ARNOLD LICHTTECHNIK

OPERATING INSTRUCTIONS

ORCHESTRA LIGHTING SYSTEM NT
**Power supply unit SPY 600 NT
(hereinafter called the Power Unit)
and
Music Stand Light NPL 1602 NT / 1624 NT**

Content

1 Description of the overall system

This system was developed to provide a comfortable, modern lighting system available for concerts and operas. Special attention was paid to ergonomics, robust and flexible control options. The system can be integrated in the existing DMX network and also provides a PLC interface for connection to a control panel system.
An additional option is to control the modes and settings via an IR interface.

A particular advantage is that all connected lights can be assigned individually to one of eight groups. These groups can be controlled in brightness and color temperature individually.
This group assignment is independent of the wiring and the assignment of lights to the individual strands (outputs of the power unit).

For the control via DMX different modes are available, which can be selected depending on the requirement of simplicity or complexity. From 1-channel to 24-channel mode, you will have different forms of controllability of the light in the eight groups.

If a power unit is not sufficient, it can be coupled with other units. This coupling is realized so that the whole system behaves as a single unit and thus requires no further action.

The lights are available with 2-pin connector cables to wire with an "Augsburg" connector BS-01 or X-Plug. This connector is characterized by extreme robustness. In much cases this connector system is already installed, which simplifies the conversion to this modern system. In addition, other connector systems such as XLR or phone jack can be used. Polarities need not be respected. It must always be kept in mind that in order to hedge the small cable cross-section of the luminaire cable a fuse (type II Littelfuse PICO 473 series, 1A) is installed on the supply side.

Connector X-Plug   XLR 4   Phone- Jack 6,3

2   The Power Unit SPY 600 NT

The control unit 600 SPY NT is the power supply and the central processing unit for up to 36 music stand lights type NPL 1624 NT and / or NPL 1602 NT.

At three outputs per Power Unit strands can be operated with up to 12 lights. It is assumed that the power drawn by the music stand light will be 18-20W. Lower power levels allow you to connect a higher number of lights. The electronic overload protection prevents overloading of the power supply. For the load test of the completely installed system there is an operating mode called POWER TEST. (See section 2.5.2.7.)

2.1   Cabling

The following connections are provided on a power unit:

- Power Supply 240V NEUTRIK POWERCON
- 3 outputs NEUTRIK SPEAKON á 12 lights
- DMX In and Thru as XLR 5
- Master Slave In and Thru (must be terminated at both ends with 120 Ohm) as XLR 7
- Connect the IR receiver module on the master device XLR 7
- Connect the host system (PLC / Ethernet, etc.) D-SUB 15 or RJ45

Before switching on the device or devices all master-slave connections must be wired correctly. The master slave chain is wired with 7-pin XLR cables. The distance between the units may be up to 300m. These connection cables are manufactured and supplied for the specific project. Optionally (for example, in the lighting control), a remote control can be included into this chain, which allows total access to all functions and parameters.

2.2 Switching on and off the System

A system here means a single power unit or a combination of several power units. They must be coupled with each other by wiring the master-slave connections. See also Section 2.1.

After the first turn on the system, whether it consists of one or more power units, the "initialize the master-slave chain" must be performed. See Section 2.6.1. The execution of this function ensures that all devices are detected in the network and that configure this correctly. If this initialization is performed once, each device saves automatically its position in the master-slave chain and can take it on restart immediately. Only when devices is operated in a different order or operated individually, the initialization of the master-slave chain must be run again.

After switching on the system, the saved system configuration is automatically loaded that was set before the last turn off your system. The devices can thus be switched on and off at will.

The switching off of the device can be carried at any time. A certain order must not be observed.

2.3 Operation and Displays

To operate the Power Unit 4-line OLED display, a jog dial and two keys are provided on the front panel. The display shows the status of the overall system, parameters can be set and there are a number of service functions.
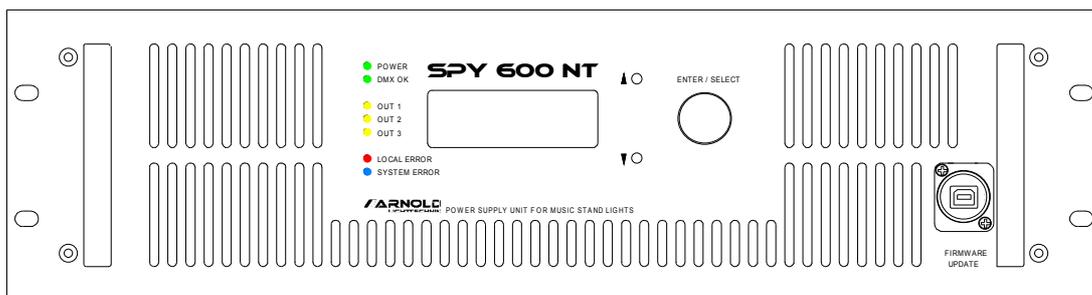
For display and operation are three main pages for disposal: status, parameters and service. The first line of the display indicates, on which of these pages the display is shown.

In the outer right column, the character '<' indicates the focus to this line for operation with the jog dial. If '<' appears in the first line, another page can be selected by turning the jog dial.

```
1 STATUS    MASTER <
DMX MODE A        1
AMP STATUS MASTER
1: OK  2: OK  3: OK
```

On the "Parameters" page, the character '<' can be moved up or down with the cursor .
The focus moves now to the parameter of the second line (such as DMX address) and to
the value of the parameter of the third line. The fourth line is a help line and shows
detailed information.

2.4   Status Display of the Power Unit

The status display of the power unit is on page 1 of the display.
If this page does not appear, navigate to the page as described in section 2.3.

```
1 STATUS    MASTER <
DMX MODE A        1
AMP STATUS MASTER
1: OK  2: OK  3: OK
```

The first line displays next to "1 Status" if there is a MASTER or SLAVE device.
See also section 2.1 cabling.
The second line shows the current operating mode and the currently valid DMX Address.
In lines three and four the status of all output stages of the system is displayed.

Each output stage can have one of the following states:

Display Message	Status Message	Meaning
OK	OK	OK, all power amp running error-free
OVER	OVERLOAD	overload (> 105%)
FAIL	POWER FAIL	No voltage at the output stage
OFF	OFF	Output stage turned OFF
ERR	ERROR	permanent short-circuit

2.5   Parameters

In order to adapt to the existing conditions and requirements of the operator are provided parameters that control and influence the behavior of the system.

1.   DMX address
2.   Operating Mode
3.   DMX Off Behavior
4.   Default Warm White
5.   Default Cold White
6.   Max. Brightness
7.   Manual Adjust Enable

Effect of the parameters and the respective ranges of values are described in the following chapters.

2.5.1   DMX address

The adjustment of the DMX address is on page 2 PARAMETERS. Select the page 2 on the display by using the jog dial as described in Section 2.3 and select the 1st parameter DMX ADDRESS in the second line. The current value is displayed in the third line.

```
2 PARAMETER MASTER |
1 DMX ADDR        |
   157            <
Range 1..512
```

Move the focus character '<' using the UP and DOWN buttons on the third row and set the DMX address there as a base address. Turn therefore the jog dial to adjust value. During the change the '<' character is flashing. Confirm the set value by pressing the jog dial.

Depending on the selected operating mode, a number of DMX addresses are used. See also the chapter 2.5.2.1 DMX Mode A to 2.5.2.5 DMX Mode E. Note that the required number of addresses does not exceed the specified address space to 512 when assigning the DMX address.

2.5.2   Operating Modes

The operating mode largely determines the behavior of the system.
To control the lights by a DMX signal, five different modes are available, the DMX modes A to E. These modes differ in different numbers of used DMX channels and their significance for brightness and color temperature as well as the assignments to the lights in the eight groups.

To set the operating mode, navigate the parameters of the screens on page 1 to the second line of 2 OPERATING MODE. See section 2.3. Then move the focus to the third line with the DOWN button and turn the jog dial to the desired mode. Confirm your selection by pressing the jog dial.

To program the individual lights on one of the eight group addresses, the PROGRAMMING MODE is available.

To test the overall performance of the system with all connected lights, use the POWER TEST MODE.

To operate the system with pure DC voltage, the DC MODE is available.

Each mode is described in more detail below.

2.5.2.1 DMX Mode A

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
1 DMX MODE A       <
8xBright, 1xWW, 1xCW
```

The incoming DMX data control the lights as follows.

Channel	Control	
1	Brightness	Group 1
2	Brightness	Group 2
3	Brightness	Group 3
4	Brightness	Group 4
5	Brightness	Group 5
6	Brightness	Group 6
7	Brightness	Group 7
8	Brightness	Group 8
9	Warm White	Group 1 to 8
10	Cool White	Group 1 to 8

2.5.2.2 DMX mode B

```
2 PARAMETER MASTER I
2 OPERATING MODE   I
2 DMX MODE B       <
8x <Bright, Color>
```

The incoming DMX data control the lights as follows.

Channel	Control	
1	Brightness	Group 1
2	Color Temperature	Group 1
3	Brightness	Group 2
4	Color Temperature	Group 2
5	Brightness	Group 3
6	Color Temperature	Group 3
7	Brightness	Group 4
8	Color Temperature	Group 4
9	Brightness	Group 5
10	Color Temperature	Group 5
11	Brightness	Group 6
12	Color Temperature	Group 6
13	Brightness	Group 7
14	Color Temperature	Group 7
15	Brightness	Group 8
16	Color Temperature	Group 8

In this mode it should be noted that the maximum adjustable brightness through the MAX BRIGHTNESS parameter is determined. To understand the effect of this parameter, please refer to chapter 2.5.6.

Color temperature the value 255 Warm White and Cool White 0 corresponds.

2.5.2.3 DMX Mode C

```
2 PARAMETER MASTER I
2 OPERATING MODE   I
3 DMX MODE C       <
8x <WW, CW, Bright>
```

The incoming DMX data control the lights as follows.

Channel	Control	
1	Warm White	Group 1
2	Cool White	Group 1
3	Brightness	Group 1
4	Warm White	Group 2
5	Cool White	Group 2
6	Brightness	Group 2
7	Warm White	Group 3
8	Cool White	Group 3
9	Brightness	Group 3
10	Warm White	Group 4
11	Cool White	Group 4
12	Brightness	Group 4
13	Warm White	Group 5
14	Cool White	Group 5
15	Brightness	Group 5
16	Warm White	Group 6
17	Cool White	Group 6
18	Brightness	Group 6
19	Warm White	Group 7
20	Cool White	Group 7
21	Brightness	Group 7
22	Warm White	Group 8
23	Cool White	Group 8
24	Brightness	Group 8

Here, the brightness reaches in each group the value of 255, and in doing to the set values for warm white and cool white.

2.5.2.4 DMX Mode D

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
4 DMX MODE D       <
8x Bright (defaults)
```

The incoming DMX data control the lights as follows.

Channel   Control

1   Brightness   Group 1
2   Brightness   Group 2
3   Brightness   Group 3
4   Brightness   Group 4
5   Brightness   Group 5
6   Brightness   Group 6
7   Brightness   Group 7
8   Brightness   Group 8

The maximum brightness and color temperature are given here on the parameters DEFAULT WARM WHITE and DEFAULT COLD WHITE (see chapter 2.5.4 and 2.5.5).

2.5.2.5 DMX mode E

```
2 PARAMETER MASTER I
2 OPERATING MODE   I
5 DMX MODE E       <
1x DC On/Off
```

This mode allows an easy switching ON and OFF of all lights via a single DMX channel. The preset information stored in the lights for brightness and color temperature is used.

Channel   Control

1   0..127 = all lights off
                 128..255 = all lights on

In this mode, the lights are operated with pure DC voltage. This means that there is no modulation of the voltage for transmitting brightness information instead. Therefore an operation is possible, which completely eliminates any interference emission via the cable to the lights.

The setting of default values for brightness and color temperature in the lights is supported by the LAMP SET DEFAULTS function (see Section 2.6.2). The values that are transmitted using this function in the lights correspond to the values used in the STAND-ALONE MODE (see Section 2.5.2.9).

2.5.2.6 Programming Mode

In order to assign the individual lights to a group address respectively, use the PROGRAMMING MODE. Navigate therefore to page 2 on the display and select the parameter OP MODE. Set the value to 6 PROGRAMMING MODE.

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
6 PROGRAMMING      <
Set Lamp Addresses
```

The lights now show their set group addresses. If you want to change this, use the IR remote control, which belongs to the system. Hold the remote control close to the viewing window of the lamp and tapping a number between 1 and 8. The lamp changes its group address to this number. You will now see the set group address. Please note here the scatter of the IR Remote so as to not inadvertently switch to adjacent lights.

2.5.2.7 Power Test Mode

After each reconfiguration of lights, the plugging in different places, a power test should be performed. Navigate to page 2 on the display and select the parameter OP MODE. Now set the value to 7 POWER TEST.

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
7 POWER TEST       <
Test with 200% Power
```

This test indicates the maximum value for Warm White and Cool White on all lamps at the same time. This corresponds to a brightness of 200%. It can be checked, whether the power units can drive the maximum load for all lights. If the system determines an overload, the lights that are in the overload segment are flashing.

2.5.2.8 DC Mode

To set this mode, navigate to the display on page 2 and select the parameter OP MODE. Now set the value to 8 DC MODE.

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
8 DC MODE          <
Control OFF
```

This mode turns all lights to the brightness and color temperature stored in their memory. Here the lights are operated with pure DC voltage. This means that there is no modulation of the voltage for transmitting brightness information. This allows an operating mode that completely eliminates any interference emission via the cable to the lights.

Note that in this mode, there is no control via DMX.

The default values for brightness and color temperature in the lamps is supported by the LAMP SET DEFAULTS function (see Section 2.6.2). The values that are transmitted with this function into the lights correspond to the values used in the STAND-ALONE MODE (see Section 2.5.2.9).

2.5.2.9 Standalone Mode

The stand-alone mode is provided to operate the system without DMX controller. This mode can also be used for rehearsals. To set this mode, navigate to the display on page 2 and select the parameter OP MODE. Now set the value to 9 ST.ALONE MODE.

```
2 PARAMETER MASTER |
2 OPERATING MODE   |
9 STD.ALONE MODE   <
BRI:  68  COL: 176
```

By pressing the DOWN button you can go to the bottom line of the display. There you will find values for brightness (BRI) and color temperature (COL). You can set the values with the jog dial. Use the DOWN button to switch between the two values.

2.5.3 DMX Off Behavior

The behavior of the system is set with this parameter in case of failure of the DMX signal. Navigate here to the display on page 2 and select the parameter 3 DMX OFF BEHAVIOR.
As adjustable values, there are HOLD and SET TO DEFAULTS available.

```
2 PARAMETER MASTER |
3 DMX OFF BEHAVIOR |
HOLD               <
Select Hold / Def.
```

HOLD ensures that the last received DMX values are retained as control value for the lights. The value SET TO DEFAULTS sets the brightness and color temperature of all lights to the preset values DEF WARM WHITE and DEF COLD WHITE after a second of DMX failure (see chapter 2.5.4 and 2.5.5).

2.5.4   Default Warm White

For different purposes, a default value for Warm White can be adjusted. To do this, navigate to the display on page 2 and select the parameter 4 DEFAULT WARM WHITE. In the third line, you can now set a value between 0 and 255with the jog dial.

```
2 PARAMETER MASTER |
4 DEFAULT WARMWHITE|
   128             <
Range 0..255
```

The default Warm White parameter plays a role in DMX mode D. In this mode only the brightness values are controlled via DMX. But the color temperature and the maximum adjustable brightness is set with the parameters DEFAULT WARM WHITE and DEFAULT COLD WHITE. (See also Section 2.5.2.4).

Furthermore, the system reuses this value in case of a DMX failure (see Section 2.5.3).

2.5.5 Default Cool White

For different purposes, a default value for Cool White can be adjusted. To do this, navigate to the display on page 2 and select the parameter 5 DEFAULT COLD WHITE. In the third line, you can now set a value between 0 and 255 with the jog dial has.

```
2 PARAMETER MASTER |
5 DEFAULT COOLWHITE|
   128              <
Range 0..255
```

The default Warm White parameter plays a role in DMX mode D. In this mode only the brightness values are controlled via DMX. But the color temperature and the maximum adjustable brightness is set with the parameters DEFAULT WARM WHITE and DEFAULT COOL WHITE. (See also Section 2.5.2.4).

Furthermore, the system reuses this value in case of a DMX failure (see Section 2.5.3).

2.5.6 Max. Brightness

This parameter is used to preset the maximum brightness in DMX mode B (see section 2.5.2.2).
To change this parameter, navigate to the display on page 2 and select the parameter 6 MAX BRIGHTNESS. You can set this value in a range from 0 to 200%. This parameter limits the maximum brightness in DMX mode B.

```
2 PARAMETER MASTER |
6 MAX. BRIGHTNES   |
   122 %           <
Range 0..200 %
```

If the value for MAX BRIGHTNESS is between 0 and 100%, the color temperature of the entire spectrum can be controlled between warm white and cool white via DMX. If the value is more than 100%, the color temperature is limited adjustable. See chart below.

Brightness %   DMX %

200   100
180   90
160   80
                    Color Temperature
140   limited adjustable   70
120   60
100   50
80   40
                    Color Temperature
60   full adjustable   30
40   20
20   10

Cold-White   Color Temperature   Warm-White
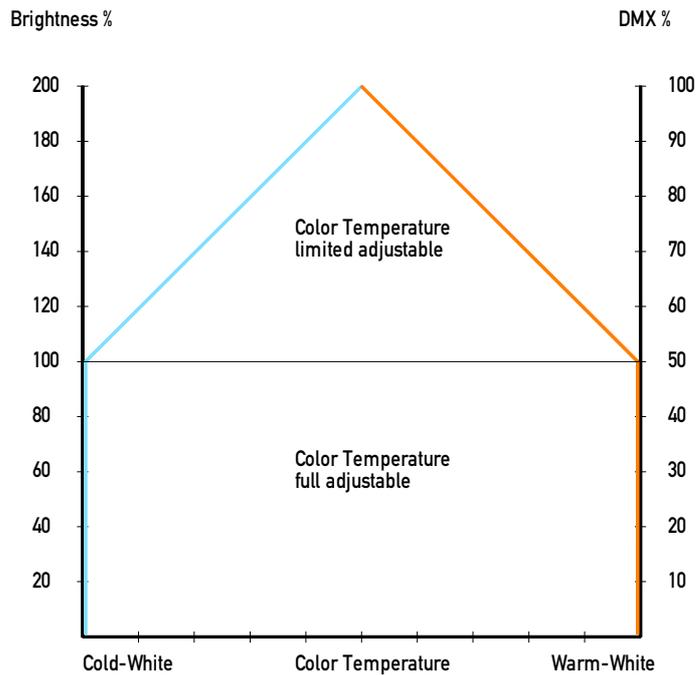
2.5.7 Manual Adjust Enable

In case that the system is equipped with lights that permit the adjustment of the brightness (and possibly color temperature) directly at the lights, it can be specified with this parameter if a manual adjustment is allowed or not.

```
2 PARAMETER MASTER |
7 MANUAL ADJ ENABLE|
   OFF              <
Select On / Off
```

Navigate therefore to the display on page 2 and select the parameter 7 MANUAL ADJ ENABLE. In the third line, you can change the value between ON and OFF.

2.5.8 Load Setup

With the function Load Setup a complete set of parameters can be loaded from one of 10 memory locations.

```
2 PARAMETER MASTER |
8 LOAD SETUP       |
   1               <
Select 1..10
```

Navigate to the display on page 2 and select the function 8 LOAD PARAMETERS. In the third line, set the number of disk space. The parameters from the selected memory are loaded by pressing the jog dial.

2.5.9   Save Setup

Use the Save Setup function to save all parameters in one of 10 memory locations.

```
2 PARAMETER MASTER |
9 SAVE SETUP       |
  1                <
Select 1..10
```

Navigate to the display on page 2 and select the function 9 SAVE PARAMETERS. In the third line, set the number of disk space. All parameters are saved on the selected memory location by pressing the jog dial.

2.6   Service functions

On page three of the display there are several service functions, which are described in the following chapters.

2.6.1   Initialization of the master-slave chain

If several power units should work in conjunction, it is necessary that each device is configured for its specific function. This requires a correct wiring of the master-slave chain. See also the chapter 2.1.

```
3 SERVICE   MASTER |
1 INIT DEV. CHAIN  <

  Press Jog to Start
```

To initialize the devices in a master-slave chain, navigate to page 3 on the screen of the master device and there on the spot 1 INIT DEV. CHAIN. If the cursor (focus) is on line 2, the automatic initialization can be started by pressing the jog dial.

```
3 SERVICE   MASTER I
1 INIT DEV. CHAIN  <
 0 SLAVES DETECTED
    READY.
```

Now all connected slaves will automatically be detected and involved into the overall system. The operation is exclusively realized with the display of the master device.

2.6.2 Setting the default values of the lighting

If the lights are operated in the DC mode, the stored values of the lighting brightness and color temperature are automatically activated. To program these values in the light, this function is available.

```
3 SERVICE   MASTER I
2 SET LAMP DEFAULTS<
 (std.alone values)
 Press Jog to Start
```

Navigate the screen to page 3 and then on the point 2 SET LAMP DEFAULTS. If the cursor (focus) is on line 2, the process can be started by pressing the jog dial. All lights will now receive the current settings for brightness and color temperature of the stand-alone mode (see also Section 2.5.2.9).

2.6.3 Setting the group addresses of the lights

To put all connected lights to the group address 1, this function is provided.

```
3 SERVICE   MASTER I
2 SET LAMP TO GRP 1<

 Press Jog to Start
```

Navigate to page 3 on the screen and then on the point 3 SET LAMP TO GRP 1. If the cursor (focus) is on line 2, the process can be started by pressing the jog dial. All lights are now set to the group address 1.

3 IR-receiver module for SPY 600 NT

The IR receiver module can be connected optionally to the Power Unit SPY 600 NT, allowing the operating mode control with the included IR remote control. This option is particularly useful when re-allocating the group addresses to the lights. The switching of modes (DMX controller, programming, testing) and the programming of the group addresses can be done with one IR remote control. See also Chapter 4. The connection of the IR receiver module is always at the Master Unit.

4 Infrared remote control

The infrared remote controller can perform a wide range of functions depending on connection type and system configuration of the respective LED lights and control equipment of NT-system.

4.1.   Functionality of the LED light in connection with the digital controller SPY 600 NT

For the reprogramming of the group addresses of the respective lights the power supply of SPY 600 NT shall be in programming mode. The current group address appears in the display of the lights connected to the system. In this state the group address can be adjusted by pressing the number from 1 to 8 on the infrared remote controller (button 9 performs no fuction). The information in the display changes to the selected number, i.e. the group address for this light is adjusted. Please note the scatter range of the infrared remore controller by appointing the group addresses in order not to reprogramm neighbouring lights by mistake. When the LED lights are supplied by SPY 600 NT, all signals from the infrared remote controller are ignored by the lights within available operating modes. The buttons 1-8 are available/active only in programming mode.

4.2.   Functionality of the IR receiver in connection with the digital controller SPY 600 NT

Connecting of an additional IR receiver (Ident -No. 609-050) is required for the direct transmission of IR data signals to SPY 600 NT. The following functions can be called using infrared remote controller in the reception area of the SPY 600 NT receiver unit.

P = Open programming mode of SPY 600 NT
T = Lamp test / load test (all groups at 200 % light output)
D = Activation of the last adjusted DMX operating mode
    (switch back to the normal operating mode) of SPY 600.

3.   Functionality of the LED light with DC and without digital controller SPY 600 NT

If the NT-series lights are supplied with DC voltage, a small dot appears in the segment display. Afterwards light colour and brigthness of the lights can be adjusted using infrared remote controller. These settings are automatically saved 5 seconds after the last pressing of the remote controller buttons and applied at the next switching on or voltage recovery. First, the desired function shall be selected by pressing the corresponding button.

B = Adjustment of brightness
C = Light colour

Both states are indicated by a short flashing of a "b" for brightness and a small "c" for light color. In each mode the desired setting can be performed using arrow keys up / down. Pressing the button 0 displays briefly the currently loaded software version. The other buttons are inactive in DC mode.

Button Description

1..8   Set the group address of lights (active only when SPY 600 is in programming mode)

P   Activation of the SPY 600 programming mode (only with the connected IR receiver)

T   Load test at 200% of SPY 600 (only with the connected IR receiver)

D   Activation of the last adjusted DMX mode of SPY 600 (only with the connected IR receiver)

B   Activate brigtness settings of the light (only in DC mode)

C   Activate colour temperature settings of the light (only in DC mode)

   up (↑) increase the value of brightness or colour temperature

   down (↓) decrease the value of brightness or colour temperature

version in the light (only in DC mode)

The values for brightness and color temperature set via the IR remote remain stored after switching off the lights. If the system runs in DC mode or DMX mode E, these stored values determine the brightness and color temperature of the lamp. These values can be overwritten by the SET LAMP DEFAULTS function. See chapter 2.6.2.

5   Music Stand Lights NPL - NT Series

With the system described here, the lights of type NPL 1624 NT and 1602 NT can be operated. Each light can be individually adjusted to one of 8 group addresses. These eight groups can be controlled via DMX differently. See chapter 2.5.2 ff.

NPL 1602 NT   NPL 1624 NT

The programming of the group address is set by using an IR remote control. See Chapter 3. For this purpose put the system into the operating mode "programming". See the description in section 2.5.2.6. The lights show this operating condition by indicating a number on the back under the transparent cover, which is the group address. Now you can go close to this side of the lamp and press a number between 1 and 8 with the remote control. The display changes to the selected number and thus the group address is set for this light.

Note the scatter of the IR remote to avoid accidentally reprogramming adjacent lights when assigning the group addresses.
The lights react to the IR remote control at a distance of up to 0.5 m. This ensures that only the light gets assigned a new group address that is in accordance short distance from the IR remote control.

Now put the operating mode to a DMX mode or the Stand-Alone Mode. See Section 2.5.2 et sqq.. The number of the light goes out. In the DC MODE appears a small red dot in the light that indicates this mode.

In the DC MODE, the brightness and color temperature can also be adjusted by using the IR remote control. See chapter 4.

Installation instructions:

When wiring the lights, ensure sufficient cable cross-sections in order to limit the voltage drop to the last connected light. For a safe operation the music stand lights of the NT-series need at least 22V DC. This corresponds to a voltage drop of about 12% at 25 V supply voltage on the SPY 600 NT.

Example:

Rated current: 10A, Voltage: 25V, cable cross-section (Cu): 4.0mm², cable length 30m results after all, already 10.7% voltage drop.
In this calculation example no contact resistances are still observed. On the other hand, a selective load at the end of the lead is very rare and the sample calculation is based on a full utilization of the forwarding path from. In practice, the values are much lower.

6 Coupling with a higher-level control system

A coupling of the system with a higher-level control system enables a remote monitoring and a remote control of power units. Here, a SPY 600 NT can optionally be equipped with a PLC coupling via a signal interface or via a COM interface. The assignment of the signals and the functionality are largely adapted to customer needs. In the next chapters both interfaces variants are described.

6.1 PLC coupling with signal interface

To monitor the operation of the system, the following signals are available:

Status	Signal Description
st_normal	System is running normally, no error.
st_overload	An overload was detected. Error.
st_programming	The system is in programming mode or performs a power test.

To control the system, the following signals are available:

Control	Signal Description
c_normal	Sets the operating mode to the last set DMX mode. This signal (static) has priority compared to the other signals.
c_program	Set the Operating Mode to PROGRAMMING. Lights can be adjusted to new group address.
c_power_test	Sets the operating mode to POWER TEST. All lamps are controlled with a brightness of 200%.
c_stand_alone	Sets the Operating Mode to the STAND-ALONE MODE. Lights can be controlled without DMX signal.

6.2   PLC coupling with COM interface

A much more convenient interface communicates with the PLC coupling via a COM connection. This has a number of ways to obtain states to set parameters and trigger actions. Here is an overview of the functions.

A much more convenient interface communicates with the PLC coupling via a COM connection. This has a number of ways to obtain states, to set parameters and to trigger actions. Here is an overview of the functions.

- State query of all power units (individual monitoring of the output stages)
- Query of all parameters
- Setting of parameters
- Securing the priority of DMX signal (presentation mode)
- Set the group addresses of all connected lights
- Set default values for warm white and cool white in all connected lights

For an individual connection of the system, the following interface modules are available:
RS 485, RS 422, Ethernet and TTY.

For a detailed description of each function, there will be a separate document available.

7   Specifications of SPY 600 NT

Overall performance (output)	3 x 240 W
Output voltage	max. 25V DC digitally modulated
Maximum number of lights	3 x 12 pieces (à 18W)
Connectors (outputs)	3 x Neutrik Speakon NL4MD
Overload protection	signal overload (pre-alarm)
	Electronic fuse 11 A
	Short-circuit protection 12 A
Control	DMX 512 / XLR5 (floating)
Number of control channels	min. 1 / max. 24
Master-Slave link	XLR7
Interface control system	TTY protocol D-SUB 15
Mains voltage	95-250 V AC
Power connector	Neutrik PowerCon
Inrush current (cold start)	about 120A at 230V AC
	about 66A at 115VAC
Rated current at full load	4.6A at 230V AC
	9,7A at 115V AC
Power consumption at full load	max. 1000W
Power Factor	0.98
Leakage current (L1 to PE)	2.5 mA
EMC test	EN61000-3-2 Class A, EN55022
	Class B, EN61000-4-2,
	EN61000- 4-4, IEC61000-4-5
Dimensions (W / H / D)	483 x 133 x 370 mm
Design	19 "/ 3U
Weight	9.5 kg

We reserve the right to change the technical parameters and the design.