

ROHDE&SCHWARZ

Test and Measurement
Division

Remote Control Box

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1 Connection

The Remote Control Box (RCB) is connected to the CMS via a supplied cable. The cable is to be plugged to the left-hand side of the RCB and to the back of CMS. The cable-mounted connectors have 50 pins.

2 Putting into Operation

The power supply for the RCB comes via the cable from CMS. Immediately after the power-on of the CMS the RCB subsystem will start. The user will be prompted to start a CMS application program.

User dialog :

Select program number ....
then press <ACCEPT> < 00 >

The user can choose the program number by pressing the keys <⇦> or <⇨>. There are program numbers up to 15.

The next dialog concerns the selection of the report medium.

User dialog:

Select report target...
then press <ACCEPT> OFF

The user can choose the medium by pressing the keys <⇦> and <⇨>. The following selections are possible:

- OFF
- PRINTER (may be selected only when a printer is connected and ready)
- MEMCARD (may be selected only when a memcard is inserted)

The next dialog is to fix the format of the report.

User dialog:

Select report format...
then press <ACCEPT> SMALL

The user can choose the format by pressing the keys <⇦> and <⇨>. The following selections are possible:

- SMALL
- MEDIUM
- LARGE

If MEMCARD was selected as the report target, the next dialog will be:

Select MEMCARD Report No.
then press <ACCEPT> < 00 >

Storing the report to memcard the user can choose a number in the range between 0 and 99.

3 Exiting the Program

A CMS application program can be stopped by means of specific dialogs. The user has to initiate an exit command using "A". The following dialog will take place:

Restart this program ?
press <ACCEPT> or <REJECT>

or

Continue with a new program ?
press <ACCEPT> or <REJECT>

The first choice will run the same program on CMS again by pressing <ACCEPT>. Pressing <REJECT> leads to the next dialog. Pressing <ACCEPT> in this case offers a choice of programs. Selecting <REJECT> leads to the normal program mode.

4 Basic Setting of the CMS

Starting from an INTERNAL application program:

A stored basic setting will be loaded by the CMS command RECALL 2 <ENT> when starting the CMS application program. To ensure that the application program runs smoothly with the RCB, some settings must be stored under location 2.

Carry out the basic setting as follows:

1. First, press Shift and Reset to set all default parameters

2. Select in the CONFIG menu: KEY BEEP OFF

3. Select in the AUTORUN menu:

SELECT	PROG-INT
REPORT FORMAT	SMALL
REPORT TARGET	OFF
STOP COND	NO-STOP
MIN DELAY	0 ms

4. Store the settings under location 2 with STORE 2 <ENT>

Note: After making a RECALL 2 the CMS should be in the AUTORUN menu and the settings should be valid

Starting from a MEMCARD application program:

A stored basic setting will be loaded by the CMS command RECALL 8 <ENT> when starting the CMS application program. To ensure that the application program runs smoothly with the RCB, some settings must be stored under location 8.

Carry out the basic setting as follows:

1. First, press Shift and Reset to set all default parameters

2. Select in the CONFIG menu: KEY BEEP OFF

3. Select in the AUTORUN menu:

SELECT	PROG-CARD
REPORT FORMAT	SMALL
REPORT TARGET	OFF
STOP COND	NO-STOP
MIN DELAY	0 ms

4. Store the settings under location 8 with STORE 8 <ENT>

Note: After making a RECALL 8 the CMS should be in the AUTORUN menu and the settings should be valid

5 Description of the Keys of the Remote Control Box

5.1 Introduction

The Remote Control Box (RCB) for CMS contains 8 keys. The keys are:

- START
- STOP
- CONTINUE
- REPEAT
- REJECT
- ACCEPT
- ⇦
- ⇨

5.2 Initialization Dialog

After power-on of the CMS the RCB provides a initialization dialog to choose the application program and other options like report target and so on. This initialization dialog is fixed and not free programmable. To operate this dialog you have to use the following keys:

- ⇦ and ⇨ to choose the program number,
- ACCEPT to make the chosen entry valid or
- REJECT to ignore the choice and go to next dialog.

You have to use this kind of action for the **whole** initialization dialog.

5.3 Reset

After the power-on of the CMS you can force a RESET by pressing ACCEPT and REJECT together, hold both pressed and then press START. After releasing the keys the RCB executes a RESET and initializes the CMS by emulation of the keys "Shift"-"RESET". The RESET of the RCB leads to the initialization dialog.

5.4 Using the Keys with an Application Program

You can program all 8 keys in three different ways:

- **Global key macro**

  You can define a key macro for every one of the 8 keys with up to 19 key emulations on CMS. If activated, the key macro will be executed every time you press the defined key after power-on. The command is the '8'. For using this command see RCB description.

- **Key definition string**

  You can define a key definition linked with the text for the two lines of the LCD. Such a key definition can contain actions for every one of the 8 keys. After calling the key definition the RCB will wait for the pressing of a key and if there is an action definition (or more than one) for this key, the RCB will provide these actions. After this the RCB will wait for a new command.

  Use commands 0, 1, 2 or B, C, D. For using these commands see RCB description.

- **Toggle definition**

  You can also define a so-called toggle definition for ⇦ and/or ⇨ linked with the text for the two lines of the display.

  Toggle definition means: The positions on the display above the ⇦ or ⇨ keys (only 4 characters for each) contain a text specific for a choice. By pressing ⇦ (for example if the text is above the ⇦ key) the display shows the next text for selection. The same applies to ⇨ if there is a ⇨ toggle. You can press ⇦ or ⇨ as much as you need to find the right selection. To validate the found toggle you have to press ACCEPT. Every toggle is able to execute up to two CMS key emulations following ACCEPT. With REJECT you will leave this dialog without any action.

  Use the commands 1, 2, 3. For using these see RCB description.

  After ACCEPT or REJECT the RCB will wait for a new command.

6 RCB commands

The RCB receives the commands via the RS-232 serial interface. The CMS is able to carry out a serial send command. The provided serial string has a maximum length of 41 bytes (characters). The string is to be terminated by CMS with a CR (0x0D) or a CR-LF (0x0D, 0x13).

The first byte of the string is the command identifier.

The main idea for using the RCB with CMS is the following one:

> The RCB provides a two line LCD (2x40 characters) and 8 keys. The text of the two LCD lines and the free-programmable functions of the keys are combined in a so-called "text entry" or "toggle entry". Such a "text entry" has a number. Under this number the user can call a "test entry" and execute it. Execute means: display the text and activate a key poll, wait for the press of a key and perform the defined key functions after pressing a key.

6.1 Starting an Application Program

An application program is to be started on the CMS with the following sequence:

```
0044: SPECIAL:REPEAT:WHILE:NOT      BCD0
0045: SPECIAL:REPEAT:STOP
```

This is important for the synchronization between the RCB and the CMS application program.

The application awaits a High on BCD0, after which the application program will be continued.

6.2 Storing Text Entries or Toggle Entries

Belonging to this group are commands 0, 1, 2 and 3.

The commands of this group store a part of an entry under its number in the RAM of the RCB.

These parts are:

- text of line 1
- text of line 2
- key or toggle definition

The following commands are available:

- store text entry for line 1 (see chapter 6.2.1)
- store text entry for line 2 (see chapter 6.2.2)
- store key definition string for a text entry (see chapter 6.2.3)
- store toggle definition string for a text entry (see chapter 6.2.4)

6.2.1 Storing Text Entry for Line 1

Byte 1: Command character '1' (0x31)
Bytes 2 + 3: Number of the entry
Byte 4 and higher: Text to display on line 1

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
1	1	2	L	C	D	-	T	E	X	T		1	s	t		L	I	N	E	

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
E	N	T	R	Y		1	2													

Stores under number 12 the text "LCD-TEXT 1st LINE ENTRY 12" for line 1.

```
0010: SERIAL:SEND:      112LCD-TEXT 1st LINE ENTRY 12
```

6.2.2 Storing Text Entry for Line 2

Byte 1: Command character '2' (0x32)
Bytes 2 + 3: Number of the entry
Byte 4 and higher: Text to display on line 2

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
2	1	2	L	C	D	-	T	E	X	T		2	n	d		L	I	N	E	

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
E	N	T	R	Y		1	2													

Stores under number 12 the text "LCD-TEXT 2nd LINE ENTRY 12" for line 2.

```
0020: SERIAL:SEND:      212LCD-TEXT 2nd LINE ENTRY 12
```

6.2.3 Storing Key Definition String for Text Entry

Byte 1: Command character '0' (0x30)
Bytes 2 + 3: Number of the entry
Bytes 4 + 5: Number of a text entry to be executed automatically after finishing the current one ("00" means no connection to another text entry)
Byte 6 and higher: Start of key definition

Syntax for key definitions (each key has its own identifier):

- "START" 'S' (0x53)
- "STOP" 'O' (0x4F)
- "CONTINUE" 'C' (0x43)
- "REPEAT" 'R' (0x52)
- "REJECT" 'J' (0x4A)
- "ACCEPT" 'A' (0x41)
- "⇦" '1' (0x31)
- "⇨" '2' (0x32)

It is possible to assign each key with a number of actions which is limited only by the length of the string.

Syntax for the actions (each action has its own identifier):

- "Disable" 'D' (0x44) no reaction
- "Next" 'N' (0x4E) automatically execute the next higher (increment 1) text entry
- "Logic" 'L' (0x4C) set the four TTLIO lines with a pattern
- "Key" 'K' (0x4B) emulate CMS key specified by its number
- "Boot" 'B' (0x42) boot the RCB and emulate the key sequence "Stop"-"Stop"-"Shift"-"Reset" on CMS
- "Reset" 'T' (0x54) reset the CMS by the key sequence "Shift"-"Reset" on CMS

For actions 'L' and 'K' there are additional parameters following the action identifier:

- 'L' follows a one-figure number in the range from '0' to 'F' representing all 16 possible combinations for the 4-bit TTLIO pattern. For example an 'A' represents the bit pattern 1010b.
- 'K' follows a two-figure number (leading zero for one-figure numbers) representing the key number on CMS. For example: number 18 specifies the key '2' of the numbers pad.

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
0	1	2	5	6	S	K	3	0	L	A	O	T								

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Stores key definition for entry 12 with a linked reference to entry 56 and definitions for the keys:

- "START" emulates key 30 on CMS **and** places the bit pattern 1010 to the TTLIO lines if pressed
- "STOP" runs a reset on CMS by emulation of the key sequence "Shift"-"Reset".

```
0010:SERIAL:SEND: 01256SK30LAOT
```

Tables of CMS key numbers

1. Keys left (CMSTL_) and right (CMSTR_) of the display

Key descriptor	Key number	Key descriptor	Key number
CMSTL_1	01	CMSTR_1	09
CMSTL_2	02	CMSTR_2	10
CMSTL_3	03	CMSTR_3	11
CMSTL_4	04	CMSTR_4	12
CMSTL_5	05	CMSTR_5	13
CMSTL_6	06	CMSTR_6	14
CMSTL_7	07	CMSTR_7	15
CMSTL_8	08	CMSTR_8	16

2. Keys of numeric keypad

Key descriptor	Key number	Key descriptor	Key number
CMSTZ_0	26	CMSTZ_8	24
CMSTZ_1	17	CMSTZ_9	25
CMSTZ_2	18	CMSTZ_PKT	27
CMSTZ_3	19	CMSTZ_STR	28
CMSTZ_4	20	CMSTZ_MHz	29
CMSTZ_5	21	CMSTZ_KHz	30
CMSTZ_6	22	CMSTZ_HZ	31
CMSTZ_7	23	CMSTZ_DB	32

3. Special keys

Key descriptor	Key number	Key descriptor	Key number
CMST_CLEAR	33	CMST_MENUP	41
CMST_ENTER	34	CMST_MENDOWN	42
CMST_SHIFT	35		
CMST_START	36		
CMST_STOP	37		
CMST_STORE	38		
CMST_PLTOL	39		
CMST_VAR	40		

6.2.4 Storing Toggle Definition String for a Text Entry

"Toggle entry" means the following procedure:

A normal text is displayed on the two LCD lines (see 5.2.1 and 5.2.2). In the second line at position 32 a short message (4 bytes long) called "toggle" should be displayed. The position is above the keys ⇦ and ⇨. Above each of the two keys there can be such a short message. With every pressing of ⇦ (or ⇨) the program will display another short text. The user has a selection of messages. If the selection is correct, the user validates the setting by pressing ACCEPT. If none of the possible selections is correct, the user can ignore them by pressing REJECT.

After pressing ACCEPT the RCB will emulate up to two keys on CMS specified by the toggle definition.

The command string is as follows:

Byte 1: Command character '3' (0x33)

Bytes 2 + 3: Number of the entry

Bytes 4 + 5: Number of a text entry to be executed automatically after finishing the current one ("00" means no connection to another text entry)

Byte 6: Select the required toggle and append or new toggle

1 - selects: new toggle entry for ⇦
2 - selects: new toggle entry for ⇨
3 - selects: append this toggle entry to the existing entry for ⇦
4 - selects: append this toggle entry to the existing entry for ⇨

Subfunctions 3 + 4 serve for adding more selections with another CMS string (because of the maximum length of the CMS serial strings the user can define up to 5 selections for each TONE key with one string).

Please be aware of the succession. First send the entry of a new toggle (1 or 2) and then send the toggle entry to be appended.

Byte 7 and higher: Start of toggle definition

Every toggle definition consists of 4 characters text and two bytes with two key definitions. Toggle entries enable the selection of an entry out of all possible toggles by pressing "ACCEPT". The RCB will emulate these two keys. In contrast to the key definitions with the 'K' option in the key definition string (chapter 6.2.3) the key definition for a toggle entry is only one byte wide. It is possible to choose just one of the 16 number keys of the numbers pad on CMS. That is why only the characters '0'-'9' or 'A'-'F' are allowed. This leads to emulation of the keys CMSTZ_0 to CMSTZ_DB.

An 'X' as a key number means: press no key. The definition of only one key is thus possible.

Example 1:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3	1	2	5	6	1		O	F	F	2	A			O	N	5	X			

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Example 1 stores a toggle definition under number 12 with a linked reference to entry 56 and two toggles for ⇦. Accepting "OFF" selects the pressing of keys CMSTZ_2 and CMSTZ_PKT on CMS. Accepting "ON" selects the pressing of key CMSTZ_5 on CMS.

```
0010:SERIAL:SEND: 312561 OFF2A  ON5X
```

Example 2:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3	1	2	5	6	3			G	O	6	X	S	T	O	P	1	X			

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Example 2 appends two toggles to a ⇦ toggle entry. Assuming the previous example has been executed before, the new toggle for ⇦ now has 4 entries: "OFF", "ON", "GO" and "STOP".

```
0020:SERIAL:SEND: 312563  GO6XSTOP1X
```

Example 3:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3	1	2	5	6	2		P	R	N	2	A		C	R	T	5	X	C	A	R

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
D	A	E																		

Example 3 stores a toggle definition under number 12 with a linked reference to entry 56 and three toggles for ⇨. Accepting PRN selects the pressing of keys CMSTZ_2 and CMSTZ_PKT on CMS. Accepting CRT selects the pressing of key CMSTZ_5 on CMS. Accepting CARD selects the pressing of keys CMSTZ_PKT and CMSTZ_HZ on CMS.

```
0020:SERIAL:SEND: 312562 PRN2A CRT5XCARDAE
```

Example 4:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
3	1	2	5	6	4	D	I	S	K	2	F									

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Example 4 appends one toggle to an existing ⇨ toggle entry. Assuming the previous example has been executed before, the new toggle for ⇨ now has 4 entries: "PRN", "CRT", "CARD" and "DISK".

```
0030:SERIAL:SEND: 312564DISK2F
```

6.3 Execute Text Entry Immediately

Belonging to this group are commands B, C and D. They execute a part of an entry immediately. These parts are:

- text of line 1
- text of line 2
- key definition

The following commands are available:

- text entry for line 1 (see chapter 6.3.1)
- text entry for line 2 (see chapter 6.3.2)
- key definition string for a text entry (see chapter 6.3.3)

6.3.1 Text Entry for Line 1

Byte 1: Command character 'C' (0x43)
Byte 2 and higher: Text to be displayed on line 1

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
C			L	C	D	-	T	E	X	T		1	s	t		L	I	N	E	

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
E	N	T	R	Y		I	M	M	E	D	I	A	T	E	L	Y				

Displays text "LCD-TEXT 1st LINE ENTRY IMMEDIATELY" on line 1.

```
0044:SERIAL:SEND: C  LCD-TEXT 1st LINE ENTRY IMMEDIATELY
```

6.3.2 Text Entry for Line 2

Byte 1: Command character 'D' (0x44)
Byte 2 and higher: Text to be displayed on line 2

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
D			L	C	D	-	T	E	X	T		2	n	d		L	I	N	E	

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	
E	N	T	R	Y		I	M	M	E	D	I	A	T	E	L	Y				

Displays the text "LCD-TEXT 2nd LINE ENTRY IMMEDIATELY" at line 2.

```
0045:SERIAL:SEND: D  LCD-TEXT 2nd LINE ENTRY IMMEDIATELY
```

6.3.3 Key Definition String for Text Entry

Byte 1: Command character 'B' (0x42)
Bytes 2 + 3: Number of a text entry to be executed automatically after finishing the current one ("00" means no connection to another text entry)
Byte 4 and higher: Start of key definition

Syntax for key definitions (each key has its own identifier):

- "START" 'S' (0x53)
- "STOP" 'O' (0x4F)
- "CONTINUE" 'C' (0x43)
- "REPEAT 'R' (0x52)
- "REJECT" 'J' (0x4A)
- "ACCEPT 'A' (0x41)
- "⇦" '1' (0x31)
- "⇨" '2' (0x32)

It is possible to assign each key with a number of actions which is limited only by the length of the string.
Syntax for the actions (each action has its own identifier):

- "Disable" 'D' (0x44) no reaction
- "Next" 'N' (0x4E) automatically execute the next higher (increment 1) text entry
- "Logic" 'L' (0x4C) set the four TTLIO lines with a pattern
- "Key" 'K' (0x4B) emulate CMS key specified by its number
- "Boot" 'B' (0x42) boot the RCB and emulate the key sequence "Stop"-"Stop"-"Shift"-"Reset" on CMS
- "Reset" 'T' (0x54) reset the CMS by the key sequence "Shift"-"Reset" on CMS

For actions 'L' and 'K' there are additional parameters following the action identifier:

- 'L' follows a one-figure number in the range from '0' to 'F' representing all 16 possible combinations for the 4-bit TTLIO pattern. For example an 'A' represents the bit pattern 1010b.
- 'K' follows a two-figure number (leading zero for one-figure numbers) representing the key number on CMS. For example: number 18 specifies the key '2' of the numbers pad.

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
B	5	6	S	K	3	0	L	A	O	T										

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Executes key definition with a connection reference to entry 56 and definitions for the keys:

- "START" emulates key 30 on CMS **and** puts the bit pattern 1010 to the TTLIO lines if pressed
- "STOP" runs a reset on CMS by emulation of the key sequence "Shift"-"Reset".

```
0034: SERIAL:SEND:      B56SK30LAOT
```

Tables of CMS key numbers

1. Keys left (CMSTL_) and right (CMSTR_) of the display

Key descriptor	Key number	Key descriptor	Key number
CMSTL_1	01	CMSTR_1	09
CMSTL_2	02	CMSTR_2	10
CMSTL_3	03	CMSTR_3	11
CMSTL_4	04	CMSTR_4	12
CMSTL_5	05	CMSTR_5	13
CMSTL_6	06	CMSTR_6	14
CMSTL_7	07	CMSTR_7	15
CMSTL_8	08	CMSTR_8	16

2. Keys of numeric keypad

Key descriptor	Key number	Key descriptor	Key number
CMSTZ_0	26	CMSTZ_8	24
CMSTZ_1	17	CMSTZ_9	25
CMSTZ_2	18	CMSTZ_PKT	27
CMSTZ_3	19	CMSTZ_STR	28
CMSTZ_4	20	CMSTZ_MHz	29
CMSTZ_5	21	CMSTZ_KHz	30
CMSTZ_6	22	CMSTZ_HZ	31
CMSTZ_7	23	CMSTZ_DB	32

3. Special keys

Key descriptor	Key number	Key descriptor	Key number
CMST_CLEAR	33	CMST_MENUP	41
CMST_ENTER	34	CMST_MENDOWN	42
CMST_SHIFT	35		
CMST_START	36		
CMST_STOP	37		
CMST_STORE	38		
CMST_PLTOL	39		
CMST_VAR	40		

Note: *Because of the immediate validity of the text entry, the application program on CMS have to place the text strings at first (commands C or D) and then to activate the key definitions.*

6.4 Executing Stored Text Entry

Command byte: '4'
Byte 2 + 3 : Number of a text entry to be executed.

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
4	1	2																		

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

This example calls the entry 12.

```
0045:SERIAL:SEND: 412
```

6.5 Emulating a Single Key

Command byte: '5'
Byte 2 +3: CMS key number (see chapter 6.2.3).

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
5	2	5																		

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

This example command presses the key CMSTZ_9.

```
0056: SERIAL:SEND:      525
```

6.6 Reading the Keys of RCB

Command byte: '6'
Byte 2 contains a key identifier like the identifiers of chapter 6.3.3. Each key has its own identifier:

- "START" 'S' (0x53)
- "STOP" 'O' (0x4F)
- "CONTINUE" 'C' (0x43)
- "REPEAT 'R' (0x52)
- "REJECT" 'J' (0x4A)
- "ACCEPT" 'A' (0x41)
- "⇦" '1' (0x31)
- "⇨" '2' (0x32)

The result of this function goes to the TTLIO lines. If the key is pressed, all four lines will be set to high.

In addition to the single key function there is an identifier 'K'. With this 'K' the user can determine a combination of keys pressed at the same time. Every bit of the four TTLIO lines is assigned to a key of a particular combination. If the key is pressed, the logic level will be high (1) for this bit.

There are two combinations:

'K' '1':

Bit 0	Bit 1	Bit 2	Bit 3
START	STOP	CONTINUE	REPEAT

'K' '2'

Bit 0	Bit 1	Bit 2	Bit 3
⇦	⇨	REJECT	ACCEPT

Example:

```
0034:SERIAL:SEND: 6K1
```

6.7 Display Functions

With this command the user can control some of the display functions.

Command byte: '7'.
Byte 2 is the number of the chosen function:

- '1' - backlight
  Byte 3 contains the control: 0 = OFF; 1 = ON
- '5' - CLS (clear display)

Example:

```
0056:SERIAL:SEND: 710
```

Turns backlight off.

6.8 Reset RCB

Provides a reset on CMS or RCB.
Command byte: '8'.
Byte 2: 0 = Init; 1 = Reset RCB.

6.9 Storing and Activating/Deactivating Global Key Macros

The user can define global key macros for each of the following keys: START, STOP, CONTINUE, REPEAT.

Command byte: '9'
Byte 2: 0 = deactivate a defined macro for specified key; 1 = activate a key macro
Byte 3: key identifier

Each key has its own identifier:

- "START" 'S' (0x53)
- "STOP" 'O' (0x4F)
- "CONTINUE" 'C' (0x43)
- "REPEAT" 'R' (0x52)

From byte 4 onwards there are up to 19 two-figured numbers (leading zero for one-figured key numbers) containing a key number of CMS. The order in the string is the order of pressing the keys on CMS.

Example:

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21
9	1	O	0	3	1	5														

22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	

Stores a global key macro for the STOP key and activates it.
By pressing the STOP key, the key macro will press the key CMSTL_3 and then CMSTR_7 on CMS.

```
0045:SERIAL:SEND: 9100315
```

6.10 Control Functions for Terminating a CMS Application Program

Command byte: 'A'.

There are two groups of control functions:

- Question group:
  Byte 2: '1' - "Restart this program ? Press ACCEPT or REJECT"
  Accept restarts the application program on CMS

  ```
  example: 0034:SERIAL:SEND:      A1
  ```

  Byte 2: '2' - "Continue with a new program ? Press ACCEPT or REJECT"
  Accept reboots the RCB and leads to the start dialog.

  ```
  example: 0034:SERIAL:SEND:      A2
  ```

- Request group:
  Byte 2: '3' - "Restart this program ! Press ACCEPT or REJECT"
  Accept restarts the application program on CMS

  ```
  example: 0034:SERIAL:SEND:      A3
  ```

  Byte 2: '4' - "Continue with a new program ! Press ACCEPT or REJECT"
  Accept starts the RCB new and runs the start dialog.

  ```
  example: 0034:SERIAL:SEND:      A4
  ```

6.11 RAM Test

There is a non-destroying RAM check implemented in the RCB firmware. You can start it with the command: byte 'F'.

After the termination of the test a text is shown on the LCD:

"RAM Test OK !"

or

"RAM Test failed !"

Example:

```
0034:SERIAL:SEND:       F
```

Additional to the message on the LCD there will be a bit pattern on the TTLIO lines which is interpreted as follows:

0x05 (0101 binary) for RAM Test OK

0x0A (1010 binary) for RAM Test failed