Channel 7 - Rotating gobos

0 - 15	Open
16 - 31	Gobo 1 (metal)
32 - 47	Gobo 2 (multicolor dichroic)
46 - 63	Gobo 3 (metal)
64 - 79	Gobo 4 (metal)
80 - 95	Gobo 5 (metal)
96 - 111	Gobo 6 (glass)
112 - 231	**Shaking gobos with variable speed**
112 - 131	Gobo 1
132 - 151	Gobo 2
152 - 171	Gobo 3
172 - 191	Gobo 4
192 - 211	Gobo 5
212 - 231	Gobo 6
232 - 255	Gobo wheel rotation from slow to fast

Channel 8 - Rotating gobo index, rotating gobo rotation

0 - 127	Gobo indexing
128 - 190	Forwards gobo rotation from fast to slow
191 - 192	No rotation
193 - 255	Backwards gobo rotation from slow to fast

Channel 9 - Shutter, Strobe, Reset

0	Shutter closed
1 - 63	Intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset, shutter closed
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Function of the control channels – 3-8 bit protocol:

Channel 1 - Horizontal movement (Pan)

Channel 2 - Vertical movement (Tilt)

Channel 3 - Speed of PAN / TILT movement

0	Max speed (tracking mode)
1	Max speed (vector mode)
249	Min. speed (vector mode)
250-252	Max. speed, black-out color changes (tracking mode)
253-255	Max. speed, black-out while PAN, TILT moving and/or color changes (vector mode)

Channel 4 - Colours

0	Open / white
10	Turquoise
21	Red
32	Cyan
42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 5 - Rotating gobos

0 - 15	Open
16 - 31	Gobo 1 (metal)
32 - 47	Gobo 2 (multicolor dichroic)
46 - 63	Gobo 3 (metal)
64 - 79	Gobo 4 (metal)
80 - 95	Gobo 5 (metal)
96 - 111	Gobo 6 (glass)
112 - 231	**Shaking gobos with variable speed**
112 - 131	Gobo 1
132 - 151	Gobo 2
152 - 171	Gobo 3
172 - 191	Gobo 4
192 - 211	Gobo 5
212 - 231	Gobo 6
232 - 255	Gobo wheel rotation from slow to fast

Channel 6 - Rotating gobo index, rotating gobo rotation

0 - 127	Gobo indexing
128 - 190	Forwards gobo rotation from fast to slow
191 - 192	No rotation
193 - 255	Backwards gobo rotation from slow to fast

Channel 7 - Shutter, Strobe, Reset

0	Shutter closed
1 - 63	Intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset, shutter closed
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

English

Function of the control channels – 4-8 bit protocol:

Channel 1 - Horizontal movement (Pan)

Channel 2 - Vertical movement (Tilt)

Channel 3 - Colours

0	Open / white
10	Turquoise
21	Red
32	Cyan
42	Light Green
53	Magenta
64	Light Blue
74	Yellow
85	Green
96	Pink
106	Blue
117	Orange
128 - 189	Forwards rainbow effect from fast to slow
190 - 193	No rotation
194 - 255	Backwards rainbow effect from slow to fast

Channel 4 - Rotating gobos

0 - 15	Open
16 - 31	Gobo 1 (metal)
32 - 47	Gobo 2 (multicolor dichroic)
46 - 63	Gobo 3 (metal)
64 - 79	Gobo 4 (metal)
80 - 95	Gobo 5 (metal)
96 - 111	Gobo 6 (glass)
112 - 231	**Shaking gobos with variable speed**
112 - 131	Gobo 1
132 - 151	Gobo 2
152 - 171	Gobo 3
172 - 191	Gobo 4
192 - 211	Gobo 5
212 - 231	Gobo 6
232 - 255	Gobo wheel rotation from slow to fast

Channel 5 - Rotating gobo index, rotating gobo rotation

0 - 127	Gobo indexing
128 - 190	Forwards gobo rotation from fast to slow
191 - 192	No rotation
193 - 255	Backwards gobo rotation from slow to fast

Channel 6 - Shutter, Strobe, Reset

0	Shutter closed
1 - 63	Intensity from 0 to 100 %
64 - 95	Shutter open
96 - 127	Strobe-effect from slow to fast (max. 8 flashes/second)
128 - 139	Reset, shutter closed
140 - 159	Shutter closed
160 - 175	Pulse-effect in sequences from slow to fast
176 - 191	Pulse-effect in sequences from fast to slow
192 - 223	Random strobe-effect from slow to fast
224 - 255	Shutter open

Note: If Mode 4 is selected, then the speed of PAN/TILT movement is set to MAXIMUM. This mode is suitable for the EX-4 controller.

DMX-controlled operation

You can control the projectors individually via your DMX-controller. Every DMX-channel has a different occupation with different features.

Addressing

The Control Board on the front side of the base allows you to assign the DMX fixture address, which is defined as the first channel from which the MH-460 will respond to the controller.
If you set, for example, the address to channel 5, the MH-460 will use the channel 5 to 12 for control.
Please, be sure that you don't have any overlapping channels in order to control each MH-460 correctly and independently from any other fixture on the DMX data link.
If two, three or more MH-460 are addressed similarly, they will work similarly.

For address setting, please refer to the instructions under "Addressing" (menu "A001").

Controlling:
After having addressed all MH-460, you may now start operating these via your lighting controller.
Note:
After switching on, the MH-460 will automatically detect whether DMX 512 data is received or not. If there is no data received at the DMX-input, the display will start to flash **"A001"** with actually set address.
This situation can occurr if:
- the 3 PIN XLR plug (cable with DMX signal from controller) is not connected with the input of the MH-460.
- the controller is switched off or defective, if the cable or connector is defective or the signal wires are swap in the input connector.

Note:
It's necessary to insert the XLR termination plug (with 120 Ohm) in the last lighting in the link in order to ensure proper transmission on the DMX data link.

Remotely controllable functions

Colour-wheel

The MH-460 features a colour-wheel with 12 color positions - 11 of these with dichroic colors and the last one open. The wheel can be positioned between two adjacent colors in any position. It is also possible to rotate the color-wheel continuously at different speeds - the so-called "Rainbow effect" is created.

Rotating gobo-wheel

The rotating gobo-wheel includes 4 metal gobos, 1 glass gobo and 1 multicolor dichroic gobo rotating in both directions, indexable, rotating gobo wheel continuous rotation slow to fast. The metal gobos have an outside diameter of 27 mm and an image diameter of 22.5 mm. The glass and dichroic gobos have an outside diameter of 26.8 mm and an image diameter of 22.5 mm.

Shutter / Dimmer / Strobe

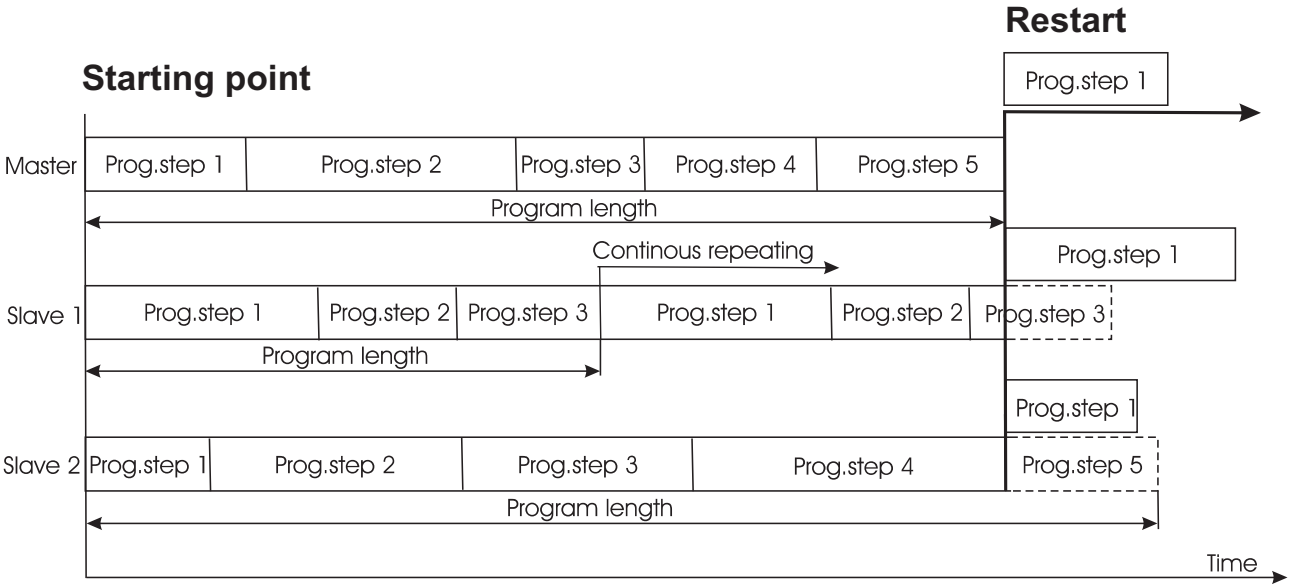
Smooth 0 - 100 % dimming is provided by the mechanical shutter/dimmer unit. The unit may also be used for strobe-effects (1 - 8 flashes per second)

Stand Alone-mode

In the Stand Alone-mode, one or several projectors of the data link can be operated without controller. Every projector features three pre-programmed programs which can be edited individually. Every projector can call up a different program. In order to set the desired program, please refer to the explanations under "Stand Alone-setting" (menu "St.AL.").
The Stand Alone-mode includes the operation of an individual projector or a chain of several projectors in master/slave-operation.
For the synchronized operatio of several projectors, the projectors have to be connected with each other via a data cable. One projector has to be defined as master-device and the others as slaves. Every slave needs to have its own slave-address "SLA-1" to "SLA-9". Please note that every slave-address can only be assigned to one projector.

The device's display shows the current program.

Please note: If the master-device runs through a reset, switches the lamp on or off or runs through the test program, all slave-devices follow the master. Furthermore, you cannot call up programs via the Control Board or edit them if the master-device is switched on and connected with the slaves.
The master-device starts the program run simultaneously at all slaves. All devices start their programs at a defined starting point. Every slave runs through the internal programs until the master-device requires a restart. If the slave's internal program is longer than the master's, the last step will not be executed and the program will be restarted.



Please note: Disconnect the master and slaves from the DMX-controller before you start master/slave-operation. Otherwise danger of data collisions.

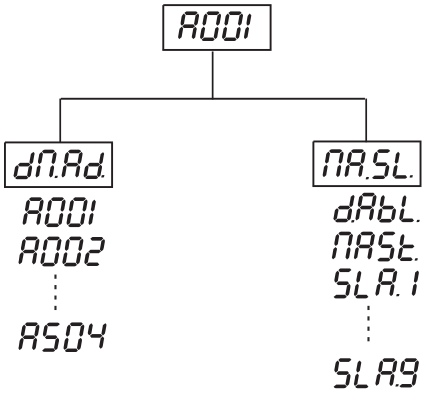
Caution: At the master-device and at the last slave-device, the DMX-cable has to be terminated with a terminator. Solder a 120 Ω resistor between Signal (–) and Signal (+) into a 3-pin XLR-plug and plug it in the DMX-output.

Control Board

The Control Board situated on the front side of the base offers several features. You can simply set the starting address, read the number of lamp or unit hours, switch on and off the lamp, run a test program, make a reset and also use special functions for manual control and service purposes.
The main menu is accessed by pressing the **[Mode]** key - press this one so many times until the display shows message **"A001"** (with actually stored address). Browse through the menu by the pressing [Up] and [Down] keys. Press **[Enter]** if you wish to select one of them. The functions provided are described in the following sections and the function hierarchy is shown below.

Main functions

A001 - Address setting and master/slave-selection



dMAd. - DMX 512 Address settings

1. The main menu is accessed by pressing the **[Mode]** key - press this one so many times until the display shows message **"A001"** (with actually stored address). Browse through the menu by pressing the [Up] and [Down] keys.
2. Press **[Enter]** and select "dM.Ad." by pressing the [Up] and [Down] keys.
3. Press **[Enter]**. The letter **"A"** flashes. Use the [Up] and [down] keys to select required address (001 - 504) and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.
4. Select "MA.SL." and press **[Enter]**. Select "d.Abl." (no master/slave) by pressing the [Up] and [Down] keys and press **[Enter]**.
5. Press the **[Mode]** key and the adjusted starting address is displayed. If the starting address is flashing, there is no DMX-data on the DMX-input.

MASL. - Master/Slave settings

1. The main menu is accessed by pressing the **[Mode]** key - press this one so many times until the display shows message **"A001"** (with actually stored address).
2. Press **[Enter]** and select "MA.SL." by pressing the [Up] and [Down] keys.
3. Press **[Enter]**. Use the [Up] and [down] keys to select "MASt" (in order to define the projector as master) or "SLA.1" to "SLA.9" (in order to define the projector as a slave) and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu. If you want to define "No master, no slave", select "d.AbL.".
4. Press the **[Mode]** key and the adjusted starting address is displayed. If "MASt." is flashing, a DMX-signal is received on the DMX-input. In this case, you need to disconnect the DMX-controller.

Only one fixture may be the master. Up to the 9 slaves may be connected to the master and on the certain address can be connected only one slave fixture (SLA1-SLA9).
Note: Disconect the fixtures from the DMX controller before master/slave operating, otherwise data collisions can occur and the fixtures will not work properly!
If the fixture is set as the master and DMX signal is connected to its input ,the error massage "MAEr" will appear on its display and the fixture's address will be set to its DMX address in order to respond to DMX signal from the controller.
For example:
The master fixture has these address setting:"dM.Ad."-menu.....**A017**
"MA.SL."-menu.....**MASt** (is displayed)

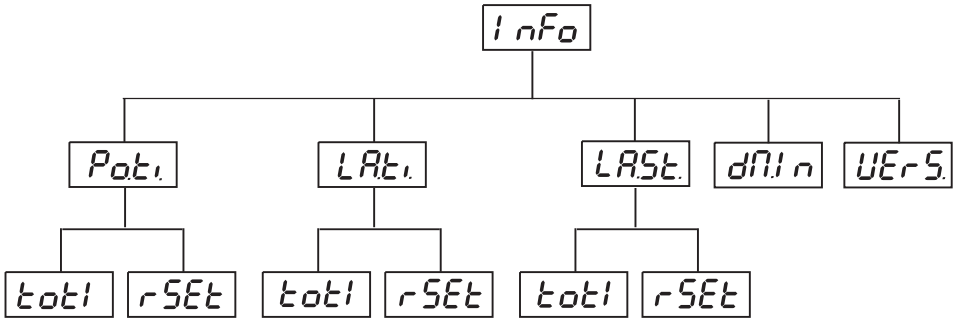
The DMX signal is connected to the master fixture.The message **"MAst"** starts fast flashing and after 20s error massage "MA.Er" appears on its display and the fixture automatically will be switched to its DMX address (master address is disabled).
Now the fixture has these address setting: "dM.Ad."-menu.....**A017** ("A017"/" MA.Er" flashing)
"MA.SL."-menu.....**d.AbL.**
If the fixture is set as the slave and DMX signal is connected to its input, the fixture will respond to DMX signal from the controller (in dependence on the fixture's DMX address).

SLCt. - Slave control

This function allows you to control the slaves from the master's control panel in a master/slave operation.
Select this function from the main menu and press **[Enter]**-button**.** Browse the list of all connected slaves (**"SL.C.1" - "SL.C.9"**) by pressing **[Up]** or **[Down]** button. Select the desired slave and press **[Enter]**-button.The slave's control panel is available from the master's control panel.

InFo - Fixture information

The menu allows you to read an useful information about the fixture as the lamp life, head temperature, software version, etc.
Press **[Up]** and **[Down]** buttons to select the desired option and press **[Enter]** to see the value or next submenu.



Pot. - Power On time

totl - By this option you can read the total number of the operation hours since the MH-460 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of the hours that the MH-460 has been powered On since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

LAt. - Lamp On time

totl - By this option you can read the total number of the lamp's operation hours since the MH-460 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of the hours that the lamp has been powered On since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

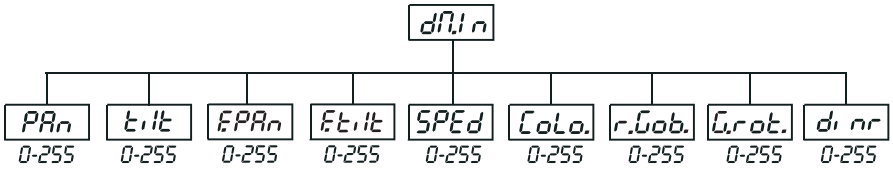
LASt. - Lamp strikes

totl - By this option you can read the total number of lamp strikes since the MH-460 has been fabricated. Press **[Enter]** or [Mode] to return to the menu.

rSEt - The number of lamp strikes since the counter was last reset. Press **[Enter]** or **[Mode]** to return to the menu. In order to reset this counter to 0, you have to hold the **[Up]** and **[Down]**-button and press the **[Enter]**-button.

dMn - DMX values

Readout DMX values of each channel received by the fixture. Use the **[Up]** and **[Down]** keys to select desired channel and press **[Enter]** to read its value coming to the fixture or **[Mode]** to cancel and return to the menu.

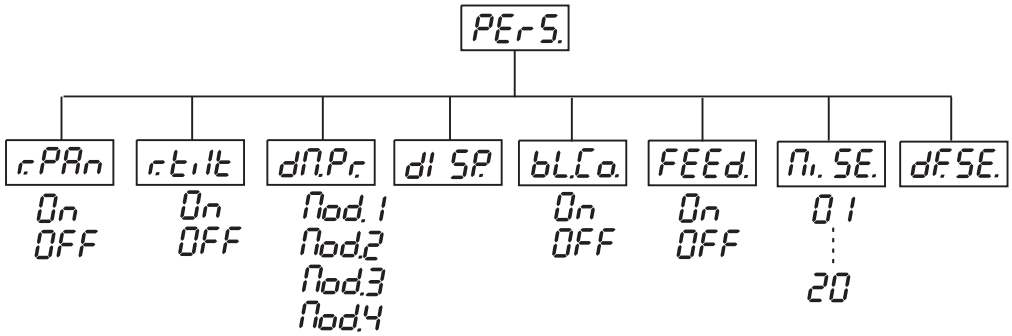


UEr S. - Software version

By this function you can read the software version of the display module. Press **[Enter]** to read its value or [Mode] to return to the menu.

PEr S. - Personality options

These options allow you to modify MH-460 operating behavior. Press **[Up]** and **[Down]** buttons to select the desired option and press **[Enter]** to set the value or to see next submenu.



rPAn - Pan reverse

This function allows you to invert the Pan-movement. Use the [Up] and [Down] keys to select **"On"** if you wish this feature or **"Off"** if you don't wish this feature and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.

rtILt - Tilt reverse

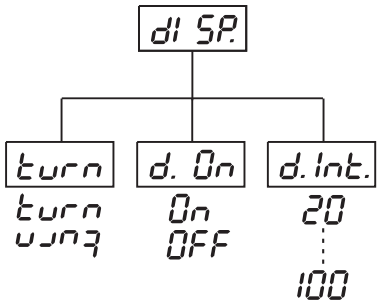
This function allows you to invert the Tilt-movement. Use the [Up] and [Down] keys to select **"On"** if you wish this feature or **"Off"** if you don't wish this feature and press **[Enter]** to confirm or **[Mode]** to cancel and return to the main menu.

dMPr. - DMX Presetting (Mode 1 default):

Channel	Mode 1	Mode 2	Mode 3	Mode 4
1	Pan	Pan	Pan	Pan
2	Tilt	Fine Pan	Tilt	Tilt
3	Fine Pan	Tilt	Speed	Colours
4	Fine Tilt	Fine Tilt	Colours	R. Gobos
5	Speed	Speed	R. Gobos	Gobo Rotation
6	Colours	Colours	Gobo Rotation	Dimmer
7	R. Gobos	R. Gobos	Dimmer	
8	Gobo Rotation	Gobo Rotation		
9	Dimmer	Dimmer		

dI SP. - Display-adjusting

This function allows you to adjust the display settings:



d.Int. - Display intensity

With this function, you can adjust the display-intensity from 20 % to 100 %. Use the **[Up]** and **[Down]** keys to select the level of the display-intensity and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

turn - Display-reverse

With this function, you can rotate the display by 180°. Use the **[Up]** and **[Down]** keys to select **"normal display"** or **"display turned by 180°"** and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

d. On- Display-On

This function allows you to keep the display on or to turn off automatically 2 minutes after last pressing any key on the control board. Use the **[Up]** and **[Down]** keys to select **"On"** if you wish to keep the display on or **"Off"** if you wish to turn off automatically 2 minutes after last pressing any key on the Control Board and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

bLCo. - Blackout during movement correction

The function executes the blackout during the head movement correction (the moving head has lost its right pan/tilt-position for a short moment). Use the **[Up]** and **[Down]** buttons to select **"On"** if you want to execute the blackout or **"Off"** if you don't and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

FEEd. - PAN/TILT-Feedback:

This function allows to return the Mowing Head to the required position after changing the position by external force (e. g. by stroke). Use the **[Up]** and **[Down]** keys to select **"On"** if you wish to enable this function or **"Off"** if you wish not to return the Moving Head to the required position and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.

Note: If feedback was switched Off, the PAN/TILT-position is changed by external force and feedbeck is switched On again, the Moving Head might not to be synchronized with the DMX signal. You have to make a reset in order to synchronize the Moving Head with the DMX signal.

MI. SE. - Microphone Sensitivity

With thiss function, you can adjust the microphone sensitivity from 1 (maximum) to 20 (minimum). Use the Up-/Down Buttons to select the level of sensitivity. Press the Enter Button to confirm the chosen level or the Mode Button to cancel and return to the menu.

Sensitivity too low

Signal level ok

Sensitivity too high

dFSE. - Default settings

Press **[Enter]** to reset all fixture personalities (not the adjusting functions) to the default values. On the display will appear **„rSt"** meaning that the fixture makes the reset. See the table of personality setting and their default positions.

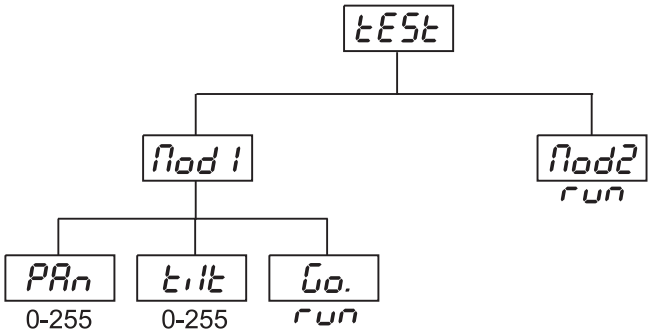
Personality	Display	Default values (SHADED)
Pan reverse	rPAn	On OFF
Tilt reverse	rtilt	On OFF
DMX presetting	dMPr	Mod 1 Mod2 Mod3 Mod4
Blackout during mov. Correction	bLCo	On OFF
Display permanent on	d On	On OFF
Display intensity	d Int	20 40 60 80 100
Display reverse	turn	turn usng
Pan/Tilt feedback	FEEd	On OFF
Music trigger	Audi	On OFF
Microphone sensitivity	Ni SE	01 02 03 04 05 06 07 08 09 10 11 12 13 14 15 16 17 18 19 20

tESt. - Test sequences

This function allows you to run a special demo-test sequences without an external controller, which will show you some possibilities of using MH-460. Press **[Up]** and **[Down]** keys to select the **"Mod1"** or **"Mod2"** sequences.

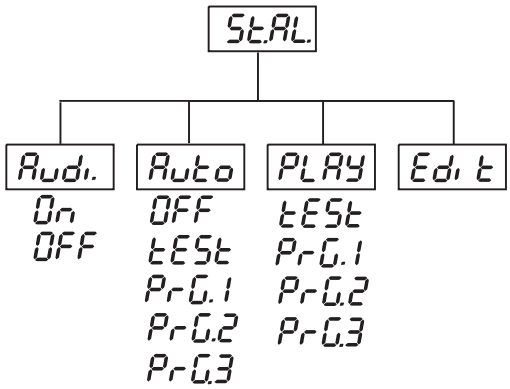
The **"Mod1"** is suitable for projections on the wall, ceiling or ground without any head-movement, the **"Mod2"** uses all MH - 460 functions and therefore is good for a complete introduction of the fixture.Select "**Mod1**" or "**Mod2**" by **[Up]** and **[Down]** buttons and press **[Enter]** to confirm the choice.If the test program is running, message "**run/test**" flashes on the display.

If you want to pause the runnnig program in the required position, press the **[Enter]-**button(messages"**PAUS**"/"**test**" blink).To continue the program running,press the **[Enter]-**button again.



StAL. - Stand Alone-settings

This menu offers options for stand-alone mode as a selection of playing program, programming and modifying current programs.



Audi. - Music control

This function activates the music control, in order to run the programs according to the music in Stand Alone Mode. Press the Up/Down Buttons to select **„ON“** or **„OFF“**. Press the Enter Button to confirm, or the Mode Button to cancel.

Auto - Playback preset

This function allows you to select the the program which will be played in the stand-alone mode after switching the fixture On.Use the **[Up]** and **[Down]** buttons to select desired program ("**tESt**"- bilt-in program) or **"OFF"** if you don't want trigger any program after switching the fixture On and press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu.Selected program will be played continuously in a loop as long as it appears on the display.
This option should be set "**OFF**" for all slaves in the master/slave chain by reason of the right program starts.
For example: You have selected program "**PrG.3**" in this menu and:
- this fixture is set as a single fixture (master/slave or controller operating)- the fixture will run its program "**PrG.3**".
- this fixture is set as a master in a data chain- the fixture will run its program "**PrG.3**".
- this fixture is set as a slave in a data chain- the fixture will run its program according to the master(if the master runs its own program "**PrG.1**", the slave will run its own program "**PrG.1**"also).
Note:If the fixture operates in the controller mode (DMX controller is connected) and any program from this menu is selected, in this case the fixture will not respond to the DMX controller after switching On and will play selected program.

PLAY - Playing program

This function allows you to run a built-in program **"tESt"** and the 3 freely-programmable programs **"PrG.1, PrG.2, PrG.3"**. Press **[Up]** or **[Down]** buttons to select the desired program and press **[Enter]** to run the program which will be played continuously in a loop.
If you want to pause the runnnig program in the required position, press the **[Enter]-**button(messages"**PAUS**"/"**program No**." flashes).To continue the program running, press the **[Enter]-**button again.
Note: If the fixture operates in the controller mode (DMX controller is connected) and any program from this function is selected in this case the fixture will not respond to the DMX controller and will play selected program.
You can't play programs on the slave fixtures from their control panels if the master fixture is switched On and connected to the slaves (playing is forced by the master).

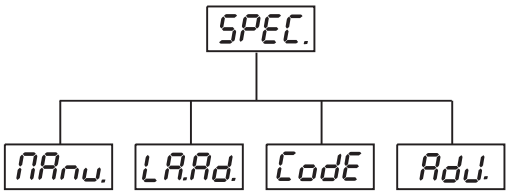
Edit - Editing program

This menu item allows you to select a program to edit or create.The MH-460 has one built-in program (**"tESt"**) and the 3 free programs,each up to 99 steps.Each program step has a dynamic part(fade time) and static part(step time).
Fade time-the time,during which effects move to the programmed position.
Step time-the time,during which effects last in the current step.
If the fixture is set as a master, then you may edit any program in the slaves.You can't edit programs on the slave fixtures from their control panels if the master fixture is switched on and connected to the slaves (editing is possible by the master control panel only).

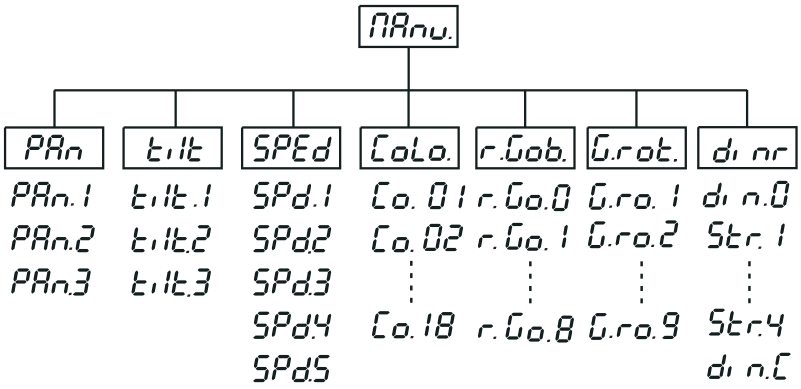
Procedure:
1. Press **[Up]** or **[Down]-**button to select the program you want to edit ("PrG.1" - "PrG.3") and press **[Enter]**.
2. Press **[Up]** or **[Down]-**button to select the desired fixture ("MASt." - "SLA.9") and press **[Enter]**-button.
3. Press **[Up]** or **[Down]-**button to select the desired program step ("St.01" - "St.99") and press **[Enter]**-button.
4 Press **[Up]** or **[Down]-**button to select the desired item and press **[Enter]-**button.Now you can edit by **[Up]** or **[Down]** buttons the DMX value for selected item:
"P.End." - a total number of the program steps,value 1-99 .**This value you must set before start programming**(e.g. if you want to create program with the 10 steps,set the value onto 10).
"PAn" - a pan,value 0-255
"tilt" - a tilt,value 0-255
"F.PAn" - a fine pan, value 0-255
"F.tilt" - a fine tilt,value 0-255
"SPEd" - a speed of PAN/TILT movement,value 0-255
"Colo" - a colour, value 0-255
"r.Gob" - a rot. gobo,value 0-255
"G.rot." - a Gobo rotation,value 0-255
"dimr" - a dimmer, value 0-255
"S.tim." - a step time,value 0,1-25,5 seconds
"F.tim." - a fade time,value 0,1-25,5 seconds
"COPY." - a copying the current prog. step to the next prog. step .If the last prog.step is copied to the next prog. step, parameter **"P.End"** is increased about 1 by itself (except step 99).
5. Press **Enter]-**button to confirm adjusted value .
6. Press **[Mode]-**button,select next prog. step and repeat this procedure (steps 4 and 6).
The editing programs "PrG.1, PrG.2, PrG.3" are saved in the current modified fixture (master or slave1-9).

rESE. - Reset Function
Press **[Enter]** key to run reset. This option enables the MH-460 to index all effects (functions) and return to their standard positions.

SPEC -Special functions
Use the **[Up]** and **[Down]** keys to browse through the special functions and select the one by pressing **[Enter]**.

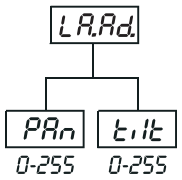


MANU - Manual control of effects
This function allows you to control manually the channel functions of the fixture. Use the [Up] and [Down] keys to select desired function and press **[Enter]** to adjust the effect or **[Mode]** to cancel and return to the menu.



LAAd. - Lamp adjustment

This function can be used when you make the fine adjustment of the lamp.If you select "**LAAd**" pressing by **[Enter]**-button ,all effects will be canceled,shutter will be opened and the dimmer intensity will be set onto 100%. By using the options "**PAn, tilt**" you can focus the light on a flat surface (wall) and perform the fine lamp adjustment.

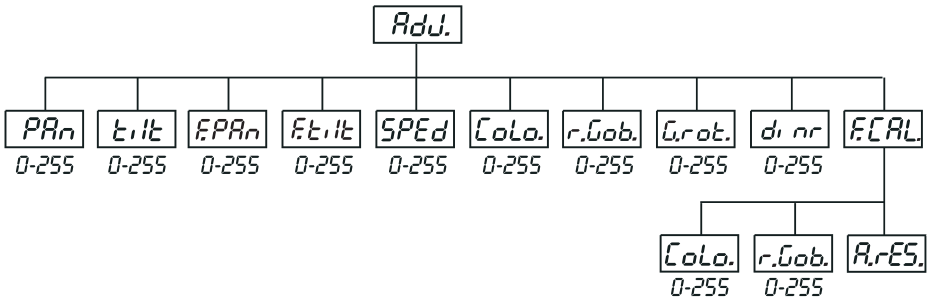


CodE - Fixture code

The option contains identification code (1-9999) for the fixture, which is used for the master/slave operation.

AdJ- Adjusting the default positions of colour and gobo wheels

By this function you can calibrate and adjust the colour wheel to the standard / right positions. Use the [Up] and [Down] keys to browse through the adjusting menu - the display shows step by step these messages: **„PAn, Tilt, FPAn, Ftilt, SPEd, Colo, rGob, Grot, dimr, FCAL“** by which you can adjust the fixture to the required / desired position (0-255) before the function calibration. Then when the positioning is finished use the last **"FCAL"** function (Fixture calibration).



1. Calibration via the control board

Press **[Enter]** and the **[Up]** and **[Down]** keys in order to display the following message: **"Colo, rGob"** for very smooth function calibration. Select, press **[Enter]** and use the **[Up]** and **[Down]** keys in order to adjust the right value from 0 to 255. Then press **[Enter]** to confirm or **[Mode]** to cancel and return to the menu. This can be repeated for each calibration parameter if it is required. When the calibration is finished, it is necessary to use the **"ArES"** function in order to write the calibration values to the memory (EEPROM) and to make a reset in order to check the newly adjusted positions of the colour and gobo wheels. When the reset of the fixture is finished, the display will show the **"FCAL"** message. Press **[Enter]** to repeat the calibration or **[Mode]** to return to the **"AdJ"** menu.

2. Calibration via the external controller

Press **[Enter]** and the **[Up]** and **[Down]** keys in order to display the following message: **"Colo, rGob"** - calibration parameters. Select and press **[Enter]**.
Now you can calibrate the colour and gobo wheel by your controller. The DMX calibration protocol is described in the table mentioned below.

DMX Calibration Protocol:

DMX Channel	1	2	3	4	5	6	7	8	9
Function	COLOUR	R. GOBO	-	-	-	COLOUR	R. GOBOS	G.ROTATION	DIMMER
	CALIBRATION 0-255	CALIBRATION 0-255	-	-	-	STANDARD PROTOCOL	STANDARD PROTOCOL	STANDARD PROTOCOL	STANDARD PROTOCOL
	SMOOTH MICROSTEP MOVEMENT								

After having calibrated required functions press **[Enter]** to confirm (or **[Mode]** to cancel and return to the menu without reset by the **"ArES"** function) and use the **"ArES"** function in order to write the calibration values to the memory (EEPROM) and to make a reset in order to check the new adjusted positions of the colour and gobo wheel indexing.

Error and information messages

nbEr
This message informs you that the main PCB does not communicate correctly with the Control Board.

CoEr
(Color-wheel error) This message will appear after the reset of the fixture if the magnetic-indexing circuit malfunctions (sensor failed or magnet missing) or the stepping-motor is defective (or its driver circuit on the main PCB). The color-wheel is not located in the default position after the reset.

rGEr
(Rotating gobo-wheel error) This message will appear after the reset of the fixture if the magnetic-indexing circuit malfunctions (sensor failed or magnet missing) or the stepping-motor is defective (or its driver circuit on the main PCB). The rotating gobo-wheel is not located in the default position after the reset.

PoEr
This message will appear if the fixture was shortly disconnect from the mains.

PAEr
(PAN-yoke movement error) This message will appear after the reset of the fixture if the yoke's magnetic-indexing circuit malfunction (sensor failed or magnet missing) or the stepping-motor is defective (or its driving IC on the main PCB). The yoke is not located in the default position after the reset.

ti Er
(TILT-head movement error) This message will appear after the reset of the fixture if the head's magnetic-indexing circuit malfunctions (sensor failed or magnet missing) or the stepping-motor is defective (or its driving IC on the main PCB). The head is not located in the default position after the reset.

MAEr
This message will appear when the device has been defined as master device and a DMX-signal is present at the DMX-input. Remove the controller cable from the input and redefine the device as master.

Technical specifications

Power supply
EU-model: 208/230/240 V AC, 50/60 Hz ~
Fuse: T 2,5 A, 230 V
US-model: 100/115/208/230/240 V AC, 50/60 Hz ~
Fuse: T 5,0 A, 115 V
Power consumption: 300 W

Lamp
CDM-SA/T 150/942 G-12 socket

Optical System

-Parabolic mirror for optimal luminousness
-High luminous-efficiency parabolic mirror and double condenser system
-Standard 19° lens
-All lenses are anti-reflection coated

Colours
- 11 interchangeable dichroic-filters plus white
- Colour-wheel with variable rotation speed

Rotating gobos
- 4 metal gobos, 1 glass gobo and 1 dichroic gobo rotating in both directions at different speeds
- Gobo indexing
- Rotating gobo-wheel cont. rotation
- Metal gobos: outside diameter 27 mm, image diameter 22.5 mm
- Glas and dichroic gobos: outside diameter 26.8 mm, image diameter 22.5 mm.

Focus
- Manual focus

Strobe
- Strobe effect with variable speed (1 - 8 flashes per second)

Shutter/Dimmer
- Smooth dimmer from 0 - 100 %

English

Motor
- 6 high quality stepping-motors controlled by microprocessors

Fans
- Two axial fans, one in the projector head and one in the base

Electronics
- Built-in microphone
- Digital serial input DMX-512
- 4 different DMX control-channels (8 or 16 bit protocol):

Channel	Mode 1	Mode 2	Mode 3	Mode 4
1	Pan	Pan	Pan	Pan
2	Tilt	Fine Pan	Tilt	Tilt
3	Fine Pan	Tilt	Speed	Colours
4	Fine Tilt	Fine Tilt	Colours	R. Gobos
5	Speed	Speed	R. Gobos	Gobo Rotation
6	Colours	Colours	Gobo Rotation	Dimmer
7	R. Gobos	R. Gobos	Dimmer	
8	Gobo Rotation	Gobo Rotation		
9	Dimmer	Dimmer		

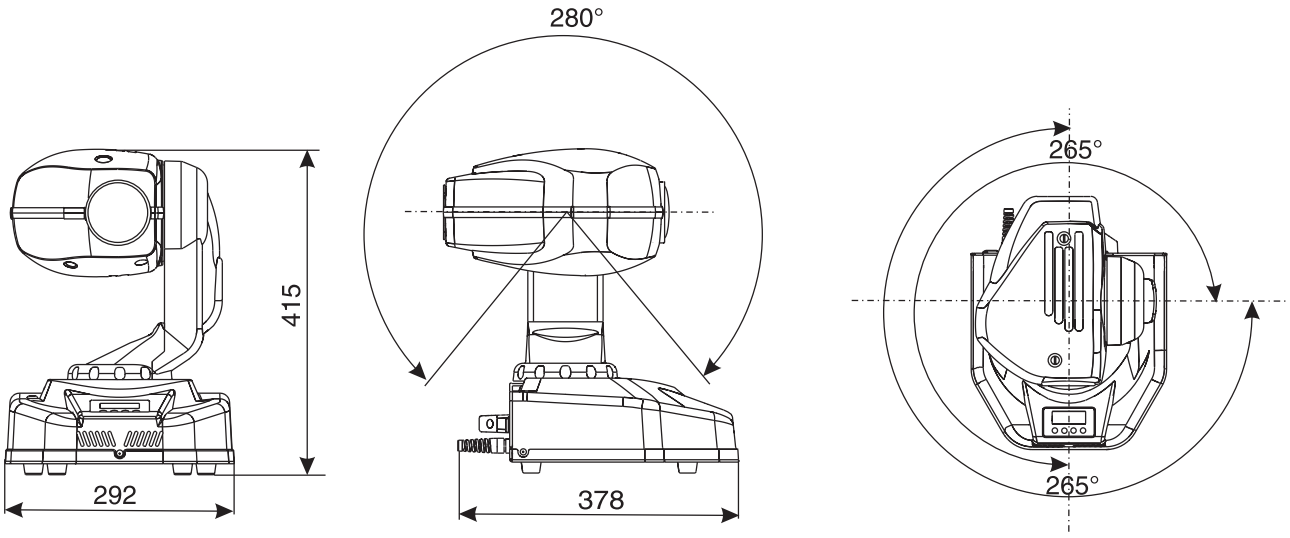
Pan/Tilt
- Pan movement range 530°
- Tilt movement range 280°
- 8/16 bit movement resolution
- Automatic Pan / Tilt position correction
- Maximum PAN-movement 530° in 3.0 s
- Maximum TILT-movement 280° in 1.9 s

Rigging
- Stands directly on the floor
- Mounts horizontally or vertically with 2 clamps
- Cam Lock system with 2 Omega holders
- Safety chain/cord attachment point

Temperatures
- Maximum ambient temperature t_a: 40° C
- Maximum housing temperature t_B (steady state): 80° C

Minimum distances:
- Min.distance from flammable surfaces: 0.5 m
- Min.distance to lighted object: 1.0 m

Dimensions and weight
- Length of base (including handles): 378 mm
- Width of yoke: 292 mm
- Height (head horizontal): 415 mm
- Weight (net): 10.5 kg
- Shipping weight: 12.5 kg



Cleaning and maintenance

The operator has to make sure that safety-relating and machine-technical installations are inspected by an expert after every four years in the course of an acceptance test.

The operator has to make sure that safety-relating and machine-technical installations are inspected by a skilled person once a year.

The following points have to be considered during the inspection:

1) All screws used for installing the devices or parts of the device have to be tighly connected and must not be corroded.
2) There must not be any deformations on housings, fixations and installation spots (ceiling, suspension, trussing).
3) Mechanically moved parts like axles, eyes and others must not show any traces of wearing (e.g. material abrading or damages) and must not rotate with unbalances.
4) The electric power supply cables must not show any damages, material fatigue (e.g. porous cables) or sediments. Further instructions depending on the installation spot and usage have to be adhered by a skilled installer and any safety problems have to be removed.

DANGER TO LIFE!

Disconnect from mains before starting maintenance operation!

We recommend a frequent cleaning of the device. Please use a moist, lint-free cloth. Never use alcohol or solvents!

CAUTION!

The lens has to be replaced when it is obviously damaged, so that its function is impaired, e. g. due to cracks or deep scratches!

The objective lens will require weekly cleaning as smoke-fluid tends to building up residues, reducing the light-output very quickly. The cooling-fans should be cleaned monthly.

The gobos may be cleaned with a soft brush. The interior of the fixture should be cleaned at least annually using a vacuum-cleaner or an air-jet.

The dichroic colour-filters, the gobo-wheel and the internal lenses should be cleaned monthly.

To ensure a proper function of the gobo-wheel, we recommend lubrication in six month intervals. The quantity of oil must not be excessive in order to avoid that oil runs out when the gobo-wheel rotates.

There are no serviceable parts inside the device except for the lamp and the fuse. Maintenance and service operations are only to be carried out by authorized dealers.

Please refer to the instructions under "Installing/Replacing the lamp".

Replacing the fuse

If the lamp burns out, the fine-wire fuse of the device might fuse, too. Only replace the fuse by a fuse of same type and rating.

Before replacing the fuse, unplug mains lead.

Procedure:

Step 1: Unscrew the fuseholder on the rearpanel with a fitting screwdriver from the housing (anti-clockwise).
Step 2: Remove the old fuse from the fuseholder.
Step 3: Install the new fuse in the fuseholder.
Step 4: Replace the fuseholder in the housing and fix it.

Should you need any spare parts, please use genuine parts.

If the power supply cable of this device becomes damaged, it has to be replaced by authorized dealers only in order to avoid hazards.

Should you have further questions, please contact your dealer.

Appendix

We hope you will enjoy your MH-460. We can assure you that you will enjoy this device for years if you follow the instructions given in this manual.

Should you have further questions, do not hesitate to contact your local dealer.