Command: | Unit | | RANGE HOLD | | Terminating key |

Response: The output is made in the new unit, the current range is retained. (Caution with linear and logarithmic units!)

Example: Measured value: 120 mV with RF level measurement (PROBE)
Measurement range: 250 mV
Command: | dBm | | RANGE HOLD | | PROBE |

The measurement range is fixed to 250 dBm (!).

Switching off of RANGE HOLD:

The function RANGE HOLD is switched off when the unit is changed since the measurement ranges are bound to the associated unit.

Example: Measured value: 1.5 W with RF power measurement (POWER)
Measurement range: 10 W with RANGE HOLD active
Command: | dBm | | POWER |

Display of measured value: +31.8 dBm
Measurement range: 50 dBm, no RANGE HOLD

Switching off is also possible by entering

| RANGE HOLD | | CLEAR | | Terminating key |

⚠ The CLEAR key does not have a command abort function in this case. A command abort following RANGE HOLD can only take place with an illegal input or by pressing the key CLEAR twice.

Example: | 10 | | µV | | RANGE HOLD | | CLEAR | | CLEAR |

| 1 | | kHz | | RANGE HOLD | | TXRX |

| RANGE HOLD | | CLEAR | | CCITT RX |

Note: The ranges 0 to 250, 0 to 500 and 0 to 1000 can still be directly selected even though they are only required in exceptional cases. The scales 0 to 25, 0 to 50 and 0 to 100 are used in the displays in these cases.

2.3.7.4   α DISPL SELECT

The α DISPL SELECT function is used for transferring the follow-
ing setting parameters to the α display:

Vo SYNTH.	$\frac{14}{23}$
INT 1	$\overline{23}$
INT 2	$\overline{24}$
EXT	$\overline{25}$
Vo MOD GEN	$\overline{32}$

If one of these parameters is output in the α display using the
command ⎡α-DISPL SELECT⎤ ⎡Terminating key⎤ , the display which
has now become free can be used for other measured/setting para-
meter of the corresponding setting field.

Furthermore, the output in the α display is retained even when
switching over from transmitter to receiver test or vice versa,
thus enabling variation (using the spin wheel) and checking of
this setting value in both modes. When calling up measured/set-
ting parameters which can only be output in the α display, the
α-DISPLAY SELECT function is switched off again.

This applies to the following parameters:

DEMOD·BEAT	$\frac{8}{8}$
AF EXT	$\overline{8}$
CODE	$\overline{7}$
DECODE	$\overline{7}$
AF INT 1	$\overline{9}$
AF INT 2	$\overline{10}$
Δf	$\overline{6}$

Example:

⎡10⎤ ⎡μV⎤ ⎡Vo SYNTH⎤	Output level of test generator is output in the RF level display.
⎡α-DISPL SELECT⎤ ⎡Vo SYNTH⎤	Output level of test generator is output in the RF level display and in the α display.
⎡PROBE⎤	Result of RF millivoltmeter is output in the RF level display, output level of test generator is only output in the α dis-play.
⎡TXRX⎤	In the transmitter test, the output level of the test generator is also output in the α display.
⎡1⎤ ⎡kHz⎤ ⎡AF INT 1⎤	Frequency of 1st modulation generator is output in the α display, the α-DISPL SELECT function is switched off.

2.3.7.5   ANALOG SELECT

Using ANALOG SELECT, two measured/setting parameters can be simultaneously output in the RF level, modulation and AF level display. This is done by splitting up the displays into digital and analog display.

Using the command ⌐ANALOG SELECT⌐ ⌐Terminating key⌐ , one of the parameters

DIST TX   2̲6̲
DIST RX   3̲3̲
SINAD   3̲3̲
ACP   1̲5̲

is assigned the associated analog display (marked by the unit and code of the measured value displayed underneath the bargraph, see Section 2.3.1.5).

The digital display remains available for output of other measured/setting parameters.

This function is switched off again using the command
⌐ANALOG SELECT⌐ ⌐CLEAR⌐ ⌐Terminating key⌐ .

Example:

⌐MAX PK⌐	The result of the modulation measurement is output in the digital and analog display.
⌐ANALOG SELECT⌐ ⌐DIST TX⌐	The result of the transmitter distortion measurement is output in the analog display, the result of the modulation measurement is further output in the digital display. (The ANALOG SELECT function is marked by DIST (%) displayed underneath the bargraph).
⌐ANALOG SELECT⌐ ⌐CLEAR⌐ ⌐DIST TX⌐	The MAX PK measurement result is again output in both the digital and the analog display.

2.3.7.6   REF

The REF function is used for the representation of measured/setting values referred to a reference value and can be applied to the following functions:

POWER	14
Vo SYNTH.	14
PROBE	17
MAX PK	23
+±/2-	24
INT 1	23
INT 2	24
EXT	25
Vo MOD GEN	32
LEVEL	32

Using the command ⎡REF⎤ ⎡Terminating key⎤ the measured/setting value just visible in the display is defined as reference value (new display: 0.0 dB). All following measured values or settings are referred to this value and output in the display according to the following formula:

Displayed value (dB) = 20 x log (new value / reference value)

It is likewise possible to enter the appropriate reference value using the command

⎡Numerical value⎤ ⎡Unit⎤ ⎡REF⎤ ⎡Terminating key⎤

(e.g., if the reference value is not displayed yet and can only be taken from the memory).

The REF function (marked by the unit dB which is not used for these parameters, usually) can be switched off using ⎡REF⎤ ⎡CLEAR⎤ ⎡Terminating key⎤ .

Example:

Display of AF voltmeter:	1.00 V

Input: [REF] [LEVEL]
Display: 0.0 dB

Variation of AF level
to 0.5 V

Display: −6.0 dB

Variation of AF level
to 3 V

Display: 9.5 dB

Input: [REF] [CLEAR] [LEVEL]
Display: 3.00 V

RF level: 100 mV
Displayed: PROBE measurement result

Input: [200] [mV] [REF] [Vo SYNTH]
Display: −6.0 dB

Input: [10] [µV] [Vo SYNTH]
Display: −86.0 dB

Input: [REF] [Vo SYNTH]
Display: 0.0 dB

Input: [REF] [CLEAR] [Vo SYNTH]
Display: 10.0 µV

2.3.7.7   STORE/RECALL

2.3.7.7.1   Storing Complete Instrument Settings

Each of the memories 1, 2 and 3 contains the complete information on an instrument status.

For storing, the command   [1] [STORE] to [3] [STORE]

and for recalling the
stored setting, the command   [1] [RECALL] to [3] [RECALL]

is used.

When storing complete instrument settings, all parameters of the transmitter and receiver test are stored:

→   All functions indicated by the key acknowledgements and LEDs (transmitter/receiver test of the individual fields and the complete instrument, INPUT SELECT, HP, CCITT etc.)

→   Type of modulation (AM, FM, φM)

→   Setting values (also ΔVAR, RANGE HOLD and REF values)

→   SPEC functions

→   Oscilloscope setting

The user specific standard tone sequences USER 0 to USER 2 and RF levels >-27 dBm (protection of receiver) are not stored.
The beat measurement is not stored.

Example:

[1] [STORE]   The current instrument status
                                      is loaded into memory 1.

                                      The CMT is now reset, e.g. for
                                      another measurement.

[1] [RECALL]   The stored instrument status is
                                      recalled.

2.3.7.7.2   Storing RF Frequencies

Memories 10 to 30 contain an RF frequency setting and are loaded with the value output in the frequency display (COUNT f / SET f TX in the transmitter test or SET f RX in the receiver test) using [10] [STORE] to [30] [STORE] .

When reading out the memory content using [10] [RECALL] to [30] [RECALL] , the corresponding value is loaded into SET f TX (transmitter test) or SET f RX (receiver test) and set at once.

If the RF counter is switched on in the transmitter test, the command [10] [RECALL] to [30] [RECALL] is ignored; an internal setting which cannot be controlled by the user is not made.

Example:

    COUNT f switched on and 438.5 MHz displayed

    [10] [STORE]   This value is loaded into
                                memory 10.

    [TXRX]   Switchover to receiver test
                                  SET f RX (output frequency of
                                  synthesizer is displayed).

    [10] [RECALL]   The output frequency of the
                                  synthesizer is now 438.5 MHz.

    All memories can be read as often as required; the content is only cleared by overwriting (STORE) or master reset.

2.3.7.8   Squelch Measurement

The squelch measurement is called up using the command $\boxed{80}$ $\boxed{SPEC}$. The level of the RF test generator is reduced from the currently set value until the squelch function starts. Then, the level is again increased until the squelch function stops again. The squelch hysteresis is now output in the α display; on the RF level field, the level at which the squelch function stops again can be read.

Manual variation of the modulation, the RF frequency or the RF level immediately switches off the current measurement.

Likewise , the measurement is aborted on the following conditions:

→ The level is 0.032 µV and the squelch function does not start.

→ The squelch function has already stopped when calling up the measurement.

→ The level is 10 mV and the squelch function does not stop.

→ After 2 minutes at the latest ("TIMEOUT ERROR")

When the measurement is aborted for these reasons, the error message "CHECK INST." is output in the α display.

Example:

Output level: 1.5 µV

$\boxed{80}$ $\boxed{SPEC}$ Switching on the squelch
                                      measurement.

The level of the test generator is reduced in steps of 0.1 dB, provided that a sufficient AF signal is applied to the connector AF VOLTM (loudspeaker connector of transceiver).

The squelch function starts at 0.75 µV; no signal is applied to the connector AF VOLTM any longer.

The level of the test generator is now increased in steps of 0.1 dB until a signal can again be measured at the connector AF VOLTM.

The squelch function stops at 1.2 µV.

The squelch hysteresis can be read on the α display ("SQUELCH 4 dB"), the level at which the squelch function stops is output in the RF level field.

If the function $\boxed{79}$ $\boxed{\text{SPEC}}$ is carried out, RF level reduction in the first part of the squelch measurements is in 1-dB steps.

This considerably increases the measurement speed (at the expense of the accuracy when the squelch hysteresis is indicated).

RF level increase in the second part of the search routine is in 0.1-dB steps.

With the aid of $\boxed{78}$ $\boxed{\text{SPEC}}$ the original state of the squelch measurement can be restored (0.1-dB steps in both directions).

2.3.7.9   Bandwidth Measurement

The bandwidth measurement is called up in the receiver test using
[84] [SPEC] . The two -6-dB points (sensitivity loss of receiver)
are located from the currently set output frequency of the RF
signal generator. After completion of the measurement, the band-
width is output in the α display and the deviation from the cen-
tre frequency can be read on the RF frequency display. Note that
the modulation of the signal generator must be switched off when
calling up the bandwidth measurement and not switched on again
when the routine is finished.

2.3.7.10   Quieting Measurement

The interesting measurement result of the quieting measurement is
the RF level at which the receiver noise has decreased by a par-
ticular rated value (mainly 12 dB or 20 dB) compared with the
noise without RF signal. The rated value can be set to values
between 6 dB and 52 dB via

[83] [SPEC]   <rated value (dB)>   [SPEC]

(factory setting: 20 dB).

The measurement is called up via [82] [SPEC] in the receiver
test. The synthesizer level is switched off (-137 dBm) and the
receiver noise measured at the output of the loudspeaker.

The receiver noise being continuously monitored, the RF level is
then increased in 5-dB steps, reduced in 1-dB steps and finally
increased again in 0.1-dB steps until the noise has been reduced
by the rated value (e.g. 20 dB). The exact quieting measurement
result is indicated in the alphanumeric display "QUIET. 20.2 dB",
the associated RF level in the RF level display.

If the modulation, the RF frequency or the RF level are manually
changed while a search routine is running, it is immediately
switched off (error message "PARAMCHANGED" in the alphanumeric
display).

The measurement is likewise aborted on the following conditions:

- Synthesizer level increases to over -10 dBm
- Final value is not yet obtained after approx. 2 min.
- The noise voltage measured at the input AF VOLTM is <-40 dBm
  (into 600 Ω).

When the measurement is aborted for one of these reasons, the
error message "CHECK INST" or "TIMEOUT" appears in the alphanu-
meric display.

It is to be noted that the modulation of the signal generator is
switched off when the quieting measurement is selected and not
switched on again at the end of the routine!

⚠ A possibly present squelsh of the transceiver must be
    switched off for this measurement.

2.3.7.11 Aborting Search Routines

Each running search routine can be aborted via the function ⌐85⌐ ⌐SPEC⌐.

This applies to

⌐80⌐ ⌐SPEC⌐   Squelch measurement

⌐82⌐ ⌐SPEC⌐   Quieting measurement

⌐84⌐ ⌐SPEC⌐   Bandwidth measurement

⌐2.8⌐ ⌐kHz⌐ ⌐MAX PK⌐   Modulation measurement

⌐20⌐ ⌐dB⌐ ⌐SINAD⌐   Receiver sensitivity

⚠ When aborting search routines, possibly changed RF and AF level values, signal generator modulation and frequency variations (bandwidth measurement) are not reset to their original status.

2.3.7.12 Selftest

Checksums had been allocated to those calibration values of the CMT (see ⌐D⌐ ⌐1⌐ ⌐SPEC⌐ , ⌐D⌐ ⌐30⌐ ⌐SPEC⌐ , ⌐D⌐ ⌐2⌐ ⌐SPEC⌐) which are not continually updated.

Every 6 s the CMT tests these values and in the case of data loss (e.g. after battery change or software update) displays an error message ("CAL*D1 D30 D2*" when all calibration data are lost).

Carry out the SPEC functions indicated in the message as described in the CMT manual.

Calibration function ⌐D⌐ ⌐2⌐ ⌐SPEC⌐ (calibration of modulation characteristic) may be carried out with built-in option CM-B9.

Care should only be taken that no RF power is applied to the RF IN/OUT input.

If calibration has been successful (133 values with message "CAL OK .. " in the α display), calibration is terminated with ">>>> DONE <<<<", otherwise "> ERROR <" is indicated.

With the EXT CAL function (section 2.3.5.6), "CHECK INST" is not displayed if the level applied to the MOD EXT input is outside the permissible range.

2.3.8   SPEC Function

The SPEC function incorporates various instrument functions which have not been assigned separate keys because they are only used rarely.

The functions are selected by entering a code number from 1 to 10000, in certain cases one of the keys A to D must be additionally entered before the key SPEC.

2.3.8.1   General Instrument Functions

| 11 | SPEC | : Display illumination is switched on/off.
(Default: illumination on)

| 16 | SPEC | : Synthesizer control loop normal rate (default)

| 17 | SPEC | : Synthesizer control loop super low (FM modulation up to min. 20 Hz)

| 18 | SPEC | : Automatic 20-dB attenuation on ⌐ (Connector
⌐ RF IN/OUT
| 19 | SPEC | : Automatic 20-dB attenuation off ⌐ 77)

| 20 | SPEC | : The RF signal applied to INPUT 2 79 is attenuated by 20 dB.

| 21 | SPEC | : The 20-dB attenuator at INPUT 2 is switched off.
(Default)

| 22 | SPEC | : 10-MHz crystal reference is synchronized with external signal source.
(Apply 10-MHz signal > 100 mV to connector REF 10 MHz 109)

| 23 | SPEC | : Internal 10-MHz reference signal is output at connector REF 10 MHz (approx. 0 dBm).
(Default)

| 24 | SPEC | <time> | SPEC | :

Modulation switch-off time (FM) in the case of RF frequency change

| 25 | SPEC | : RMS measurement is switched to FAST mode (80 ms) (only possible for input frequencies > 150 Hz).

| 26 | SPEC | : RMS measurement is switched to SLOW mode (250 ms).
(Default)

`28` `SPEC` : Test diode of power meter (low distortion) is switched off.

`29` `SPEC` : Power diode is switched on. (Default)

`30` `SPEC` `ATT` `SPEC` :

Input of attenuation value of an external attenuator at connector RF IN/OUT 77. (Protect, 0 Default)

`35` `SPEC` : Modulation measurement with RMS or peak weighting depending on result. (Default setting)
AM : < 1 % (RMS)
FM : < 100 Hz (RMS)
ΦM : < 0.1 rad (RMS)

`36` `SPEC` : Modulation measurement always peak weighted.

`37` `SPEC` : Modulation measurement always RMS weighted.

`40` `SPEC` : AF voltmeter measurement RMS weighted. (Default)

`41` `SPEC` : AF voltmeter measurement peak weighted (positive)

`42` `SPEC` : AF voltmeter measurement peak weighted (negative)

`43` `SPEC` <R (Ω)> `SPEC` : Setting of reference resistance with AF voltmeter measurements (2 Ω <R <3000 Ω).

`45` `SPEC` : No averaging (default after switching on)

`46` `SPEC` : Averaging over 30 measurements for all RMS weighted measurements.

`47` `SPEC` : Averaging over 60 measurements for all RMS weighted measurements.

`48` `SPEC` : Averaging over 140 measurements for all RMS weighted measurements.

`49` `SPEC`	:	Averaging over 255 measurements for all RMS weighted measurements.
`50` `SPEC`	:	Modulation of the synthesizer by the 2nd tone generator INT 2 remains uninfluenced with the S/N measurement. (Default)
`51` `SPEC`	:	INT 2 is also switched on and off with the S/N measurement.
`52` `SPEC`	:	Modulation of the synthesizer by the external modulation input EXT remains uninfluenced with the S/N measurement. (Default)
`53` `SPEC`	:	EXT is also switched on and off with the S/N measurement.
`55` `SPEC`	:	Switch on transmitter S/N measurement instead of DIST measurement.
`56` `SPEC`	:	Switch off transmitter S/N measurement. (DIST measurement again) (Default)
`58` `SPEC`	:	S/N, SINAD, DIST measurement: Search routine is terminated when the preset value is reached.
`59` `SPEC`	:	S/N, SINAD, DIST measurement: Search routine is continued even when the tolerance window is reached.
`60` `SPEC`	:	Tolerance window of the final value of the SINAD, DIST and S/N measurement is ±1 dB.
`61` `SPEC`	:	Tolerance window of the final value of the SINAD, DIST and S/N measurement is ±2 dB.
`65` `SPEC` <f> `SPEC`	:	Entry of frequency of 1st modulation generator which is automatically set when SINAD/DIST is called. (Protect, entry in Hz, 1000 Hz default)
`70` `SPEC`	:	Demodulator control: squelch on. (Default)

| 71 | | SPEC | : Demodulator control: switch off output signal.

| 72 | | SPEC | : Demodulator control: connect output signal.

| 75 | | SPEC | : Switch on 750 µs deemphasis with FM.
(⌐ symbol in the display)

| 76 | | SPEC | : Switch off 750 µs deemphasis.
(Default)

| 78 | | SPEC | : The original state of the squelch measurement can
be restored.

| 79 | | SPEC | : The RF level reduction in the first part of the
squelch measurements is in 1-dB steps.

| 80 | | SPEC | : Start squelch measurement (see 2.3.7.8).

| 82 | | SPEC | : Switch on quieting measurement

| 83 | | SPEC | <rated value> [dB] | SPEC | : Entry of rated value for
quieting measurement
(20 dB default)

| 84 | | SPEC | : Start bandwidth measurement (see 2.3.7.9).

| 85 | | SPEC | : Switch-off of all running search routines, the
currently set instrument status being retained.

| 95 | | SPEC | : Instrument preset (also via autorun control and
IEC bus)

| 99 | | SPEC | : Master reset of instrument (factory setting).

| 104 | | SPEC | : The PLL of the synthesizer is optimized for
minimum broadband spurious FM in S/N operation
(default).

| 105 | | SPEC | : The PLL of the synthesizer is optimized for
minimum narrowband spurious FM (useful for S/N
measurement with CCITT filter switched on).

| 111 | | SPEC | : 0-dB attenuation for probes selected.
(default)

| 112 | SPEC | : 20-dB attenuation for probes selected.

| 113 | SPEC | : 40-dB attenuation for probes selected.

| 114 | SPEC | : Probe measurement: the output in dBm is referred to 75 Ω.

| 115 | SPEC | : Probe measurement: the output in dBm is referred to 50 Ω.
(Default)

| 121 | SPEC | : Single tone at connector MOD GEN.
(Default)

| 122 | SPEC | : Double tone at connector MOD GEN (both tones have the same level, the RMS value of the total signal is displayed).
$$V_{disp} = V1 \times \sqrt{2}$$

| 123 | SPEC | : Double tone at connector MOD GEN (both tones have the same level, the RMS value of one signal is displayed).
$$V_{disp} = V1$$

| 130 | SPEC | : Oscilloscope preset (switch-on status

| 131 | SPEC | : The distortion signal without the fundamental wave is displayed on the oscilloscope.

| 132 | SPEC | : Switch back oscilloscope to normal mode (switch off 131 SPEC).
(Default)

| 140 | SPEC | : Any channel spacing ACP.

| 141 | SPEC | : Fixed channel spacing ACP:
10, 12.5, 20 oder 25 kHz.

| 144 | SPEC | <RF level [dBm]> | SPEC | : Calibration of the selective RF millivoltmeter (| 0 | ACP |) through indication of the currently applied power.

| 145 | SPEC | : Calibration of the selective RF millivoltmeter (| 0 | ACP |) by means of the power applied to RF IN/OUT.

| 180 | | SPEC | : Collection of the result of the PK HOLD measurement via IEC bus and autorun control.

| 181 | | SPEC | <waiting time [s]> | SPEC |: Setting the waiting time between PK HOLD command and start of PK HOLD measurement. Works only in remote control mode (IEC bus and autorun control). (0.5 s default)

| 182 | | SPEC | <measuring time [s]> | SPEC | : Setting the measuring time of PK HOLD measurement. Works only in remote control mode (IEC bus and autorun control). (0.5 s default)

| 967 | | SPEC | : All settings and parameters not visible are protected against being changed unintentionally.

Protected parameters:

→ programs of the autorun control
→ all store facilities of the STORE key.
→ all SPEC functions that are particularly marked (Protect)

| 968 | | SPEC | : All parameters can be changed as required (switch off | 967 | | SPEC |). (Default)

2.3.8.2 Control Functions for the Option Autorun Control CM-B5 (A...SPEC)

| A | | 00 | | SPEC | to | A | | 31 | | SPEC |

Three programmable control outputs are available if the CM-B5 option is fitted (CONTROL A).

1st digit: 1 to 3 corresponds to control output 1 to 3
            0 means all control outputs 1 to 3 simultaneously

2nd digit: 0 corresponds to "N/O contact open"
            1 corresponds to "N/O contact closed"

Example:

| A | | 1 | | 0 | | SPEC |

CONTROL A   N/O contact 1   Open

| A | | 0 | | 1 | | SPEC |

CONTROL A   N/O contacts   Close
              1 to 3

| A | | 800 | | SPEC | | STORE | Initialization of autorun control. Required after each battery replacement and new fitting of option (only in manual mode).

A	100	SPEC	to	Start of programming = switchover to LEARN mode.
A	199	SPEC		

100 to 199 = program 00 to 99 (only in manual mode).

A	200	SPEC

End of programming = switchover to manual mode (only in LEARN mode).

A	300	SPEC	STORE	to
A	399	SPEC	STORE	

Deletion of a program 300 to 399 = program 00 to 99 (only in manual mode).

A	500	SPEC

Start of message entry (only in LEARN mode).

A	505	SPEC	1	SPEC	to
A	505	SPEC	1000	SPEC	

Start of a repetition block to be executed 1 to 1000 times (only in LEARN mode).

A	506	SPEC

End of a repetition block (only in LEARN mode).

A	510	SPEC

If the tolerance is exceeded during the program run (red LED lights up), the program is interrupted (Default).

A	511	SPEC

Exceeding of the tolerance is only stored in the protocol, the program run is continued without interruption.

A	512	SPEC

After calling up this special function, the memory capacity still available is indicated (in blocks). Each command line consists of at least one block.

A	513	SPEC

Small format of test reports

A	514	SPEC

Medium format of test reports

A	515	SPEC

Large format of test reports

A	520	SPEC

Start of message input with input requested in RUN mode (only in LEARN mode).

Keys	Description
`A` `525` `SPEC`	Edit the printer configuration string
`A` `526` `SPEC`	Output the printer configuration string to the printer (string is generated before by `A` `525` `SPEC` .)
`A` `527` `SPEC`	Enter a control character sequence for the autotest. In RUN mode, the programmed string is output to the printer.
`A` `530` `SPEC`	Copy CMT program to transfer memory.
`A` `531` `SPEC`	Copy transfer memory program to CMT.
`A` `532` `SPEC`	Append transfer memory program to CMT program.
`A` `533` `SPEC`	Delete transfer memory program.
`A` `540` `SPEC`	Initialize transfer memory.
`A` `600` `SPEC` `0` `SPEC` to `A` `600` `SPEC` `10000` `SPEC`	Setting of minimum time between execution of the individual commands. 0 to 10000 = 0 to 10000 ms. (only in manual mode and HOLD mode).
`A` `605` `SPEC`	Display of directory of programs in the α display (only in manual mode).
`A` `606` `SPEC`	Directory switched off.
`A` `607` `SPEC`	Enter the function display directory of transfer memory
`A` `610` `SPEC`	Output of the Autorun Control Directory on a printer.
`A` `611` `SPEC`	Output of the Transfer Memory Directory on a printer.

$\boxed{A}$ $\boxed{1000}$ $\boxed{SPEC}$ to		Selection of a particular line. 1000 to 1999 = line 000 to 999
$\boxed{A}$ $\boxed{1999}$ $\boxed{SPEC}$		(only in LEARN mode).
$\boxed{A}$ $\boxed{2000}$ $\boxed{SPEC}$ to		Deletion of a program block. 2000 to 2999 = deletion of lines 000 to 999 from the set position
$\boxed{A}$ $\boxed{2999}$ $\boxed{SPEC}$		(only in LEARN mode).

The error message **"ADD OPT. CM-B5"** is output in the α display if the option CM-B5 is not fitted and the corresponding SPEC function is called.

2.3.8.3   Control Functions for the Option IEC Bus CM-B4 (B...SPEC)

$\boxed{B}$ $\boxed{00}$ $\boxed{SPEC}$ to $\boxed{B}$ $\boxed{81}$ $\boxed{SPEC}$

8 freely programmable control outputs are available if the option CM-B4 is fitted. Control takes place via the SPEC function as with CONTROL A (8 control outputs in this case):

Example:

$\boxed{B}$ $\boxed{8}$ $\boxed{1}$ $\boxed{SPEC}$

CONTROL B   N/O contact 8   Close

$\boxed{B}$ $\boxed{0}$ $\boxed{0}$ $\boxed{SPEC}$

CONTROL B   N/O contacts   Open
                  1 to 8

$\boxed{B}$ $\boxed{100}$ $\boxed{SPEC}$ to   Control functions of IEC bus

$\boxed{B}$ $\boxed{1000}$ $\boxed{SPEC}$

$\boxed{B}$ $\boxed{100}$ $\boxed{SPEC}$ <xx> $\boxed{SPEC}$ Setting of IEC-bus address in listener and talker mode. (0 < xx < 30).

$\boxed{B}$ $\boxed{101}$ $\boxed{SPEC}$: The CMT only sends CR/LF to the controller at the end of a string (default).

$\boxed{B}$ $\boxed{102}$ $\boxed{SPEC}$: In addition to CR/LF, the CMT also sends EOI to the controller at the end of a string.

The error message **"ADD OPT. CM-B4"** is output in the alphanumeric display if the option CM-B4 is not fitted and the corresponding SPEC function is called.

2.3.8.4 Control Functions for Frequency Counter and CODE(DECODE) (C...SPEC)

AF counter

| C | 10 | SPEC | : Gate time counting also in range from 7 Hz to 4 kHz (1 Hz or 0.1 Hz resolution)
Advantage: High S/N ratio
Disadvantage: Relatively low measuring rate

| C | 11 | SPEC | : Period measurements in frequency range from 7 Hz to 4 kHz
(0.1 Hz resolution)

Advantage: Very high measuring rate
Disadvantage: Slightly more sensitive to interference

| C | 12 | SPEC | : Gate time counting of AF counter with resolution of 0.1 Hz (10 s gate time).

| C | 13 | SPEC | : Gate time counting of AF counter with resolution of 1 Hz (1 s gate time).

| C | 30 | to | C | 37 | SPEC | <f> | SPEC | : Modification of variation sequence of 1st modulation generator.
(f = frequency in the range of the 1st modulation generator.)

| C | 40 | to | C | 47 | SPEC | <f> | SPEC | : Modification of variation sequence of 2nd AF synthesizer.
(f = frequency in the range of the 2nd AF synthesizer.)

RF counter

| C | 20 | SPEC | : RF counting with resolution of 1 Hz (measuring cycle < 1.2 s or 4.2 s depending on frequency range).

| C | 21 | SPEC | : RF counting with resolution of 10 Hz (measuring cycle < 300 ms or 700 ms depending on frequency range).

| C | 50 | SPEC | : Switch on frequency transfer function

| C | 51 | SPEC | : Switch off frequency transfer function

| C | 52 | SPEC | <Δf> | SPEC | :

        Duplex spacing for frequency transfer function

        -99999.99 to 0 kHz   receive frequency of
                                     transceiver below transmit
                                     frequency

        0 to 99999.99 kHz   receive frequency of
                                     transceiver above transmit
                                     frequency

Control functions CODE/DECODE

| C | 100 | SPEC | <xx> | SPEC | : Load the user-specific standard tone sequence USER 0 with a fixed sequence
(xx = 0 to 10)
(Protect)

| C | 101 | SPEC | <xx> | SPEC | : Load the user-specific standard tone sequence USER 1 with a fixed sequence
(xx = 0 to 10)
(Protect)

| C | 102 | SPEC | <xx> | SPEC | : Load the user-specific standard tone sequence USER 2 with a fixed sequence
(xx = 15 to 19)
(Protect)

| C | 110 | SPEC | <xx> | SPEC | : Activate a standard tone sequence for CODE/DECODE
(xx = 0 to 10, 15, 20 to 22)

| C | 111 | SPEC | <xx> | SPEC | : Activate a standard tone sequence for DECODE exclusively
(xx = 0 to 10, 15, 20 to 22)

| C | 150 | SPEC | : Automatic repeat on
(E = repeat tone)
11111 → 1E1E1
123322444 → 123E2E4E4

| C | | 151 | | SPEC | : | | Automatic repeat off
11111 → 11111

| C | | 160 | | SPEC | <T> | SPEC | : Duration of 1st tone in ms
(T = 10 ms to 5000 ms)

| C | | 161 | | SPEC | <T> | SPEC | : Duration of the following tones
in ms (T = 10 ms to 5000 ms)

| C | | 162 | | SPEC | <T> | SPEC | : Pause duration in ms
(T = 0 and 10 ms to 5000 ms)

| C | | 163 | | SPEC |<f tol.>| SPEC | : Frequency deviation of the sent
tones from the nominal frequency
in % (−10 % to +10 %).

| C | | 170 | | SPEC | : DECODE : DEMOD (Default)

| C | | 171 | | SPEC | : DECODE : AF VOLTM

| C | | 172 | | SPEC |<f tol.>| SPEC | : Evaluation window for selective
call decoder (±1 % to ±10 %)

| C | | 173 | | SPEC | : Decoding aborted approx. 100 ms
after the last tone. (Applies to
selective call decoding only (de-
fault after switching on).

| C | | 174 | | SPEC | : Decoding aborted approx 400 ms
after the last tone. (Applies to
selective call decoding only (de-
fault after switching on)

| C | | 175 | | SPEC | : Automatic gain setting for DTMF
decoder (default).

| C | | 176 | | SPEC | : −6-dB gain for DTMF decoder

| C | | 177 | | SPEC | : 0-dB gain for DTMF decoder

| C | | 178 | | SPEC | : +6-dB gain for DTMF decoder

| C | | 180 | | SPEC | <T> | SPEC | : Decoding is restricted to time T
[ms]. (Applies to selective-call
decoding only) (default: 1000 ms
corresponds to switch-off of this
function).