Appendix
For the procurement with Id. No. 2

TECHNICAL SPECIFICATION

BASIC INFORMATION'S

Project and its Location

Project: Latvian National Opera – Stage Lighting Control System

Customer

Latvian National Opera

Technical director Vilmars Sadris

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01. Dimmer system

Shall be an intelligent, high precision, fully digital dimming system.

Shall be complete on-line reporting facility keeping the operator constantly informed of the dimmer and local status on the dimmer monitor and control workstation (PC with special software).

Shall be modular design for different rack combinations.

01.01. Dimmer Rack cabinet for 24 slots with 3P+N

Quantity: 13 pcs.

Racks shall have a capacity of 24 modules, containing at least 48 channels of 5kW dimmers or at least 48 channels of 25A relay outputs or any combination of dimmers and relay.

The racks shall be designed with easy insertion and removal of the dimmer drawers and the control modules without the use of any additional tools.

Rack design shall allow convenient access to load wiring, live and control termination.

Dimmer system shall allow both DMX and/or Ethernet communication with status reporting either to the local control module or to the lighting control console.

The rack cabinet shall incorporate multi-fan cooling system, with computerized micro processor speed control. The fan operation system be powered on 3-phase power supply. This can assure continuity of cooling system in a case of a missing any power supply phase. Individual dimmer module shall shutdown, in case of over-temperature. The dimmer shall have over-temperature programming capabilities.

Dimmer modules shall be with advanced digital processing (on board DSP), which allows correct zero-crossing detection in presence of noise.

3- phase supply for the control electronics shall assure continuity of operation in a case of a missing any power supply phase.

Each dimmer channel shall be patched to any one of the following communication ports in any combination of HTP (Highest Takes Priority) or LTP (Latest Takes Priority) mode:

- To first or second DMX inputs;
- To analog control input;
- To Ethernet input.

Capability of running the show on a stand-alone basis using cues and timing stored in back up.

Shall have local and remote master panic switch.

Each cabinet should have the controller as a fully embedded PC, which controls the rack electronics.

Controller shall communicate with the lighting control and dimmer remote monitoring system and control the microprocessors located in each dimmer drawer.

The local control panel, should have the LCD display and keyboard, to program the dimmer rack controller module.

The second controller shall be connected as a slave unit. The slave controller module shall track the master controller module and take over in case of master fault.

01.02. Controller module for dimmer rack cabinet

Quantity: 26 pcs.

Shall be installed two controller modules in each dimmer rack cabinet in master/slave configuration.

Controller shall communicate over DMX and Ethernet network communication protocols and support Art-Net and ACN.

Shall be with bi-directional communication to PC, with installed of dimmer monitoring software.

3-phase power supply for the control electronics ensures control continuity in the event of a missing any of power supply phase.

Quick access to load, voltage and frequency data, using local screen and control navigation buttons.

Real-time automatic dimmer error indication display and slot status (active/inactive) report.

Patch and parameter setup wizards.

Shall be able to control dimming curve settings, to choose from at least 8 factory dimming curves and to program up to 8 user-defined and named dimming curves.

Testing intensity per each dimmer channel.

Shall be integrated color Touch screen graphic LCD display with size at least 4“ and with resolution not less as 480*270 pixels. The display shall be used to show different screen pages, soft key functions, and rack status information.

Shall be control buttons to navigate a screen and enter values.

Shall be the wheel to scroll through screen values.

Shall be HELP button, available for every screen, button and hardware control on the dimmer system.

Shall be available virtual keyboard and external keyboard support (connected by USB).

Shall be with integrated LED‘s for indication:

- Ethernet communication status Active/Not-active.
- DMX communication status for DMX1 and DMX2 inputs.
- Power LED.
- 3-phase power supply indication LED‘s L1, L2, L3.

Shall be provided the following information displayed in the rack status mode:

- *Rack* - cabinet number
- *Voltage* - Voltage of each input per phase (Volts)
- *Current* - The load in each phase (Amps)
- *Frequency* - The current frequency of the cabinet power supply (Hz)

- *Patch* - The DMX start and end address in the cabinet.
- The amount of active slots in the cabinet (quantity of drawers in operation).
- Controller module status and position in the dimmer cabinet (for example: *Stand Alone/Bottom Drawer).*

Shall have the multifunctional USB port, which can be used for following functions:

- To connect USB keyboard or mouse.
- Save and restore module data from / on a USB flash drive.
- Save log files to a USB flash drive.
- Update system software from the USB flash drive.

The following data shall be displayed on the drawer status page screen:

- Slot number.
- Temperature of the drawer in C° .
- The drawer power type in kW (for example: 5kW or 2.5kW).
- The start DMX address of the drawer.
- Circuit Breaker information.
- Error reports.

01.03. The dimmer drawer 2x5kW

Quantity: 256 pcs.

The onboard microprocessor shall receive/transmit control data from the Master and Slave control module via the internal bus. Its primary task shall be generate the triggers for power devices. In parallel it shall measure and report back the following parameters:

- Load current for each dimmer channel
- Temperature of the dimmer module
- Open load conditions
- Circuit-breaker status
- Warning if DC voltage is present in the dimmer output.

In case alarm conditions appears, it shall be flashed the corresponding multi-color LEDs on the module's front panel and send report back to the monitor software.

Each dimmer shall be equipped with the high rise-time choke, which will protect the lamp filament and reduce RFI (Radio Frequency Interference).

01.04. The relay drawer 2x25A

Quantity: 56 pcs.

The onboard microprocessor shall receive/transmit control data from the Master and Slave control module via the internal bus. Its primary task shall be generate the triggers for power devices. In parallel it shall measure and report back the following parameters:

- Load current for each relay channel
- Temperature of the relay module
- Open load conditions
- Circuit-breaker status

In case alarm conditions appears, it shall be flashed the corresponding multi-color LEDs on the module's front panel and report back to the monitor software.

01.05. False panel for dimmer slot

Quantity: 4 pcs.

Shall be false panels to cover the empty slots. Shall be easy to cover the panels without additional tools. All empty rack space should be covered with false panels.

01.06. Network workstation for system manager

Shall be industrial type fanless touch panel computer with following features:

- 22" high brightness (at least 300 nits) WSXGA+ TFT LCD monitor
- Screen resolution 1680 x 1050
- Viewing Angle (H/V) 160°/160°
- with Socket P Intel Core2 Duo / Celeron M or simmilar processor, speed 2.5 GHz or better
- Water/dust-proof and fanless design (protection level for front bezel: IP65, for full enclosure: IPX1)
- System memory shall support 2 x DDR3 SO-DIMM memory up to 8 GB
- Storage at least 500GB 2.5" SATA HDD and 1 x CompactFlash
- I/O connectors: RS-232/422/485, 4 x USB 2.0, Audio (Mic-in/Line-out), 2 x 10/100/1000Mbps Ethernet, 1 x VGA
- Multi drive unit including DVD-R, DVD-RW and DVD-RAW support
-

Software requirements:

- Shall be installed operating system like Windows.
- Shall be installed control application software (node management utility) to manage DMX over Ethernet nodes. It shall help find unit's IP address and then open a browser window to make the required changes in DMX / Ethernet network management units.

01.07. The dimmer monitoring software

The dimmer monitoring software shall be like Windows, iOS or Linux based application, enabling full control and monitoring of the dimmer racks from the PC. The software shall enable full control and configuration of the dimmer Ethernet network, and communicate with the existing theatre equipment, Ethernet capable consoles and other devices.

The software shall enable patching and properties configuration for every rack, slot and dimmer, monitor the dimmers, and provide a comprehensive status reports at any time.

A selection of cross-referenced reports shall be generated and updated on-line.
Software shall provide - capturing, storing and playing-back of lighting scenes using the dimmers' control module and performing manual and automatic tests.

A USB dongle key shall be provided with the software. The dongle key shall be used during restart of set up.

Main features:

- Data communication and monitoring between dimmer racks and network workstation PC via TCP/IP Ethernet Comunication protocol.
- Real-time status view of the dimmer racks.
- Rack/slot/dimmer location data (physical addresses) & logical dimmer addresses.
- Automatic and Manual Testing Procedures enabling dimmer testing and evaluation of dimmer errors.
- Backup screens creation utility and playback control from the dimmer monitoring software.
- Real-time dimmer status report display (rack/slot/dimmer physical address, logical address, date and time of error, error status, error type).
- Dimmer control module Panel Emulator enabling real-time display and control of the dimmer rack control module.
- Patch and Parameter update utility.
- Save & Load show configurations.

01.08. Mobile lighting control console

Shall be portable mobile lighting control console (size less than: 500x350x100mm, weight less than 5kg). The console shall be with fanless cooling system.

Mobile lighting control console shall be used with a hosting PC, which runs control software compatible with existing main control lighting consoles and can be used as standalone or as tracking backup console on stage. The mobile lighting control console will be used on stage and connected to DMX distributing system.

The PC software shall include all main features to edit and control and shall have the simmilar functionality as existing lighting control consoles.

Main features:

- Up to 200 virtual playbacks (running simultaneously)
- Advanced color programming for CMY/RGB values
- Gobo, Color and Media graphical pickers
- Full tracking backup
- MIDI support
- 9999 Cue lists
- 9999 Groups

- Cue numbering up to 9999
- 10 Library types
- 9999 entries per Library type
- 9999 Macros
- 9999 Snaps (playback assignment snapshots)

Shall be system controls:

- Dedicated intensity push wheel
- 5 dedicated parameter push wheels
- INTENSITY, POSITION, COLOR, BEAM, IMAGE, SHAPE, EFFECTS, TIMING, PALETTE, TRACKING GENERAL libraries
- Illuminated TrackBall for X-Y
- Grand Master with illuminated blackout key
- 10 Playback faders
- Playback keys: Select, Go, Hold/Back and Flash (fully customizable).

Output options:

- Ethernet; virtual connectors, Art-Net
- 4 DMX-512 input/output (2048 cofigurable)
- 1 Ethernet port 1GB
- MIDI In/Thru (Time code, Show control, Notes, Macros)
- Adjustable desk light

01.09. Mobile PC workstation

Shall be notebook type PC to use with mobile lighting control console. This PC will run lighting control software compatible with existing main lighting control consoles.

Main features:

- Not less as 15" diagonal LED-backlit HD anti-glare (1366 x 768) display
- Shall be the aluminum casing and wear-resistant finish.
- Shall be the spill-resistant, full sized keyboard with numeric keypad and thin layer film under the keyboard for electronic protection.
- Shall be “Drive Guard” feature to protect hard drive against impact, bumps and drops for enhanced data protection.
- Shall be easy-to-use fingerprint swipe security safeguard for data from unauthorized users.
- Touchpad with gestures support, on/off button with LED indicator, two-way scroll, two pick buttons
- processor speed at least 2.5 GHz or better

- RAM not less than 6 GB 1333 MHz DDR3 SDRAM
- Drive at least 500GB SATA II (7200 rpm)
- I/O connectors: 4 x USB 2.0, Audio (Mic-in/Line-out), 10/100/1000Mbps Ethernet, 1 x VGA, 1 x HDMI
- Wireless 802.11b/g/n
- Optical drive DVD+/-RW Super Multi DL
- Operating system Windows 7 or similar

02. Ethernet and DMX distributing system

The new dimmer control network shall support dimmer control from the control room and other devices on stage over-Ethernet network. The new equipment shall provide merging and transmitting of DMX strings and rebroadcast on the Ethernet. The system shall include the routers and Ethernet/DMX nodes.
Shall be provided euipment to merge four lighting control consoles to control the dimmers and other DMX controlled equipment at the same time.
Shall be available to connect and use the lighting control console on the stage for rehearsall purposes.

02.01. Multi-purpose DMX management unit

Quantity: 5 pcs.

Units shall form the backbone of a network, provide optical isolation, merge levels from multiple streams, and communicate between DMX and Ethernet protocols.

Shall be following main features:

- DMX Hub/Splitter/Switcher function
- convert DMX to Ethernet
- convert Ethernet to DMX
- Or configured in any combination of the above.

The set ups shall be done on a web browser window, via RS232 command, or with the touch control buttons on the device front panel.

DMX shifting.

Break time configuration for each DMX port (100us to 1ms)

DMX Refresh rate configurable for each port

Number of channels configurable for each port (1 to 512)

Profile modes shall be selected and viewed with front panel menus on LCD display.

Shall be Graphical User Interface for creating and editing ports in flow-chart oriented and documents data form.

Simple Scene Playback or Test Frame Generation.

Hot spare for another unit or any combination of the above.

Hardware specifications:

8 RDM enabled 1500V isolated DMX ports

Shall be LCD display to provide network and status information.

Shall be at least four buttons on front panel (MENU, UP, DOWN, ENTER) for easy configuration.

Profile storage on hard drive or import/export to USB flash disk key or FTP

Support Art-Net 1, Art-Net 2

10/100/1000 base-T Ethernet port

Shall be Rack mount 19" x 1U

Shall be with integral cooling fan with speed or on/off control available in advance settings.

02.02. Multi-purpose DMX management unit with merging

Quantity: 3 pcs.

Shall be the same main features as unit in pos. 02.02. but with additional DMX merging function in HTP or LTP mode. This unit will be used in control room to merge several control consoles.

Two pieces of this unit shall be installed in control room, to merge the four main lighting consoles.

One piece shall be installed on stage to merge the mobile lighting control consoles for use during rehearsalls or for special purposes during shows.

02.03. DMX splitter 8 port

Quantity: 4 pcs.

Shall be DMX/RDM compatible 8 port fully isolated splitter.

It shall allow Customer to build an Remote Device Management (RDM) compliant DMX network, for bidirectional communication between RDM compatible lighting devices over DMX network.

Shall be 1 DMX input and 8 DMX outputs.

The splitter shall operate in:

- Normal mode: splitter actively repeats RDM traffic bidirectionally while level information goes from controller to DMX devices as usual.
- Filter Mode: Single button-press allows all RDM traffic to be filtered out, for legacy devices which might flicker if they saw the messages on the line.
- Backup Mode: Another button bypass intelligent RDM functionality completely to work as a traditional DMX splitter would.

The splitter should be:

- Fully compliant with ESTA and USITT standards for DMX512A with RDM and RDM Standard ANSI E1.20 - 2006
- Shall be Rack mountable 19" x 1U.

02.04. Single port DMX-Ethernet node

Quantity: 6 pcs.

It shall be DMX / Ethernet gateway. It shall be configured as an Art-Net output node on universe 0:0 but can be easily and quickly changed using the free node management utility tool. This shall be used for distributing DMX signals over Cat5E in a cost effective manner or with wireless Ethernet systems.

- 10/100 Ethernet port
- Support Art-Net
- 1 Input & 1 Output connector (not simultaneous use)
- Status, Direction and Link LED‘s
- Ethercon connector
- Upgradeable firmware

02.05. Two port DMX-Ethernet node

Quantity: 6 pcs.

This shall be 2 output or input ports unit, support multiple protocols and to be configured using any web browser thanks to the built-in web server.

The node shall receive DMX512 data from the lighting controller and processed the DMX data for transmission over Ethernet. The data packets shall be sent using a UDP/IP scheme with a broadcast IP and MAC address. The output nodes shall unpack the DMX data and update it's internal buffers.

- Plug and Play or Configured operation
- Available configuration: 2 input, 2 output or 1 in 1 out ports
- Remote Device Management (RDM) enabled
- Up to 256 DMX512 universes on a 10Base-T Ethernet link
- Remote configuration using web browser interface.
- Endless Softpatch capabilities
- Node Universe Binding (have multiple nodes each assigned to their own DMX universe)
- Static or DHCP IP configuration
- RLE Data compression to minimize bandwidth
- Easy firmware upgrades using DHCP + TFTP
- Art-Net protocol support
- hardware shall fit into 9.5 inch 1 Unit rack space, two units can be mounted side by side to form a standard 19 inch rack.

02.06. 16-Port 10/100Mbps Switch

Quantity: 6 pcs.

The switch should be with 16 10/100Mbps ports. These ports must be able to detect the network speed and auto-negotiate between 100BASE-TX and 10BASE-T protocols, as well as between full and half-duplex. Unit must meet IEEE802.3u 100BASE-TX Fast Ethernet and IEEE 802.3 10BASE-T Ethernet and/or similar standarts.

- Auto-learning of network configuration.
- Flow control in full duplex mode for protection against data loss.
- Back pressure in half duplex mode.
- RAM buffer dynamically allocated, at least 4Mbits per device.

02.07. Cat5E patch pannel 24 ports

Quantity: 6 pcs.

- 24-Port CAT5e Patch Panel
- For placement in 19” rack
- Compliance with CAT5e standard
- Color coded according to EIA/TIA 568 A&B

02.08. Rack-cabinet wall mounted 12U high

Quantity: 6 pcs.

Rack-cabinet shall be wall mountable. It shall have lockable door with glass.

- Side walls shall be detachable and lockable.
- Cable entries must be either at the top and bottom.
- Rack-cabinet shall withstand at least 60 kg of weight
- It shall have IP20 or higher protection

02.09. Wireless Access point

Quantity: 1 pc.

Wireless Access point should have plenum rated chassis. At transfer rates up to 300Mbps in 2.4GHz users must be able to connect with legacy 802.11b/g adapters as well as the latest 802.11n adapters to enjoy instant communication.

- Device shall meet IEEE802.11n/g, IEEE802.3 or similar standards
- Device must have web-based configuration and control interface.
- Dipole antenna gain shall be at least 5 dBi at 2.4 GHz
- Transmit output power shall be at least 26 dBm at 2.4 GHz Dual Chain

02.10. Uninterruptible power supply UPS

Quantity: 1 pc.

Shall be „smart“ type UPS provided for servers, networking equipment, telecommunication systems, industrial and other mission-critical applications. The unit shall be based on the field-proven smart UPS functionality, feature double conversion on-line topology, which delivers tight voltage and frequency regulation, zero transfer time to and from battery, and input power factor correction.

The UPS shall be managed using control software.

UPS shall provide battery back up to the load through the use of internal batteries.

Shall be possible to use the number of external battery packs to meet desired levels of extended runtime.

The UPS can be in tower configuration, with easily possibility convert to the 19" rack-mount mode.

Output power capacity not less 1400 Watts / 2000 VA

Nominal output Voltage 230V (configurable for 220 : 230 or 240 nominal output voltage)

Output voltage distortion less than 3%

Output frequency (sync to mains power) 50/60 Hz +/- 3 Hz user adjustable +/- 0.1

Shall be built-in bypass mode.

Input voltage range for main operations not less from 160 to 280V

Battery type - maintenance-free sealed Lead-Acid battery with suspended electrolyte or simmilar

Shall be Interface port for communication and management – at least RS232 or USB and slot for optional network card.

Shall be LED status display with load and battery bar-graphs and LED indicators: On Line, On Battery, Replace Battery, Overload, Bypass.

Shall be audible alarm when: on battery, distinctive low battery alarm, overload continuous tone alarm.

02.11. Cables, connectors, mounting accessories for control network

Shall be provided all neccessary power supply and network cables, connectors, mounting accessories and other supporting material to install Ethernet and DMX network between control room to dimmer room and stage area.

03. Work / rehearsall lighting control

Shall be installed multifunctional power controller. The controller shall be installed as power unit, connected to separate mains power supply input feed and to be controlled by individual control network and dedicated operator controllers. The work / rehearsall lighting control system shall be independent from dimmer system, but the control system shall be interconnected with stage lighting control system during shows and rehearsalls.

03.01. Multifunctional power controller

Up to 96 channels as stage dimmer system (48 ch. for dimmers or relay switches, 48 ch. for 1/10V analogue outputs).

Shall be equiped with optical isolated DMX-512 input.

Shall be programmable DMX address assigns. Each DMX channel shall be programmed to activate a channel or a scene or a chaser mode.

Shall be DMX merge capability (HTP merge, LTP merge, Last merge).

Shall be programmable DMX termination.

Shall be 48 fully programmable analogue inputs.

Programmable analogue input assigns. Each analogue input can be programmed to activate a channel or a scene or a chaser.

Shall be at least six programmable operating modes for each analogue input (0/+10V, 0/+5V, Contact normal open, Contact normal closed, Easy Net, Push Button).

Shall be programmable blocking function for each analogue input. Each analogue input can be blocked by a programmable DMX channel, or by DMX signal present.

Shall be control capability from wall mounted control panels, simple faders, dry contacts, motion detectors, push button switches.

Shall be analogue input grouping capability. When an input in a group receives a signal, this shall cancel all other input assigns of that group offering the “one active” capability.

Up to 512 programmable scenes with programmable fade in/out (0 - 59min 59,9sec.)

Up to 128 programmable chasers with programmable fade in/out (0 - 59,9sec.), speed rate (0,05 - 59,99sec.).

Shall be chaser creator for easy chaser creation.

DMX packet capture for easy scene or step creation.

Programmable preheat level per channel.

Programmable soft start per channel.

Programmable fade in/out (0 - 59,9sec.) per channel.

Shall be law selection per channel (at least 6 factory set dimming curves + user dimming curves).

Programmable maximum output level per channel.

Programmable behaviour on DMX signal loss (Blackout, hold of last DMX data packet, scene).

Shall be programmable function keys.

Standby Key.

Two encoders for easy selection and value setting.

Shall be at least 128x64 graphic display (for minimum 8 lines x 20 characters could be displayed).

Shall be password protection.

Shall be temperature sensors inside checking all the time the dimming units.

Automatic power control to prevent over-heating.

Individual configuration of the dimmer channels.

MCB protection for each channel.

Heavy duty mains switch shall be fitted.

Up to 4 RCDs in power supply input can be fitted.

Easy wall mounting with provided metal plate.

Shall be easy access to all screw terminals inside enclosure (for example no need of removing the front cover of the metal enclosure, just front part (door) shall open by unscrewing 2 screws or simple lock).

Shall be screw terminals with live, neutral, and earth per output.

Power supply screw terminals up to 70.

Three phase power supply (400/230V~ 3/N/PE/50Hz)

03.02. Electronic push button control boxes

Quantity: 6 pcs.

Shall be provided electronic push button wall mounted control boxes, installed in different placesnear the stage, on stage and in control room to control work /rehearsall lights in different pre-programmed modes.

The control boxes shall be disabled during shows from control room, to prevent accidental control the work / rehearsall lights from wall boxes during shows.

The control boxes shall be micro-controller based and connected to multifunctional power controler using Cat5E or simmilar type control cables.

04. Mains power switchgears and output lines distributing system

The existing dimmer lines shall be connected to the new dimmer system, using the same direct channel numbers between stageboxes and physical dimmer channels. If neccessary, shall be installed additional enclosures with feed-through terminal blocks, to connect old dimmer and non-dimmer lines to the new equipment. The quantities of old and new dimmer output lines are listed in table below.

The new dimmer cabinets shall be connected to existing mains power feeds.
The mains power supply factor for each cabinet shall be calculated between 0,5 – 0,7.

Dismantling

The old power and dimmer cabinets shall be dismantled from dimmer room and the new racks and power enclosures shall be installed in same place. The utilization of dismantled equipment is the scope of Customer. Quantity of dismantled enclosures – not less as 26 pcs

04.01. Mains power cabinet including switchgears and fuses

Quantity: 3 pcs.

Shall be installed the new basic distributing cabinets with mains power switchgears and fuses for all new dimmer cabinets. The switchgears (block contactors) for dimmer cabinets shall be controlled remotely from the local operator pannel. The mains power operator panel shall be installed in the dimmer room and shall provide the safe mains power on/off for all dimmer racks. Shall be cable interconnect base for cabinet standing on the floor. Each distributing cabinet shall be equiped with neccessary mains power distributing components and accessories for 4 dimmer cabinets.

The main features:

- Shall be enclosure with measurements not less 1500x600x300mm, made of solid steel sheet. The degree of protection shall be IP65. The door of the enclosure shall be easy to remove in case any further mechanical work needs to be carried out. Concealed inside hinges according quick-change technology shall be easy to remove for this purpose and provide for quick and easy reversal of the hinging from left to right and vice-versa.
- Shall be installed 4pcs block contactors for mains power feeds for each dimmer rack. Rated operation current not less 260A, according to IEC AC-3. Nominal voltage 400V.
- Shall be installed RBK type or simmilar fuse switch disconnectors, with fuses with nominal rate not less 250A.

04.02. Push button control box for dimmers mains power

Shall be provided custom made or special control box with push buttons to control the mains power contactors for dimmer cabinets. The control box shall contain on/off buttons for each dimmer cabinet and power indicators.

04.03. Power supply cables, connectors and mounting accessories for power supply and output lines

The all existing power cables shall be used for mains power and exisiting output lines.

All existing dimmer and non-dim lines shall be connected to the new dimmer cabinets.

The extra dimmer and non-dim lines shall be installed additionaly to existing old lines, according to the outpul lines table below.

The old dimmer lines – 453, new dimmer lines – 59, total dimmer lines – 512 channels.

The old non-dim lines – 26, new non-dim lines – 86, total non-dim lines – 112 channels.

The additional stage boxes shall be installed for the new output lines. The quantity of the new stage boxes shall be at least 30 pcs, according to dimmer output lines table.

For Extra dim lines shall be provided the outputs with multipin (Socapex type) connectors. The dimmer lines shall be grouped in 6 channels for 2pcs multipin connectors (Socapex type) configured in parallel.

Quantity of additional stageboxes for extra dim lines – 10 pcs.

For Extra non-dim lines shall be provided the 1pc CEE 3P32A and 2 pcs Schuko outlets configured in parallel for each of non-dim channel.

Quantity of additional stage boxes for non-dim lines – 20 pcs.

The placement and sizes of additional stage boxes shall be agreed with Customer.

The stage boxes shall meet following features:

- The enclosures shall be made from aluminium or steel.
- The Schuko and CEE type outlet sockets shall be with covers, protection IP44.
- The multipin connectors shall be compatible with Socapex 19pin type connectors.

Output lines table:

Nr.	Name	Latvijas	Dim Channel Nr.	Dim qty	Extra dim	Non-dim	Extra non-dim	Total qty
1	Front	Fronte	405-408	4		2		8
2	Kino projekcija	Kino proj balkons	409-414	6	6	4	2	18
3		Režija			5	2		7
4	Lodge left	Loža augš GP	329-338	10				10
			349-354, 361-366	12		2		14
5	Lodge right	Loža augš PP	339-348	10				10
			355-360, 367-372	12		2		14
6	Orchestra Lodge left	Loža apakš GP	373-376	4			3	7
7	Orchestra Lodge right	Loža apakš PP	377-380	4			3	7
8	Rampa		9-16.	8				8
9	Orchestra floor	Orkestra grīda	417-420	4		2		6
10	Front lighting bridge 1	Zales sofita	421-425	5			6	11
11	Jāatjauno piesl. orķestrī		1, 2, 5, 6, 7	5				5
12		Orkestra pults	3, 4, 8, 436, 437	5				5
13	Portal bridge	Skatuves tilts	17-24, 141-162	30	6	2	6	44
14	Portal towers left	Portals GP	233-244	12		1		13
15	Portal towers right	Portals PP	245-256	12		1		13
16	Lighting bridge 1	1 sofe	25-40, 163-176	30	6		6	42
17	Lighting bridge 2	2 sofe	41-56, 177-190	30	6		6	42
18	Lighting bridge 3	3 sofe	57-86, 191-204	44	6		6	56
19	Lighting bridge 4	4 sofe	87-116, 205-218	44	6		6	56
20	Lighting bridge 5	5 sofe	117-140, 219-232	38	6		6	50
21	Stage loft left	Sanu tilts GP	381-392	12		1	3	16
22	Stage loft right	Sanu tilts PP	393-404	12		1	3	16
23	Stage towers left	Sanu ramji GP	257-276	20				20
24	Stage towers right	Sanu ramji PP	277-296	20				20
25		Lustra	426-429	4				4
26	Turntable	Skatuves ripa	430-435	6		1		7
27	Stage floor left	Grīda GP	297-312	16	6	2	12	42
28	Stage floor right	Grīda PP	313-328	16	6	2	12	42
29	Jāatjauno piesl. arjerā		438-445	8				8
30		Arjers	446-453	8			6	14
31		Rier projekcija	415, 416	2		1		5
			Total lines:	453	59	26	86	624