

EMC32-S: Transmission of Disturbance Signal Parameters to dAV Camera Systems

Application Note

Products:

- | R&S®EMC32-S
- | dAV Camera Systems by mk-messtechnik GmbH

This application note explains step by step all necessary settings for transmitting parameters of the disturbance signal from an EMS test to a dAV Camera System via serial port or LAN interface. The dAV Camera System overlays these parameters onto the camera signal.

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1 EMC32-S: Transmission of Disturbance Signal Parameters to dAV Camera Systems

1.1 What is the Goal of this Application Note

An EMS test measures the performance of an Equipment or Device under Test (EuT or DuT) when a disturbance signal is applied.

In order to recognize failures, the EuT can be observed with a dAV Camera System. This system typically consists of pan/tilt/zoom cameras, a camera receiver, and monitors displaying the camera signals.

EMC32 can send parameters of an EMS disturbance signal (such as frequency and field strength) to the dAV Camera System as a string. The camera receiver can then overlay this string onto the camera signal, so that they are shown on the same monitor in real-time.

This application note shows how to configure EMC32 properly to transmit disturbance signal parameters to a dAV Camera System. The dAV Camera System is supported in EMC32 via the Generic Monitoring driver in combination with the EMC32 Standard Control driver. The EMC32 Standard Control driver assigns the role of a video inserter to the Generic Monitoring driver. EMC32 allows communicating with the Camera Receiver via serial port or local area network (LAN).

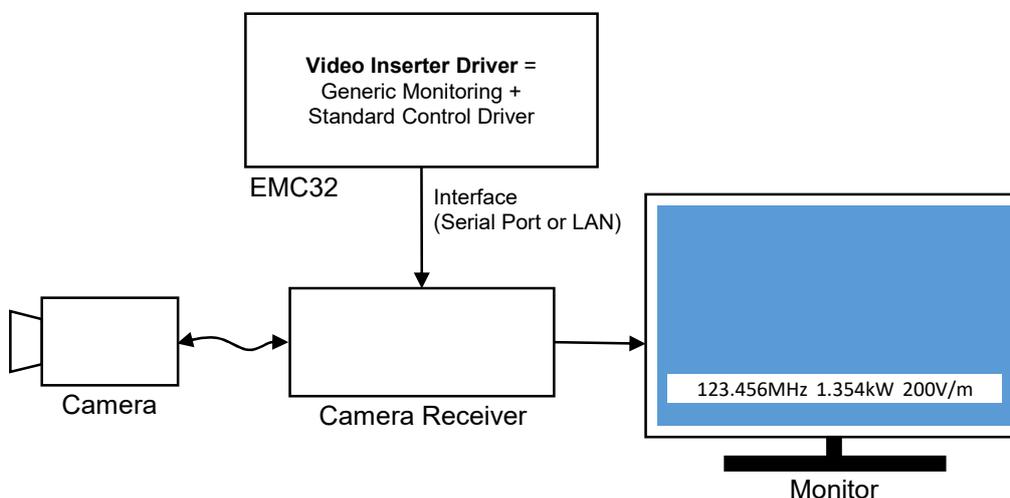


Figure 1: Disturbance Signal Parameters inserted on the Video Monitor Screen

The output string that is transmitted by EMC32 can have up to 50 characters. The disturbance signal parameters in the string can be configured. The following shows an example, how the resulting string can look like:

1	10	20	30	40	50
123.456MHz	12.34W	12V/m	AM/1kHz/80%	HOR	

It contains following disturbance signal parameters:

- signal frequency: "123.456MHz"
- power level: "12.34W"
- immunity level: "12V/m"
- modulation: "AM/1kHz/80%"
- polarization: "HOR"

2 Configuration of dAV Camera System

The dAV Camera System can insert “permanent” parameters into the camera signal. Permanent means that the camera receiver displays these parameters after power up independent from a connection to EMC32. This applies to the following parameters:

- Current time
- Current date
- Four static text strings
- Battery status of camera

Permanent parameters can be configured either by using the Camera Control Software or by sending OSD text commands. This application note gives a brief walkthrough for a standard configuration with the Camera Control Software. Some legacy camera receivers may not support this configuration but instead provide an alternate time/date function. For more detailed instructions, please refer to the (Extended) Manual of the dAV Camera System.

In contrast to that, disturbance signal parameters are “transient”. This means that they are only shown when transmitted from EMC32 to the camera receiver.

2.1 Connecting the Camera Control Software

For serial port connection, choose “Comport”, select virtual COM port, and set baud rate to 57600.

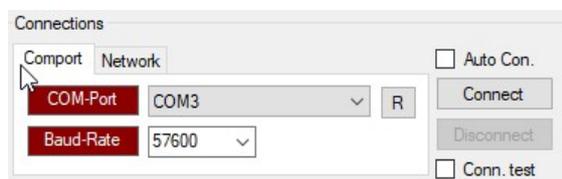


Figure 2: Open serial port connection

For LAN connection, choose “Network” and enter IP address of camera receiver.

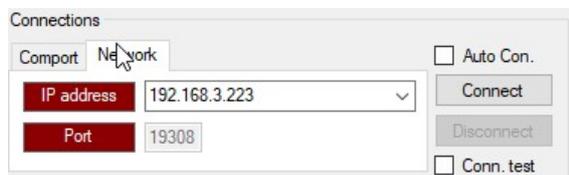


Figure 3: Open LAN connection

Select “Connect” to open the connection.

2.2 Configuration of Permanent Parameters

When being connected to the camera receiver, switch to tab “Onscreen display > Permanent OSD”.

2.2.1 Selecting Output Channels

The overlay of permanent parameters can be configured for each output channel. A channel is a physical slot in the camera receiver. For example, a monitor connected to the output of channel 1 shows the permanent parameters configured for channel 1.

The Camera Control Software shows channel numbers on coloured backgrounds:

- white: available for selection
- red: selected
- gray: not available for selection (channel is not present or has no output)

You can select one or more channels. For selecting multiple adjacent channels, hold the left mouse button and move the mouse over the channels. In order to select non-adjacent channels, hold the "CTRL" key while choosing the channels one by one.

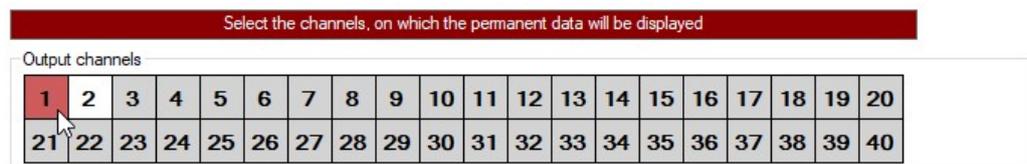


Figure 4: Selection of output channel 1

2.2.2 Quick Start – Load Preset Configuration

It is possible to load or save a configuration on the PC that runs the Camera Control Software.

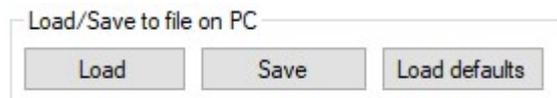


Figure 5: Load or save a configuration on PC

For a quick start, check whether your installation folder contains the file `osd_example_datetimebat_de.xml`. If you load this file, the configuration is set as detailed in sections 2.2.3 and 2.2.4. After that, you can activate this preset configuration as explained in section 2.2.5.

2.2.3 Configuration of Time, Date, and Static Texts

The camera receiver can display time, date, and static texts. You can configure font size, position, and foreground (FG) / background (BG) colour for each of them separately.

The following figure depicts a typical configuration, which shows time and date in the upper right corner of a monitor with 1920x1080 resolution.

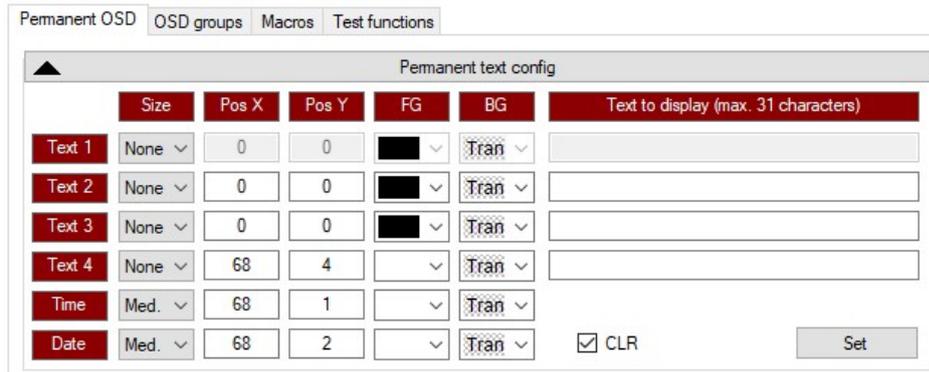


Figure 6: Displaying time and date in the upper right corner

In order to hide a parameter, set its font size to “None”.

The position is given in characters per column (x) and row (y). The origin (0, 0) is located in the upper left corner of the monitor. The maximum depends on the output screen resolution and the font size. For resolution 1920x1080 and font size “Large” the maximum is x = 60 and y = 22.

It can be configured, how time and date are displayed. A common setting is to use one of the ISO formats as shown below.

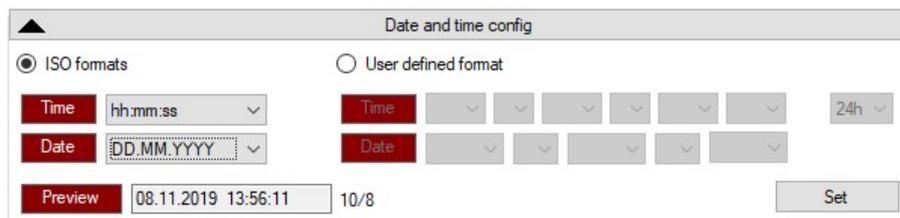


Figure 7: Setting ISO formats for time and date

After completing the configuration, transmit it to the camera receiver (see section 2.2.5).

Besides configuration of how time and date are displayed, time and date values must also be set. This can be done with the Camera Software as shown in the following figure.



Figure 8: Synchronize time and date with PC

Camera receivers can store and update time and date values even when switched off. This feature is optional and depends on the individual configuration of the camera receiver. If not present, time and date values must be set after the receiver has been switched on.

It is also possible to send commands to set time and date values from EMC32 (see section 3).

2.2.4 Configuration of Battery Status

Cameras have the option to report their battery status (START, OK, LOW, EMPTY) to the camera receiver. If this option is present, you can configure font size, position, foreground (FG) / background (BG) colour, and the text to be displayed for each status.

The following figure depicts a typical configuration, which shows the battery status in the upper right corner of a monitor with 1920x1080 resolution.

The screenshot shows a window titled "Battery text config" with a grey title bar and a small upward-pointing triangle icon on the left. The window is divided into several sections:

- Global config:** Contains three rows of controls:
 - "Size" with a dropdown menu set to "Med."
 - "Pos X" with a text input field containing "1"
 - "Pos Y" with a text input field containing "3"
- Texts, FG, BG, Text:** A table-like structure with four columns. Each row corresponds to a battery status:

Texts	FG	BG	Text
Text	Black dropdown	Green dropdown	BAT START
Ok	Black dropdown	Green dropdown	BAT OK
Low	Black dropdown	Yellow dropdown	BAT LOW
Empty	Black dropdown	Red dropdown	BAT EMPTY
- Set:** A grey button located at the bottom right of the window.

Figure 9: Display battery status in upper right corner

When done, transmit the configuration to the camera receiver (see section 2.2.5).

2.2.5 Transmission of Configuration to Camera Receiver

When done, you must transmit your configuration to the camera receiver:

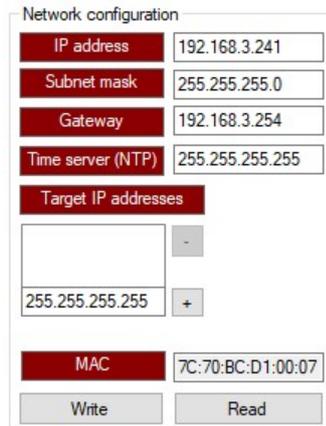
- The **"Set"** or **"Set all"** buttons send a configuration to the camera receiver.
- **After sending the configuration, the "Write" button stores this configuration permanently** in the receiver.

2.3 Network Configuration / IP Address

When being connected to the camera receiver, switch to tab “Configuration”.

The LAN interface of a camera receiver is optional and may not be present.

Clicking on the “Read” button retrieves the current LAN settings from the camera receiver. Remember the IP address for later connection with EMC32.



The screenshot shows a 'Network configuration' window with the following fields and values:

IP address	192.168.3.241
Subnet mask	255.255.255.0
Gateway	192.168.3.254
Time server (NTP)	255.255.255.255
Target IP addresses	-
	+
255.255.255.255	
MAC	7C:70:BC:D1:00:07
Write	Read

Figure 10: Reading network configuration

In order to change values, you must be connected to the camera receiver via serial port. Then, you can change all values except the MAC address. When done, use the “Write” button to store the new settings in the camera receiver. This will lead to a restart of the camera receiver interface.

3 Configuration of EMC32

The configuration is done in the Device List which is accessible via menu “Extras > Device List” ... or with shortcut “F9”.

3.1 Adding Devices to the Device List

In the Device List you have to add two devices:

- **Generic Monitoring** device from group **Monitoring**.
- **Standard Control** device from group **SystemControls**.

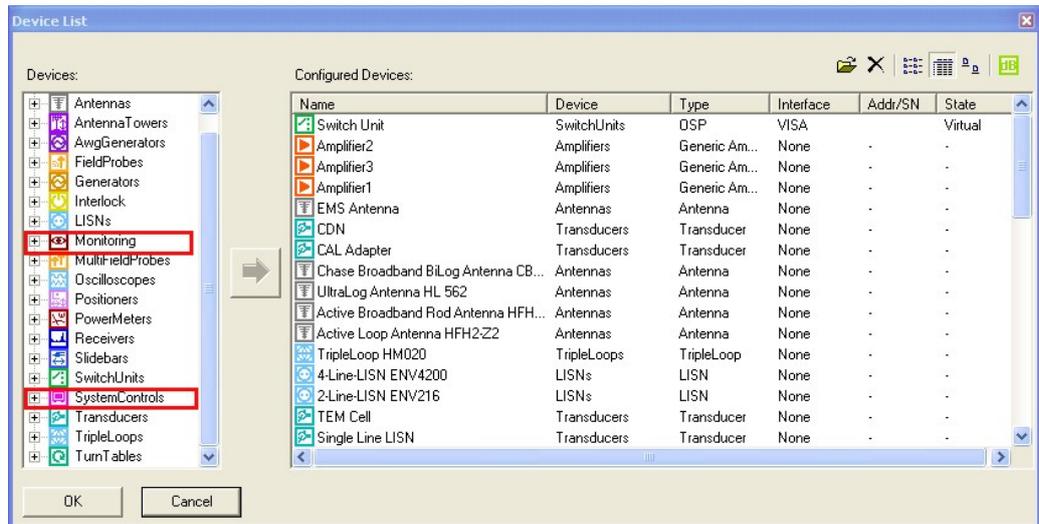


Figure 11: Device groups “Monitoring” and “SystemControls”

Add the Generic Monitoring device from the left side to Configured Devices on the right side of the Device List.

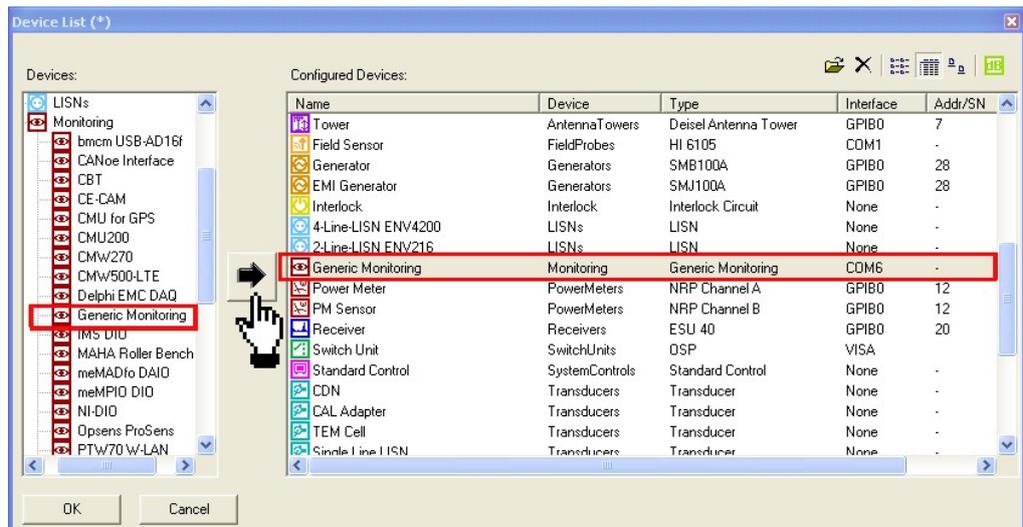


Figure 12: Adding “Generic Monitoring” device to Configured Devices

Add the Standard Control driver to Configured Devices.

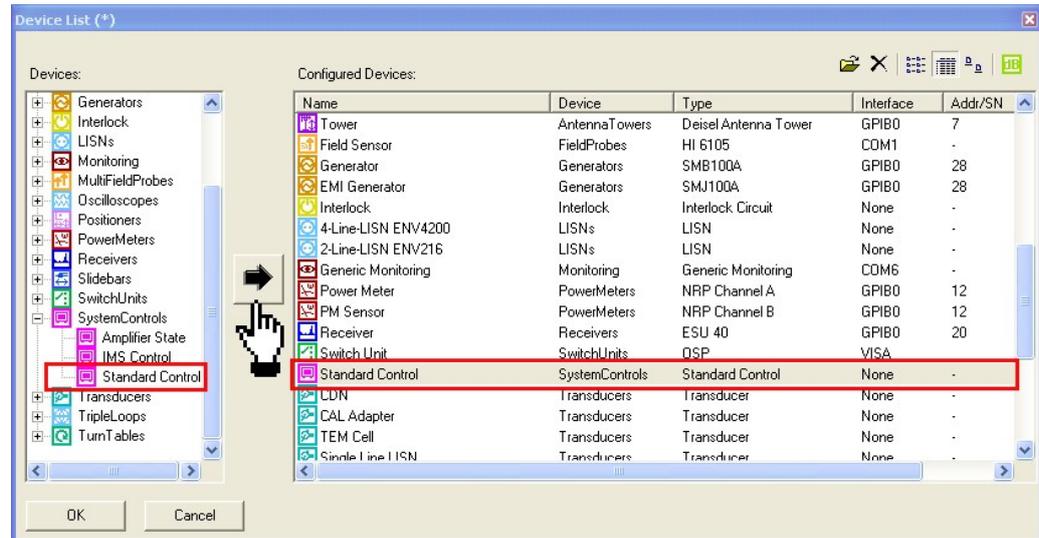


Figure 13: Adding “Standard Control” device to Configured Devices

(Optional) Rename “Generic Monitoring” to an appropriate device name e.g. “dAV Camera System”.



Figure 14: Renaming “Generic Monitoring” device

EMS Scan Templates as well as EMS Auto Test Templates remain unchanged.

3.2 Configuration of Generic Monitoring device

Open the properties dialog by right mouse click and choose “edit” or double mouse click on the Generic Monitoring device in Configured Devices.

3.2.1 Properties of Generic Monitoring – An Overview

The properties dialog has six tabs:

- General
- Interface Parameters
- General Commands
- Device Programming
- Measurement Queries
- EMS Information

After having completed the input of parameters, close the properties dialog with a mouse click on the “OK” button. Then, close the Device List by clicking the “OK” button. If there are significant changes in the Device List, also close and restart EMC32.

3.2.2 General and Interface Parameters Tabs: Configuring Serial Interface

This section explains how to configure the connection with serial interface. This is an alternative to the LAN interface. If you already use the LAN interface, you do not need the serial interface.

On tab “General”, select a COM interface as Type, for example COM1.

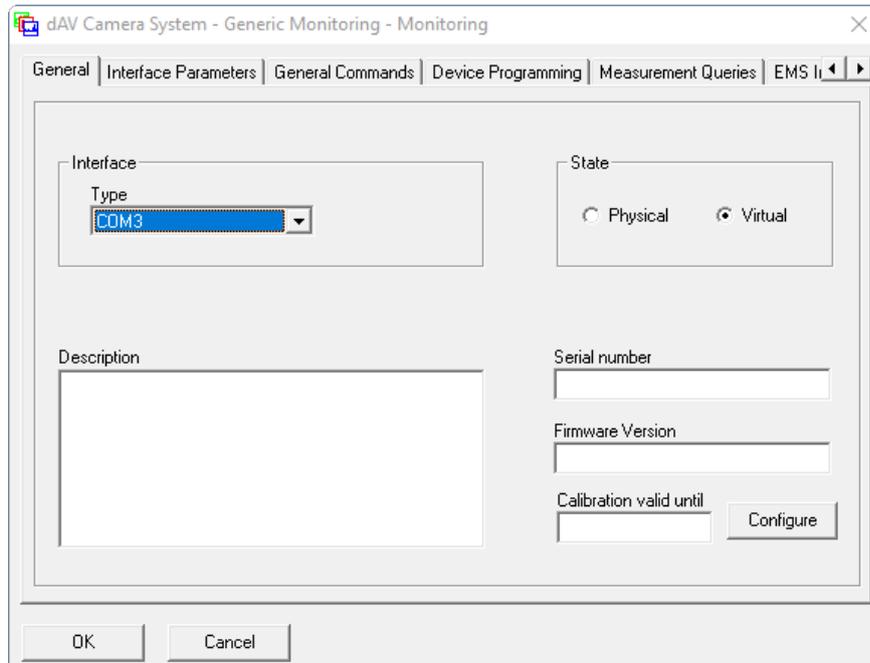


Figure 15: General settings

Change to tab “Interface Parameters” and change following settings:

- End Of String (EOS) character = 10 (control code “LF, line feed”).
- Second EOS = 0.
- Baud Rate = 57600
- Data Bits = 8
- Stop Bits = 1
- Parity = None
- Handshake = None

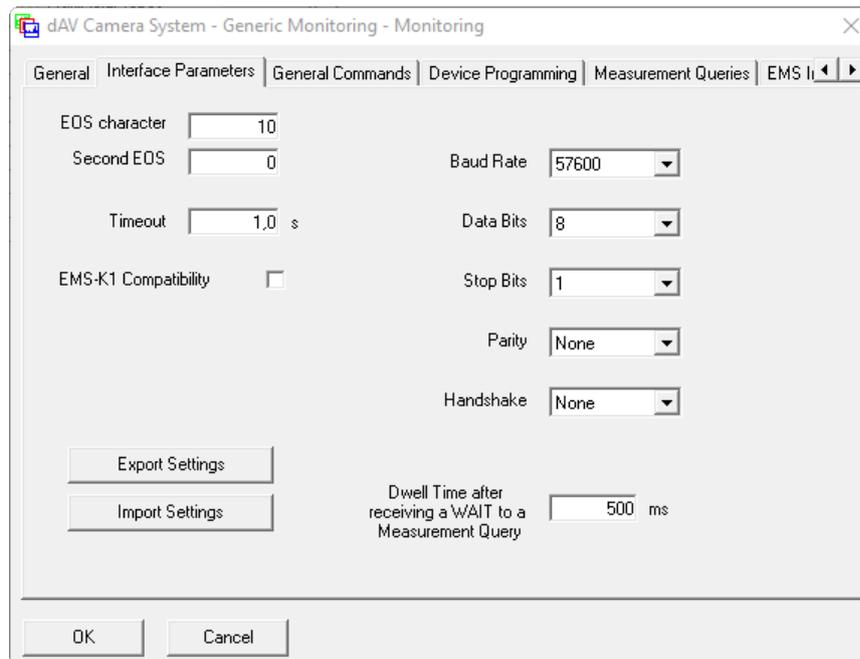


Figure 16: Interface Parameters settings

Go back to tab “General”, change the State from “Virtual” to “Physical”. This opens the serial connection to the device.

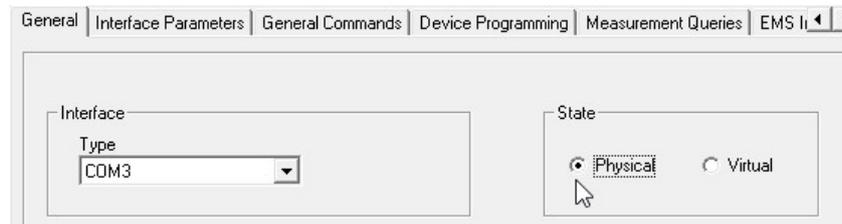


Figure 17: Set State from to Physical

3.2.3 General and Interface Parameters Tabs: Configuring LAN Interface

This section explains how to configure the connection with LAN interface, which is an option of the camera receiver. This is an alternative to the serial interface. If you already use the serial interface, you do not need the LAN interface.

On tab “General”, select Type LAN. Enter the IP address of your camera receiver followed by “:19308”. For determining the IP address, see section 2.3. The port 19308 is fixed and cannot be changed.



Figure 18: General settings

Set End Of String (EOS) character to 10 (control code “LF, line feed”).



Figure 19: EOS character setting

3.2.4 General Commands Tab

On tab “General Commands”, the commands for the basic configuration of the monitoring device are defined.

EMC32 sends commands in section Reset / Initialize once after it has been started or when the device state is changed from “Virtual” to “Physical”.

Enter commands in this section, which are required to initialize the camera receiver. All other sections can be left empty. Commands in these sections are executed, for example, when a measurement is started or stopped.

For dAV Camera Systems, use following commands. Please do not insert any additional characters, e. g. by pressing the “Enter” key:

```
%INITMKNEW,OSD:CLR 255 1-20@30@OSD:COL 255 1-20 3 0@30@OSD:FONT
255 1-20 2@30@MX:TIME 250 $TIME@30@MX:DATE 250 $DATE
```

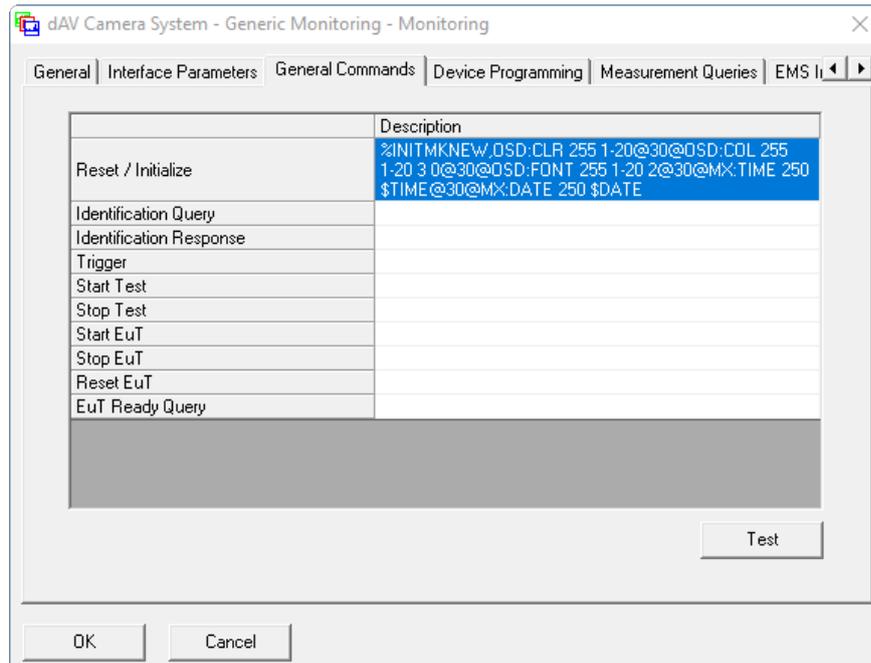


Figure 20: General Commands settings

Command Details:

%INITMKNEW,	Internal EMC32 command. It is not sent to the camera receiver. Tells EMC32 to combine all disturbance signal parameters into a single line.
OSD:CLR 255 1-20 @30@	Clears Screen Separates two commands. EMC32 waits 30ms before sending the next command.
OSD:COL 255 1-20 3 2	If the @ character is required in a command you need to use the @@ character sequence. Sets Foreground (= 3) and Background Colour (= 2)
OSD:FONT 255 1-20 2	Sets Font Size (= 2)
MX:TIME 250 \$TIME	Syncs time with PC
MX:DATE 250 \$DATE	Syncs date with PC

IMPORTANT – Use EMC32 in Physical Mode

EMC32 does not process its internal command %INITMKNEW when it runs in mixed mode with simulated and physical devices. In order to actually see disturbance signal parameters on the monitor of a dAV Camera System, you must run EMC32 in fully physical mode with no simulated devices.

The commands MX:TIME and MX:DATE send time and date from PC to the camera receiver. Camera receivers can have an optional battery buffered real-time clock. If camera receivers are equipped with the optional LAN interface, they can retrieve time and date from a Network Time Protocol (NTP) server. In both cases, you may omit the two commands from the Reset / Initialize section.

Command Parameters:

Commands `OSD:CLR`, `OSD:COL`, and `OSD:FONT` have two common parameters:

- The **first** parameter must be always 255. The command is sent to all output channels in the camera receiver.
- The **second** parameter is a list of camera IDs. The command applies only to output channels, which currently show one of the cameras in the list. You can combine single IDs and ID ranges, such as 1, 2-5, 10, 12-20. At the beginning, it is recommended to use 1-20, in order to select a wide range of camera IDs.

The available parameters for font size and foreground / background colours are shown in Table 1 and Table 2.

Font Size Parameter	Description	Width	Height
1	Small	12 px	16 px
2	Medium	24 px	32 px
3	Large	32 px	48 px

Table 1: Font sizes

Colour Parameter	Description
0	Do not change colour
1	Transparent
2	Black
3	Red
4	Green
5	Blue
6	Yellow
7	Purple
8	Turquoise
9 – 15	Gray 1 (dark) – Gray 7 (bright)
16	White

Table 2: Foreground and background colours

Some legacy camera systems can have a different command set. This applies in particular to table top camera receivers with one fixed channel. Use following commands and refer to the Manual of the dAV Camera System for more details.

```
%INITMKNEW,OSD:CLR 255 1@30@OSD:COL 255 1 3 0@30@OSD:FONT 255 1
2@30@OSD:TIME 255 1 $TIME@30@OSD:TIMEABS 255 1 1 1@30@OSD:TIMERUN
255 1 1@30@OSD:DATE 255 1 $DATE@30@OSD:DATEABS 255 1 1
2@30@OSD:DATERUN 255 1 1
```

3.2.5 Device Programming Tab

This tab is not used and has to be empty

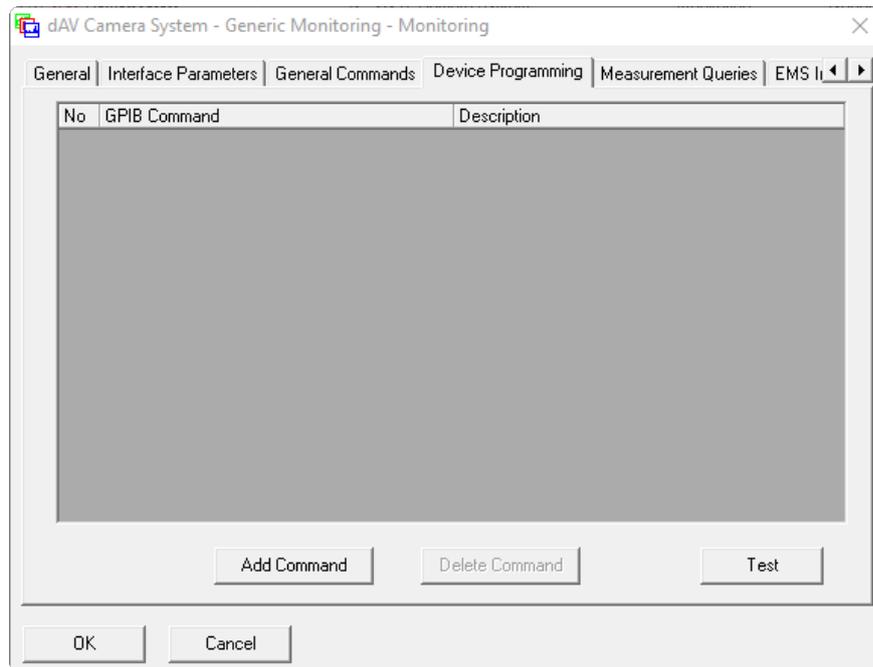


Figure 21: Empty Device Programming settings

3.2.6 Measurement Queries Tab

This tab is not used. However, at least one measurement command must be defined. Otherwise the properties dialog cannot be closed.

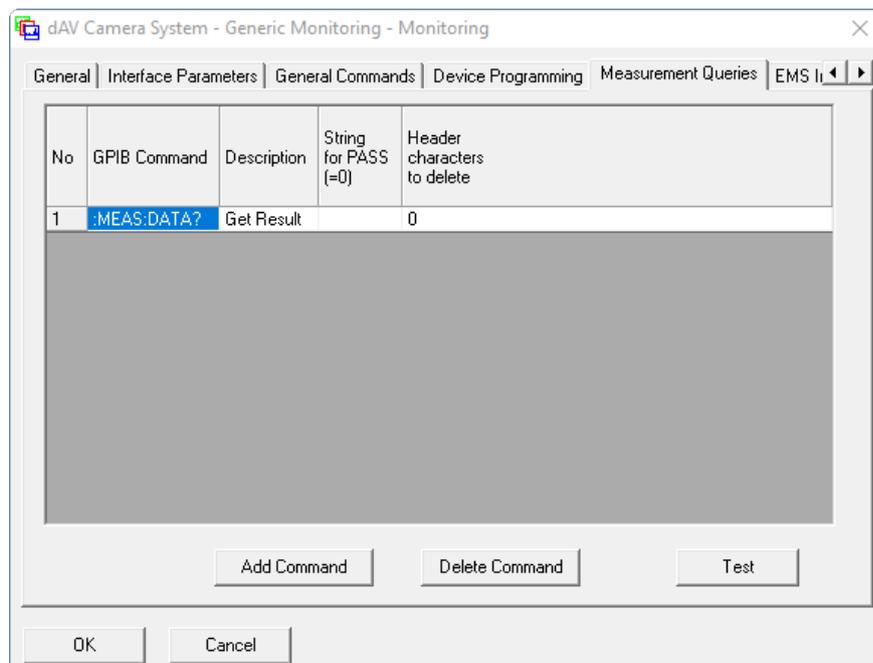


Figure 22: Unused Measurement Queries settings

3.2.7 EMS Information Tab

In this tab, commands can be inserted that transmit disturbance signal parameters from EMC32 to dAV Camera Systems.

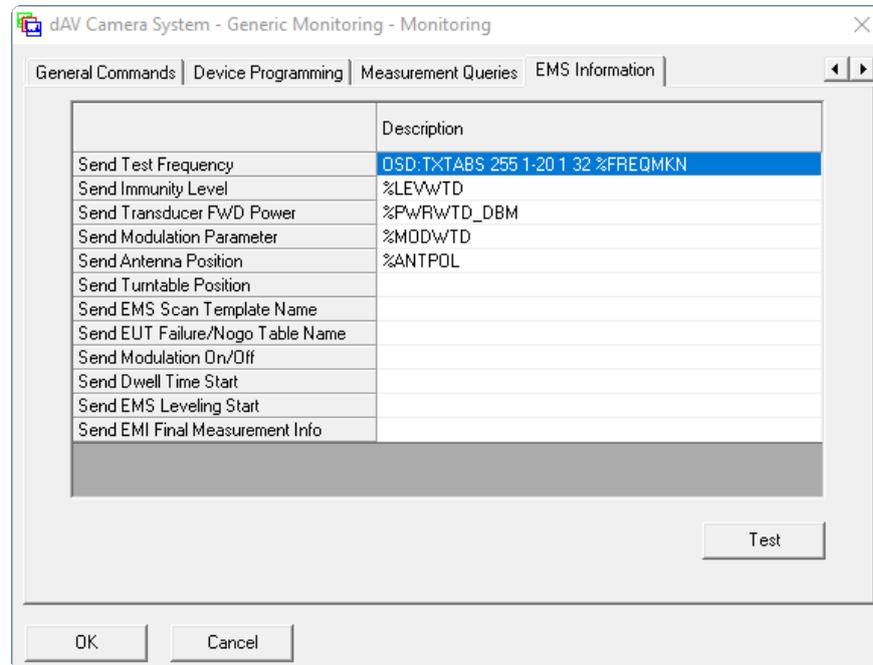


Figure 23: EMS Information settings

When using the %INITMKNEW in the “General Commands” tab (see section 3.2.4), EMC32 combines all disturbance signal parameters into a single line.

Table 3 shows the standard commands that display frequency, immunity level, transducer power, modulation parameter, and antenna position. The first line must start with OSD:TXTABS. This tells EMC32 to actually send the parameters. The following lines must only contain the disturbance signal parameters.

Action	Command
Send Test Frequency	OSD:TXTABS 255 1-20 1 32 %FREQMKN
Send Immunity Level	%LEVWTD
Send Transducer FWD Power	%PWRWTD_W (using unit W) or %PWRWTD_DBM (using unit dBm)
Send Modulation Parameter	%MODWTD
Send Antenna Position	%ANTPOL

Table 3: Commands to transmit all disturbance signal parameters

Table 4 shows an example, how to display only the frequency and the modulation parameter. ECM32 does not allow to omit the frequency.

Action	Command
Send Test Frequency	OSD:TXTABS 255 1-20 1 32 %FREQMKN
Send Immunity Level	
Send Transducer FWD Power	
Send Modulation Parameter	%MODWTD
Send Antenna Position	

Table 4: Example to transmit only some disturbance signal parameters

Command Parameters:

The command `OSD:TXTABS` begins with the same two parameters as `OSD:CLR`, `OSD:COL`, and `OSD:FONT`. These are 255 for addressing all channels and 1-20 for addressing camera ID 1 to 20. See section 3.2.4 for more details on these parameters.

The next two parameters define the position where the disturbance signal parameters are displayed on the monitor. Please see section 2.2.3 for more details on the position.

3.2.8 Monitoring Test Dialog: Testing the Parameters and Settings

Open the “Monitoring Test” dialog by clicking the button “Test” on the “EMS Information” tab.

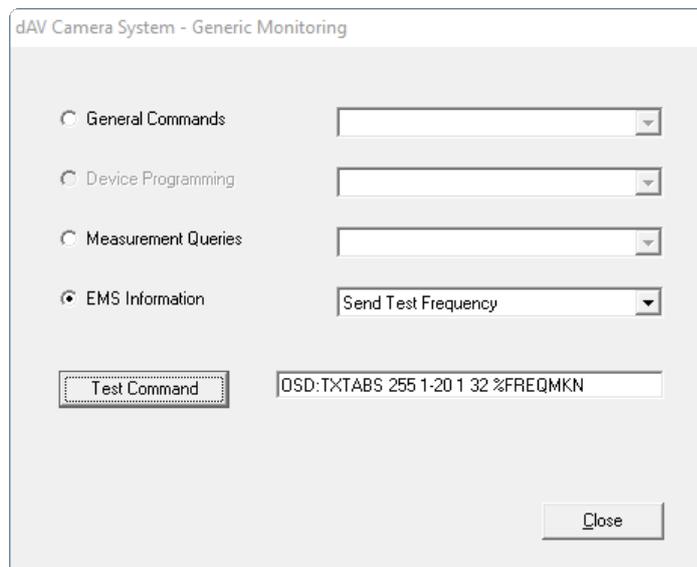


Figure 24: Monitoring Test dialog

This dialog allows to send a selected command to the dAV Camera System. EMC32 does not support the internal command `%INITMKNEW` for this test. Hence, you can only test use “Send Test Frequency” from “EMS Information”. When the Generic Monitoring device is in state “Physical”, select “EMS Information” and “Send Test Frequency”. Click on Button “Test Command”. As a result, a test frequency should be displayed on the monitor showing the camera signal.

3.3 Configuration of Standard Control

After having configured the Generic Monitoring device, the Standard Control device is next.

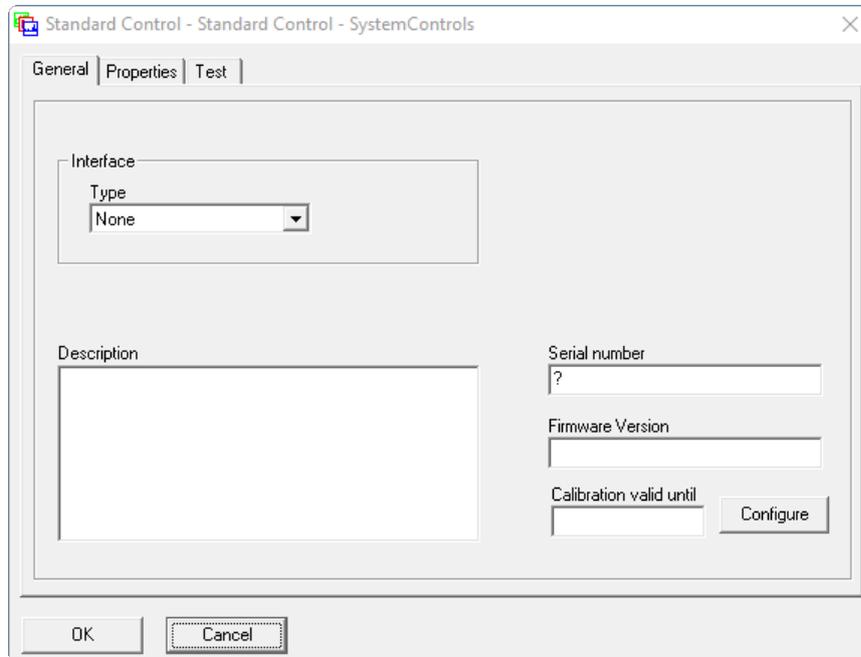


Figure 25: General settings

There is nothing to set on the “General” tab.

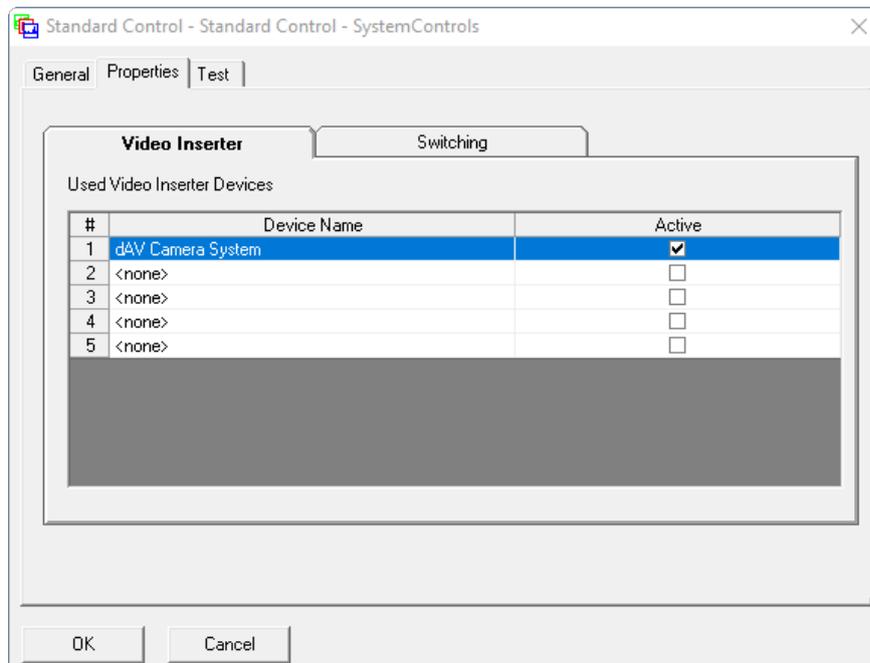


Figure 26: Properties settings

Select the Generic Monitoring device configured in the previous section, for example “dAV Camera System”.

Enable the checkbox “Active” for this device in order to activate it.

3.4 Messages at Work

Now, EMC32 is ready. In order to look at the results, start an EMS Scan as a new test directly

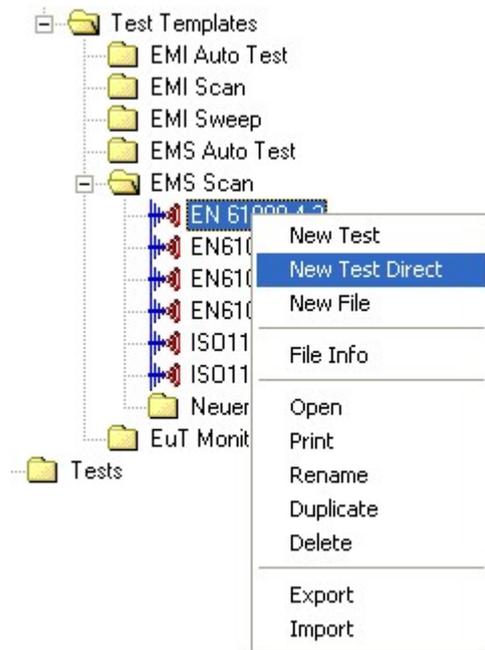


Figure 27: Start “EMS Scan” template as “New Test Direct”

When ready, start the EMS scan.

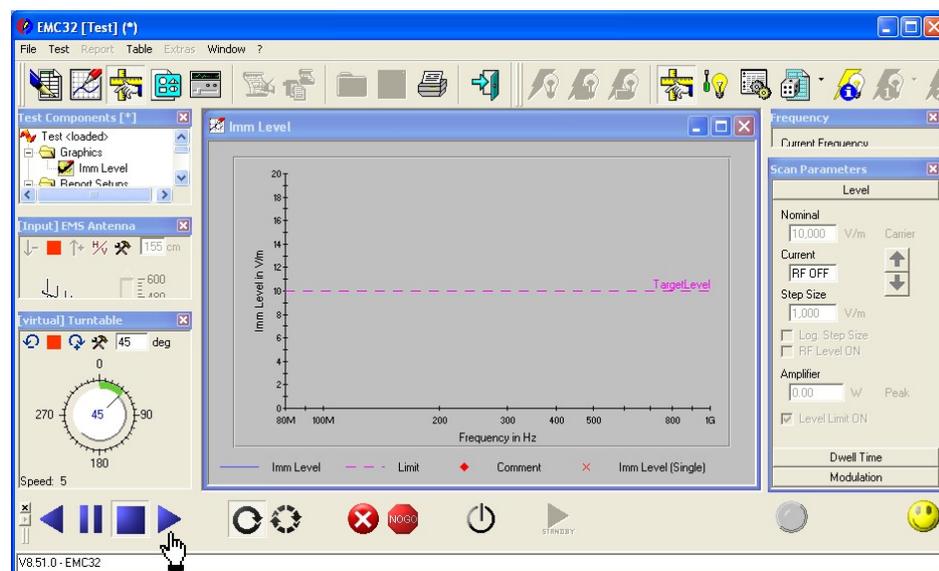


Figure 28: Start EMS scan

When you have applied all settings as suggested, your result looks as in Figure 29 on a 1920x1080 monitor. You see date, time, and battery status in the upper right corner and the disturbance signal parameters in the lower left corner.



Figure 29: 1920x1080 monitor with date, time, battery status, and disturbance signal parameters



Figure 30: Disturbance signal parameters in lower left corner

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