C_ATTEND_NOCHANGE to inform that the ‘presence’ has not changed. The same situation can occur when the delegate has already left the system.

Error codes returned
AT_E_NOERROR
AT_E_APP_NOT_STARTED

Update notifications
AT_C_SEND_INDIV_REGISTRATION
AT_C_SEND_TOTAL_REGISTRATION

Related functions
AT_C_START_AT_APP

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications send by the CCU. All the update notifications of the AT application are listed in this chapter. A global description of notifications is made in [SRS_INF].

4.1.1 Preconditions

The update notifications coming from the AT application use the UnitId and DelegateId to connect each other. The valid UnitId's in the DCN NG system can be queried and the DelegateId's can be set using remote functions described in [SRS_SCSIINF].

4.1.2 Notification item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.
- **Related functions**
  The related function in conjunction with the notification described.

4.2 Attendance Registration and Access Control notifications

4.2.1 AT_C_SEND_INDIV_REGISTRATION

Purpose
Notify the remote controller the individual status of the delegates, which (de)registers themselves. The presence and location results will be sent every second if changes have been detected on the CCU. Also the initial state (directly after activation) is sent to the remote controller using this notification. The notification is sent to every controller who started the attendance registration application with AT_C_START_AT_APP before.

Notify structure with this update
The update comes with the same structure as used for the response of the remote function AT_C_GET_INDIV_REGISTRATION (section 3.2.6).

Note that only the changes are sent to the remote controller.

Related functions
AT_C_STORE_SETTING
AT_C_ACTIVATE
AT_C_HANDLE_IDENTIFICATION

4.2.2 AT_C_SEND_TOTAL_REGISTRATION

Purpose
Notify the remote controller the total number of present and absent delegates. This information will be sent every second by the CCU if changes have been detected on the CCU. Also the initial totals (directly after activation) are sent to the remote controller using this notification.

These results will only be sent if attendance registration is activated.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    WORD     wAttend;
    WORD     wLeave;
} AT_T_REGISTER_TOTAL;
```

where:

wAttend	Number of delegates who have registered themselves present.
wLeave	Number of delegates who are known in the delegate database and who are not registered yet.

Related functions
AT_C_STORE_SETTING
AT_C_ACTIVATE
AT_C_HANDLE_IDENTIFICATION

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values:

The values are presented in ‘C’-syntax

```
#define AT_C_START_AT_APP               (0x0901)
#define AT_C_STOP_AT_APP                (0x0902)
#define AT_C_STORE_SETTING              (0x0903)
#define AT_C_ACTIVATE                   (0x0904)
#define AT_C_HANDLE_IDENTIFICATION      (0x0905)
#define AT_C_GET_INDIV_REGISTRATION     (0x0906)

#define AT_C_SEND_INDIV_REGISTRATION    (0x090A)
#define AT_C_SEND_TOTAL_REGISTRATION    (0x090B)

#define AT_C_APP_CONTROL                1
#define AT_C_APP_MONITOR                2

#define AT_C_SEAT                       1
#define AT_C_ENTRANCE_EXIT              2

#define AT_C_ANY_SEAT                   1
#define AT_C_ONE_SEAT                   2

#define AT_C_PRESENTKEY                 1
#define AT_C_IDCARD                     2
#define AT_C_IDCARD_PINCODE             3
#define AT_C_PINCODE                    4
#define AT_C_PRESENTCONTACT             5

#define AT_C_NOSTATUS                   0
#define AT_C_ATTEND                     1
#define AT_C_LEAVE                      2
#define AT_C_ATTEND_NOCHANGE            3
#define AT_C_LEAVE_NOCHANGE             4

#define AT_C_MAX_DELEGATE               250
#define AT_C_MAX_REGISTRATION           50

#define ACSC_EVENT_INSERT_CARD_ENTRANCE 5
#define ACSC_EVENT_INSERT_CARD_EXIT     6

#define DBSC_EMPTY_UNIT                 0xFFFF
#define DBSC_EMPTY_DELEGATE             0xFFFF

#define TRUE                            1
#define FALSE                           0

#define MAX_CARD_CODE                   999999999L
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field ('wError'). In this appendix an overview is given of the possible errors and their values.

Attendance Registration Error code Explanation	Value: Dec	Hex
AT_E_NOERROR The execution of the remote function was successful.	0	0x000
AT_E_APP_NOT_STARTED The remote controller has not called the AT_C_START_AT_APP yet. Therefore any remote function call to the attendance registration application fails with this error.	2305	0x901
AT_E_STORE_SETTING_FAILED Settings or a combination of settings is not correct.	2306	0x902
AT_E_HANDLE_IDENTIFICATION_FAILED The eventId, the ID-card code and/or length of PIN-code are not correct to handle the requested action.	2314	0x90A
AT_E_SETTING_NOT_CORRECT Settings are not correct to handle the requested action.	2315	0x90B
AT_E_INCONTROL_OTHER_CHANNEL The AT_C_START_AT_APP function could not finish successfully because the attendance application is already controlled by another remote controller using another channel.	2316	0x90C
AT_E_INCONTROL_THIS_CHANNEL The attendance application is already under control by this remote controller (on the same channel). Probably you have called the AT_C_START_AT_APP function twice.	2317	0x90D
AT_E_INMONITOR_THIS_CHANNEL The attendance application is already monitored by this remote controller (on the same channel). Probably you have called the AT_C_START_AT_APP function twice.	2318	0x90E
AT_E_NOT_INCONTROL The remote function is not allowed, because this remote controller has no control over the attendance registration application.	2319	0x90F
AT_E_CHANGE_NOT_ALLOWED A change of setting (even if they are the same as the previous call) is not allowed, because attendance registration and/or access control is currently active. Or the setting is present contact (AT_C_PRESENTCONTACT), but no external contact is configured as present contact in SI (see SRS_SCSIINF)	2321	0x911
AT_E_ACTIVATION_NOT_ALLOWED The settings made by the remote function AT_C_STORE_SETTING are conflict with the activation or deactivation of attendance registration and/or access control. See chapter 2 for more information.	2322	0x912
AT_E_ILLEGAL_CONTROL_TYPE The control-type passed to the function AT_C_START_AT_APP is not within range of valid values (see Appendix A for the correct control-type values).	2333	0x91D
AT_E_ILLEGAL_EVENT The event-type passed to the function AT_C_HANDLE_IDENTIFICATION is not within range of valid values (see Appendix A for the correct event values).	2334	0x91E
AT_E_ILLEGAL_ARRAY_SIZE The fill-level passed along with the function AT_C_HANDLE_IDENTIFICATION exceeds the maximum array	2335	0x91F

Attendance Registration Error code Explanation	Value:	Dec	Hex
size.			

APPENDIX C. EXAMPLES

In the examples below the remote functions and update notifications, that are defined in this document as constant values for the wFnId parameter of the message (see [SRS_INF]), are presented as functions described in a 'C' syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function is assumed that the function will create the required input parameter structure, transport the parameters to the CCU and waits for the result information coming from the CCU.

For both the remote functions as the update notifications the same names are used as their identifier, but without the constant mark "C", some "_" and using mixed case names.

For example remote function AT_C_STORE_SETTING shall be referenced as function:

AT_StoreSetting (&tSettings);

C.1. 0.1 Using Attendance Registration and Access Control

This example shows how the remote controller can perform attendance registration with the entrance- and exit units by using ID Cards.

For this example we have defined the following DCN NG system:

- A conference hall equipped with delegate units without ID-card readers
- Entrance and Exit units are present.
- The seat-assignment has been done by the remote controller.
- A delegate database is downloaded into the CCU.

Using this system we like to use the ID-cards for registration and access control for all delegates. Because the system does not have an ID-card reader in the units, we use card-readers in the entrance- and exit units to register the delegates.

First the remote controller must register himself to the AT application.

```
error = AT_StartATApp (AT_C_APP_CONTROL);
switch (error)
{
    case AT_E_INCONTROL_THIS_CHANNEL:
    /* I have the attendance registration app already under control */
    /* Is that correct? Is the remote controller restarted? */
    /* For the moment assume to be correct and continue */
    .........
    break;

    case AT_E_INCONTROL_OTHER_CHANNEL:
    /* Another remote controller has control over the attendance registration
app */
    /* report error and terminate */
    .........
    return;

    case AT_E_INMONITOR_THIS_CHANNEL:
    /* I tried to open the application for control, but it seems that I have the
*/
    /* attendance registration application already opened for Monitoring
attendance. */
    /* report error and terminate */
    .........
    return;

    case AT_E_NOERROR:
    /* function ended succesful, continue */
    break;

    default:
    /* some unexpected error occurred. */
    /* report the error */
    .........
    break;
}
```

We now have control over the attendance registration application and may change the settings, but first the input parameter structure must be filled in:

```
AT_T_SETTINGS     tSettings;

tSettings.bySeatAttend      = AT_C_ENTRANCE_EXIT;
tSettings.bySeatAccess      = AT_C_ONE_SEAT;
tSettings.byControlType            = AT_C_IDCARD;


error = AT_StoreSetting (&tSettings);
if (error != AT_E_NOERROR)
{
 /* do error handling */
}
```

Starting attendance registration and access control will be done by calling the following function:

```
AT_T_ACTIVATE     tActivate;

tActivate.bAttendanceOn     = TRUE;
tActivate.bAccessOn   = TRUE;

error = AT_Activate (&tActivate);
if (error != AT_E_NOERROR)
{
 /* do error handling */
}
```

The CCU is now running attendance registration and access control. When a delegate inserts his ID-card into an entrance unit, the AT application on the CCU sends an “individual registration” and “total registration” notification.

This result in the following two functions:

```
void AT_SendIndivRegistration (AT_T_REGISTER_INDIV *tIndivResults)
{
 WORD wIndex;

 /* get presence of delegates */
 for (wIndex = 0; wIndex < tIndivResults->wFillLevel; wIndex++)
 {
     /* handle the presency of each delegate separately */
 }
}

void AT_SendTotalRegistration (AT_T_REGISTER_TOTAL *tTotalResults)
{
 /* update the local results with the new total present and absent
information      from the CCU */
}
```

When the remote controller is also equipped with a card-reader, then the delegates may use that card-reader to register themselves. In that specific case the remote controller reads the ID-card and registers the delegate to the Attendance application by using the AT_C_HANDLE_IDENTIFICATION remote function.

For example when two delegates with card-code 16824 and 6823 have registered themselves using the remote controller, the remote controller performs the following actions:

```
AT_T_IDENTIFICATION_REC  tIdentification;

tIdentification.wEvent   = ACSC_EVENT_INSERT_CARD_ENTRANCE;
tIdentification.wFillLevel     = 2;
tIdentification.tDelIdentification [0].dwCardCode = 16824;
tIdentification.tDelIdentification [0].wPinCode   = 0;     /* not used */
tIdentification.tDelIdentification [1].dwCardCode = 6823;
tIdentification.tDelIdentification [1].wPinCode   = 0;     /* not used */

wError = AT_HandleIdentification (&tIdentification);
if (wError != AT_E_NOERROR)
{
    /* do error handling */
}
```

Finally, when the congress is ended, we can stop the Attendance registration and Access control by calling:

```
AT_T_ACTIVATE     tActivate;

tActivate.bAttendanceOn      = FALSE;
tActivate.bAccessOn   = FALSE;

error = AT_Activate (&tActivate);
if (error != AT_E_NOERROR)
{
 /* do error handling */
}
```

Now the control can be given back to the CCU by calling the following function:

```
error = AT_StopATApp ();
if (error != AT_E_NOERROR)
{
 /* do error handling */
}
```

Intercom

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to describe the remote interface for Intercom between the CCU and third party software.

1.2 Scope

This Software Requirement Specification describes the remote interface for Intercom. It is meant for developers who want to use this remote interface to control the Intercom application, present in the CCU, remotely. The Interface can be used to build an Intercom User interface.

For a complete description of the System Set-up can be referred to [SRS_INF].

1.3 Definitions, Acronyms and Abbreviations

CCU	Central Control Unit. This can be either a single-CCU system or a Multi-CCU system.
ACN	Audio Communication Network
DCN	Digital Congress Network
DCN NG	Digital Congress Network Next Generation
IC	Intercom
SC	System Configuration
SI	System Installation
UnitId	Unit identification, also called unit-number. A unique identification of a unit within the CCU system.
PC	Personal Computer
Remote controller	Device (e.g. PC) connected to the CCU, which remotely controls a part of the applications present in the CCU.

1.4 References

This document should be referenced as [SRS_ICINF].

[SRS_INF]	General Remote Interface Description	Du010933
[SRS_SCSIINF]	System Config and System Installation Remote Interface	Du010934

1.5 Overview

Chapter 2 describes Intercom Remote Interface in general.

Chapter 3 and chapter 4 describe respectively, the remote functions and the update notifications, which can be used to control the intercom links between the units connected to the CCU.

Appendix A gives an overview of the constants used in combination with the remote functions described in this document.

Appendix B gives an overview of the possible error's, which could be returned upon a remote function.

Appendix C gives an example on using the remote interface for Intercom.

2. INTERCOM FOR A REMOTE INTERFACE

2.1 Introduction

The Intercom Remote Interface is part of the DCN NG software, which allows for another controlling entity outside the CCU, not being the DCN NG Control PC, to use the Intercom application.

2.2 Remote Intercom Control

Intercom is the application that allows for controlling intercom calls between delegates, chairmen and interpreters during a conference. It allows several types of calls to be made:

- From participant to operator, or vice versa
- Between participants, via the operator or directly
- From interpreter to operator, or vice versa
- Between interpreters, via the operator or directly
- From participant to interpreter, or vice versa, via the operator or directly.

More details on the complete IC application can be found in the user manual.

Setting up and controlling intercom calls with a remote interface is by means of calling a defined set of Remote Functions and acting upon a defined set of Update Notifications. The general concept of Remote Functions and Update Notifications is described in [SRS_INF]. [SRS_INF] also describes the protocol and hardware conditions concerning the remote interface.

Together with this remote interface, there are up to three locations in a full-connected CCU where IC can be influenced. These locations are:

- The remote interface or remote controller using the RS-232 interface. The remote controller makes Remote Function calls for Intercom.
- The actual units that handle their intercom handset.
- The interpreter units that handle their intercom- or chairman-call button.

It is not possible to receive update notifications on both the remote controller and the DCN NG Control PC.

During the processing of remote functions on the CCU, the update messages are created and transmitted. This implies that the response information of a remote function can be received after the reception of an update notification. The remote controller must wait for the response of the remote function. After reception of the response appropriate action should be taken upon the error code returned. The notifications received during the wait for the response may be processed directly.

This document gives the set of Remote Functions and the set of Update Notifications concerning Intercom. The relation between Remote Function, sent by the remote controller, and Update Notifications is given in the description of each separate Remote Function. The relation between unit events and Update Notifications is given in section 4.1.2.

3. REMOTE FUNCTIONS

3.1 Introduction

This chapter describes the various remote functions needed to use the intercom functionality of the system.

3.1.1 Remote function item explanation

Each description consists of the following items:

- **Purpose**
  A global description of the purpose of the function.
- **Parameter structure for the function**
  The input parameters needed to fulfil the function. When the function requires no parameters, no structure is described here. The type definitions of the basic types used to build up the input parameter structure are given in [SRS_INF].
- **Response structure from the function**
  The output information coming from the function called. This information is only valid when the ‘wError’ field of the received response information equals IC_E_NOERROR.
- **Error codes returned**
  The possible error values returned in the ‘wError’ field of the response information for this remote function. All different error codes are described in Appendix B.
- **Update notifications**
  The update notifications, which are generated during the execution of the remote function. When there are no notifications generated, then this part will be omitted.
- **Related functions**
  The related function in conjunction with the function described. It refers to other remote functions and to related update notifications.

3.2 Intercom functions

3.2.1 IC_C_START_IC_APP

Purpose
Indicates the CCU that the remote controller wants update notifications from the IC application inside the CCU. Update notifications are sent upon state changes due to actions from all intercom actions on the units.

When you omit the execution of this remote function, you can still execute remote functions, but no update notifications will be sent to the remote controller.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
IC_E_NOERROR
IC_E_NO_OPERATOR
IC_E_INCONTROL_THIS_CHANNEL
IC_E_INCONTROL_OTHER_CHANNEL
IC_E_NO_AUDIO_CHANNELS

Update notifications
IC_UPD_AVAILABLE_LINES
IC_UPD_OPERATOR_STATE

Related functions
IC_C_CLOSE_IC_APP

3.2.2 IC_C_CLOSE_IC_APP

Purpose
Indicates the CCU that the remote controller no longer requires updates from the IC application inside the CCU.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
IC_E_NOERROR

Related functions
IC_C_START_IC_APP

3.2.3 IC_C_SET_LINKS

Purpose
This function allows the remote controller to set special links.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    IC_T_LINKINFO_LIST   tList[IC_MAX_LINKS_IN_RFC];
} IC_T_LINKINFO_LIST;
```

with:

```
typedef struct
{
    UNITID      wSourceId;
    UNITID      wDestId;
} IC_T_LINKINFO_STRUCT;
```

where:

wSourceId	The unitId of the initiator of the intercom call. If the wSourceId is IC_C_UNASSIGNED_UNIT, then this is the last link in the list.
wDestId	The unitId of the receiver of the intercom call

Response structure from the function
The function has no response parameters.

Error codes returned
IC_E_NOERROR
IC_E_WRONG_PARAMETER

3.2.4 IC_C_CLEAR_ LINKS

Purpose
This function allows the remote controller to remove all the existing special links between units.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
IC_E_NOERROR

4. UPDATE NOTIFICATIONS

4.1 Introduction

This chapter describes the various update notifications sent by the CCU. All the update notifications of the IC application are listed in this chapter.

4.1.1 Update notification item explanation

Each update notification description consists of the following items:

- **Purpose**
  A global description of the purpose of the notification.
- **Notify structure with this update**
  The information passed with the update notification.

4.1.2 Unit/user event relations

This section gives information about the events coming from the units and the processing done for the events. In the table below and overview is made about the events and the actions performed.

Event	Action performed
Pick up the hook on a unit (NOT the operator)	The following notifications are sent: • IC_UPD_AVAILABLE_LINES • IC_UPD_INCOMING_CALL • IC_UPD_OPERATOR_STATE
Put down the hook on a unit (NOT the operator)	The following notifications are sent: • IC_UPD_AVAILABLE_LINES • IC_UPD_OPERATOR_STATE
Operator picks up the hook	The following notifications are sent: • IC_UPD_AVAILABLE_LINES • IC_UPD_OPERATOR_STATE
Operator puts down the hook	The following notifications are sent: • IC_UPD_AVAILABLE_LINES • IC_UPD_OPERATOR_STATE

4.2 Intercom notifications

4.2.1 IC_UPD_AVAILABLE_LINES

Purpose

Notifies the remote controller about the number of lines that are available for intercom.

Notify structure with this update

The update comes with the following structure:

```
BYTE byLines;
```

where:

byLines	The number of available intercom lines.

4.2.2 IC_UPD_OPERATOR_STATE

Purpose
Notifies the remote controller about the state of the operator.

Notify structure with this update
The update comes with the following structure:

```
BYTE byState;
```

where:

byState	The state of the operator This can be one of the following values: • IC_C_NOT_PRESENT • IC_C_IDLE • IC_C_NO_OPER • IC_C_CONNECTED • IC_C_CONN_BREAK • IC_C_NO_REQ • IC_C_RECEIVING • IC_C_DIALING • IC_C_RETURN

4.2.3 IC_UPD_CONNECTION_INFO

Purpose
Notifies the remote controller that there is a change in the intercom connections.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    UNITID      wCallerId;
    UNITID      wReceiverId;
    BOOLEAN     bLinked;
} IC_T_CONNECTION_INFO;
```

where:

wCallerId	Unit Identifier of the calling unit.
wReceiverId	Unit Identifier of the receiving unit.
bLinked	Indication of the status of the link. TRUE if the connection has been made. FALSE if the connection is disconnected.

4.2.4 IC_UPD_INCOMING_CALL

Purpose
Notifies the remote controller that a handset of a unit has been picked up.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    UNITID  wUnitId;
    WORD    wUnitType;
} IC_T_INCOMMING_CALL;
```

where:

wUnitId	Unit Identifier of the unit initiating the call.
wUnitType	The type of the unit which initiates the call

APPENDIX A. VALUES OF THE DEFINES

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in 'C'-syntax

```
#define MKWORD(lb,hb)            ((WORD)(((WORD)(hb))<<8) | (WORD)(lb)))
#define UNITID                   WORD
#define DCNC_APP_IC              7


#define IC_C_START_IC_APP                 ( MKWORD (1 , DCNC_APP_IC) )
#define IC_C_CLOSE_IC_APP                 ( MKWORD (2 , DCNC_APP_IC) )
#define IC_C_SET_LINKS                    ( MKWORD (3 , DCNC_APP_IC) )
#define IC_C_CLEAR_LINKS                  ( MKWORD (5 , DCNC_APP_IC) )
#define IC_UPD_AVAILABLE_LINES            ( MKWORD (6 , DCNC_APP_IC) )
#define IC_UPD_OPERATOR_STATE             ( MKWORD (7 , DCNC_APP_IC) )
#define IC_UPD_CONNECTION_INFO            ( MKWORD (8 , DCNC_APP_IC) )
#define IC_UPD_INCOMING_CALL              ( MKWORD (9 , DCNC_APP_IC) )


#define IC_MAX_LINKS_IN_RFC               512
#define IC_C_UNASSIGNED_UNIT              0xFFFF


#define IC_C_NOT_PRESENT                  0
#define IC_C_IDLE                         1
#define IC_C_NO_OPER                      2
#define IC_C_RETURN                       5
#define IC_C_CONNECTED                    6
#define IC_C_CONN_BREAK                   7
#define IC_C_NO_REQ                       8
#define IC_C_RECEIVING                    9
#define IC_C_DAILING                      10
```

APPENDIX B. ERROR CODES

Responses returned upon a remote function request contain an error field (‘wError’). In this appendix an overview is given of the possible errors and their values.

Intercom Error code Explanation	Value (hex)
IC_E_NOERROR The execution of the remote function was successful.	0 (0x00)
IC_E_NO_AUDIO_CHANNELS There are no audio channels available for intercom.	1796 (0x704)
IC_E_NO_OPERATOR There is no operator assigned.	1797 (0x705)
IC_E_INCONTROL_THIS_CHANNEL The CCU is already in control with this channel.	1810 (0x712)
IC_E_INCONTROL_OTHER_CHANNEL The CCU is already in control by another channel.	1811 (0x713)
IC_E_WRONG_PARAMETER The value of a parameter passed in a function call is invalid (out of range).	1812 (0x714)

APPENDIX C. EXAMPLES

In the example below the remote functions and update notifications, that are defined in this document as constant values for the wFnId parameter of the message (see [SRS_INF]), are presented as functions described in a 'C' syntax. The parameter structures of these functions are according the input, output or notify structures described in the appropriate section.

For every function is assumed that the function will create his structure, transport the parameters to the CCU and waits for the result information coming from the CCU.

For both the remote functions as the update notifications the same names are used as their identifier, but without the constant mark "C" and using mixed case names. So, e.g. remote function IC_C_SET_LINKS shall be referenced as function as:

IC_Set_Links (&tLinks);

Appendix C.1 Intercom without update notifications

This example shows the steps to be taken for controlling the IC application.

In this example, we will setup a link between some units. We will assume an operator has been assigned.

```
WORD wError;
IC_T_LINKINFO_LIST tLinks;

/*
 * Set up a bi-directional link between units 3 and 7 and a
 * one-way link from unit 2 to unit 5.
 */
tLinks[0].wSourceId = 3;       /* from unit 3 */
tLinks[0].wDestId = 7;         /* to unit 7 */
tLinks[1].wSourceId = 7;       /* from unit 7 */
tLinks[1].wDestId = 3;         /* to unit 3 */
tLinks[2].wSourceId = 2;
tLinks[2].wDestId = 5;

/* End of list. */
tLinks[3].wSourceId = IC_C_UNASSIGNED_UNIT;
tLinks[3].wDestId = IC_C_UNASSIGNED_UNIT;

wError = IC_Set_links(&tLinks);
switch(wError)
{
    case IC_E_NOERROR:
        /* links are set */
        break;
    case IC_C_WRONG_PARAMETER:
        /* do error handeling */
        break;
    default:
        /* report error */
        break;
}
```

When the handset of unit 3 is picked up, a call is made to unit 7. If unit 7 picks up the handset the call will be established (and vice versa). When unit 5 picks up its handset, the operator will be called, and not unit 2. On the other hand, when unit 2 starts a call, the call will be made to unit 5.

Appendix DCN Wireless

Table of Contents

1. INTRODUCTION

1.1 Purpose

The purpose of this document is to define the user interface of the Remote Interface Description.

1.2 Scope

This document describes the user interface for the Remote Interface Description. It is not a functional specification of all aspects of the Remote Interface Description.

Only the changed or added functionality comparing with the DCN NG remote interface description has been described. The available DCN NG remote interface descriptions can be found in: [SRS_INF], [SRS_ SCSIINF], [SRS_ MMINF], [SRS_ CCINF], [SRS_ ININF], [SRS_ VTINF], [SRS_ LDINF], [SRS_ MDINF], [SRS_ ATINF], [SRS_ ICINF].

1.3 Definitions, Acronyms and Abbreviations

.

1.4 References

MMI_AQ_INF	This document	**Error! Reference source not found.**
SRS_INF	General Remote Interface	Du010933.doc
SRS_SCSIINF	SC & SI & DB Remote Interface Description	Du010934.doc
SRS_MMINF	MM Remote Interface Description	Du020903.doc
SRS_CCINF	CC Remote Interface Description	Du020905.doc
SRS_ININF	IN Remote Interface Description	Du030905.doc
SRS_VTINF	VT Remote Interface Description	Du040905.doc
SRS_LDINF	LD Remote Interface Description	Du080902.doc
SRS_MDINF	MD Remote Interface Description	Du090902.doc
SRS_ATINF	AT Remote Interface Description	Du100902.doc
SRS_ICINF	IC Remote Interface Description	Du110902.doc

1.5 Summary

Three OI applications have been changed, System Configuration (SC), System Installation (SI) and Microphone Management (MM).

Chapter 3 and 4 describes the SC changes, chapter 5 and 6 describes the SI changes and chapter 7 and 8 describes the MM changes.

For each application the additional defines are added in the appendixes.

2. GENERAL REMOTE DESCRIPTION

General remote description information can be found in [SRS_INF].

2.1 Remote function handling

Remote requests will give a response with one or more notifications. All notifications, expected after executing the remote request, will be sent to the remote controller within 5 seconds.

3. SYSTEM CONFIGURATION (SC) FUNCTIONS

All SC Function information can be found in [SRS_ SCSIINF].

3.1 SC_C_GET_CCU_VERSIONINFO

Response structure from the function

The function returns the following structure:

```
typedef struct
{
    WORD            tOperatingMode;
    CHAR            szSwVersion [SC_C_MAX_VERSION_LENGTH];
    BYTE            byMajorVersionOfDownloadedSw;
    BYTE            byMinorVersionOfDownloadedSw;
    BYTE            byMajorVersionOfResidentSw;
    BYTE            byMinorVersionOfResidentSw;
    BYTE            bySystemMode;
    BYTE            byReservedForSwInfo [SC_C_MAX_SOFTWARE_INFO];
    SC_T_CCU_TYPE   tCCUType;
    BYTE            byTCBVersion;
    BYTE            byReservedForHwInfo [SC_C_MAX_HARDWARE_INFO];
    CHAR            szSWRelNum[VERSION_C_LENGTH];
} SC_T_CCU_VERSION_INFO;
```

where:

tOperatingMode	See [SRS_SCSIINF]
szSwVersion	See [SRS_SCSIINF]
byMajorVersionOfDownloadedSw, byMinorVersionOfDownloadedSw	See [SRS_SCSIINF]
byMajorVersionOfResidentSw, byMinorVersionOfResidentSw	See [SRS_SCSIINF]
bySystemMode	See [SRS_SCSIINF]
byReservedForSwInfo	From index 0 up to 7: ‘W’ ‘i’ ‘r’ ‘e’ ‘l’ ‘e’ ‘s’ ‘s’. Rest of the bytes are reserved space for extra software information.
tCCUType	See [SRS_SCSIINF]
byTCBVersion	See [SRS_SCSIINF]
byReservedForHwInfo	See [SRS_SCSIINF]
szSWRelNum	See [SRS_SCSIINF]

3.2 SC_C_GET_CCU_CONFIG

Response structure from the function

The function returns the following structure:

```
typedef struct
{
    WORD            wNumberOfSlaveCCUs;
    WORD            wNumberOfUnitsConnected;
    WORD            wNumberOfUnits;
    SC_T_UNIT_DATA  tUnitData [SC_C_CLUSTER_MAX];
} SC_T_CCU_CONFIGURATION;
```

where the SC_T_UNIT_DATA is defined as:

```
typedef struct
{
    WORD    wUnitId;
    BYTE    byUnitType;
} SC_T_UNIT_DATA;
```

where:

wNumberOfSlaveCCUs		See [SRS_SCSIINF]
wNumberOfUnitsConnected		See [SRS_SCSIINF]
wNumberOfUnits		See [SRS_SCSIINF]
tUnitData []		See [SRS_SCSIINF]
	wUnitId	See [SRS_SCSIINF]
	byUnitType	DCNC_UNIT_WAP DCNC_UNIT_WDISC_DELEGATE DCNC_UNIT_WDISC_DELEGATE_NO_KEYS DCNC_UNIT_WDISC_DELEGATE_DUAL DCNC_UNIT_WDISC_CHAIRMAN DCNC_UNIT_WDISC_CHAIRMAN_NO_KEYS

3.3 SC_C_BATTERY_STATUS_REQ

Purpose
This function will request the battery status of all units in the parameter list. After executing this function a notification will be send for each known unit.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wNrOfUnits;
    UNITID  tUnitList[DBSC_MAX_UNIT];
} SC_T_UNIT_LIST;
```

where:

wNrOfUnits	The number of unit list entries actual present in the tUnitList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_UNIT.
tUnitList[]	Array holding the list of unit ids.

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_BATTERY_STATUS

3.4 SC_C_BATTERY_INFO_REQ

Purpose
This function will request the battery information of all units in the parameter list. After executing this function two notifications will be send for each known unit.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_UNIT_LIST as parameter. This structure is defined in section 3.2.

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_BATTERY_SERIAL
SC_C_BATTERY_ COND

3.5 SC_C_SIGNAL_STATUS_REQ

Purpose
This function will request the signal status of all units in the parameter list. After executing this function a notification will be send for each known unit.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_UNIT_LIST as parameter. This structure is defined in section 3.2.

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_SIGNAL_STATUS

3.6 SC_C_SIGNAL_QUALITY_REQ

Purpose
This function will request the signal quality of the system.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_ SIGNAL_QUALITY

3.7 SC_C_VERSIONINFO_REQ

Purpose
This function will request the version information of all units in the parameter list. After executing this function one or more notifications will be send for each known unit, depending on the availability of the version information of the unit. Each execution of SC_C_VERSIONINFO_REQ results in a maximum of one (and minimum of zero) notifications for each version type.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_UNIT_LIST as parameter. This structure is defined in section 3.2.

Response structure from the function
The function has no response parameters.

Error codes returned
SC_E_NOERROR

Update notifications
SC_C_HW_VERSIONINFO
SC_C_SW_VERSIONINFO

4. SYSTEM CONFIGURATION (SC) NOTIFICATIONS

4.1 Introduction

See [SRS_SCSIINF].

4.1.1 Unit/user event relations

UNIT-EVENT MATRIX

Event	Update Notification
Connect a WAP	SC_C_CONNECT_UNIT
Disconnect a WAP	SC_C_DISCONNECT_UNIT SC_C_DISCONNECT_UNIT ->For each unit connected to the WAP

4.2 SC_C_BATTERY_STATUS

Purpose

Notifies the remote controller the battery status of a unit. This notification is send after the battery status of a unit has been changed or after SC_C_BATTERY_STATUS_REQ is executed.

Notify structure with this update

The update uses the following structure:

```
typedef struct
{
    UNITID          tUnitId;
    BYTE            byBatteryLevel;
    WORD            wRemainingTime;
} SC_T_BATTERY_STATUS;
```

where:

tUnitId	The unit identifier of a unit.
byBatteryLevel	Level of the battery [%] from 0 to 100 % When the unit has no battery the level will be 100
wRemainingTime	Remaining time of the battery in minutes When the unit has no battery the remaining time will be 0xFFFF

4.3 SC_C_BATTERY_INFO_SERIAL

Purpose

Notifies the remote controller the serial number of the battery located in the unit. This notification is send after SC_C_BATTERY_INFO_REQ is executed.

Notify structure with this update

The update comes with the following structure:

```
typedef struct
{
    UNITID          tUnitId;
    DWORD           dwSerialNr;
} SC_T_BATTERY_INFO_SERIAL;
```

where:

tUnitId	The unit identifier of a unit.
dwSerialNr	Serial number of the battery located in the unit

When the unit has no battery the serial number will be 0xFFFFFFFF

4.4 SC_C_BATTERY_INFO_COND

Purpose
Notifies the remote controller the condition of the battery located in the unit. This notification is send after SC_C_BATTERY_INFO_REQ is executed.

Notify structure with this update
The update comes with the following structure:

```
typedef struct
{
    UNITID           tUnitId;
    WORD             wChargeCount;
} SC_T_BATTERY_INFO_COND;
```

where:

tUnitId	The unit identifier of a unit.
wChargeCount	Number of charges / discharges for the battery, which has been passed, located in the unit When the unit has no battery the number of charges / discharges will be 0

4.5 SC_C_SIGNAL_STATUS

Purpose
Notifies the remote controller the signal status of a unit. This notification is send after the signal status of a unit has been changed or after SC_C_SIGNAL_STATUS_REQ is executed.

Notify structure with this update
The update uses the following structure:

```
typedef struct
{
    UNITID               tUnitId;
    SC_T_SIGNAL_LEVEL    tSignalLevel;
} SC_T_SIGNAL_STATUS;
```

where:

tUnitId	The unit identifier of a unit.
tSignalLevel	The signal level of the unit which is one of the following: • SC_C_SIGNAL_EXCELLENT • SC_C_SIGNAL_GOOD • SC_C_SIGNAL_POOR

4.6 SC_C_SIGNAL_QUALITY

Purpose
Notifies the remote controller the quality of the signal within the system. This notification is send after the signal quality has been changed or after SC_C_SIGNAL_QUALITY_REQ is executed.

Notify structure with this update
The update comes with the following structure:

```
BOOLEAN      bBadSignal;
```

where:

bBadSignal	TRUE: Signal quality of the system is bad. FALSE: Signal quality of the system is ok.

4.7 SC_C_HW_VERSIONINFO

Purpose

Notifies the remote controller the hardware version information of a unit. This notification is send after SC_C_VERSIONINFO_REQ is executed, or when a slave unit is connected.

Notify structure with this update

The update uses the following structure:

```
typedef struct
{
    UNITID              tUnitId;
    SC_T_HW_VERSION_TYPE tHwVersionType;
    WORD                wVersion;
} SC_T_HW_VERSIONINFO;
```

where:

tUnitId	The unit identifier of a unit.
tHwVersionType	The hardware version type of the unit which is one of the following: • SC_C_VER_RF_MODULE • SC_C_VER_MAINBOARD • SC_C_VER_FPGA
wVersion	Version of the specific hardware module.

4.8 SC_C_SW_VERSIONINFO

Purpose

Notifies the remote controller the software version information of a unit. This notification is send after SC_C_VERSIONINFO_REQ is executed, or when a slave unit is connected.

Notify structure with this update

The update uses the following structure:

```
typedef struct
{
    UNITID              tUnitId;
    WORD                wMajorSwVersion;
    WORD                wMinorSwVersion;
    WORD                wBuildNr;
} SC_T_SW_VERSIONINFO;
```

where:

tUnitId	The unit identifier of a unit.
wMajorSwVersion	Major software version of the unit.
wMinorSwVersion	Minor software version of the unit.
wBuildNr	Software build number of the unit.

5. SYSTEM INSTALLATION (SI) FUNCTIONS

All SI Function information can be found in [SRS_ SCSIINF].

5.1 SI_C_GET_WAP_SETTINGS

Purpose
Retrieve all settings of the WAP.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function has one parameter:

```
UNITID      tUnitId;
```

where:

tUnitId	Reserved. (The unit identifier of a WAP.) Must be DCNC_UNASSIGNED_UNIT.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    UNITID                      tUnitId;
    SI_T_CARRIER                byCarrier;
    SI_T_WIRELESS_POWERLEVEL    byPowerLevel;
} SI_T_WAP_SETTINGS;
```

where:

tUniId	Reserved. (The unit identifier of a WAP.). Will be DCNC_UNASSIGNED_UNIT.
byCarrier	The carrier of the WAP which is one of the following: • SI_C_CARRIER_BAND_1 • SI_C_CARRIER_BAND_2 • SI_C_CARRIER_BAND_3
byPowerLevel	The coverage of the WAP which is one of the following: • SI_C_POWERLEVEL_OFF • SI_C_POWERLEVEL_LOW • SI_C_POWERLEVEL_MEDIUM • SI_C_POWERLEVEL_HIGH

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_WAP_SETTINGS

5.2 SI_C_SET_WAP_SETTINGS

Purpose
Set all settings of the WAP.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_WAP_SETTINGS as parameter. This structure is defined in section 5.1.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER

Related functions
SI_C_GET_WAP_SETTINGS

Update notifications
SI_C_WAP_SETTINGS

5.3 SI_C_GET_WIRELESS_SETTINGS

Purpose
Retrieve all wireless system settings of the system.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
typedef struct
{
    BYTE    bySystemId;
    BYTE    byRepetitions;
} SI_T_WIRELESS_SETTINGS;
```

where:

bySystemId	The system identifier. Range 0…15
byRepetitions	The number of repetitions within the wireless communication path. Range 0…2

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_WIRELESS_SETTINGS

5.4 SI_C_SET_WIRELESS_SETTINGS

Purpose
Set all wireless system settings of the system.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_WIRELESS _SETTINGS as parameter. This structure is defined in section 5.3.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER

Related functions
SI_C_GET_WIRELESS_SETTINGS

Update notifications
SI_C_WIRELESS_SETTINGS

5.5 SI_C_GET_WIRELESS_MODE

Purpose
Retrieve the wireless mode of the system.

Availability
This function is available in system mode: CONGRESS.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
SI_T_WIRELESS_MODE   tMode;
```

where:

tMode	The wireless mode of the system which is one of the following: • SI_C_WIRELESS_MODE_ON • SI_C_WIRELESS_MODE_SLEEP • SI_C_WIRELESS_MODE_OFF • SI_C_WIRELESS_MODE_SUBSCRIPTION

Error codes returned
SI_E_NOERROR

Related functions
SI_C_SET_WIRELESS_MODE

5.6 SI_C_SET_WIRELESS_MODE

Purpose
Set the wireless mode of the system.

Availability
This function is available in system mode: CONGRESS.

Parameter structure for the function
This function requires the structure SC_T_WIRELESS_MODE as parameter. This structure is defined in section 5.5.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR
SI_E_WRONG_PARAMETER

Related functions
SI_C_GET_WIRELESS_MODE

Update notifications
SI_C_WIRELESS_MODE

5.7 SI_C_START_MON_SI

Purpose
Function to start the monitoring behavior of the SI application.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the following structure:

```
WORD     wNrOfInstances
```

where:

wNrOfInstances	The value of the update use count for the SI application at the end of the function handling. It contains the number of times a remote PC has connected over the same communication

medium.

Error codes returned
SI_E_NOERROR
SI_E_REGISTER_RFS_FAILED

Related functions
SI_C_STOP_MON_SI

5.8 SI_C_STOP_MON_SI

Purpose
Function to stop monitoring the behavior of the SI application.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function has no additional parameters.

Response structure from the function
The function returns the number of instances, see 0

Error codes returned
SI_E_NOERROR
SI_E_NOT_INCONTROL

Related functions
MM_C_START_MON_MM

5.9 SI_C_UNSUBSCRIBE_REQ

Purpose
This function will request to unsubscribe units of all units in the parameter list.

Availability
This function is available in system mode: MAINTENANCE, CONFIG and CONGRESS.

Parameter structure for the function
The function requires the following structure as parameter:

```
typedef struct
{
    WORD    wNrOfUnits;
    UNITID  tUnitList[DBSC_MAX_UNIT];
} SI_T_UNIT_LIST;
```

where:

wNrOfUnits	The number of unit list entries actual present in the tUnitList array. Only this amount of array elements is transmitted. This value never exceeds the constant DBSC_MAX_UNIT.
tUnitList[]	Array holding the list of unit ids.

Response structure from the function
The function has no response parameters.

Error codes returned
SI_E_NOERROR

Update notifications
SC_C_DISCONNECT_UNIT

6. SYSTEM INSTALLATION (SI) NOTIFICATIONS

All SI Notifications information can be found in [SRS_ SCSIINF]. Notifications will only come while monitoring the SI application.

6.1 SI_C_WAP_SETTINGS

Purpose
Notifies the remote controller the settings of WAP. This notification is send after the settings of a WAP has been changed.

Notify structure with this update
The update comes with the structure SI_T_WAP_SETTINGS as defined in section 5.1.

6.2 SI_C_WIRELESS_SETTINGS

Purpose
Notifies the remote controller the wireless settings of the system. This notification is send after the wireless settings of the system has been changed.

Notify structure with this update
The update comes with the structure SI_T_WIRELESS _SETTINGS as defined in section 5.3.

6.3 SI_C_WIRELESS_MODE

Purpose
Notifies the remote controller the wireless mode of the system. This notification is send after the wireless mode of the system has been changed.

Notify structure with this update
The update comes with the structure SI_T_WIRELESS_MODE as defined in section 5.5.

7. MICROPHONE MANAGEMENT (MM) FUNCTIONS

All MM Function information can be found in [SRS_MMINF].

7.1 MM_C_GET_SETTINGS

Response structure from the function

The function returns the following structure:

```
typedef struct
{
    WORD    wOperationMode;
    WORD    wActiveMics;
    WORD    wMaxRTSListLen;
    BOOLEAN bAllowCancelRequests;
    BOOLEAN bAllowMicroOff;
    WORD    wAttentionTone;
    BOOLEAN bAmbientMicCtrl;
    BOOLEAN bAutoMicOff;
} MM_T_CCU_GLOBAL_SETTINGS;
```

where:

wOperationMode	see [SRS_MMINF]
wActiveMics	see [SRS_MMINF]
wMaxRTSListLen	see [SRS_MMINF]
bAllowCancelRequest	see [SRS_MMINF]
bAllowMicroOff	see [SRS_MMINF]
wAttentionTone	see [SRS_MMINF]
bAmbientMicCtrl	see [SRS_MMINF]
bAutoMicOff	TRUE: Automatic microphone off function is activated. FALSE: Automatic microphone off function is deactivated.

7.2 MM_C_SET_SETTINGS

Parameter structure for the function

This function requires the structure MM_T_CCU_GLOBAL_SETTINGS as parameter. This structure is defined in section 7.1.

8. MICROPHONE MANAGEMENT (MM) NOTIFICATIONS

All MM Notifications information can be found in [SRS_MMINF].

8.1 MM_C_SET_SETTINGS_ON_PC

Notify structure with this update

The update comes with the structure MM_T_CCU_GLOBAL_SETTINGS as defined in section 7.1.

APPENDIX A. VALUES OF THE DEFINES FOR SC

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define SC_C_BATTERY_STATUS_REQ          ( MKWORD (39 , DCNC_APP_SC) )
#define SC_C_BATTERY_INFO_REQ            ( MKWORD (40 , DCNC_APP_SC) )
#define SC_C_SIGNAL_STATUS_REQ           ( MKWORD (41 , DCNC_APP_SC) )
#define SC_C_SIGNAL_QUALITY_REQ          ( MKWORD (42 , DCNC_APP_SC) )
#define SC_C_BATTERY_STATUS              ( MKWORD (43 , DCNC_APP_SC) )
#define SC_C_BATTERY_INFO_SERIAL         ( MKWORD (44 , DCNC_APP_SC) )
#define SC_C_BATTERY_INFO_COND           ( MKWORD (45 , DCNC_APP_SC) )
#define SC_C_SIGNAL_STATUS               ( MKWORD (46 , DCNC_APP_SC) )
#define SC_C_SIGNAL_QUALITY              ( MKWORD (47 , DCNC_APP_SC) )
#define SC_C_VERSIONINFO_REQ             ( MKWORD (48 , DCNC_APP_SC) )
#define SC_C_HW_VERSIONINFO              ( MKWORD (49 , DCNC_APP_SC) )
#define SC_C_SW_VERSIONINFO              ( MKWORD (50 , DCNC_APP_SC) )


#define DCNC_SUBTYPE_WDISC               0x06
#define DCNC_SUBTYPE_WDISC_DUAL          0x07
#define DCNC_SUBTYPE_WDISC_NO_KEYS       0x08


#define DCNC_SUBTYPE_WAP                 0x02


#define DCNC_UNIT_WAP                    (DCNC_TYPE_CCU | DCNC_SUBTYPE_WAP)
#define DCNC_UNIT_WDISC_DELEGATE         (DCNC_TYPE_DELEGATE |
                                         DCNC_SUBTYPE_WDISC)
#define DCNC_UNIT_WDISC_DELEGATE_NO_KEYS (DCNC_TYPE_DELEGATE |
                                         DCNC_SUBTYPE_WDISC_NO_KEYS)
#define DCNC_UNIT_WDISC_DELEGATE_DUAL    (DCNC_TYPE_DELEGATE |
                                         DCNC_SUBTYPE_WDISC_DUAL)
#define DCNC_UNIT_WDISC_CHAIRMAN         (DCNC_TYPE_CHAIRMAN |
                                         DCNC_SUBTYPE_WDISC)_
#define DCNC_UNIT_WDISC_CHAIRMAN_NO_KEYS (DCNC_TYPE_CHAIRMAN |
                                         DCNC_SUBTYPE_WDISC_NO_KEYS)


typedef BYTE SC_T_SIGNAL_LEVEL;
#define SC_C_SIGNAL_POOR                 0
#define SC_C_SIGNAL_GOOD                 1
#define SC_C_SIGNAL_EXCELLENT            2


typedef BYTE SC_T_HW_VERISON_TYPE;
#define SC_C_VER_RF_MODULE               0
#define SC_C_VER_MAINBOARD               1
#define SC_C_VER_FPGA                    2
```

APPENDIX B. VALUES OF THE DEFINES FOR SI

In this document a lot of definitions are given, which have values connected to them. In this appendix all defines will be connected to their values;

The values are presented in ‘C’-syntax

```
#define SI_C_GET_WAP_SETTINGS            ( MKWORD (18 , DCNC_APP_SI) )
#define SI_C_SET_WAP_SETTINGS            ( MKWORD (19 , DCNC_APP_SI) )
#define SI_C_GET_WIRELESS_SETTINGS       ( MKWORD (20 , DCNC_APP_SI) )
#define SI_C_SET_WIRELESS_SETTINGS       ( MKWORD (21 , DCNC_APP_SI) )
#define SI_C_GET_WIRELESS_MODE           ( MKWORD (22 , DCNC_APP_SI) )
#define SI_C_SET_WIRELESS_MODE           ( MKWORD (23 , DCNC_APP_SI) )
#define SI_C_WAP_SETTINGS                ( MKWORD (24 , DCNC_APP_SI) )
#define SI_C_WIRELESS_SETTINGS           ( MKWORD (25 , DCNC_APP_SI) )
#define SI_C_WIRELESS_MODE               ( MKWORD (26 , DCNC_APP_SI) )
#define SI_C_START_MON_SI                ( MKWORD (27 , DCNC_APP_SI) )
#define SI_C_STOP_MON_SI                 ( MKWORD (28 , DCNC_APP_SI) )
#define SI_C_UNSUBSCRIBE_REQ             ( MKWORD (29 , DCNC_APP_SI) )


typedef BYTE SI_T_CARRIER;
#define SI_C_CARRIER_BAND_1              0
#define SI_C_CARRIER_BAND_2              1
#define SI_C_CARRIER_BAND_3              2


typedef BYTE SI_T_WIRELESS_POWERLEVEL;
#define SI_C_POWERLEVEL_OFF              0
#define SI_C_POWERLEVEL_LOW              1
#define SI_C_POWERLEVEL_MEDIUM           2
#define SI_C_POWERLEVEL_HIGH             3


typedef BYTE SI_T_WIRELESS_MODE;
#define SI_C_WIRELESS_MODE_ON            0
#define SI_C_WIRELESS_MODE_SLEEP         1
#define SI_C_WIRELESS_MODE_OFF           2
#define SI_C_WIRELESS_MODE_SUBSCRIPTION  3
```