EMR Remote Control Documentation

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Hardware:

A fiber optical adapter converts the optical signals from the serial, bidirectional interface used in the EMR devices into electrical RS-232 signals. The adapter is powered by the PC; no additional power supply is necessary. When connected to a PC, the adapter must be set to 'DTE'.

The data format of the interface is 4800 baud, 1 start bit, 8 data bits, 1 stop bit, no parity. For the protocol, XON/XOFF should be set. Data are transmitted and received as ASCII characters.

Command language:

The device is controlled using commands based on SCPI. Commands must be terminated with 'LF'. A 'CR' is optional before the 'LF'. No distinction is made between upper and lower case. Output strings are terminated with 'CR LF'.

It is good practice to use a garbage collector for the data strings received from the EMR instruments. The following signs should be deleted before further processing: blanks, CR, LF, DC1 and DC3 (in decimal: 32, 13, 10, 17, 19).

In the description of the commands, the following nomenclature is used:

[?] an optional '?' is used to query the parameter settings

<X> angled brackets enclose a transmission parameter X
!!! the parameter must be separated from the preceeding text by a blank !!!

/ a slash separates possible alternative entries

{ } an abbreviated form of commands is given in curly brackets

!!! You should use only those commands which are listed here. There exist a few other commands which are intended only for the production test shop and for the service department at Narda STS GmbH. !!!

*IDN?

Returns a string with the company name, device name, serial number and version number of the device software.

SYST:BEEP {BP}

The device outputs a beep.

SYST:ERR? {SE}

An error message of the command interpreter is queried. This can be executed to check whether a command was properly understood.

0	no error
-109	missing parameter
-110	unknown command
-222	data out of range
-224	illegal parameter value
-300	mode error

SYST:BAT?

You can query whether the NiCds or batteries are still delivering sufficient voltage:

BAT_LOW	batteries are low
BAT_OK	batteries still OK

!!! If you query this item regularly, there is still enough charge for 15 minutes of operation once the first BAT_LOW is reported. Afterwards, the device shuts off automatically. If the device detects insufficient battery voltage at power-on, then it automatically shuts off during the self-test after outputting an appropriate error message. !!!

SYST:KLOC <X> {KLOC <X>}

The keypad of the basic device can be disabled. When disabled, the device beeps if a key is pressed; the key press is otherwise ignored. The ON/OFF key is an exception. You can still power off the device manually even when the keypad is disabled.

X = ON	Keypad is disabled
X = OFF	Keypad is enabled

The following commands work only in measurement mode. In other words, the device must have passed the self-test after power-on with no error messages. You can test whether the device is in measurement mode by transmitting one of the following commands, followed by the command SYST:ERR?. If error -300 (mode error) is reported, the device is not in measurement mode.

MEAS? {M}
A single measured value is output.
The decimal point is a '.'.
The length of the output string is constant per output unit; leading zeroes lying more than one place to the left of the decimal point are represented as a 'BLANK'.
For a three-channel measurement, the three spatial components are output separated by a comma.
See also the commands CALC:UNIT and CALC:AXIS.

MEAS:ARRAY? <X> {MA <X>}
X measured values are output at intervals ranging from 400 ms to 1200 ms.
You can stop outputting measured values with MEAS:STOP.
X = 1 to 255

MEAS:START {MSTR}
Continuous output of measured values is initiated.
The interval between measured values can range from 400 ms to 1200 ms.
Use MEAS:STOP to stop outputting values.

MEAS:STOP {MSTP}
Ends output of measured values which was initiated with MEAS:START or MEAS:ARRAY?.

CALC:AVER[?] <X> {AV[?] <X>}
Computation of the AVERAGE value can be switched on and off.
X = ON/OFF
Averaging can be active at the same time as the MAX function. When this happens, the maximum average value is output. See also CALC:MAX.

!!! When AVERAGE is switched on, measured values are output on the serial interface only if the averaging time setting (see also CALC:AVER:TIME) has elapsed since the device was switched on or the average memory was cleared (see CALC:AVER:CLEAR). When AVERAGE is switched on, measured values are output only at intervals of 4 seconds. !!!

CALC:AVER:TIME[?] <X> {AVT[?] <X>}
The averaging time can be set with a resolution of 4 seconds.
X = 4 to 1000
When the device is powered on, X is set equal to 360 seconds (6 minutes).

CALC:AVER:CLEAR {AVC}
Use this function to clear the averaging memories (AVERAGE: X,Y,Z and EFF).

CALC:MAX[?] <X> {MAX[?] <X>}

The maximum value function can be switched on and off.
X = ON/OFF
The maximum value function can be active at the same time as the AVERAGE function. When this happens, the maximum average value is output. See also CALC:AVER.

CALC:MAX:CLEAR {MAXC}

The memories for the maximum value function (MAX: X,Y,Z and EFF and MAX AVERAGE: X,Y,Z and EFF) are cleared.

CALC:UNIT[?] <X> {CU[?] <X>}

The output units for the measured values can be set.

X = E_Field	E field (V/m) Format XXXXX.XX
X = H_Field	H field (A/m) Format XXX.XXXX
X = Power_Dens	Electromagnetic power density (mW/(cm*cm)) Format XXXXXXX.XXXXX
X = Power_Dens_SI	Electromagnetic power density (W/(m*m)) Format XXXXXXXX.XXXX

For software version 3.0 or higher the follwoing unit was introduced.It works only with shaped probes and is ignored with flat probes.

X = Percent	Percentage of Standard in terms of power density (%) Format XXXX.XX

CALC:CAL[?] <X> {CC[?] <X>}

The CAL factor can be entered.
X = 0.01 to 99.99
(display value = CAL factor * measured value)

CALC:AXIS[?] <X> {CAX[?] <X>}

The processing of the three spatial components can be set for isotropic probes.

X = ALL	The display gives the equivalent field strength. However, the three spatial components are output separately on the serial interface. The order of the spatial components is X, Y and Z. For single-channel probes, only the X component is output. This setting is always activated after power-on.
X = EFF	The display as well as the serial interface output the equivalent field strength.
X = X/Y/Z	The display as well as the serial interface output the selected spatial component (X, Y or Z).

Since the device has a total of 16 memories for the four different averaging modes (ACTUAL, AVERAGE, MAX and MAX & AVERAGE) and spatial components (X, Y, Z and EFF), setting the averaging mode has the same effect on all settings of CALC:AXIS, i.e. in all cases the average values are computed from actual values of the displayed spatial component.

CAL:AUTO:ZERO[?] <X> {AZ[?] <X>}

Setting of automatic zero alignment.

X = 0 to 2	reserved, only for W&G testing and service.
X = ON	zero alignment is executed and is then performed from this point onwards cyclically at intervals as set with CAL:ZERO:TIME.
X = OFF	zero alignment is performed once.

Zero alignment lasts about three seconds. No measured values are output during zero alignment. Automatic zero alignment is used only to compensate for temperature variations.
In a lab environment, a single zero alignment is sufficient if the temperature is kept constant to 3 degrees Celsius. The advantage of this is that you can prevent measurements from being interrupted by a zero alignment.

CAL:ZERO:TIME[?] <X> {ZT[?] <X>}

Setting of the maximum time interval (minutes) at which automatic zero alignment is performed.
X = 2 to 60 in steps of 1
After power-on, X is always set equal to 6 (6 minutes).

The following commands work only with device software version 2.00 or higher (see command *IDN?). This software runs only on newer devices. A software update for older devices is not possible.

FAST:MODE[?] <X>

Sets the instrument to an mode which is optimized for fast remote control but dissables serveral functions. This mode is very usefull for automated measurements in EMC laboratories.
X = ON/OFF Default ist OFF
With X = ON the time intervall between measured values is constantly 400ms if the commands MEAS:ARRAY? or MEAS:START are used. No data are lost.
The response time for the command MEAS? is improved.
On the other hand all averaging or max hold is frozen.
The returned measured values are actual values.
The limit value is no longer surveyed. No keyboard inter-upts are serviced. The display is frozen and shows FAST.The automatic zero alignment is done one time when entering FAST:MODE and is then dissabled until leaving the FAST:MODE. The calculation unit is set to the base unit of the probe. The axis calculation is set to effectiv field strength. When leaving FAST:MODE the previous settings are restored.

SYST:DEFAULTS

Restores the power up state and dissables all averaging and max hold functions. Returns the device id (like *IDN?) and the actual calculation unit (like CALC:UNITS?, in this case always the base unit of the probe)

SYST:PROBES? <X1 Y1>
"
<XN YN>

Returns the probe type number X and the probes serial number Y for every probe that is known to the device.
There may be me data for N = 1 .. 15 probes.
You may only use probes with correct type number and serial number,because the calibration data are stored in the device and not in the probe.

The following commands work only with EMR-30, EMR-31 ...

SYST:TIME[?] <X,Y,Z>
Sets or returns the time of the internal real time clock
X = hours (00 to 23)
Y = minutes (00 to 59)
Z = seconds (00 to 59)

SYST:DATE[?] <X,Y,Z>
Sets or returns the date of the internal real time clock
X = year (00 to 99); 95=1995, 01=2001
Y = month (01 to 12)
Z = day (01 to 31)

MEM?
Returns the number of data (0 to 1500) stored in the data logger

MEM:ARRAY? <X,Y>
Returns a list of fully documented measured values.
X and Y indicate the memory location in the data logger
X = 1 to 1500 start location
Y = 1 to 1500 stop location (Y <= result of MEM?; Y >= X)

MEM:HEADER
A header with device information and explanation for the data columns is returned

MEM:ALL
Like MEM:ARRAY but at the begining the header is send and then all stored data are returned.