

External Control of the CU 4005 / CU 4010

General

Data is sent using a rate of 9600 baud, 8 bits, No Parity and 1 stop bit. The RTS/CTS handshake signals are in use. The RS4232 card has two serial ports - one RS232 port and one RS422 port, which may be used simultaneously.

The messages to and from the RS4232 card are sent in 'strings', which are not zero-terminated, but terminated with either a checksum <CHKSUM> calculated over the entire message or by a carriage return <CR>. The brackets <> are not part of the syntax, but are used to identify a single byte.

<CR> has the ASCII value 10.

_ (underscore) is used in this paper to identify the space character. (ASCII value 32)

IMPORTANT: In order for the RS4232 Card to relay status messages other than the start-up message it's necessary to transmit one of the question mark commands to the RS4232 card. (e.g. "?M<CR>") Upon reception of one of these status request commands, the RS4232 card acknowledges that an external peripheral is connected to the serial port and starts relaying all status messages on this port.

RS4232 interface card, message list

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Data from the RS4232 Card

Startup message from RS4232

```
"!W_RS4232_version_1.0_Copyright_DIS_(Danish_
Interpretation_Systems)_1995<CR>"
```

This message is sent from the interface card, after Power Up. The version number and/or year will be altered in upgraded versions of the RS4232 software.

Number of microphones connected

```
"!M<CU1:CHAIN1><CU1:CHAIN2><CU2:CHAIN1> ... <CU10:CHAIN2><CHKSUM>"
```

This message is sent as response to a request on the number of microphones connected in the system when the number of microphones in the system is changed, or a chain of microphones changes state (valid/invalid). The byte <CU1:CHAIN1> contains the number of microphones connected to CU number 1 Chain number 1 and so forth. Data is sent for each of the 10 CU's with each 2 Chains allowed in a single system. A single chain can contain from 0 to 50 microphones.

If a Chain is identified as invalid (due to a faulty microphone or a change in the number of microphones) the number 255 is sent. In case a chain is invalidated during operation, the remaining system will still work. When a chain is invalidated this message also implies that microphones in this chain is turned off from Speak or Request - hence no separate messages are sent.

Chairmen connected

```
"!C<CHAIRMAN1 CU><CHAIRMAN1 CHAIN><CHAIRMAN1 MIC>
....
<CHAIRMAN10 CU> <CHAIRMAN10 CHAIN><CHAIRMAN10 MIC><CHKSUM>"
```

<CHAIRMAN1 CU> holds the number of the CU (1-10) to which the first chairman microphone is

connected. If this chairman microphone is not present in the system this byte takes on the value 0.

<CHAIRMAN1 CHAIN> holds the number of the Chain (1-2) to which the first chairman microphone is connected.

<CHAIRMAN1 MIC> holds the number of the Chairman microphone in the Chain (1-50).

Data is sent for the possible 10 Chairman microphones.

Maximum number of delegates speaking

```
"!K<MAXSPK><CHKSUM>"
```

This message contains the maximum number of delegate microphones allowed to be in Speak at any time. This system value ranges from 1 to 6.

Maximum number of delegates in request

```
"!Q<MAXREQmsb><MAXREQlsb><CHKSUM>"
```

This message contains the maximum number of delegate microphones that can be put in request at any time. <MAXREQmsb> contains the most significant byte, and <MAXREQlsb> contains the least significant byte. This system value ranges from 1 to 999.

System mode

```
"!E<MODE><CHKSUM>"
```

This message is sent when the mode of operation for the CDS 4000 system changes. Possible modes are:

'A': AUTOMATIC

'F': FIFO

'M': MANUAL

Volume Control

```
"!V<MIC VOLUME><INPUT
VOLUME><CHKSUM>"
```

This message is sent, when one of the volume controls is adjusted. The possible ranges for each of the two volume controls is 0 to 64.

```
0:      off
1:      -42dB
2:      -41dB
...
63:     +20dB
```

Microphone is turned on

```
"!S<CU><CHAIN><MIC><CHKSUM>"
```

This message is sent, when a microphone is turned on.

<CU> is the number of the CU to which the microphone is connected (1-10).

<CHAIN> is the number of the Chain to which the microphone is connected (1-2).

<MIC> is the microphone number in the Chain (1-50).

If the microphone switched on, was in request, this message also implies that the request is deleted.

Microphone in Speak

```
"!s<CU><CHAIN><MIC><CHKSUM>"
```

This message is sent as response to a request for the system status. The message is sent for each microphone currently switched on.

Microphone is put in Request

```
"!R<CU><CHAIN><MIC><CHKSUM>"
```

This message is sent when a microphone is put in request.

Microphone in Request

```
"!r<CU><CHAIN><MIC><CHKSUM>"
```

This message is sent as response to a request for the system status. The message is sent for each microphone currently in request. The messages are ordered so that the microphone put in request first will be identified in the first message and so forth.

Microphone is turned off

```
"!O<CU><CHAIN><MIC><CHKSUM>"
```

This message is sent, when a microphone is turned off. This message is used regardless of whether the microphone was in Speak or Request before it was turned off.

Delegate Off activate acknowledge message

```
"!D<CR>"
```

This message is sent from the interface card to acknowledge the reception of a Delegate Off activate message.

Delegate Off deactivate acknowledge message

```
"!d<CR>"
```

This message is sent from the interface card to acknowledge the reception of a Delegate Off deactivate message.

Conversion Table download acknowledge message

```
"!P<POSmsb><POSlsb><CHKSUM>"
```

This message is sent from the interface card to acknowledge the reception of a Conversion Table

download message. The bytes <POSmsb> and <POSlsb> identifies the position in the conversion table where the update was applied.

Test status message

"!T<T1><CHKSUM>"

This message is sent when the microphone system enters or leaves test mode, and as a response to the test status request message. If the byte <T1>=0 the system is not in test-mode. If <T1>=1 the system is running a test controlled by the master CU - other values of <T1> identifies which MC panel is currently running a system test. When the system is in Test mode it is not possible to control the microphones via the interface card.

RS4232 card internal buffer overflow

"!X<CR>"

This message is sent when an internal buffer overflow occurs in the RS4232 card. This may occur if the RS4232 card receives messages from the master CU at a higher rate than it can relay the messages over the serial port - this may occur if the PC or other equipment connected to the RS4232 card holds off transmission with the hardware

handshake signal. Once transmission is re-established, the overflow message will be sent, and the external equipment has notified that one or more microphone Speak/Request/Off messages were lost. These are the only messages that can provoke an overflow, as all other messages are non-synchronous. When the external equipment has notified that some messages were lost, it is able to re-achieve correct microphone status by sending the microphone status request message to the RS4232 card and collect the response from this request.

It is necessary to allow this overflow possibility to ensure that a faulty computer connected to the RS4232 card does not bring down the entire microphone system.

Serial Receive overflow

"!F<CR>"

This message is sent from the interface card if an overflow occurs in the incoming data-stream from the external equipment. An overflow can only occur if the external equipment is not honouring the CTS/RTS hardware handshake signals. An overflow will result in the loss of one or more messages to the interface card, and these messages will have to be repeated.

Data to the RS4232 Card

System status request messages

The external equipment can request the status of the various system variables. A message is automatically sent if an update of one of these variables occurs.

- "?M<CR>": Number of microphones connected
- "?C<CR>": Chairmen connected
- "?K<CR>": Maximum number of delegates speaking
- "?Q<CR>": Maximum number of delegates in request
- "?E<CR>": System mode
- "?V<CR>": Volume Control
- "?T<CR>": Test status

Microphone status request

"?S<CR>"

This message requests the status of the microphones in the system and will be responded with a series of microphone in speak/microphone in request messages.

Commands to control the microphone system

The commands to put a microphone in request/speak/off, adjust the volume control, set the maximum number of delegates speaking/in request, and change the system mode of operation are identical to the commands sent from the RS4232, when any of these variables are changed from the CU.

Delegate Off activate message

"!D<CR>"

Sending this message to the interface card has the same effect as pressing a Delegate Off button on a chairman microphone. In Manual and Automatic mode all delegate microphones will be turned off - in Fifo mode the delegate microphones will be muted. While delegate off is activated it will not be possible for delegate microphones to switch on.

The interface card will respond to this message by returning a Delegate Off activate acknowledge message.

Delegate Off deactivate message

"!d<CR>"

This message deactivates the delegate off function of the interface card.

!! IT IS VERY IMPORTANT THAT THIS MESSAGE IS SENT FOLLOWING THE DELEGATE OFF ACTIVATE MESSAGE TO ALLOW DELEGAT MICROPHONES TO BE SWITCHED ON AGAIN.

The interface card will respond to this message by returning a Delegate Off deactivate acknowledge message.

Conversion Table Download message

"!P<POSmsb><POSlsb><LOG1msb><LOG1lsb> ... <LOG10msb><LOG10lsb><CHKSUM>"

This message is sent to the interface card to update the conversion tables of the MC4000 panels in the microphone system. Please refer to the MC4000 chapter for a description of the Conversion Table.

The bytes <POSmsb> and <POSlsb> are the most significant byte and least significant byte respectively of the physical number entry in the conversion table from which the following logical numbers will be inserted. The physical number POS will receive the logical number LOG1, the physical number POS+1 will receive the logical

number LOG2 and so forth. 10 consecutive physical numbers are always updated upon reception of a download message. Note observe the restriction $1 \leq \text{POS} \leq 990$ – POS and the following 9 positions all have to be within the conversion table bounds. It is not possible to invalidate the conversion table by giving two physical numbers the same logical number - the MC4000 software

enforces the basic rule that all logical numbers in the conversion table have to be different. The interface card will respond to this message by returning a Conversion Table Download acknowledge message.

DM / CM 4100 Series Voice Activated microphone units

The DM / CM 4100 series of units function exactly as the standard units, but only when they are in MAN/AUT mode. If they are in VOICE ACTIVATE mode, no messages will be sent about

units switching on and off automatically controlled by the sound level. The message is not sent from the microphones to the central unit, so it is not possible for the central unit to tell.