

# **BLACK&WHITE AND COLOUR MULTIPLEXERS**

## **Installation and user manual**

**ENGLISH**

<b>TP4MD</b>	<b>TP10MD</b>	<b>TP16MD</b>
<b>TP4CD</b>	<b>TP10CD</b>	<b>TP16CD</b>



# IMPORTANT SAFEGUARDS

## READ THE INSTRUCTIONS

Be sure to read all the safety and operating instructions before using the device.

## KEEP THE INSTRUCTIONS

Be sure to keep all the safety and operating instructions for possible future need and queries.

## FOLLOW THE INSTRUCTIONS

Be sure to follow all the safety and operating instructions.

## WATER AND HUMIDITY

Do not use the unit near water – for example near a bathtub, or in any area showing evidences of humidity.

## POWER SUPPLY

This equipment can be charged only by the type of supply quoted by a production code on the device. Do not overload electric adapters and extension cords as this can result in fire or electric shock.

## REPAIR

Do not open covers and repair this unit yourself, refer all repairs to a qualified person.

## UNPACKING

Transfer package is a safe cover for device transportation. We recommend keeping the wrapping for possible future usage.

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## INTRODUCTION

Multiplexers TP are devices, which enable recording and decoding of up to 16 TV signals (cameras) on the VCR. They also offer the simultaneous displaying of all cameras on a divided screen in a number of displaying formats – views.

The multiplexers have two digital channels. The main channel is used for LIVE display or for playback of recorded pictures. The recording channel is used only for recording.

The multiplexers have RS 485 and the CAN interface, which enables to control the telemetry receivers used for controlling the PAN/TILT camera heads and zoom lenses.

For optimum camera recording on VCR it is possible to use the activity detector. The activity detector enables to affect the camera recording or displaying cameras with detected motion.

The multiplexers have not only a digital channel, but also an analogue channel, which contains a sequential switcher with the programmable order and time of cameras switching. The spot channel is used even for manual controlling from the main panel.

## MAIN CHARACTERISTICS

- 4, 10 or 16 video inputs
- main and spot output
- VCR input and output
- automatic TV standard detection from connected cameras
- 864 samples per a TV line CCIR/PAL (856 - EIA/NTSC)
- 576 active TV lines CCIR/PAL (480 – EIA/NTSC)
- 256 grey scale / 16 million colours
- RS 485 and CAN interface for telemetry controlling of pan/tilt units and zoom lenses
- possibility of controlling from external keyboard
- displaying of 1, 2, 3, 4, 7, 8, 9, 10, 13, 16 cameras on divided screen
- digital zoom
- picture freeze
- user friendly on-screen menu
- on-screen time, date, titles and status
- programmable switching sequence for spot and main monitor
- built-in activity detector
- 4, 10 or 16 alarm inputs
- potentialless alarm output
- wide range of alarm settings
- acoustic and optical alarm signalling
- recording of alarm events

## OPERATING ELEMENTS AND FUNCTIONS

Fig. 1: Front panel of TP16CD

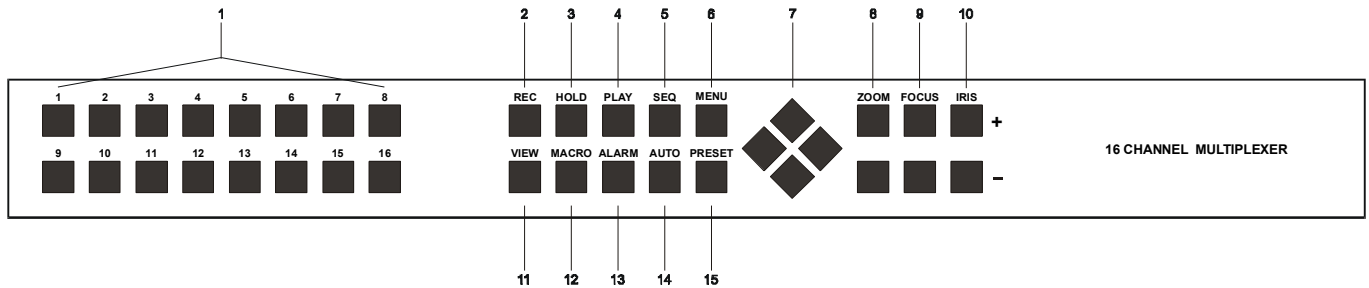
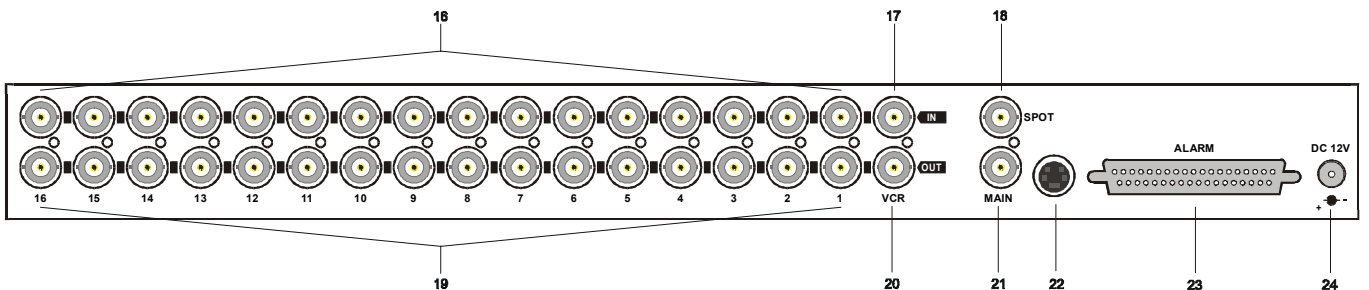


Fig. 2: Back panel of TP16CD



# MULTIPLEXER CONTROLLING

## 1. 1-16

Press the buttons 1 - 16 to display the corresponding camera image.

## 2. REC

Press the button REC to start recording to the VCR.

## 3. HOLD

Press the button HOLD to freeze all cameras on the divided screen.

## 4. PLAY

Press the button PLAY to start the playback from the VCR.

## 5. SEQ

Press the button SEQ to control an analogue channel MON SPOT.

## 6. MENU

Press the button MENU to display the on-screen menu.

## 7. DIRECTION ARROWS

These buttons are used for moving in the menu and for controlling the pan/tilt camera heads and zoom lenses in telemetry.

## 8. ZOOM +/-

By pressing the buttons ZOOM it is possible to control the digital zoom (PLAY mode only) and the optical zoom for telemetry.

## 9. FOCUS +/-

Focus controlling buttons for telemetry

## 10. IRIS +/-

Iris controlling buttons for telemetry

## 11. VIEW

After pressing the button VIEW it is possible to select various types of displaying of the camera numbers on the screen.

## 12. MACRO

Press the button MACRO to load the defined macros.

## 13. ALARM

Press the button ALARM to display the alarm status. Press the button again to display the list of alarm events.

## 14. AUTO

Press the button AUTO to starts/stop the automatic camera switching, according to the programmed sequence.

## 15. PRESET

By pressing the button PRESET it is possible to set up prepositions of the connected devices. This button has more telemetry functions.

## 16. IN1 – IN16

Video inputs for cameras 1 – 16.

The video inputs are automatically terminated if the corresponding video output is left unconnected. If a device is connected to video out make sure that it is properly terminated.

## 17. VCR IN

Use this video input for connecting from VCR.

## 18. SPOT

Video output to spot monitor.

## 19. OUT1 – OUT16

Video outputs for cameras 1 – 16.

## 20. VCR OUT

Video output to VCR.

## 21. MAIN

Video output to main monitor.

## 22. MAIN

S-VHS video output to main monitor ( only for colour multiplexers ).

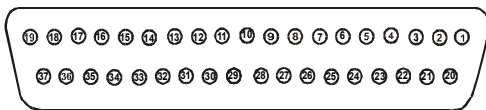
## 23. ALARM

Connector serve for RS 485, RS 232 and CAN interfaces and enables connecting alarm contact makers, sensors, ect.

## 24. DC12V

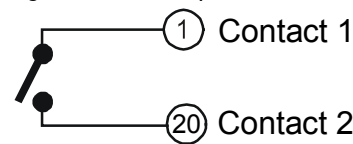
Connector for connecting power supply (12VDC, min 700mA).

Fig. 3a: D-SUB37M alarm connector



- (1) Alarm output – contact 1
- (2) Reserve
- (3) Common input conductor – ground (GND)
- (4) Alarm input 1
- (5) Alarm input 3
- (6) Alarm input 5 (TP10, TP16)
- (7) Alarm input 7 (TP10, TP16)
- (8) Alarm input 9 (TP10, TP16)
- (9) Alarm input 11 (TP16)
- (10) Alarm input 13 (TP16)
- (11) Alarm input 15 (TP16)
- (12) Common input conductor – ground (GND)
- (13) RS 232 RX
- (14) RS 232 TX
- (15) CAN terminating resistance
- (16) CAN\_L, connect to twist pair cable conductor
- (17) Common input conductor – ground (GND)
- (18) RS 485 A (+)
- (19) RS 485 terminating to use connect with (18)

Fig. 3b: Alarm output internal connection



- (20) Alarm output – contact 2
- (21) Common input conductor – ground (GND)
- (22) AUX input from VCR
- (23) Alarm input 2
- (24) Alarm input 4
- (25) Alarm input 6 (TP10, TP16)
- (26) Alarm input 8 (TP10, TP16)
- (27) Alarm input 10 (TP10, TP16)
- (28) Alarm input 12 (TP16)
- (29) Alarm input 14 (TP16)
- (30) Alarm input 16 (TP16)
- (31) Common input conductor – ground (GND)
- (32) RS 232 RTS
- (33) RS 232 CTS
- (34) CAN\_GND, connect to shielding of the cable
- (35) CAN\_H, connect to twist pair cable conductor
- (36) RS 485 B (-)
- (37) CAV\_V+, (5V/100mA) – do not connect

# CAN & RS 485, RS 232 INTERFACE

ENGLISH

The external devices (PAN/TILT camera heads, lenses) are connected to the multiplexer using the RS 485 and the CAN interface. The devices are connected with shielded twisted pair cable.

Basic connection of two devices on the CAN bus is shown at figure 4. (Connection of the multiplexer and the telemetry receiver TC is used as the example). Length of the CAN bus can be 1000 m at maximum and both ends of the bus must be terminated with 120 Ω resistor.

Fig. 4: Connection of terminal devices of the CAN bus

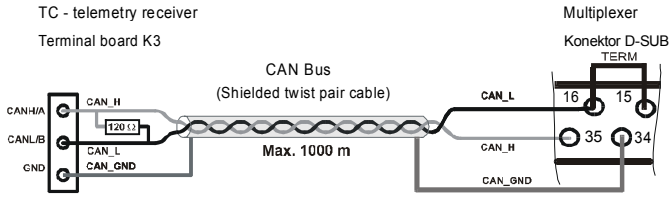
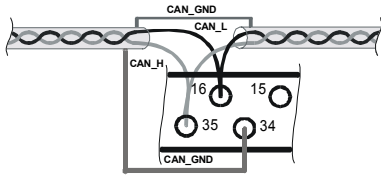


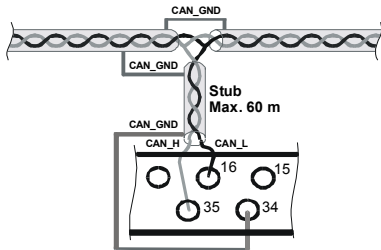
Figure 5 shows the connection of other devices on the CAN bus. It is possible to connect up to 90 devices in this way. If you need to connect more devices, it is necessary to use the CAN bus hub.

Fig. 5: Connection of next device of the CAN bus



If it is not possible to connect the device directly to the bus (fig. 5), you can connect it using a stub (fig. 6). The length of one stub must be 60 m at maximum. The whole length of all stubs must not exceed 300 m. Other connection possibilities can be reached using the CAN bus hub.

Fig. 6: Connection using the stub



## EXTERNAL KEYBOARD

The external keyboard enables remote controlling of other external equipment (multiplexers, PAN/TILT camera heads, lenses) connected to the CAN bus. You can connect several external keyboards to CAN bus and control different or the same devices. During controlling of one device by several keyboards you are able to operate controlled device by another keyboard five seconds after the last command of the pre-

vious keyboard (it is not possible to control one device from two keyboards at the same time).

## MULTIPLEXERS NETWORKING

Using the external keyboard and auxiliary video switcher you can simply control several multiplexers from one external keyboard. So it is possible to control a group of multiplexers or cameras and watch their outputs on one monitor. You can use a multiplexer sequential switcher instead of a video switcher. At fig. 8 you can see the use of the multiplexer no. 3 analogue sequential switcher as an auxiliary video switcher. Video outputs of multiplexers no. 1 and 2 lead to video inputs 1 and 2 of the multiplexer no. 3. For example, when the external keyboard starts to control multiplexer no. 2, it also sends a command to the multiplexer no. 3 to display output of the multiplexer no. 2 to the monitor. You can use the unused video inputs of the multiplexer no. 3 for recording or displaying on a divided monitor screen.

Fig. 8: Multiplexers networking example

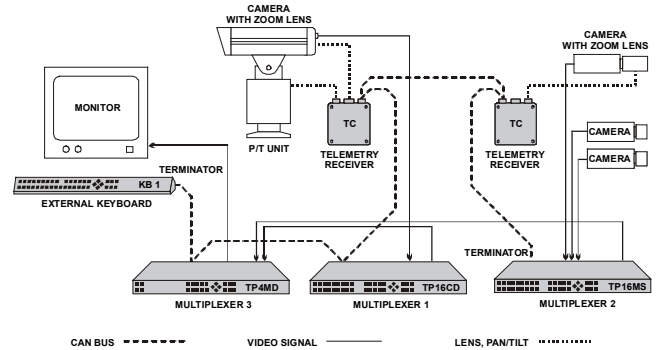


Fig. 9: Connection of RS 485 bus

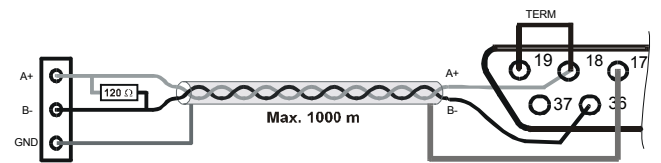
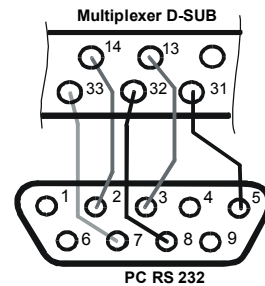


Fig. 10: Connection of RS 232 for download



# MULTIPLEXER CONTROLLING

## CAMERAS DISPLAYING – LIVE

The camera displaying is an implicit mode, which is started after the device has been switched on. Cameras are displayed according to the last chosen view.

Set up camera to the first position by pressing the corresponding button 1 to 16; the following cameras are arranged automatically. If the camera was at the first position, it will be displayed at full screen. The TP multiplexers omit the displaying of the disabled cameras, that provides the better compatibility of displaying without empty frames among the cameras.

The first camera has the privilege of the zooming function (ZOOM - PLAY mode only) and telemetry controlling.

Pressing the button AUTO it switches the automatic switching sequence on or off. Set up the sequence parameters using the menu *Sequence*, *Displayed cameras* and *Time multiplier* (see page 8 and 9).

## PLAYBACK RECORDING - PLAY

The playback of the coded record from the VCR is switched ON by pressing the PLAY button. The cameras are displayed on the screen of the main channel according to the topical view in this mode.

Pressing the button 1 to 16 set up the particular camera to the first view position; the following cameras are arranged automatically. The function of zooming (ZOOM) is always available only for the first camera. By another pressing the button PLAY, the multiplexer switches into the LIVE mode.

## DIGITAL ZOOM - ZOOM

Digital picture zoom can be switched on only in the PLAY mode by pressing the button ZOOM+. When you are using the zoom function, only the centre of the whole picture is displayed on the monitor screen. The picture can be moved using the direction arrows. When the zoom is on, the title ZOOM is displayed on the monitor status line. The zoom can be set up only on the main channel. The digital zoom will be turned off by pressing the button ZOOM- or ZOOM+.

## PICTURE RECORDING - REC

The recording of the coded images is switched on by pressing the button REC and it is indicated by red point in the status line. Recording uses its own independent channel without affecting the main channel. Another pressing the REC button stops recording.

## ANALOGUE CHANNEL CONTROLLING - SEQ

Controlling a spot analogue channel is switched on by pressing the button SEQ. The buttons 1 to 16 are used for displaying a corresponding camera, by pressing the button AUTO it is switched the automatic switching sequence on or off. Set up sequential switching parameters using the menu *Sequence*, *Cameras in sequence* and *Time multiplier* (see page 8 and 9). By another pressing the button SEQ, the multiplexer switches back into the controlling of the main channel.

## DISPLAYING VCR INPUT - VCR

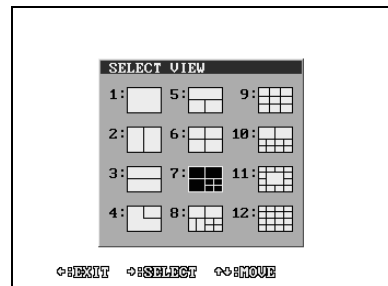
When playback does not work as expected, it is probably caused by missing or improper signal at VCR IN input.

Press and hold the PLAY key for at least 2 seconds to display signal from VCR IN to the monitor controlled at the moment. If you control LIVE or PLAY mode, the picture is processed digitally (as real playback), when you control analogue channel, the signal is displayed as it is to the analogue output.

Releasing the PLAY key returns the multiplexer to its previous mode.

## SELECT VIEW – VIEW

The view on the main monitor can be selected by pressing the VIEW button. On the monitor screen the following menu will be displayed and than the demanded view can be chosen by pressing the button 1 to 12. Only the first 6 displayed possibilities are available for 4 channel multiplexers and only the first 10 for 10 channel multiplexers.



## TELEMETRY CONTROLLING

TP multiplexers offer remote controlling of cameras using the RS 485 and the CAN interface. If a split screen is being displayed, you can control the first camera of the view (left top corner of the view or the centre at the view no. 11). Only cameras with telemetry receiver address set up can be controlled. This address is set up in the menu *Telemetry addresses* (see page 9).

### PAN/TILT unit and lens controlling:

PAN/TILT camera heads are controlled using the direction buttons. The lens is controlled using the buttons ZOOM +/-, FOCUS +/-, IRIS +/- . Automatic focus or iris is turn on by pressing the buttons PRESET, AUTO, FOCUS+ or IRIS+, if camera support this. Automatic function is turn off by start of manual control.

### User AUX outputs controlling:

Multiplexer can control 2 user outputs (AUX1 and AUX2) of the telemetry receiver. The user outputs controlling is possible with the use of the buttons PRESET (the button starts flashing) and one of the buttons ZOOM. Allocation of the individual user outputs AUX to the buttons is as following:

- AUX1 – ZOOM+
- AUX2 – ZOOM-

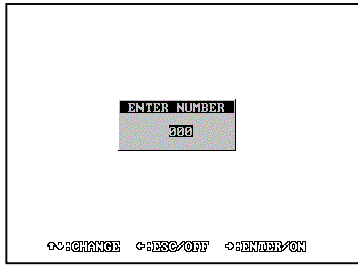
The output function can be set up in the menu *Telemetry* (see page 16).

# MULTIPLEXER CONTROLLING (continued)

Multiplexers TP can set up a so-called preposition (in advance programmed position of PAN/TILT camera heads and zoom lenses).

### Preposition invoking:

Pressing the button PRESET, PLAY and enter the number within the displayed rectangle and confirm. Although the number can be set up to 999, the range depends on the camera possibilities (please see its manual). The PAN/TILT camera heads and the zoom lens will be set up into the in advance saved preposition.



### Preposition saving:

Pressing the buttons PRESET, REC and the number subsequently the preposition can be saved. After that the topical position of the PAN/TILT camera heads and zoom lens is saved into the telemetry receiver memory.

### Cameras OSD menu:

The cameras OSD menu can be disabled in the menu *Telemetry* (see page 16), so if you are using the cameras menu be sure the function is enabled.

For show the cameras menu press the buttons PRESET, MENU. On the status line the "PRESET" is displayed. The arrow buttons (← ↑ ↓ →) are used for moving in the menu. However in some special cases must be used another buttons according to displayed instructions. If number entering is required, this could be done by long pressing PLAY button.

After leaving the cameras menu and pressing the PRESET button you return back to the pan/tilt and lens controlling mode. After that the "PRESET" disappears from the status line.

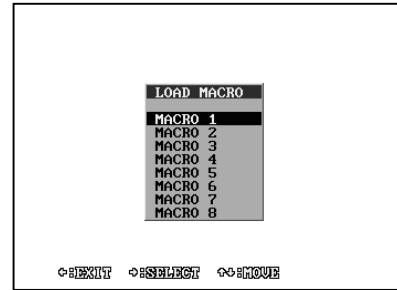
### FREEZE PICTURE (HOLD)

During LIVE and PLAY modes pressing the button HOLD freezes the main channel monitor view. The picture starts to move again by other pressing of this

### LOAD MACRO (MACRO)

TP multiplexers enable to define so-called macros. Macro is a set of parameters, which change the multiplexer settings when the macro is launched.

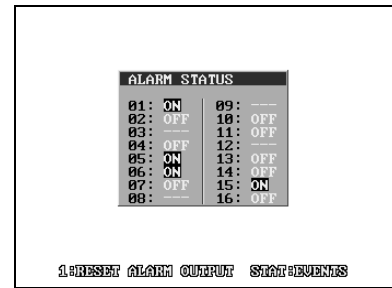
The following menu is displayed after pressing the button MACRO.



A particular macro is switched on by pressing the button of 1 to 8 and it changes prepared parameters. The intended parameters can be set up in the menu *Edit macro* (see page 13).

### DISPLAY ALARM STATUS (ALARM)

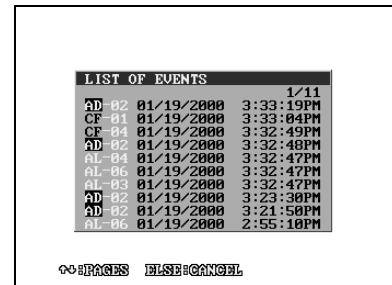
By pressing the button ALARM the following table is displayed, which represents actual status of all alarm inputs.



In case the alarm output (relay) is active, you can switch it off by pressing the button 1. If you press the button ALARM again, the list of recorded events is displayed.

### DISPLAY LIST OF EVENTS

There is displayed a list of events in this menu, which correspond to the parameters set up in the menu *EVENTS* (page 14). The events are displayed from the last recorded one. They are displayed ten on each page. Pages can be listed by buttons ↑ and ↓.



Error message notation is as following:

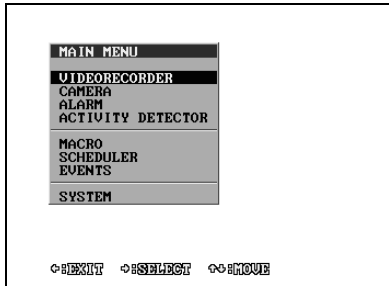
- CF** - Camera fail (video signal lost)
- AD** - Activity detection
- AL** - Alarm event (alarm inputs)



# MENU

By pressing the button MENU the main menu is displayed on the screen. It is the starting point for setting up all multiplexer functions. To make the work easier, there is an info line at the bottom of the screen.

## MAIN MENU



## MENU CONTROLLING

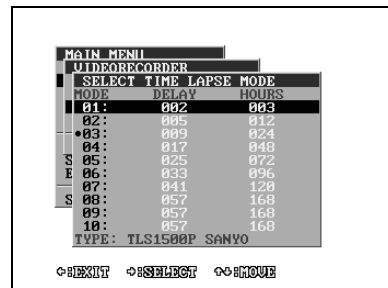
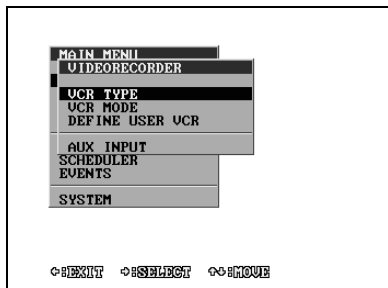
- The button ← (**BACK**) cancels the actual level of the menu on the screen and goes back to the previous level.
- The buttons ↑ and ↓ enable moving up and down or correct the edited level.
- The button → (**CHOOSE, NEXT**) chooses a subordinate menu or moves to the other level.
- The buttons of **1** to **10** set up a number.
- The button **ZOOM+** delete last figure in the number
- The button **ZOOM-** enters number.
- For faster move into the subordinate menu it is possible to enter the number of its line. You can get directly into the menu, which you want to change using several buttons.

## MENU - VIDEORECORDER

Set up the type and working modes of the VCR in this menu. For the correct recording function it is important to ensure that the VCR and multiplexer work in the same mode. You can also define the type of the connection between the VCR and the multiplexer with the help of AUX input.

## VCR MODE

Time-lapse VCRs can work in several working modes. You can set the topical working mode of the VCR by the choice of the line of 1 to 10. The working mode of the VCR can also be set up with the help of macro or AUX input on the alarm connector (see page 8).

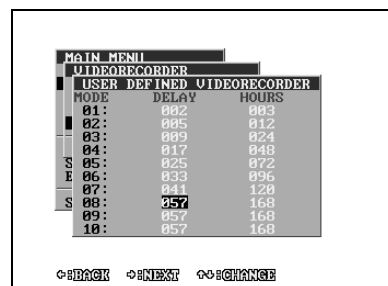
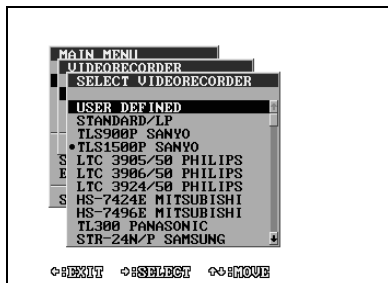


## VCR TYPE

Set up your VCR type here. If your VCR type is not mentioned here, use an analogous type or choose a user defined VCR and set up the working VCR modes in the menu *User defined VCR* (see page 7).

## USER DEFINED VCR

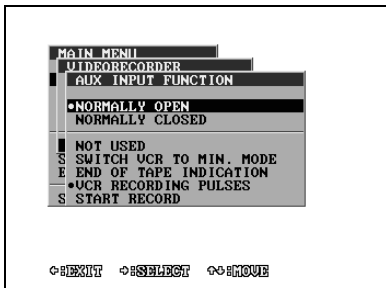
Time-lapse VCRs do not have only common recording speed in real time (50 or 60 fields per second), but also extended modes. These modes extend the recording time from 3 hours (using the E180 cassette) to 12, 24, 48, 72, 96, 120, 168, 240, 480 or 960 hours. These recording times are different at various types of VCRs. This longer recording time is attainable by omitting some fields during recording. The parameter DELAY sets up intervals between recorded fields in this menu.



## MENU – VIDEORECORDER (continued)

### AUX INPUT

AUX input is used for delivering information from the VCR to the multiplexer. Set up the required function.



**Normally open / closed** – specify AUX input activity in an inactive state

**Not used** – the AUX input is not used

**Switch VCR to the minimal mode** – the VCR informs the multiplexer that under the influence of some situation (for example alarm condition) it records in the highest speed (in the real time mode). Multiplexer must adapt itself to the VCR speed.

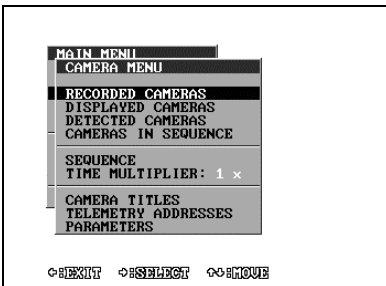
**End of tape indication** – the VCR informs that a tape is at the end. The multiplexer displays the note about this situation for the operator on the screen.

**VCR recording pulses** – it is the function of recording mode synchronised from the VCR. Some VCRs have a signal with recording pulses (normally marked as SW OUT or CLK OUT) leaded on the back panel, which determines the VCR recording speed. This signal can be used for the synchronisation of recording between the VCR and the multiplexer. If the operator switches the recording speed on the VCR or the recording speed is changed by the influence of the alarm signal on the VCR, the multiplexer changes its recording speed automatically.

**Start record** – if the AUX input activity is detected, multiplexer starts the recording automatically.

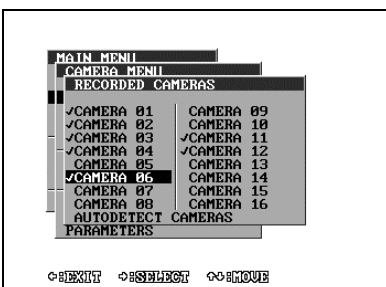
## MENU - CAMERA

Set up camera parameters of recording, displaying, activity detection, sequential switching and telemetry in this menu.



### RECORDED CAMERAS

By marking the lines choose the cameras, which will be recorded to the VCR after the recording is switched on. If you choose the line *Autodetect cameras*, the multiplexer finds out, which cameras are in operation at the moment and marks them in the table.



### DISPLAYED CAMERAS

By marking the lines choose the cameras, which will be displayed during the live mode (LIVE) even in the automatic switching sequence or during playback (PLAY).

### DETECTED CAMERAS

By marking the lines choose the cameras, which will have the activity detection in operation, see *Activity detection* on page 12.

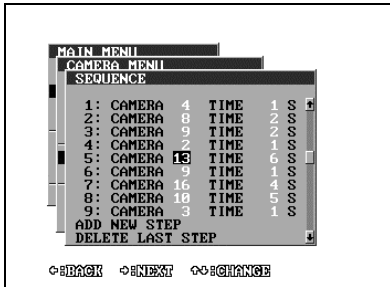
### CAMERAS IN SEQUENCE

By marking the lines choose the cameras, which will be available for the automatic switching sequence on the spot analogue output (MON SPOT).

# MENU - CAMERA (continued)

## SEQUENCE

The menu SEQUENCE programmes the order and time of the displaying (switching) of particular cameras on analogue switching output (MON SPOT) or in LIVE mode on main monitor. You can program from 2 up to 32 switching steps of the sequence. The individual steps are marked with sequential numbers and are arranged one under the other. If you want to choose the camera or time of some step, you have to choose the particular step with the help of direction keys up and down at first. Then press the button → (CHOOSE) and now you can change the camera number with the help of arrow keys. By another pressing the button (NEXT) you can go to edit the time. The time of this step can be set up in the interval from 1 up to 255 seconds. The next press of the button → finishes the editing of the chosen step. The last two steps of the menu obtain the functions for the change of the sequence length: adding a new step (ADD NEW STEP) and deleting the last sequence step (DELETE LAST STEP). By pressing the button ← (END) you can stop the editing of the sequence and return to the camera menu.



## TIME MULTIPLIER

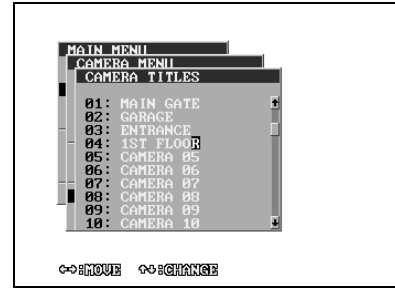
If you would like to change the camera switching time, it is not always necessary to reprogram the switching sequence. All the time data of the sequence are multiplied with the parameter TIME MULTIPLIER. The time of the displaying of particular cameras can be quite lengthened or shortened and the proportion of displaying particular steps (cameras) still lasts. It is important to note that the time of displaying one step after the change will still stay in interval of 1 to 255 seconds.

There is an illustrated example in the table, how the switching time changes according to the programmed switching sequence "Sequence time", if you use the time multiplier 8x or 1/4x.

Camera	Time of sequence	Multiple 8 x	Multiple 1/4
2	1 s	8 s	1 s
4	12 s	96 s	3 s
8	100 s	255 s	25 s
3	4 s	32 s	1 s
5	24 s	192 s	6 s

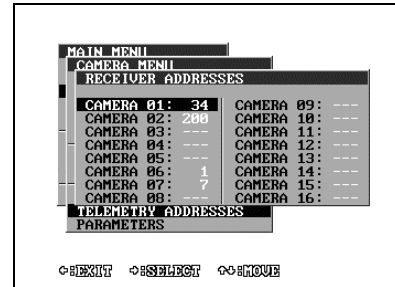
## CAMERA TITLES

Each camera can have its own title for better identification. The title can include up to 16 symbols and there can be used letters from A to Z, numerals from 0 to 9, symbols . , ! ? ' + - \* / ( ) < > = and a space.



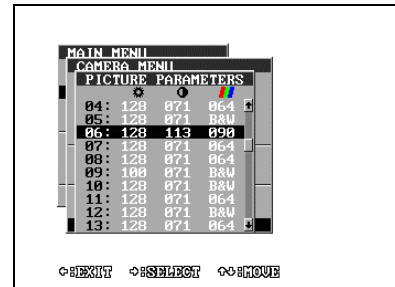
## TELEMETRY ADDRESSES

The address of the telemetry receiver can be defined in the interval from 0 up to 255 for controlling the PAN/TILT camera heads and lenses for each camera. The multiplexer, with the help of this address, distinguishes particular devices, which are connected to the RS 485 or CAN bus. If a camera does not have the receiver address set up, you can not switch on the telemetry for the camera.



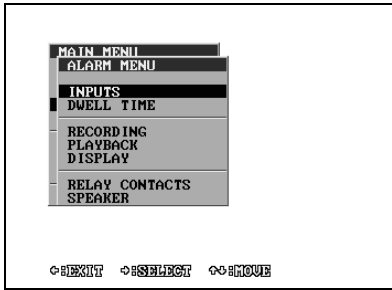
## PICTURE PARAMETERS

Colour multiplexers enable setting of picture parameters for every camera. Implicit values are: 110 for brightness, 64 for contrast, and 64 for colour. You are not allowed to set colours if using B&W multiplexers. Using a B&W camera set colour to "B&W". The camera displaying will be sped up.



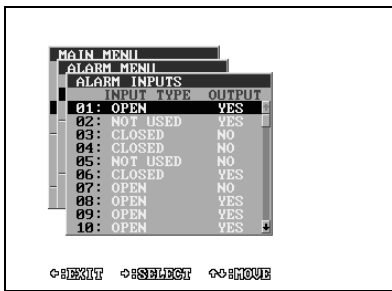
# MENU – ALARM

The alarm outputs and inputs characteristics, the reactions to alarm, the activity detection or the video signal lost are set up in this menu.



## ALARM INPUTS

You can set up the activity of the any alarm input and its influence to the alarm output (relay).



### INPUT TYPE

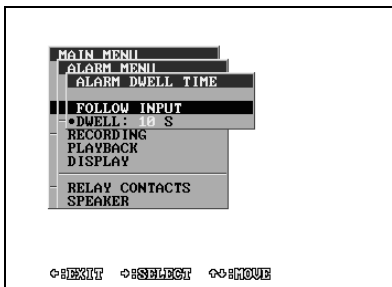
- Not used** - signal is ignored on this output
- Closed** - input is normally closed (active if open)
- Open** - input is normally open (active if closed)

### OUTPUT

- Yes** - alarm input influences the alarm output (relay)
- No** - alarm input does not influence the alarm output (relay)

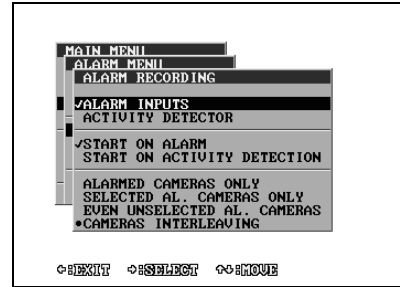
## DWELL TIME

The length of alarm reaction to the impulse on the alarm input can be set up from 1 up to 99 seconds there. If you set up the function FOLLOW INPUT, alarm will be active during the time of lasting the alarm signal on the alarm input.



## RECORDING

The recording to VCR can be modified, if the alarm is detected. For setting up the changes the following menu is used:



**Alarm inputs** - marking the line, the alarm inputs will influence recording.

**Activity detector** - if you mark this line, the activity detector will influence recording.

**Alarmed cameras only** - only the cameras with the alarm detection will be recorded during the alarm lasting. The source of the alarm can be either from the alarm inputs or from the activity detector.

**Selected alarmed cameras only** - only the cameras with the alarm detection, which are also selected for recording, will be recorded during the alarm condition (see the menu *Recorded cameras* on page 13).

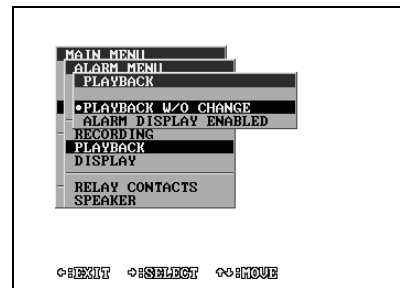
**Even unselected alarmed cameras** - all cameras will be recorded during the alarm condition, either the ones with the alarm detection or the ones chosen for recording.

**Cameras interleaving** – the cameras with the alarm detection will be interleaved into the normally recorded cameras.

For example: Cameras 1, 2, 3, 4 are chosen for recording and the alarm is detected on the cameras 6 and 7. The recording sequence will be as following: 1, 6, 7, 2, 6, 7, 3, 6, 7, 4, 6, 7, 1, 6, 7 etc

## PLAYBACK

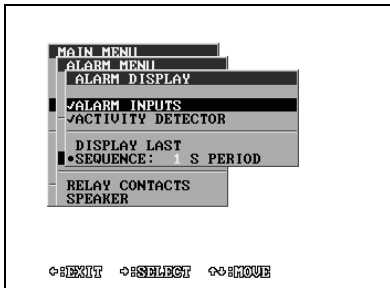
You can choose, whether the alarm signals and activity detection will influence the displaying during the playback or not.



# MENU - ALARM (continued)

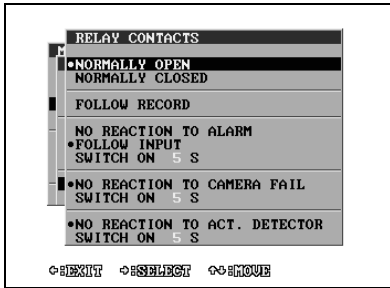
## DISPLAY

When the alarm is detected, the camera with the last activated alarm can be switched into the full screen mode or the alarm cameras on the main or spot channel can cycle according to the prepared period.



## RELAY CONTACTS

Controlling an alarm output is displayed in the following menu.



**Normally open/closed** – this function defines the situation of the relay without alarm.

**Follow record** – if this function is selected, the relay is active during the recording, functions below than have no meaning.

**No reaction to alarm** – no reaction to alarm inputs.

**Follow input** – active during the alarm lasting on any of the inputs.

**Switch on XX seconds** – active for the time from 1 to 99 seconds since the last alarm activation.

**No reaction to camera fail** – no reaction to the video signal lost.

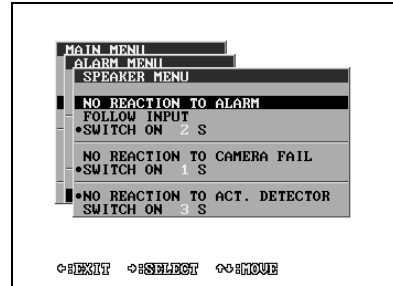
**Switch on XX seconds** – active for the time from 1 to 99 seconds since the camera signal fails.

**No reaction to activity detector** – activity detector does not influence alarm output.

**Switch on XX seconds** – active for the time from 1 to 99 seconds since the last activity detection.

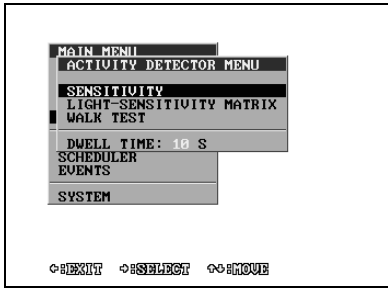
## SPEAKER

This menu controls the acoustic signalling of alarm. Meaning of corresponding lines is the same as in menu *Relay contacts* (see page 11).



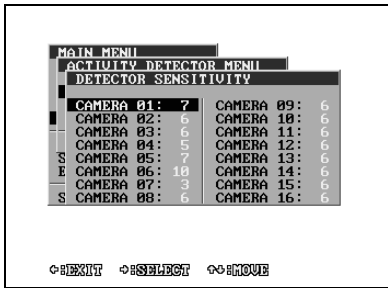
# MENU – ACTIVITY DETECTOR

Multiplexers TP have the activity detector, which enables to detect the motion in the images of connected cameras and can influence multiplexer activities.

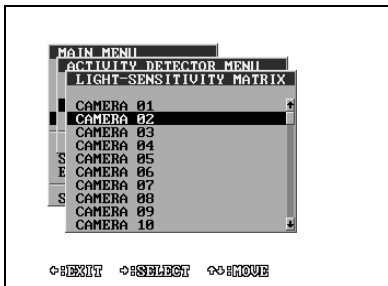


## SENSITIVITY

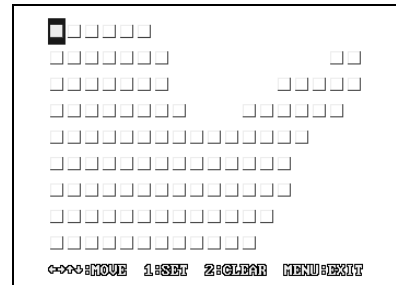
The level of sensitivity can be set up for each camera in this menu. It controls how sensitively the cameras should react to the image changes. The levels can be set up in the interval from 1 to 10. The lower values (lower sensitivity) are suitable for outdoor cameras with the wide range of lighting changes and the higher sensitivity for indoor cameras with constant lighting.



## LIGHT-SENSITIVITY MATRIX



The area, in which the activity detector will explore the image changes, can be defined with the help of this matrix 18 x 9 of light-sensitivity elements for every camera. The transparent squares represent active fields.



There are described controlling buttons for editing the light-sensitivity matrix here:

- 1 – sets one active matrix field
- 2 – clears one field
- 3 – sets the whole line
- 4 – clears the whole line

## WALK TEST

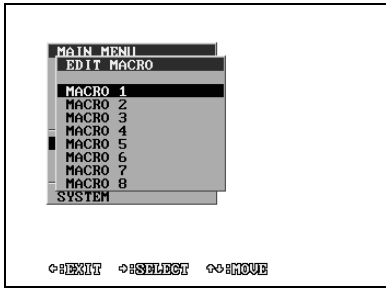
The walk test is used for checking the correct setting of the activity detector and continuously displays the detected areas together with the picture.

## DWELL TIME

It is the time of multiplexer reaction after the motion detection. This time is used especially for the reason of some overlapping of recording at the VCR after the moment of detection. If the dwell time is for example 30 seconds, the multiplexer will react (record or display this camera) even 30 seconds after the motion detection.

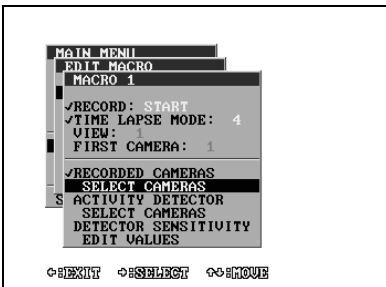
# MENU – MACRO

You can edit the macros in this menu. Macro is a set of parameters, which change the multiplexer settings when the macro is launched.



## MACRO 1 TO 8

Every macro enables to change all or some of the following multiplexer's characteristics. If the line is marked, the parameter will be changed to the defined value after the macro is been launched. If this item is not marked, the parameter remains unchanged.



**Record** – determines, whether to start or stop the recording to the VCR

**Time-lapse mode** – determines, whether or which mode of the recording to the VCR will be set up after the macro is launched

**View** – the number of displayed view.

**First camera** – the number of first displayed camera in the view

**Recorded cameras** – by marking this line, the set of recorded cameras will be changed after the macro is launched

**Select cameras** – by opening this submenu you can choose your own set of the cameras for recording.

**Activity detector** – by marking this line, the cameras for activity detection will be changed after the macro is launched

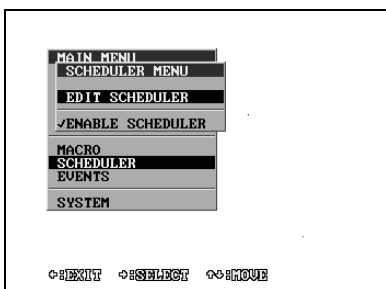
**Select cameras** – your own set of the cameras for activity detection

**Sensitivity of the detector** – by marking this line, the sensitivity will be changed after the macro is launched

**Edit levels** – edits the sensitivity levels

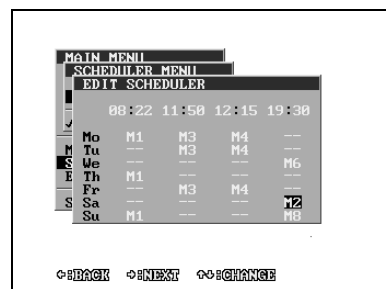
# MENU - SCHEDULER

The multiplexer scheduler enables the automatic starting of a macro at the certain time of a certain day of the week.



## EDIT SCHEDULER

You can edit 4 time memories, by which you want to change the multiplexer setting. The macro, being set up in the menu, starts every day in a week at this time. For example, the following menu shows that on Friday at 11:50, the macro number 3 is launched.

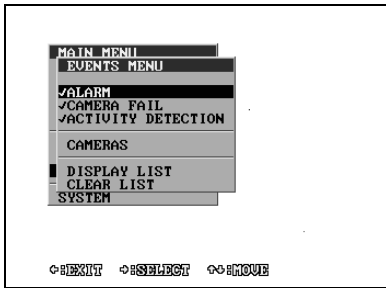


## ENABLE SCHEDULER

If you mark this line, the scheduler is put in operation and launches the programmed macros.

# MENU – EVENTS

Multiplexers TP enable storing of alarm events into its own memory. Using this menu you are able to choose what events will be recorded and displayed in the list.



## ALARM

If the item is marked, the alarms will be recorded and displayed in the list of events.

## CAMERA FAIL

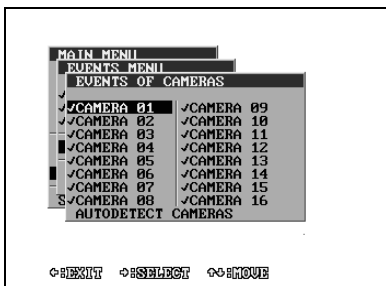
If the item is marked, the camera fails will be recorded and displayed in the list of events.

## ACTIVITY DETECTION

If the item is marked, the cameras with activity detection will be recorded and displayed in the list of events.

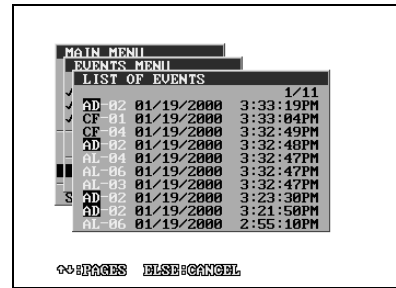
## CAMERA EVENTS

The cameras, which will be recorded and displayed into the list of events, are chosen in this menu.



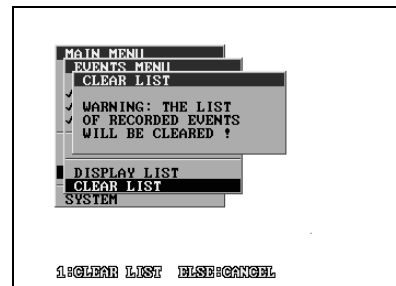
## DISPLAY LIST

You can display the list of events, which corresponds to previous setting in this menu.



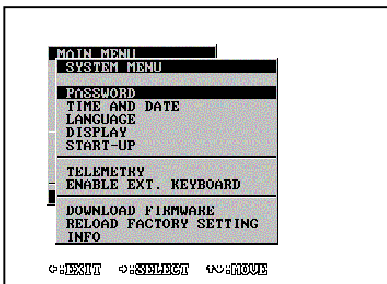
## CLEAR LIST

You can clear the list of events in this menu by pressing the button 1.



# MENU - SYSTEM

In this menu you can set up such parameters, which correspond to the functions of multiplexers as the password, the data and time setting, interlace correction, telemetry characteristics and the language choice.



## PASSWORD

The user can control the access into the menu of TP multiplexers by user and install passwords. The use password enables the entrance to the user functions.

The install password – enables the entrance to the user and install functions. The install password is used also as the insurance against the forgetting of the user password. If the user menu is cancelled or was already set up, the menu is available without another password setting. If the install password in cancelled, the user has free access into all menus.



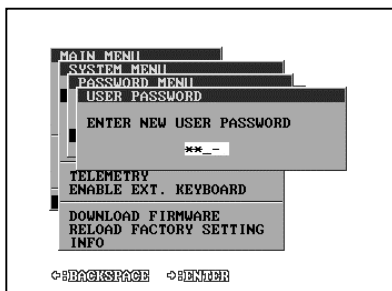


## MENU – SYSTEM (continued)

**Lock menu** – using this function, menu is locked. If the user password was set up, the system will ask you for setting up the entrance password during another try of access. If the install password was set up, this choice will lock all install menus. To unlock them it is possible only with the help of the function *Unlock locked menus*. The item *Lock menu* is not available in the case that no password has been set up or the menu has been already locked.

**Unlock locked menus** – after choosing this item and setting the correct install password, the install menus will be unlocked. This choice is blocked, if the install password has been disabled or the menus are unlocked already.

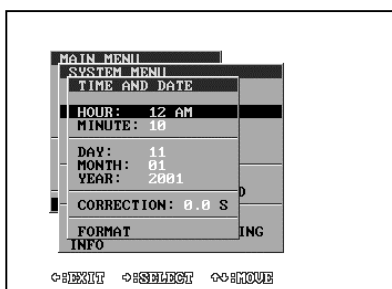
**Change user password** – enables to set up a new or disabled the old user password. Setting an empty password disables the password.



**Change install password** – enables to set a new or disable the old install password. Setting an empty password disables the password. If the menu is not available, it is necessary to unlock the menu in the menu *Unlock locked menus* by typing the install password.

### TIME AND DATE

This menu enables the possibility of changing the topical time and date of the multiplexer and its format of displaying on the monitor. If you choose some time and date item, time will stop and will not start since this menu is finished.

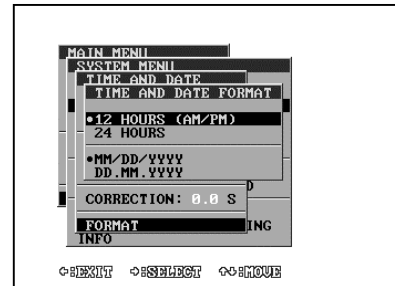


### TIME CORRECTION

You can correct the multiplexer internal clock deviations by setting the value of seconds added or taken off per a day. For example: If the clock of multiplexers delays 2.5 seconds a day, increase the value of the correction of 2.5 s, if it speeds up decrease of 2.5 s.

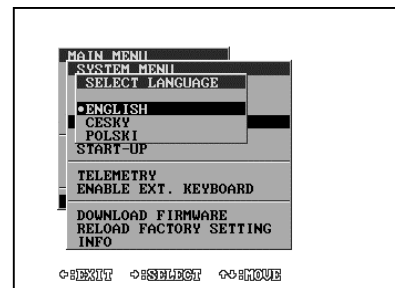
### FORMAT

Choose the displaying format of time and date on the screen.



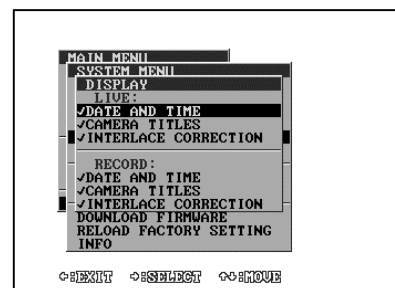
### LANGUAGE

Choose the language for communication with user.



### DISPLAY

Choose whether to display camera titles and the date and time on the status line in LIVE mode and recording. Then you can set-up the interlace correction. The interlace correction influences the displaying of the cameras on the monitor and the recording.



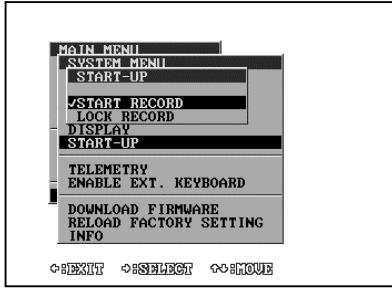
Disabled interlace correction of live images can cause the gliding effect of reduced-size pictures, which is caused by the displaying of different fields of the same camera. The same field will be displayed by marking this item. The picture stability increases with result of slower displaying.

The interlace correction of record always ensures the recording of same fields of the camera. The playback quality will be higher, but it can result the lower frequency of recorded cameras switching. This choice will affect only the recording to the VCR in the minimal mode (3 hours).

# MENU – SYSTEM (continued)

ENGLISH

## START - UP

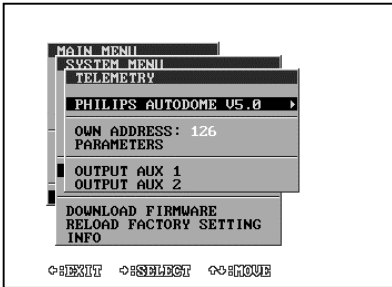


The device starts automatically recording after the device is turned on, if the START RECORD line is marked.

If the LOCK RECORD line is marked, the possibility of switching recording off from the keyboard is blocked.

## TELEMTRY

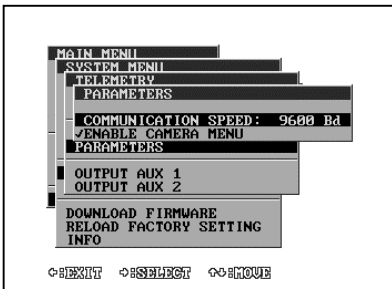
The telemetry receiver parameters of the multiplexer can be set up in this menu.



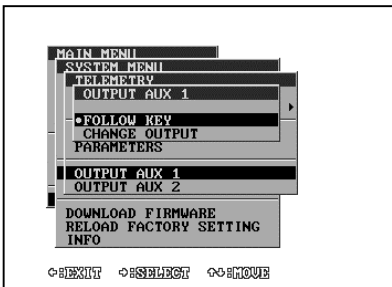
**Select protocol** – first line selects the communication protocol.

**Own address** – every device on the telemetry bus must have its address, different from other connected devices. The multiplexer address can be set up here.

**Parameters** – setup parameters for selected protocol.



The following menus control the function of user outputs AUX1, AUX2 (see *Telemetry controlling* on page 8)



**Change output** – by pressing one of the buttons AUX1/2 the state of user output will be changed.

**Follow key** – The user output is switched on while holding the button AUX.

**ENABLE EXTERNAL KEYBOARD** – marking this line you enable multiplexer to be controlled from external keyboard.

## DOWNLOAD FIRMWARE

After choosing and confirming, the unit will be waiting for firmware downloading from PC. On the PC the downloading program must be started.



## RELOAD FACTORY SETTING

If you press the button 1, all parameters will be changed into the factory setting.



## INFO

The system information of multiplexer is shown here.

# BEFORE LOOKING FOR HELP

YOUR TROUBLE	THE CAUSE AND ITS SOLUTION
<p><b>After switching on the device does not work.</b></p>	<ul style="list-style-type: none"> <li>• The power supply is not connected.                             <ul style="list-style-type: none"> <li>○ Check the power supply connector and the power supply polarity.</li> </ul> </li> <li>• The supply adapter is not dimensioned sufficiently.                             <ul style="list-style-type: none"> <li>○ Check if the adapter power output and voltage corresponds to the multiplexer requirements (12V, min 700mA).</li> </ul> </li> </ul>
<p><b>After connecting the supply voltage some LEDs are on, but the device does not work.</b></p>	<ul style="list-style-type: none"> <li>• The power supply adapter is not dimensioned sufficiently.                             <ul style="list-style-type: none"> <li>○ Check if the adapter power output and voltage corresponds to the multiplexer requirements (12V, min 700mA).</li> </ul> </li> </ul>
<p><b>Horizontal stripes go over the divided screen.</b></p>	<ul style="list-style-type: none"> <li>• The power supply adapter is not dimensioned sufficiently.                             <ul style="list-style-type: none"> <li>○ Check if the adapter power output and voltage corresponds to the multiplexer requirements (12V, min 700mA).</li> </ul> </li> </ul>
<p><b>There is no picture on the monitor.</b></p>	<ul style="list-style-type: none"> <li>• The cable to the monitor is defective.                             <ul style="list-style-type: none"> <li>○ Check the connecting cable to the monitor carefully.</li> </ul> </li> </ul>
<p><b>Some cameras are not displayed and cannot be detected with auto detection.</b></p>	<ul style="list-style-type: none"> <li>• The camera signal is not connected properly or has been debased by strong interference from the power distribution.                             <ul style="list-style-type: none"> <li>○ Check the camera patch cord. Check the camera and monitor ground conductor and the interference level in the signal.</li> </ul> </li> </ul>
<p><b>The picture on the split screen has stopped.</b></p>	<ul style="list-style-type: none"> <li>• The picture has been stopped from the keyboard (HOLD key is blinking).                             <ul style="list-style-type: none"> <li>○ Press the button HOLD</li> </ul> </li> <li>• The cameras were disconnected or switched off.                             <ul style="list-style-type: none"> <li>○ Check the camera power supply and connection.</li> </ul> </li> </ul>
<p><b>Some cameras on divided screen are flashing.</b></p>	<ul style="list-style-type: none"> <li>• Video inputs are terminated improperly.                             <ul style="list-style-type: none"> <li>○ Check connection on back panel. Every output video signal must be loaded with one 75 Ω termination at the end of the line by the connected device or must be left unconnected.</li> </ul> </li> </ul>
<p><b>Cameras on divided screen are slightly shaking.</b></p>	<ul style="list-style-type: none"> <li>• Interlace correction is switched off.                             <ul style="list-style-type: none"> <li>○ Set up the interlace correction of live picture in menu SYSTEM - DISPLAY (page 16). The shaking stops with result of slower displaying.</li> </ul> </li> </ul>
<p><b>At colour multiplexer displayed have incorrect colours.</b></p>	<ul style="list-style-type: none"> <li>• Improper setting of camera parameters.                             <ul style="list-style-type: none"> <li>○ Check the brightness, contrast and colours setting in menu CAMERA - PARAMETERS (page 9). Black and white cameras mark as "B&amp;W" in colour column.</li> </ul> </li> </ul>
<p><b>The playback from the VCR does not work.</b></p>	<ul style="list-style-type: none"> <li>• Missing or defective signal from VCR.                             <ul style="list-style-type: none"> <li>○ Check the signal quality from VCR with connection the VCR output directly to the monitor. The signal quality can be affected with VCR adjusting (V-Sync, Tracking).</li> </ul> </li> <li>• Cameras are not switched for displaying.                             <ul style="list-style-type: none"> <li>○ Set the cameras in menu DISPLAYED CAMERAS (page 8).</li> </ul> </li> <li>• Cameras were not recorded to VCR.                             <ul style="list-style-type: none"> <li>○ Check the setting of cameras in menu RECORDED CAMERAS (page 8). Check the connection cables to the VCR. Check the VCR for recording.</li> </ul> </li> </ul>
<p><b>The sequential output does not switch cameras automatically.</b></p>	<ul style="list-style-type: none"> <li>• Automatic sequence is switched off manually.                             <ul style="list-style-type: none"> <li>○ Switch to sequence controlling (SEQ) and switch on the automatic sequence (AUTO).</li> </ul> </li> <li>• Sequence or switching time is set up incorrectly.                             <ul style="list-style-type: none"> <li>○ Check the setting of the sequence in menu SEQUENCE, CAMERAS IN SEQUENCE, TIME MULTIPLIER (pages 8 and 9).</li> </ul> </li> </ul>
<p><b>At simplex multiplexer it is not possible to enter menu.</b></p>	<ul style="list-style-type: none"> <li>• The recording is running.                             <ul style="list-style-type: none"> <li>○ Switch off the recording using REC button and enter the menu.</li> </ul> </li> </ul>
<p><b>The recording starts by itself.</b></p>	<ul style="list-style-type: none"> <li>• Start of recording is set up on alarm or activity detection.                             <ul style="list-style-type: none"> <li>○ Check start of recording in menu ALARM - RECORDING (page 10). Check alarm inputs and activity detector.</li> </ul> </li> <li>• Start of recording is set up on AUX input.                             <ul style="list-style-type: none"> <li>○ Check the setting of AUX input in menu VIDEORECORDER - AUX INPUT (page 8).</li> </ul> </li> <li>• Recording was started with macro from the scheduler.                             <ul style="list-style-type: none"> <li>○ Check menu SCHEDULER and MACRO (page 13).</li> </ul> </li> </ul>

## BEFORE LOOKING FOR HELP (continued)

YOUR TROUBLE	THE CAUSE AND ITS SOLUTION
<p><b>Camera cannot be controlled with the RS 485 or the CAN bus (rotating and zoom lens controlling).</b></p>	<ul style="list-style-type: none"> <li>• Camera is not at the first position in view.                             <ul style="list-style-type: none"> <li>○ <i>Press the corresponding camera number first before controlling.</i></li> </ul> </li> <li>• Camera does not have set up the telemetry address of receiver (multiplexer does not beep when direction arrows are pressed).                             <ul style="list-style-type: none"> <li>○ <i>Set up correct receiver address of corresponding camera in menu CAMERA - TELEMETRY ADDRESSES (page 9).</i></li> </ul> </li> <li>• Camera has set up incorrect receiver address.                             <ul style="list-style-type: none"> <li>○ <i>Set up correct receiver address of corresponding camera in menu CAMERA - TELEMETRY ADDRESSES (page 9).</i></li> </ul> </li> <li>• The connection with telemetry receiver is defective.                             <ul style="list-style-type: none"> <li>○ <i>Check the connection of multiplexer and receiver on bus (page 4).</i></li> </ul> </li> </ul>
<p><b>Multiplexer cannot be controlled from external keyboard.</b></p>	<ul style="list-style-type: none"> <li>• Multiplexer is blocked due the control from other keyboard (5 seconds since the last command - signalled with long beep).                             <ul style="list-style-type: none"> <li>○ <i>Wait and try to control later.</i></li> </ul> </li> <li>• Different telemetry address of controlled device on external keyboard and multiplexer.                             <ul style="list-style-type: none"> <li>○ <i>Check the device address of multiplexer in menu SYSTEM - TELEMETRY (page 16) and address of controlled device on external keyboard.</i></li> </ul> </li> <li>• The connection between multiplexer and external keyboard is defective.                             <ul style="list-style-type: none"> <li>○ <i>Check the connection of multiplexer and keyboard on CAN bus (page 4).</i></li> </ul> </li> </ul>
<p><b>The device does not react to alarm inputs.</b></p>	<ul style="list-style-type: none"> <li>• The alarm processing is switched off in the main menu.                             <ul style="list-style-type: none"> <li>○ <i>Set up the alarm function in menu ALARM (page 10 and 11).</i></li> </ul> </li> <li>• The connection of the alarm inputs is defective.                             <ul style="list-style-type: none"> <li>○ <i>Check the connection of the alarm inputs (page 3).</i></li> </ul> </li> </ul>
<p><b>The device reacts to alarm inputs incorrectly.</b></p>	<ul style="list-style-type: none"> <li>• The set up of alarm inputs polarity is incorrect.                             <ul style="list-style-type: none"> <li>○ <i>Check the polarity of alarm inputs in menu ALARM - INPUTS (page 10).</i></li> </ul> </li> </ul>
<p><b>The alarm output (relay) does not react properly.</b></p>	<ul style="list-style-type: none"> <li>• The polarity of alarm is set up incorrectly.                             <ul style="list-style-type: none"> <li>○ <i>Set up the normal state of alarm output in menu RELAY CONTACTS (page 11).</i></li> </ul> </li> <li>• The reaction to required condition is switched off.                             <ul style="list-style-type: none"> <li>○ <i>Set up reaction to alarm inputs, activity detection or camera fail in menu RELAY CONTACTS (page 11). Check the reaction of individual alarm inputs to alarm output in menu ALARM - INPUTS (page 10).</i></li> </ul> </li> </ul> <p>Note: If you want the alarm output to switch to ground (e.g. for VCR controlling), connect one of the relay contacts to ground.</p>
<p><b>The device does not react to the motion in the camera picture.</b></p>	<ul style="list-style-type: none"> <li>• The activity detection for corresponding camera is switched off.                             <ul style="list-style-type: none"> <li>○ <i>Check the menu DETECTED CAMERAS (page 8).</i></li> </ul> </li> <li>• The sensitivity or the light-sensitivity matrix is not set up correctly.                             <ul style="list-style-type: none"> <li>○ <i>Check the setting in menu SENSITIVITY and LIGHT-SENSITIVITY MATRIX and try the WALK TEST (page 12).</i></li> </ul> </li> <li>• The reaction to the activity detection is switched off.                             <ul style="list-style-type: none"> <li>○ <i>In menu ALARM check the menu RECORDING, DISPLAY, RELAY CONTACTS and SPEAKER (pages 10 and 11).</i></li> </ul> </li> </ul>
<p><b>Multiplexer internal clock is delaying or speeding up.</b></p>	<ul style="list-style-type: none"> <li>• The time correction is not set up.                             <ul style="list-style-type: none"> <li>○ <i>Find of what time is the clock delaying or speeding up per one day and of this value increase or decrease the time correction in menu TIME AND DATE - CORRECTION (page 15).</i></li> </ul> </li> </ul>
<p><b>All LEDs are flashing.</b></p>	<ul style="list-style-type: none"> <li>• Firmware fault detected (probably caused by previous incomplete firmware downloading).                             <ul style="list-style-type: none"> <li>○ <i>Download firmware. Connect device with PC by RS 232 and start the program for firmware downloading on the PC.</i></li> </ul> </li> </ul>

# TECHNICAL SPECIFICATION

PICTURE PARAMETERS	
TV standard:	PAL (CCIR) / NTSC (EIA)
Number of the active TV lines:	576 / 480
Samples per TV line:	864 / 856
Grey scale (black and white multiplexers):	256
Number of colours (colour multiplexers):	16 million
VIDEO INPUTS	
Number:	4+1, 10+1 or 16+1 (composite)
Amplitude:	0,75 - 1,5V p-p
Input impedance:	75 $\Omega$ (high if a connector is plugged in to video output)
Connectors:	BNC (composite)
VIDEO OUTPUTS	
Number:	3 independent (composite), 1 independent (S-VIDEO)
Standard:	1 V p-p load of 75 $\Omega$
Connectors:	BNC (composite), MINI DIN 4 (S-VIDEO)
ALARM INPUTS	
Number:	4, 10 or 16
Loop connection:	input – ground (GND)
Activity:	programmable
Maximum alarm loop impedance:	1 k $\Omega$
Connector:	D-SUB 37-pin female connector
AUX INPUT	
Loop connection:	input – ground (GND)
Activity:	programmable
Maximum alarm loop impedance:	1 k $\Omega$
ALARM OUTPUT	
Number:	1 potentialless (contacts of low voltage relay)
Maximum switching voltage:	40 V
Maximum switching current:	0.5 A
RS 485 INTERFACE	
Baud rate:	depend on protocol
Maximum length:	1000 m
Terminators:	120 $\Omega$ at both ends
CAN INTERFACE	
Baud rate:	50 kBs
Maximum length: bus/ stubs/ cumulative stubs	1000 m / 60 m / 300 m
Terminators:	120 $\Omega$ at both ends
Cable for bus length 0 – 40 m:	0.25mm <sup>2</sup> - 0.34mm <sup>2</sup> (AWG23, AWG22)
Cable for bus length 40 – 600 m:	0.34mm <sup>2</sup> - 0.6mm <sup>2</sup> (AWG20)
Cable for bus length 600 – 1000 m:	0.75mm <sup>2</sup> - 0.8mm <sup>2</sup> (AWG18)
TEMPERATURE CONDITIONS	
Range of operating temperatures:	0 – 40 °C
Humidity:	max. 85 %
POWER SUPPLY	
Input voltage:	12 VDC
Power consumption:	max. 7 W
Connector:	concentric 5.5 × 2.1 mm
MECHANICAL PARAMETERS	
Dimensions:	436(W) × 44.5(H) × 230(D) mm
Weight:	3,3 kg
ACCESSORIES	
Alarm connector D-SUB male + cover:	1 piece