104. A system of claim 103, wherein the zones are separate DMX zones.

105. A system of claim 103, wherein the zones are located in different rooms of a building.

106. A system of claim 103, wherein the zones are located in the same location within an environment.

107. A system of claim 103, wherein the environment is a stage lighting environment.

108. A system of claim 98 further comprising:

a discovery module for automatically discovering interfaces that are capable of being managed by the light system manager and adding them to a graphical user interface for mapping locations of lighting units associated with the interfaces.

109. A system of managing lighting control, comprising:

a grouping facility for grouping a plurality of light systems, wherein grouped light systems respond as a group to control signals.

110. A system of claim 109, wherein the grouping facility comprises a directed graph.

111. A system of claim 109, wherein the grouping facility comprises a drag and drop user interface.

112. A system of claim 109, wherein the grouping facility comprises a dragging line interface.

113. A system of claim 109, wherein the grouping facility permits grouping of any selected geometry.

114. A system of claim 109, wherein the grouping facility permits grouping in a two-dimensional representation of a three-dimensional space.

115. A system of claim 114, wherein the two-dimensional representation is mapped to light systems in a three-dimensional space.

116. A system of claim 109, wherein the grouping facility groups lights into groups of a predetermined conventional configuration.

117. A system of claim 116, wherein the known configuration is a rectangular, two-dimensional array.

118. A system of claim 117, wherein the known configuration is a square.

119. A system of claim 116, wherein the configuration is curvilinear.

120. A system of claim 116, wherein the configuration is a line.

121. A system of claim 116, wherein the configuration is an oval.

122. A system of claim 116, wherein the configuration is an oval-shaped array.

123. A system of claim 116, wherein the configuration is a circle.

124. A system of claim 116, wherein the configuration is a circular array.

125. A system of claim 116, wherein the configuration is triangle.

126. A system of claim 116, wherein the configuration is a triangular array.

127. A system of claim 116, wherein the configuration is a serial configuration.

128. A system of claim 116, wherein the configuration is a helix.

129. A system of claim 116, wherein the configuration is a double helix.

130. A system of providing lighting control, comprising:

a light system composer for allowing a user to author a lighting show using a graphical user interface.

131. A system of claim 130, wherein the light system composer further comprises an effect authoring system for allowing a user to generate a graphical representation of a lighting effect.

132. A system of claim 131, wherein the effect authoring system allows a user to set parameters for a plurality of predefined types of lighting effects.

133. A system of claim 130, wherein the effect authoring system allows a user to create user-defined effects.

134. A system of claim 130, wherein the effect authoring system allows a user to link effects to other effects.

135. A system of claim 130, wherein the effect authoring system allows a user to set a timing parameter for a lighting effect.

136. A system of claim 130, wherein the effect authoring system allows a user to generate meta effects comprised of more than one lighting effect.

137. A system of claim 136, wherein the light system composer allows the user to generate shows comprised of more than one meta effect.

138. A system of claim 136, wherein the user can link meta effects.

139. A system of claim 130, wherein effects can be linked to each other in timing.

140. A system of claim 130, wherein the user may assign an effect to a group of light systems.

141. A system of claim 130, wherein the effect is selected from the group consisting of a color chasing rainbow, a cross fade effect, a custom rainbow, a fixed color effect, an animation effect, a fractal effect, a random color effect, a sparkle effect, a streak effect, a burst effect, an XY spiral effect, and a sweep effect.

142. A system of claim 130, wherein the effect is an animation effect and wherein the animation effect corresponds to an animation generated by an animation facility.

143. A system of claim 142, wherein the animation effect is loaded from an animation file.

144. A system of claim 143, wherein the animation facility is a flash animation facility.

145. A system of claim 143, wherein the animation facility is a multimedia animation facility.

146. A system of claim 143, wherein the animation facility is a video animation facility.

147. A system of claim 143, wherein the animation facility is a three-dimensional simulation animation facility.

148. A system of claim 143, wherein the lighting show composer facilitates the creation of meta effects that comprise a plurality of linked effects.

149. A system of claim 130, wherein the lighting show composer generates an XML file containing a lighting show.

150. A system of claim 130, wherein the lighting show composer includes stored effects that are designed to run on a predetermined configuration of lighting systems.

151. A system of claim 130, wherein the user can apply a stored effect to a configuration of lighting systems.

152. A system of claim 130, wherein the lighting system composer includes a graphical simulation of a lighting effect on a lighting configuration.

153. A system of claim 152, wherein the simulation reflects a parameter set by a user for an effect.

154. A system of claim 152, wherein the simulation is an animation window of a graphical user interface.

155. A system of claim 130, wherein the lighting show composer allows synchronization of effects between different groups of lighting systems that are grouped using a grouping facility.

156. A system of claim 155, wherein the lighting show composer further comprises a wizard for adding a predetermined configuration of light systems to a group and for generating effects that are suitable for the predetermined configuration.

157. A system of claim 156, wherein the predetermined configuration is a rectangular array.

158. A system of claim 156, wherein the predetermined configuration is a string.

159. A system of providing lighting control, comprising:

a light system engine for relaying control signals to a plurality of light systems, wherein the light system engine plays back lighting shows.

160. A system of claim 159, wherein the light system engine includes a processor, a data facility, an operating system and a communication facility.

161. A system of claim 159, wherein the light system engine is configured to communicate with a lighting control facility.

162. A system of claim 161, wherein the lighting control facility is a DALI facility.

163. A system of claim 161, wherein the lighting control facility is a DMX facility.

164. A system of claim 161, wherein the lighting control facility operates with a serial communication protocol.

165. A system of claim 161, wherein the lighting control facility is a power/data supply.

166. A system of claim 159, wherein the light system engine executes lighting shows downloaded from the light system composer.

167. A system of claim 166, wherein shows are delivered as XML files from the lighting show composer to the light system engine.

168. A system of claim 166, wherein shows are delivered to the light system engine over a network.

169. A system of claim 166, wherein shows are delivered over an Ethernet facility.

170. A system of claim 166, wherein shows are delivered over a wireless facility.

171. A system of claim 166, wherein shows are delivered over a Firewire facility.

172. A system of claim 166, wherein shows are delivered over the Internet.

173. A system of claim 166, wherein the lighting shows composed by the lighting show composer are combined with other files from another computer system.

174. A system of claim 173, wherein the lighting shows are combined by adding additional elements to an XML file that contains a lighting show.

175. A system of claim 174, wherein the other computer system includes an XML parser for handling XML files.

176. A system of claim 173, wherein the other computer system is selected from the group consisting of a sound system, and entertainment system, a multimedia system, a video system, an audio system, a sound-effect system, a smoke effect system, a vapor effect system, a dry-ice effect system, another lighting system, a security system, an information system, a sensor-feedback system, a sensor system, a browser, a network, a server, a wireless computer system, a building information technology system, and a communication system.

177. A system of claim 173, wherein the other computer system comprises a browser and wherein the user of the browser can edit the XML file using the browser to edit the lighting show generated by the lighting show composer.

178. A system of claim 166, wherein the light system engine includes a server, wherein the server is capable of receiving data over the Internet.

179. A system of claim 159, wherein the light system engine is capable of handling multiple zones of light systems, wherein each zone of light systems has a distinct mapping.

180. A system of claim 179, wherein the multiple zones are synchronized using the internal clock of the light system engine.

181. A system of claim 159, wherein the light system engine comprises a personal computer with a Linux operating system.

182. A system of claim 159, wherein the light system engine is associated with a bridge to a DMX system.

183. A system of claim 159, wherein the light system engine is associated with a bridge to a DALI system.

184. A system of providing lighting control, comprising:
a user interface for triggering shows downloaded on a light system engine.

185. A system of claim 184, wherein the user interface is selected from the group consisting of a knob, a dial, a button, a touch screen, a serial keypad, a slide mechanism, a switch, a sliding switch, a switch/slide combination, a sensor, a decibel meter, an inclinometer, a thermometer, a anemometer, and a barometer.

186. A system of claim 185, wherein the user interface is a serial keypad and wherein initiating a button on the keypad initiates a show in at least one zone of a lighting system governed by a light system engine connected to the keypad.

187. A method of providing lighting control signals, comprising:
capturing an incoming video signal;

determining pixel values from the video signal; and

converting the pixel values to corresponding lighting control signals for a lighting system.

188. A method of claim 187, wherein the video signal is a streaming video signal.

189. A method of claim 187, wherein the video signal comes from a video storage medium.

190. A method of claim 189, wherein the video storage medium is selected from the group consisting of a disk, a tape, and a DVD.

191. A method of claim 187, wherein the video signal is a data stream.

192. A method of claim 187, wherein capturing the video signal uses a Firewire facility.

193. A method of claim 187, wherein converting the pixel values includes precalculating a storage location for a lighting control signal based on a pixel location in a video signal.

194. A method of claim 187, further comprising manipulating the video signal before converting the video signal into a lighting control signal.

195. A system for providing lighting control signals, comprising:

a capture facility for capturing an incoming video signal and determining pixel values from the video signal; and

a mapping facility for converting the pixel values to corresponding lighting control signals for a lighting system.

196. A system of claim 195, wherein the video signal is a streaming video signal.

197. A system of claim 195, wherein the video signal comes from a video storage medium.

198. A method of claim 197, wherein the video storage medium is selected from the group consisting of a disk, a tape, and a DVD.

199. A system of claim 195, wherein the video signal is a data stream.

200. A system of claim 195, further comprising a Firewire facility.

201. A system of claim 195, wherein the mapping facility includes a precalculation facility for precalculating a storage location for a lighting control signal based on a pixel location in a video signal.

202. A system of claim 195, further comprising a manipulation facility for manipulating the video signal before converting the video signal into a lighting control signal.

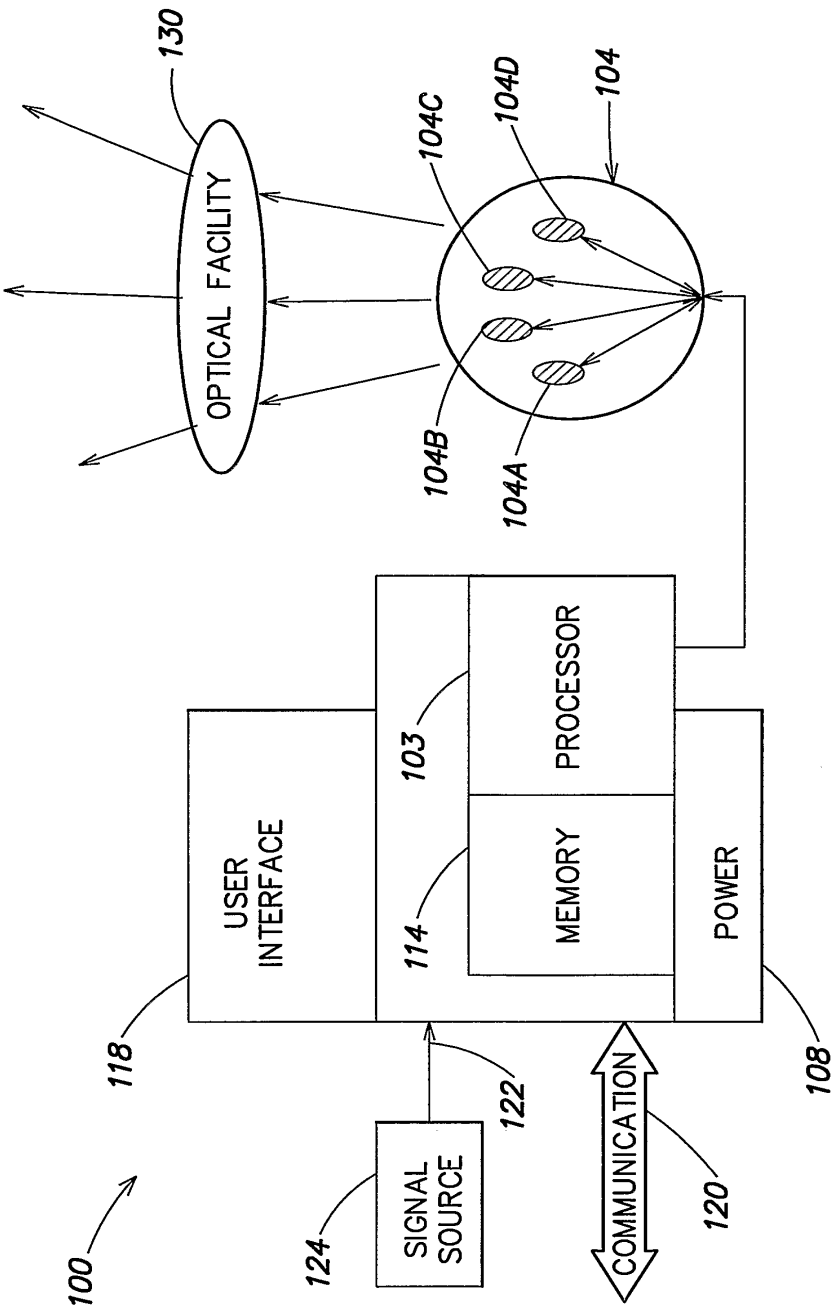

130
OPTICAL FACILITY
104C
104D
104
104B
104A
PROCESSOR
103
USER INTERFACE
MEMORY
114
POWER
118
122
108
COMMUNICATION
120
SIGNAL SOURCE
124
100

FIG. 1

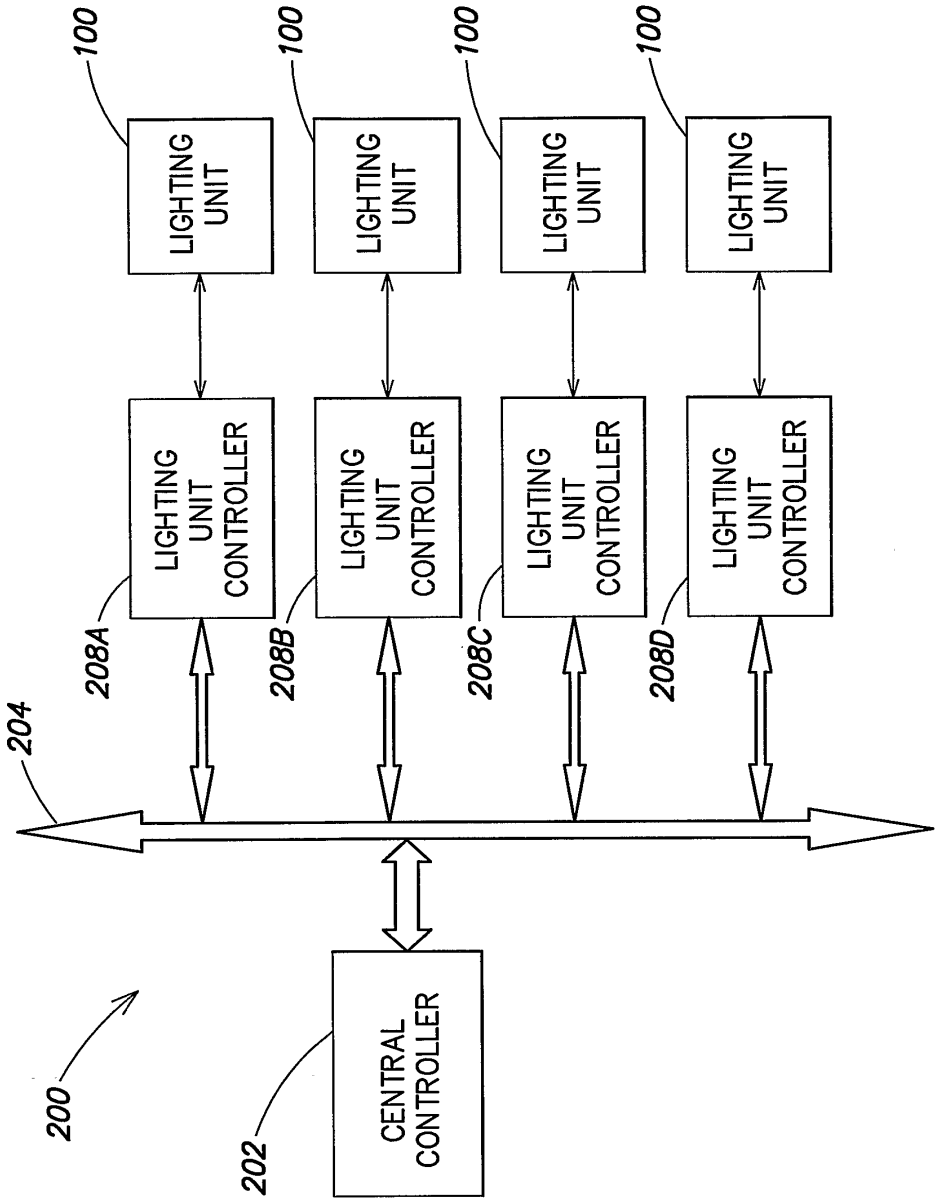

100
100
100
100
LIGHTING UNIT
LIGHTING UNIT
LIGHTING UNIT
LIGHTING UNIT
LIGHTING UNIT CONTROLLER
LIGHTING UNIT CONTROLLER
LIGHTING UNIT CONTROLLER
LIGHTING UNIT CONTROLLER
208A
208B
208C
208D
204
200
202
CENTRAL CONTROLLER

FIG. 2

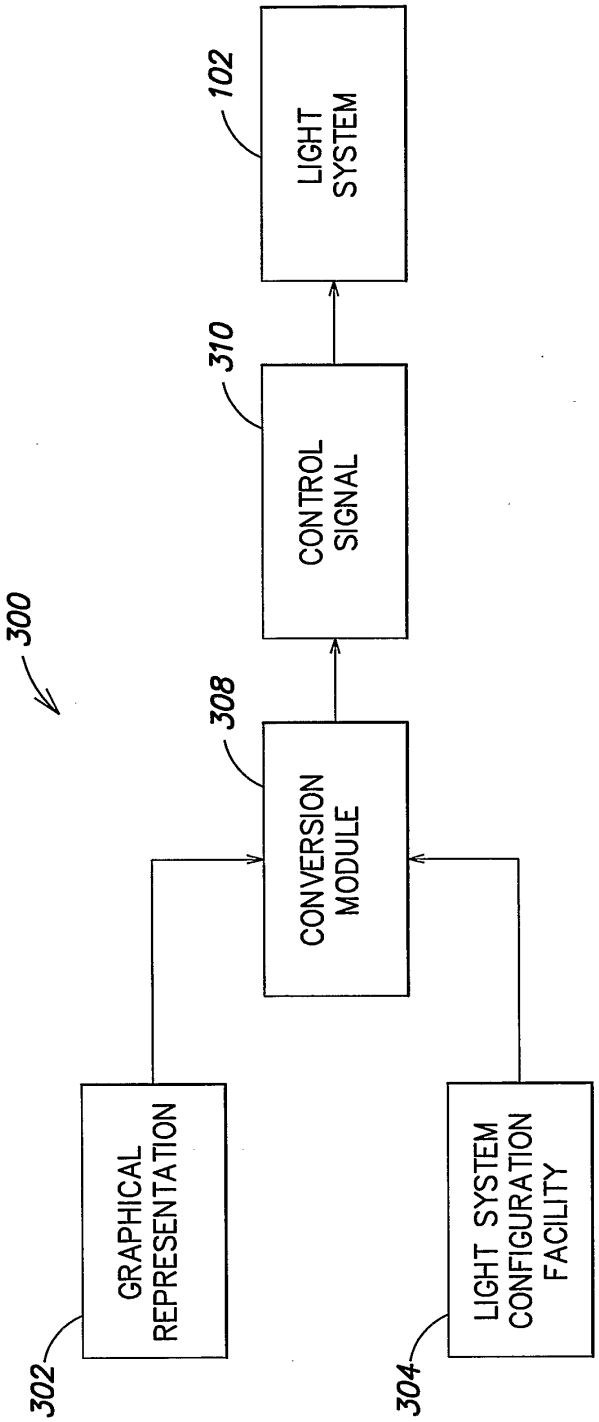

300
LIGHT SYSTEM
102
CONTROL SIGNAL
310
CONVERSION MODULE
308
GRAPHICAL REPRESENTATION
302
LIGHT SYSTEM CONFIGURATION FACILITY
304

FIG. 3

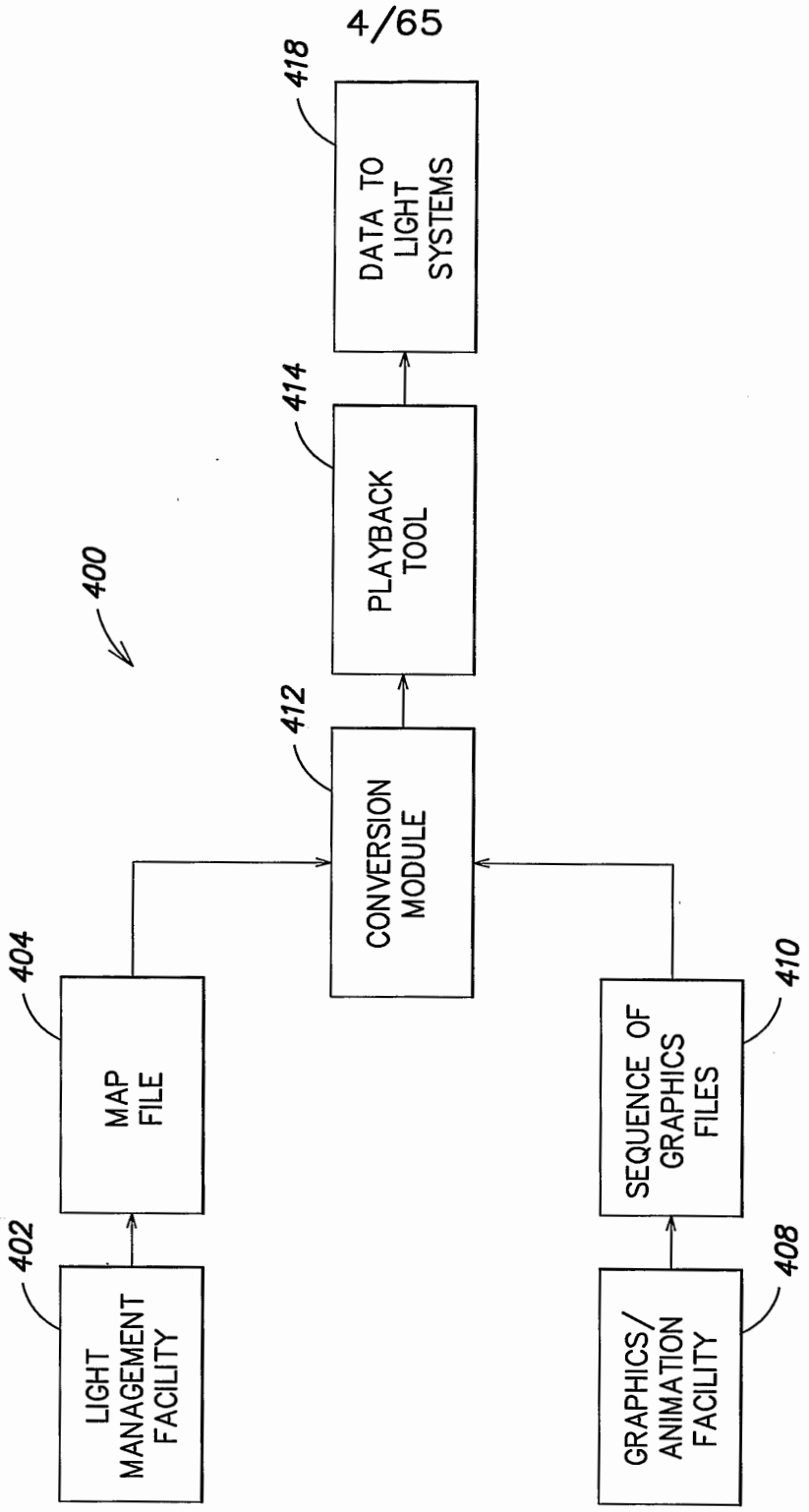

400
402
LIGHT MANAGEMENT FACILITY
404
MAP FILE
408
GRAPHICS/ ANIMATION FACILITY
410
SEQUENCE OF GRAPHICS FILES
412
CONVERSION MODULE
414
PLAYBACK TOOL
418
DATA TO LIGHT SYSTEMS

FIG. 4

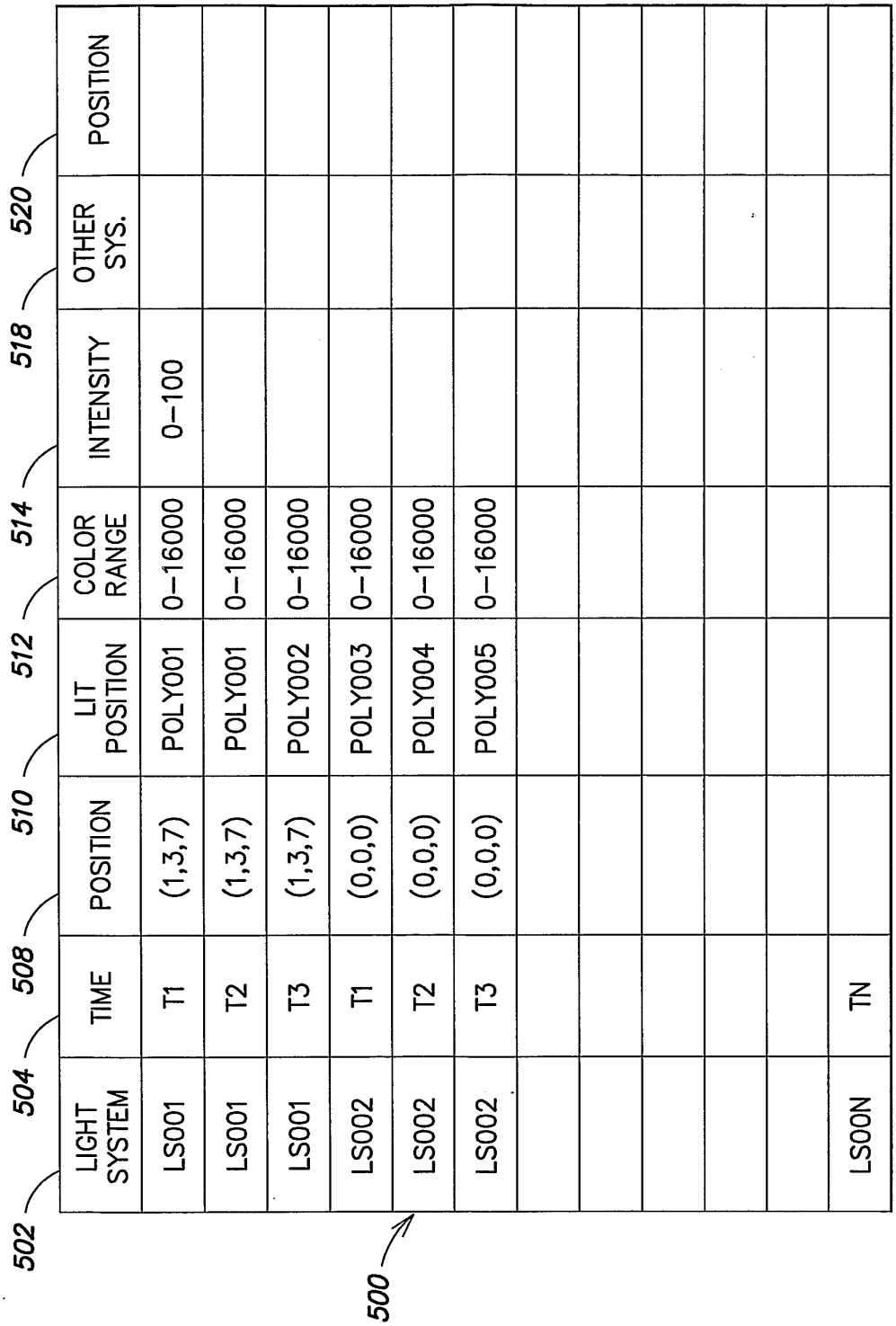

500
502
504
508
510
512
514
518
520
LIGHT SYSTEM
TIME
POSITION
LIT POSITION
COLOR RANGE
INTENSITY
OTHER SYS.
POSITION
LS001 T1 (1,3,7) POLY001 0–16000 0–100
LS001 T2 (1,3,7) POLY001 0–16000
LS001 T3 (1,3,7) POLY002 0–16000
LS002 T1 (0,0,0) POLY003 0–16000
LS002 T2 (0,0,0) POLY004 0–16000
LS002 T3 (0,0,0) POLY005 0–16000
LS00N TN

FIG. 5

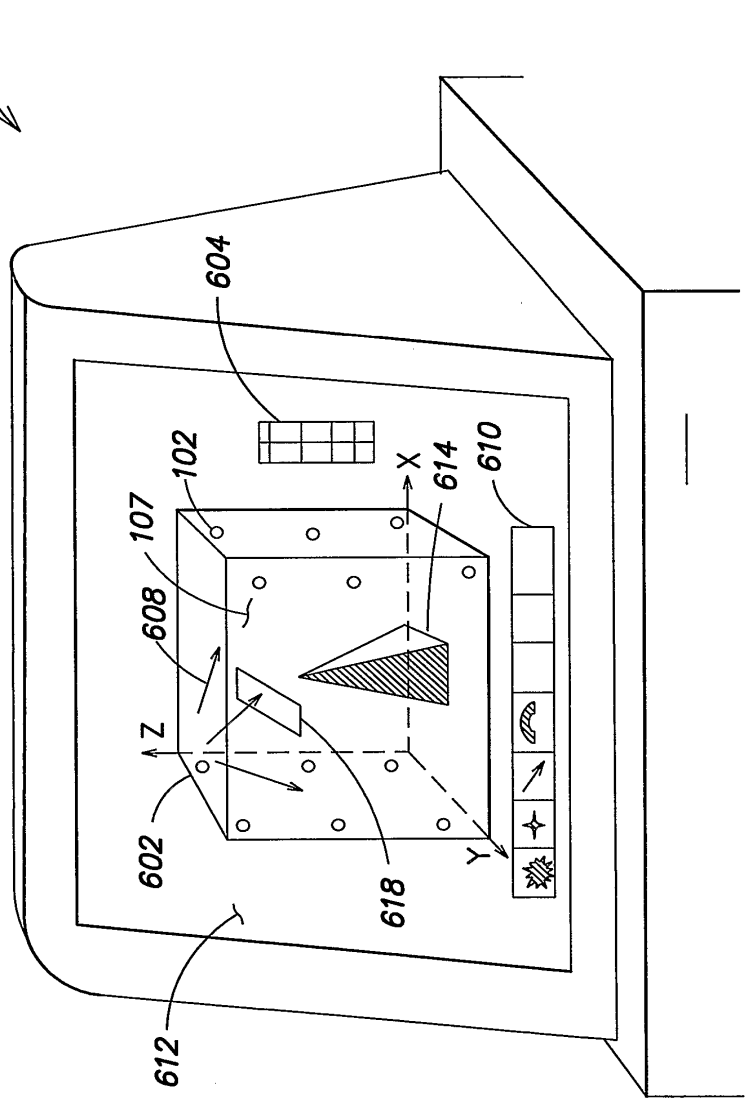


FIG. 6

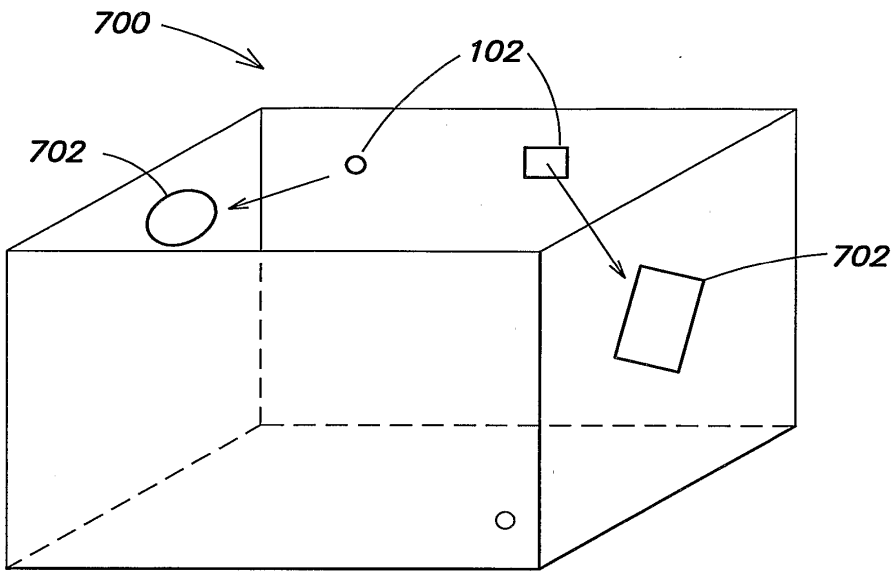


FIG. 7

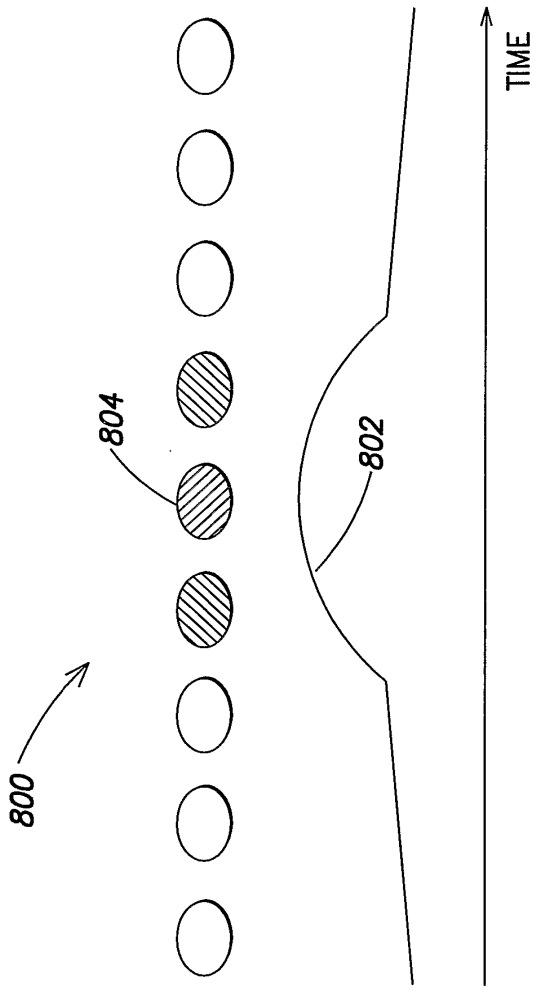


FIG. 8

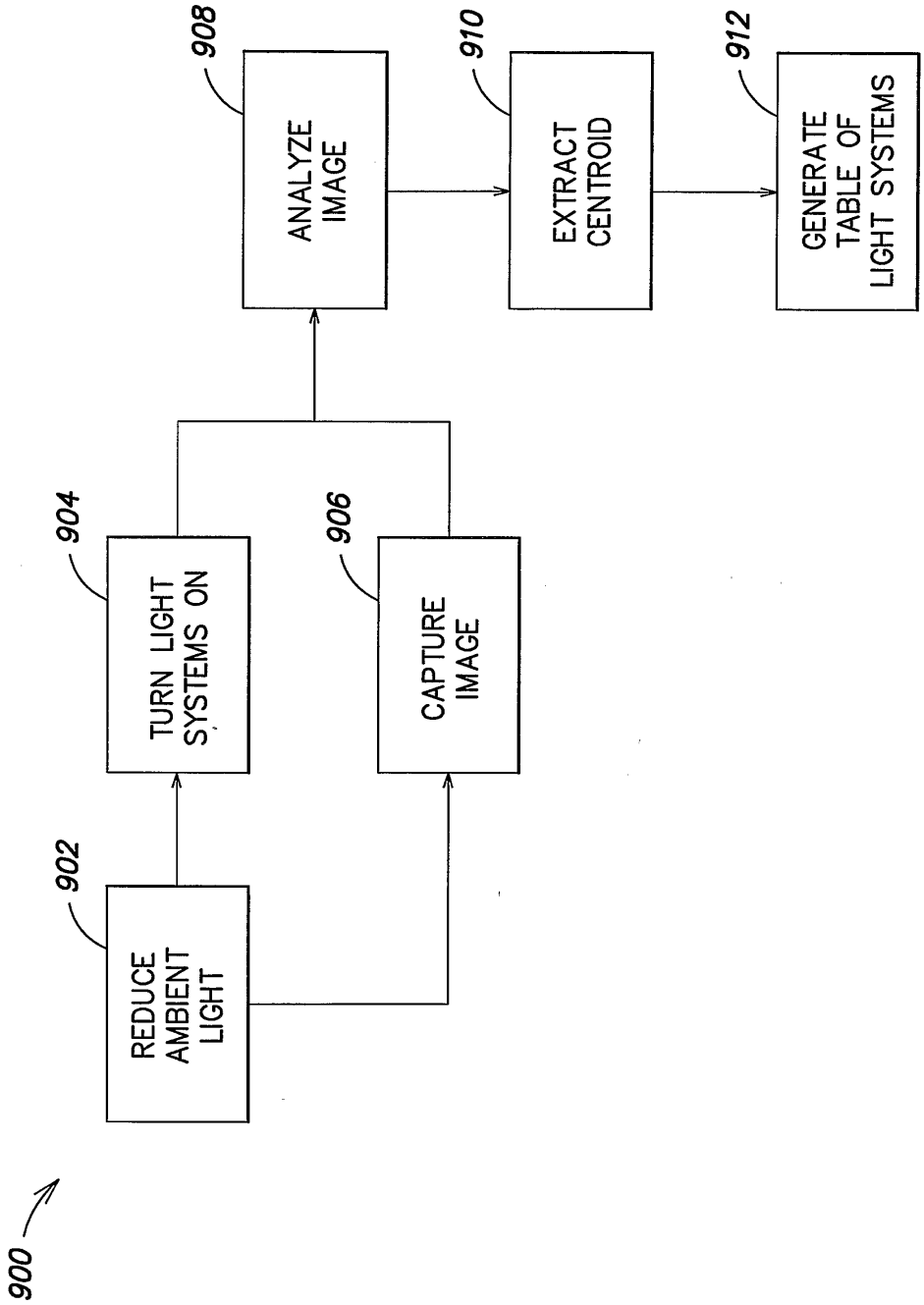

900
902
REDUCE AMBIENT LIGHT
904
TURN LIGHT SYSTEMS ON
906
CAPTURE IMAGE
908
ANALYZE IMAGE
910
EXTRACT CENTROID
912
GENERATE TABLE OF LIGHT SYSTEMS

FIG. 9

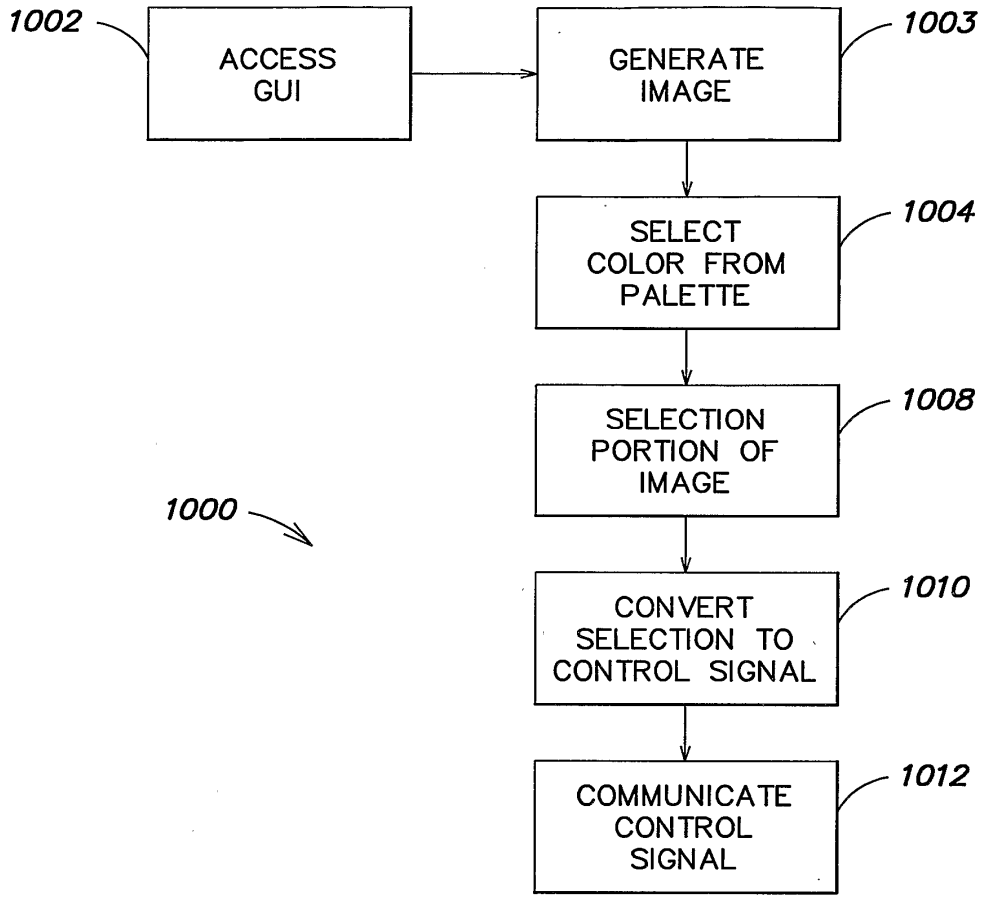

1002
ACCESS GUI
GENERATE IMAGE
1003
SELECT COLOR FROM PALETTE
1004
SELECTION PORTION OF IMAGE
1008
1000
CONVERT SELECTION TO CONTROL SIGNAL
1010
COMMUNICATE CONTROL SIGNAL
1012

FIG. 10

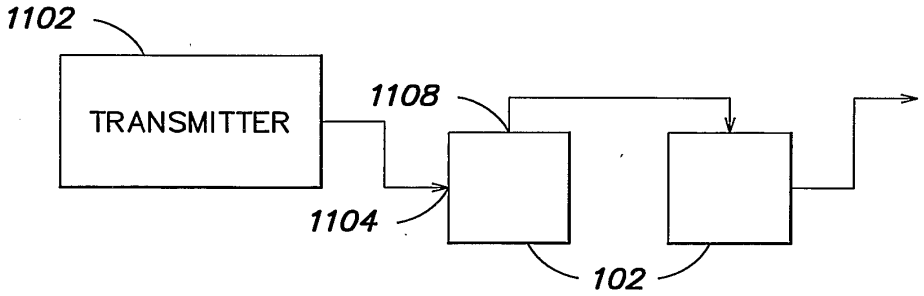

1102
TRANSMITTER
1108
1104
102

FIG. 11

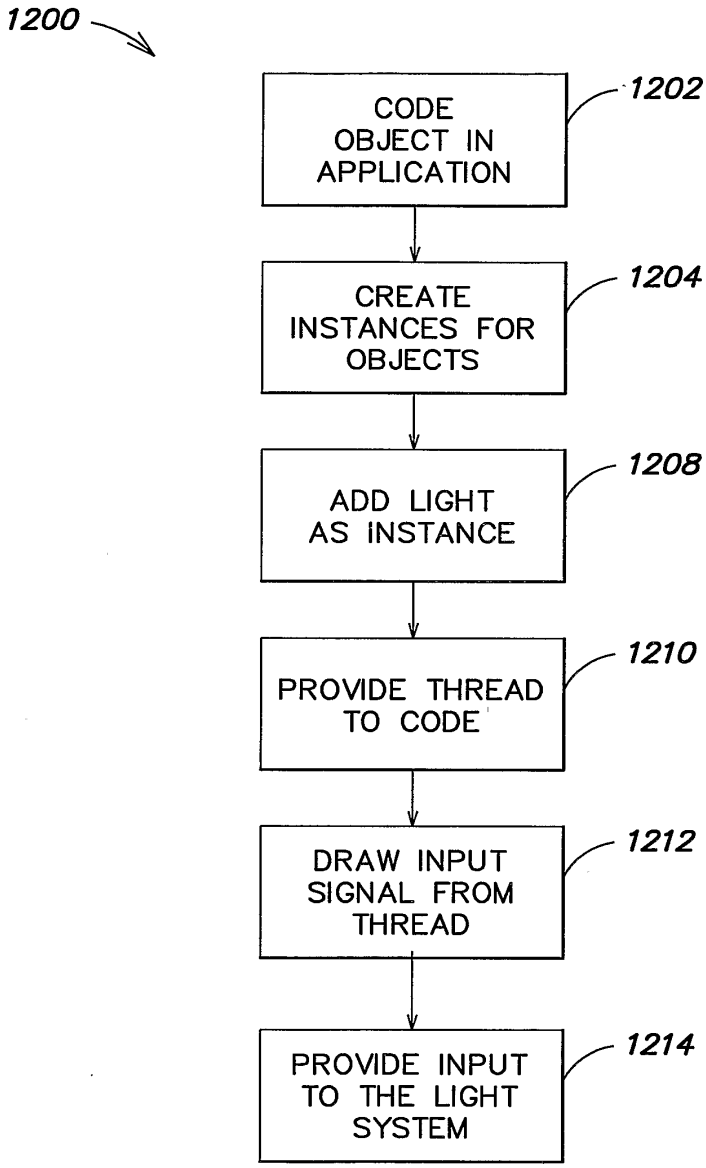

1200
CODE OBJECT IN APPLICATION
1202
CREATE INSTANCES FOR OBJECTS
1204
ADD LIGHT AS INSTANCE
1208
PROVIDE THREAD TO CODE
1210
DRAW INPUT SIGNAL FROM THREAD
1212
PROVIDE INPUT TO THE LIGHT SYSTEM
1214

FIG. 12

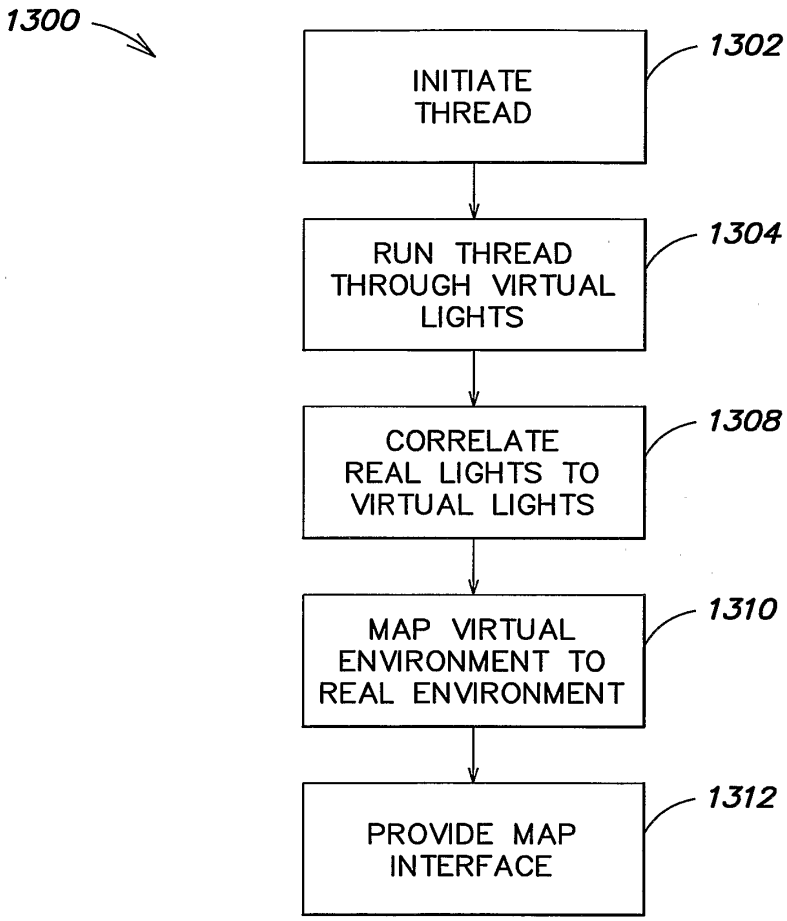

1300
INITIATE THREAD
1302
RUN THREAD THROUGH VIRTUAL LIGHTS
1304
CORRELATE REAL LIGHTS TO VIRTUAL LIGHTS
1308
MAP VIRTUAL ENVIRONMENT TO REAL ENVIRONMENT
1310
PROVIDE MAP INTERFACE
1312

FIG. 13

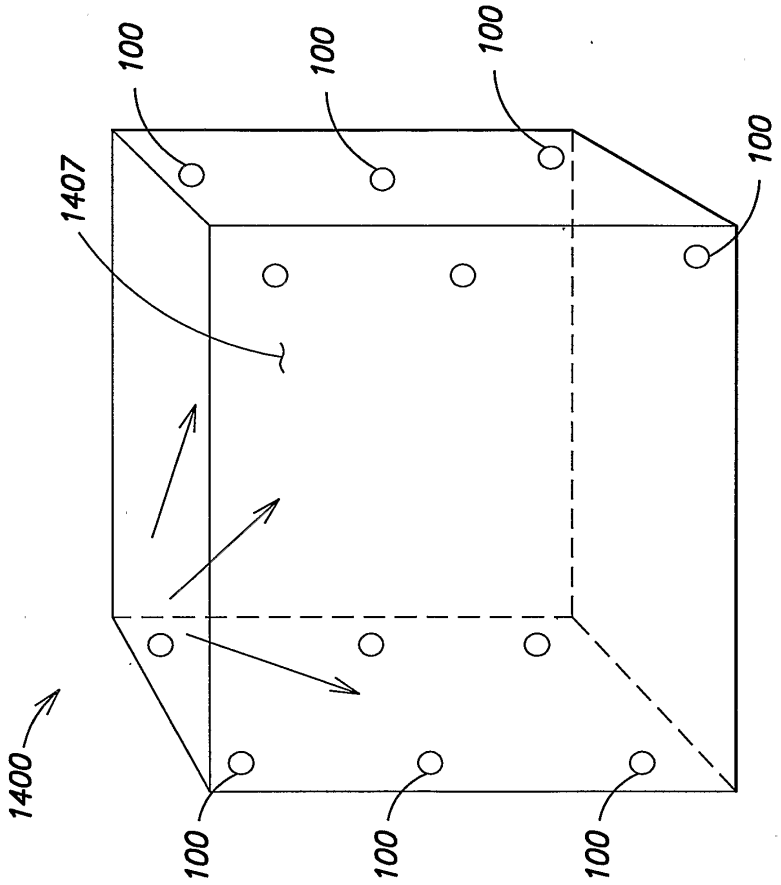


FIG. 14

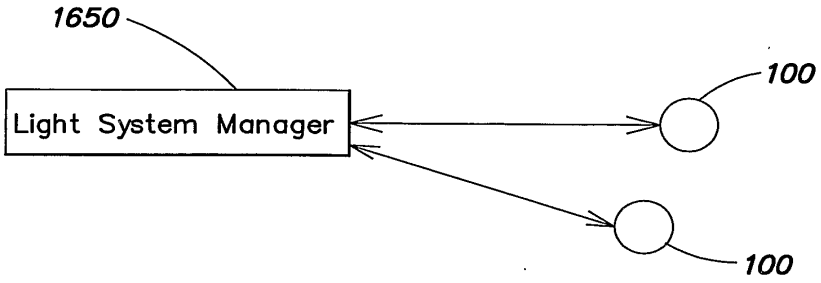

1650
Light System Manager
100
100

FIG. 15

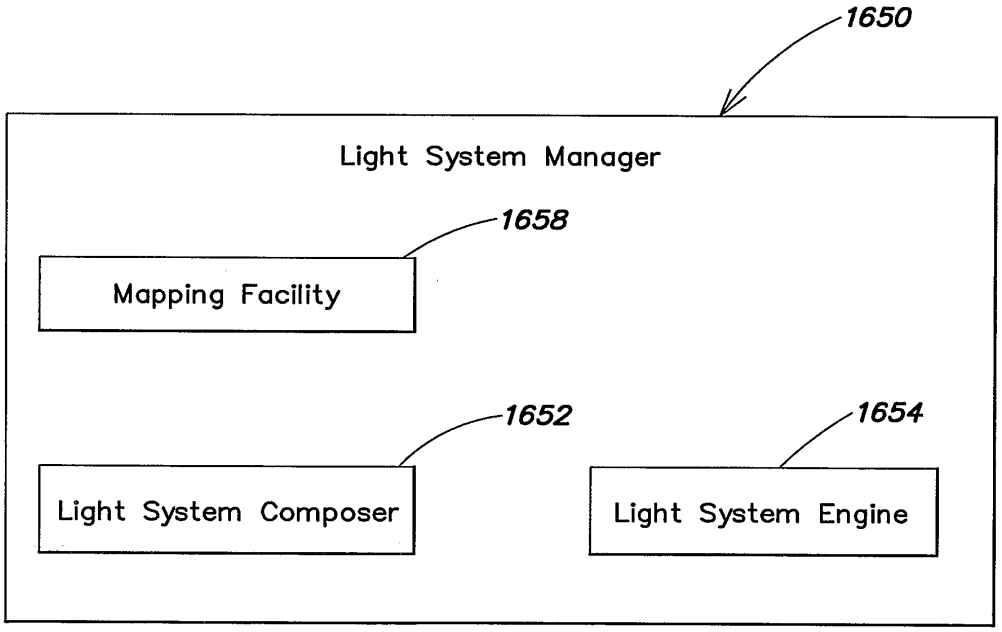

1650
Light System Manager
1658
Mapping Facility
1652
Light System Composer
1654
Light System Engine

FIG. 16

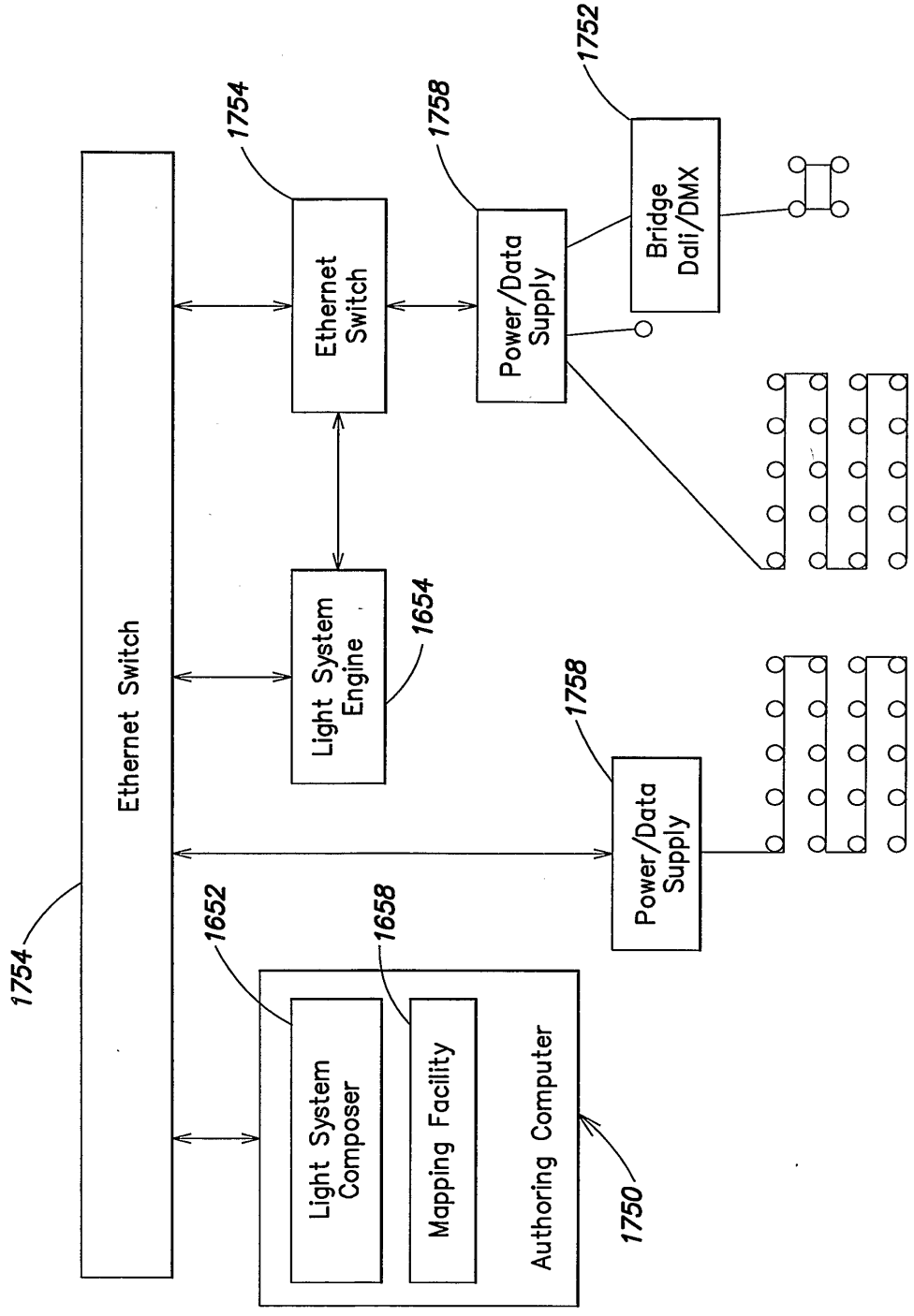

1754
Ethernet Switch
1652
Light System Composer
1658
Mapping Facility
Authoring Computer
1750
Light System Engine
1654
1754
Ethernet Switch
1758
Power/Data Supply
1758
Power/Data Supply
1752
Bridge Dali/DMX

FIG. 17

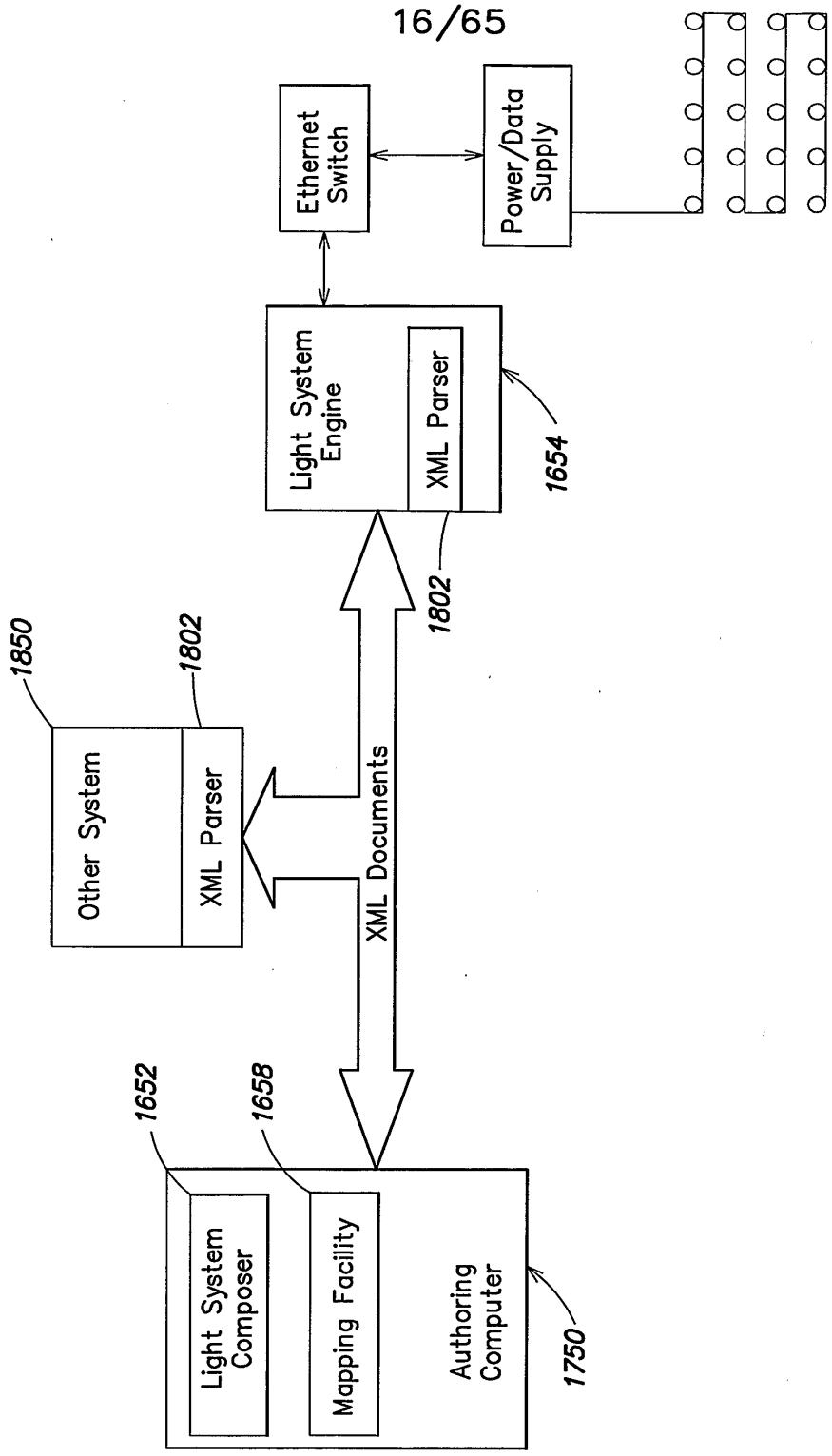

Ethernet Switch
Power/Data Supply
Light System Engine
XML Parser
1654
1802
1850
1802
Other System
XML Parser
XML Documents
1652
1658
Light System Composer
Mapping Facility
Authoring Computer
1750

FIG. 18

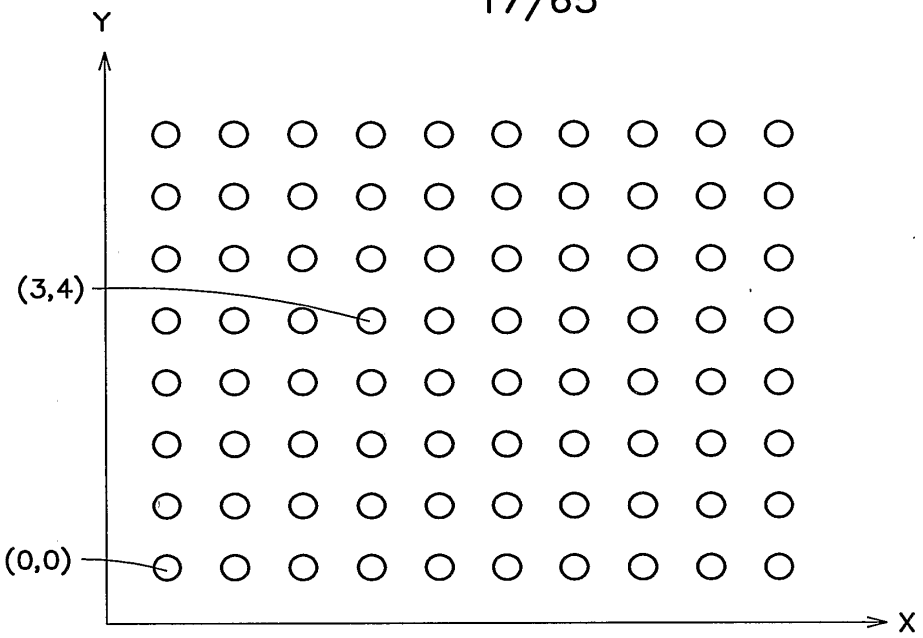


FIG. 19

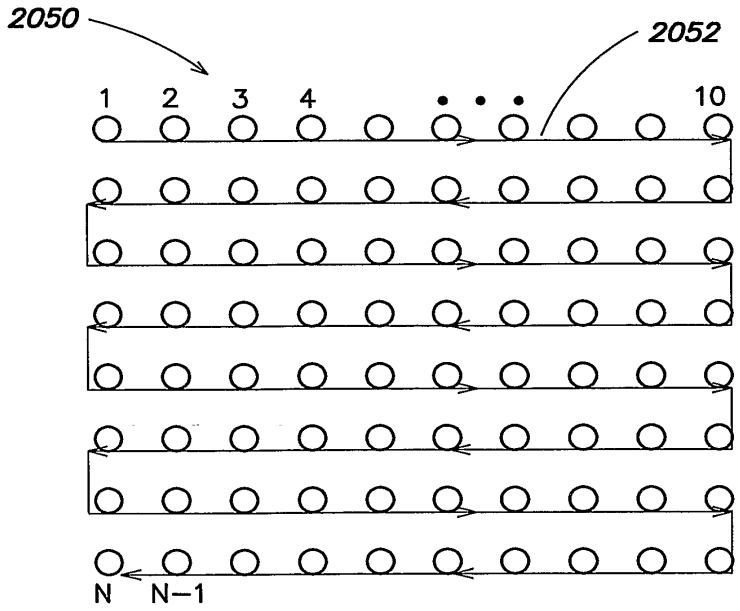


FIG. 20

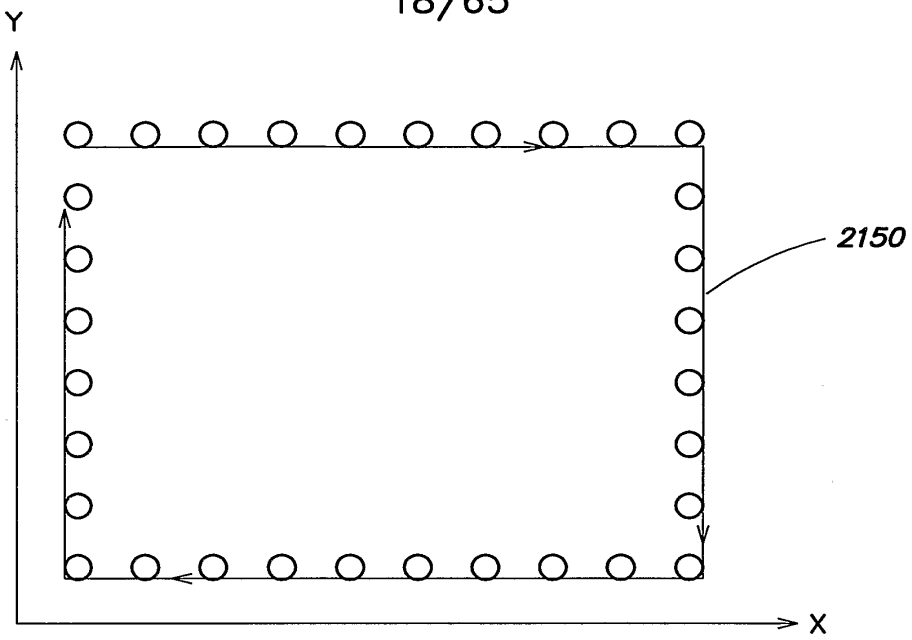


FIG. 21

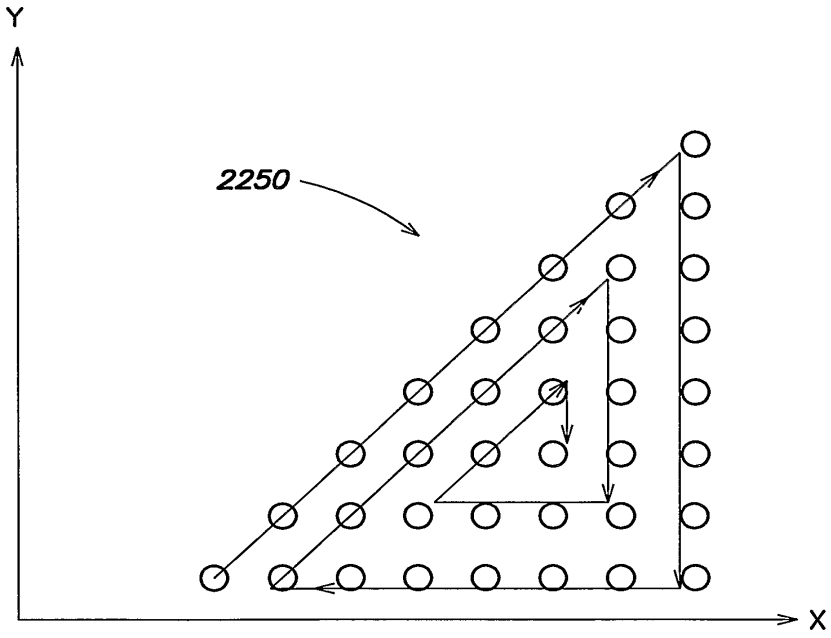


FIG. 22

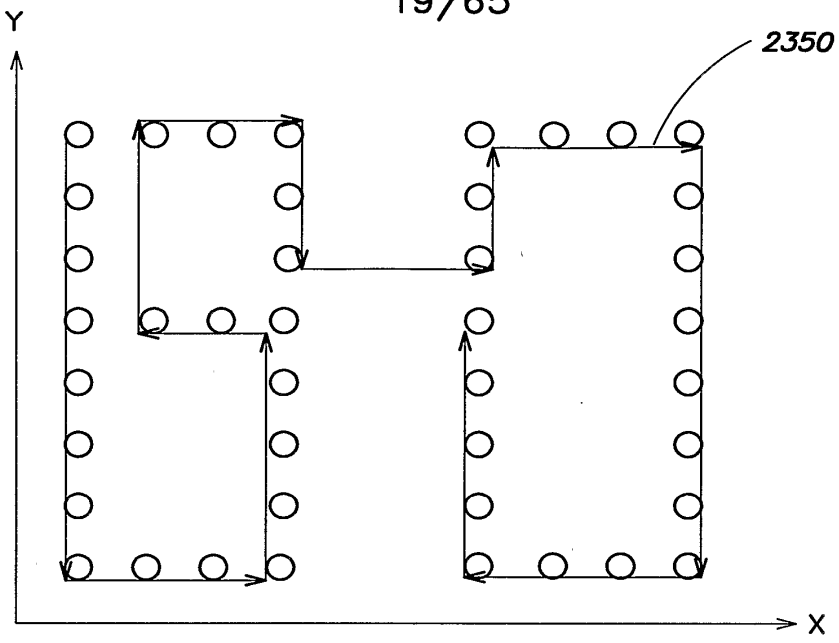


FIG. 23

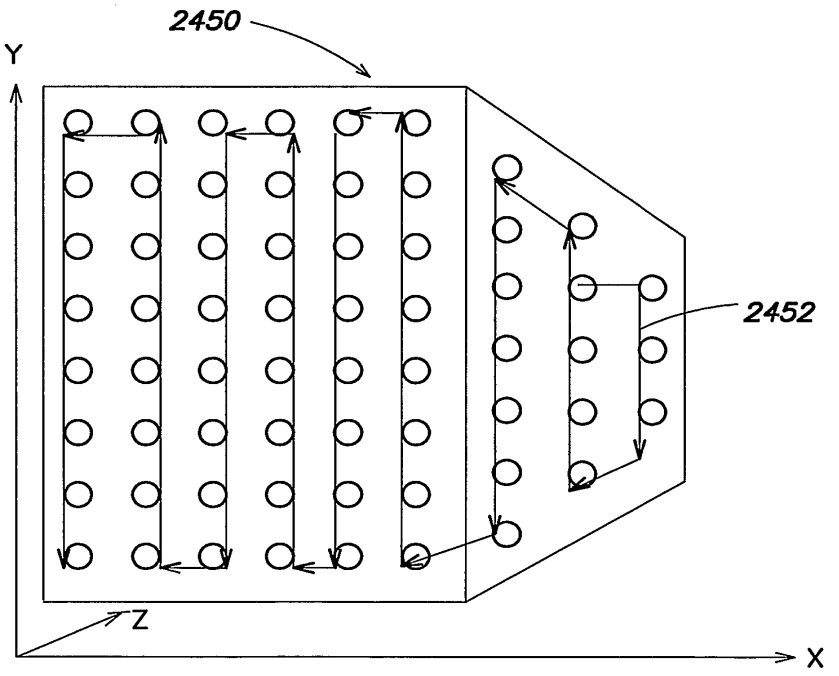


FIG. 24

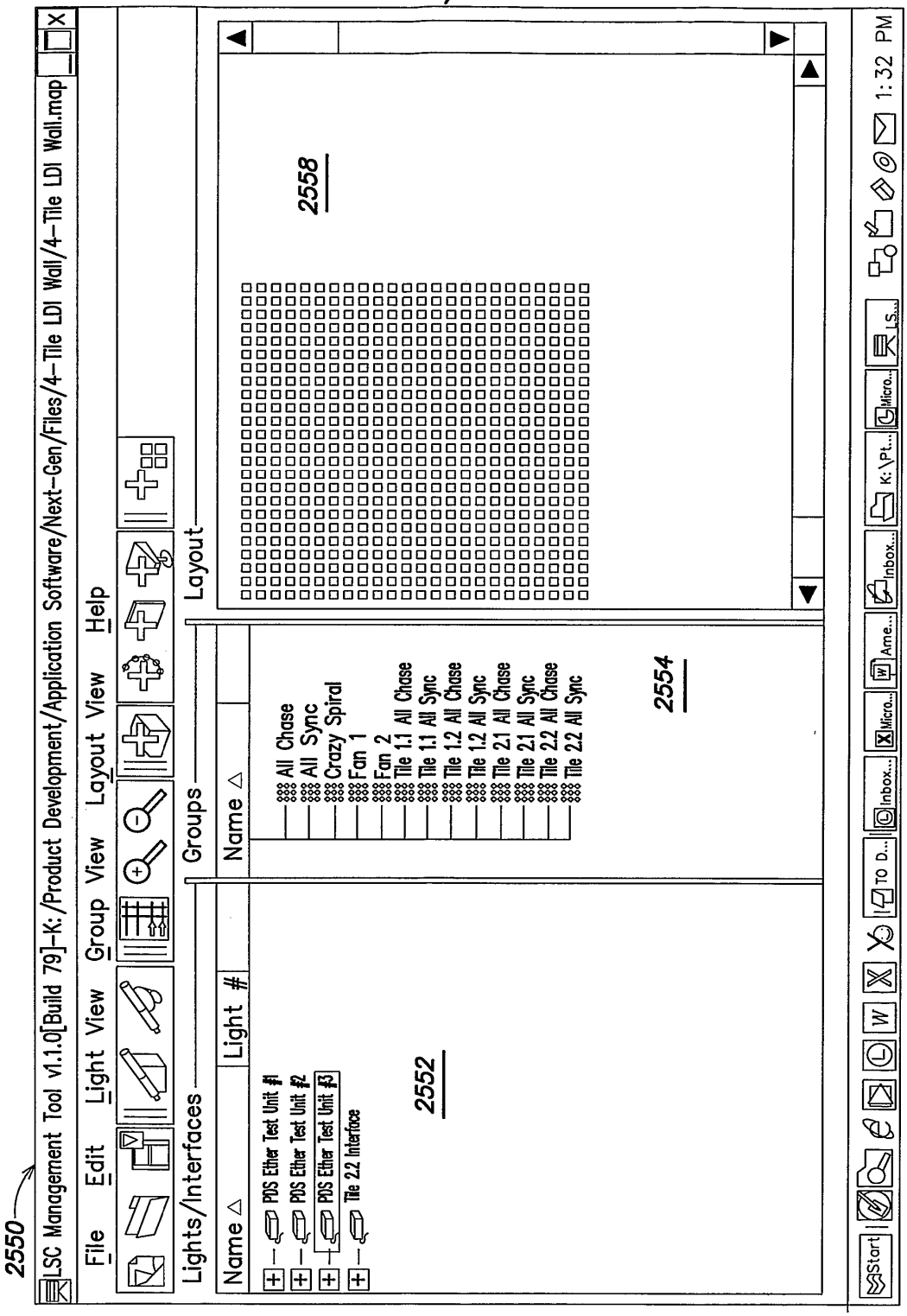

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Lights/Interfaces
Groups
Layout
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
2552
Name △
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2554
2558
Start
1:32 PM

FIG. 25

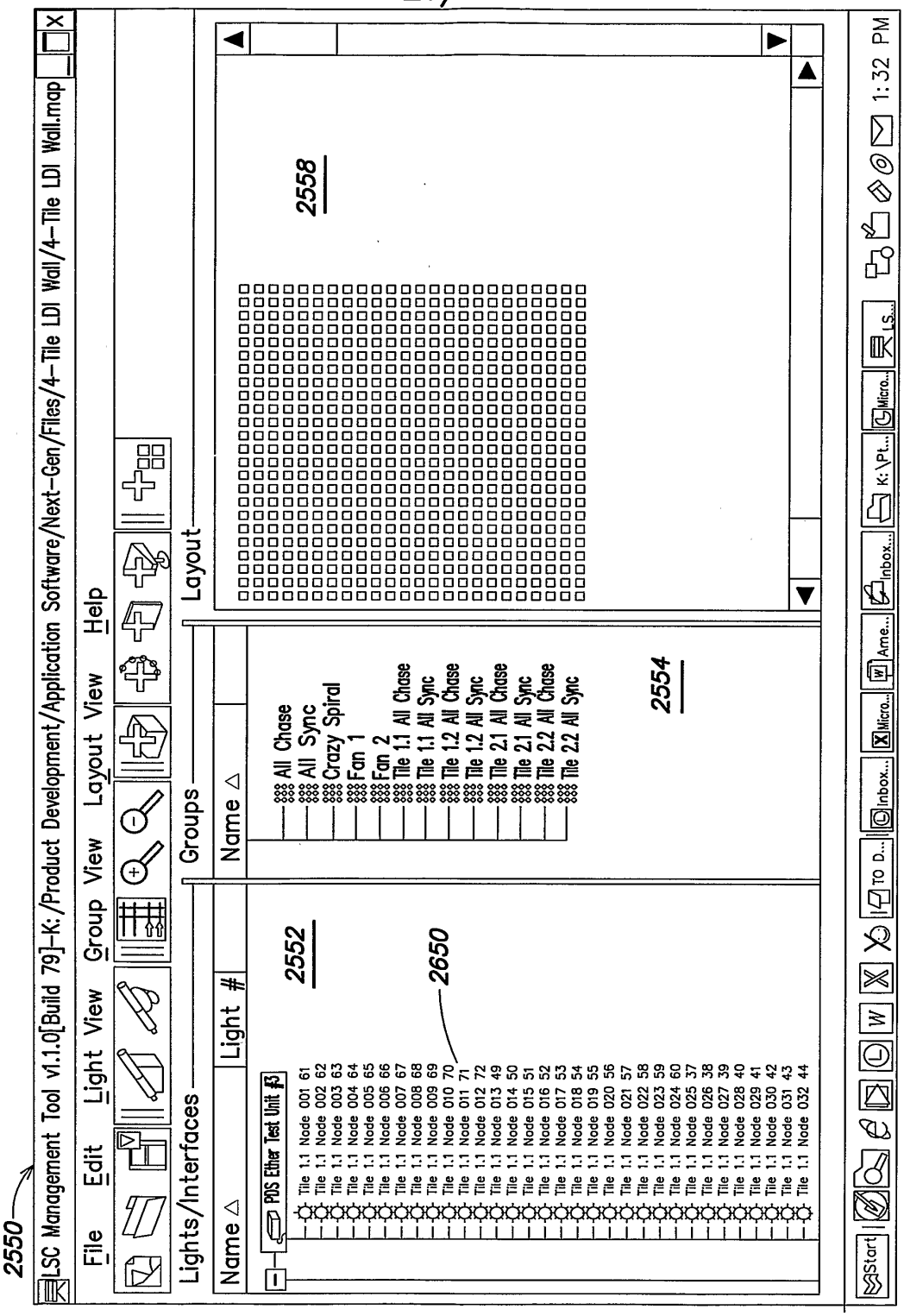

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Lights/Interfaces
Groups
Layout
Name △
Light #
POS Ether Test Unit #3
Tile 1.1 Node 001 61
Tile 1.1 Node 002 62
Tile 1.1 Node 003 63
Tile 1.1 Node 004 64
Tile 1.1 Node 005 65
Tile 1.1 Node 006 66
Tile 1.1 Node 007 67
Tile 1.1 Node 008 68
Tile 1.1 Node 009 69
Tile 1.1 Node 010 70
Tile 1.1 Node 011 71
Tile 1.1 Node 012 72
Tile 1.1 Node 013 49
Tile 1.1 Node 014 50
Tile 1.1 Node 015 51
Tile 1.1 Node 016 52
Tile 1.1 Node 017 53
Tile 1.1 Node 018 54
Tile 1.1 Node 019 55
Tile 1.1 Node 020 56
Tile 1.1 Node 021 57
Tile 1.1 Node 022 58
Tile 1.1 Node 023 59
Tile 1.1 Node 024 60
Tile 1.1 Node 025 37
Tile 1.1 Node 026 38
Tile 1.1 Node 027 39
Tile 1.1 Node 028 40
Tile 1.1 Node 029 41
Tile 1.1 Node 030 42
Tile 1.1 Node 031 43
Tile 1.1 Node 032 44
2552
2650
Name △
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2554
2558
Start
1:32 PM

FIG. 26

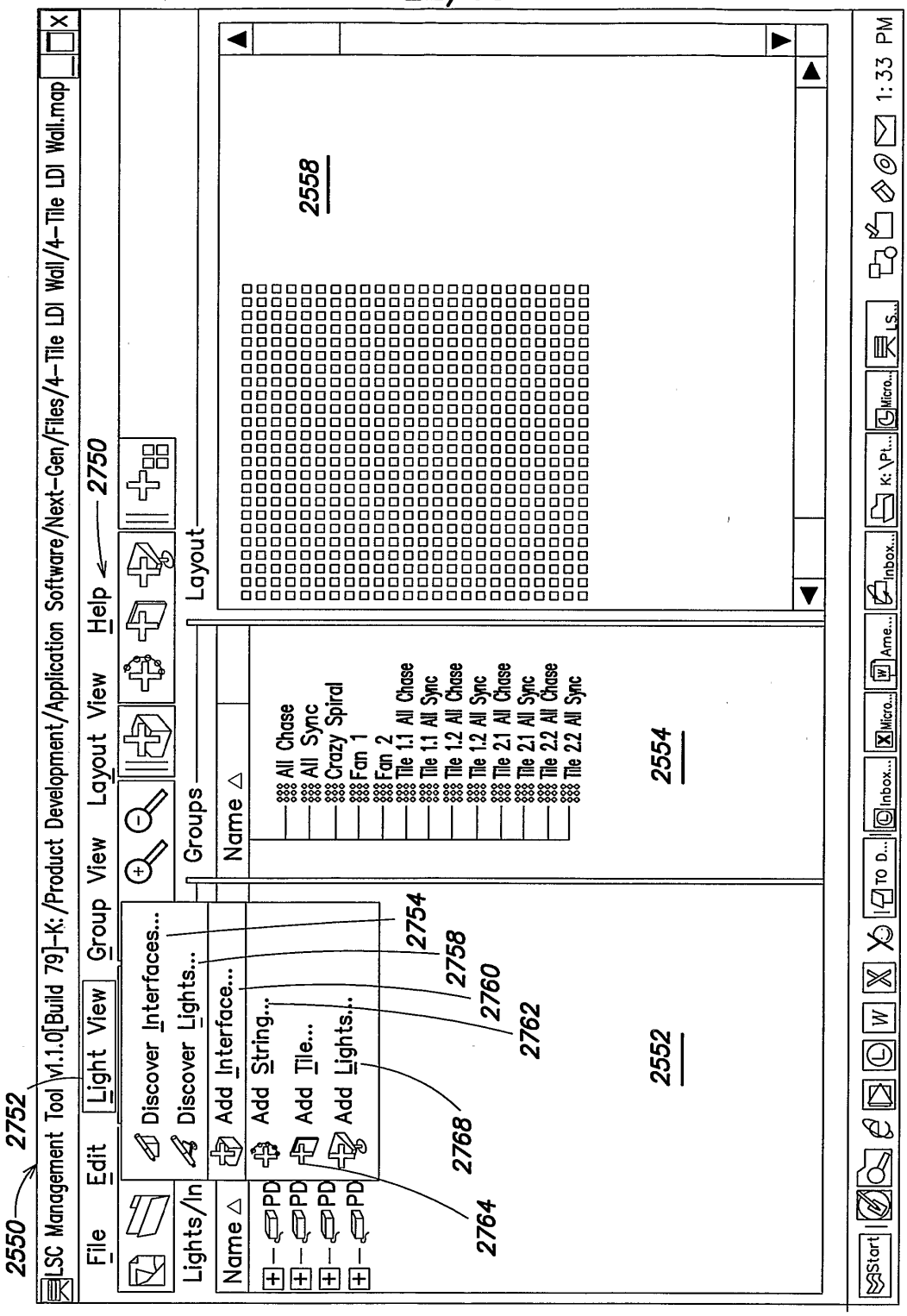

LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Discover Interfaces...
Discover Lights...
Add Interface...
Add String...
Add Tile...
Add Lights...
Lights/In
Groups
Layout
Name
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2550
2552
2554
2558
2750
2752
2754
2758
2760
2762
2764
2768
Start
1:33 PM

FIG. 27

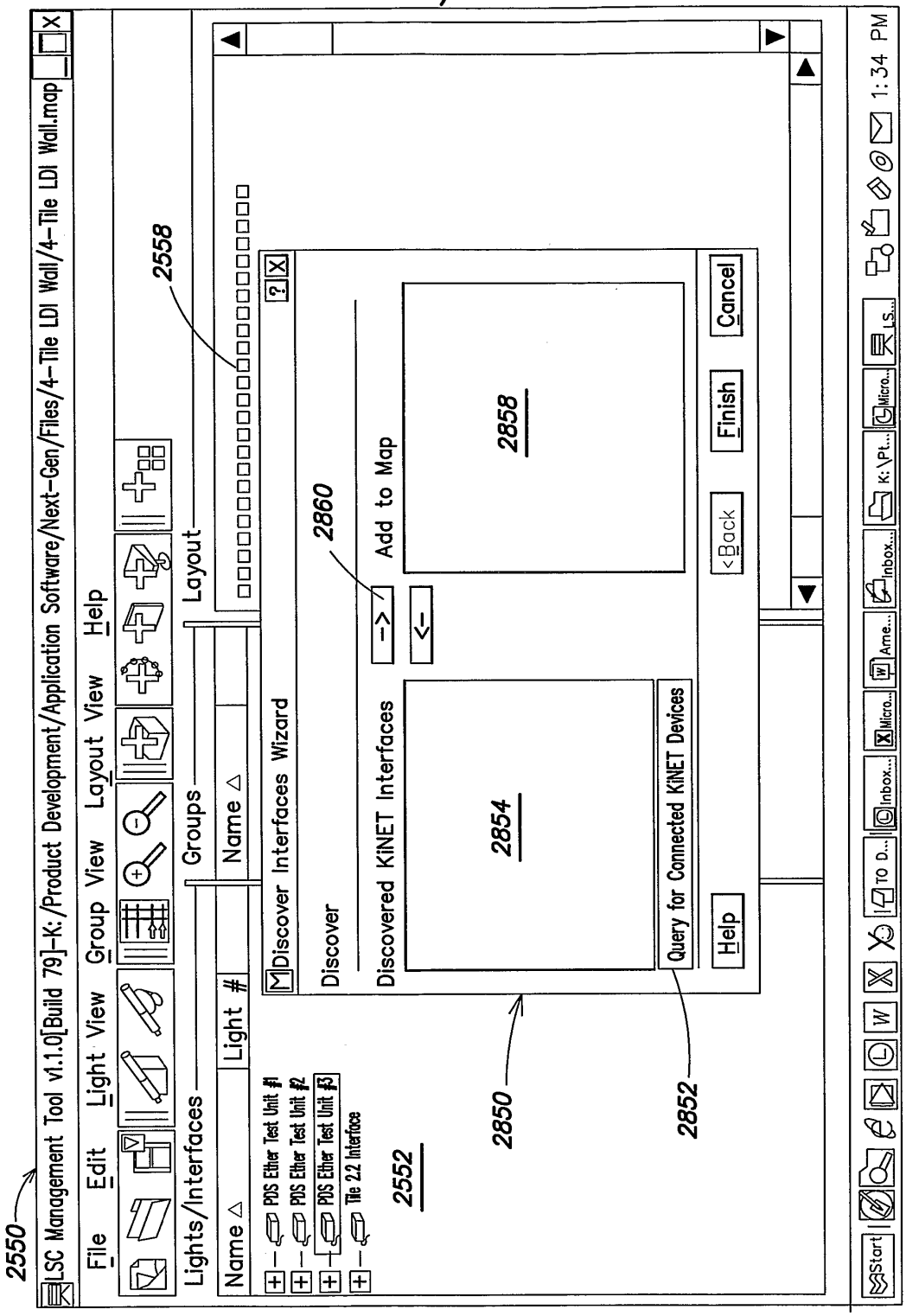

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Lights/Interfaces
Groups
Layout
2558
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
2552
Discover Interfaces Wizard
Discover
Discovered KiNET Interfaces
2860
Add to Map
2858
2854
2850
2852
Query for Connected KiNET Devices
Help
<Back
Finish
Cancel
Start
1:34 PM

FIG. 28

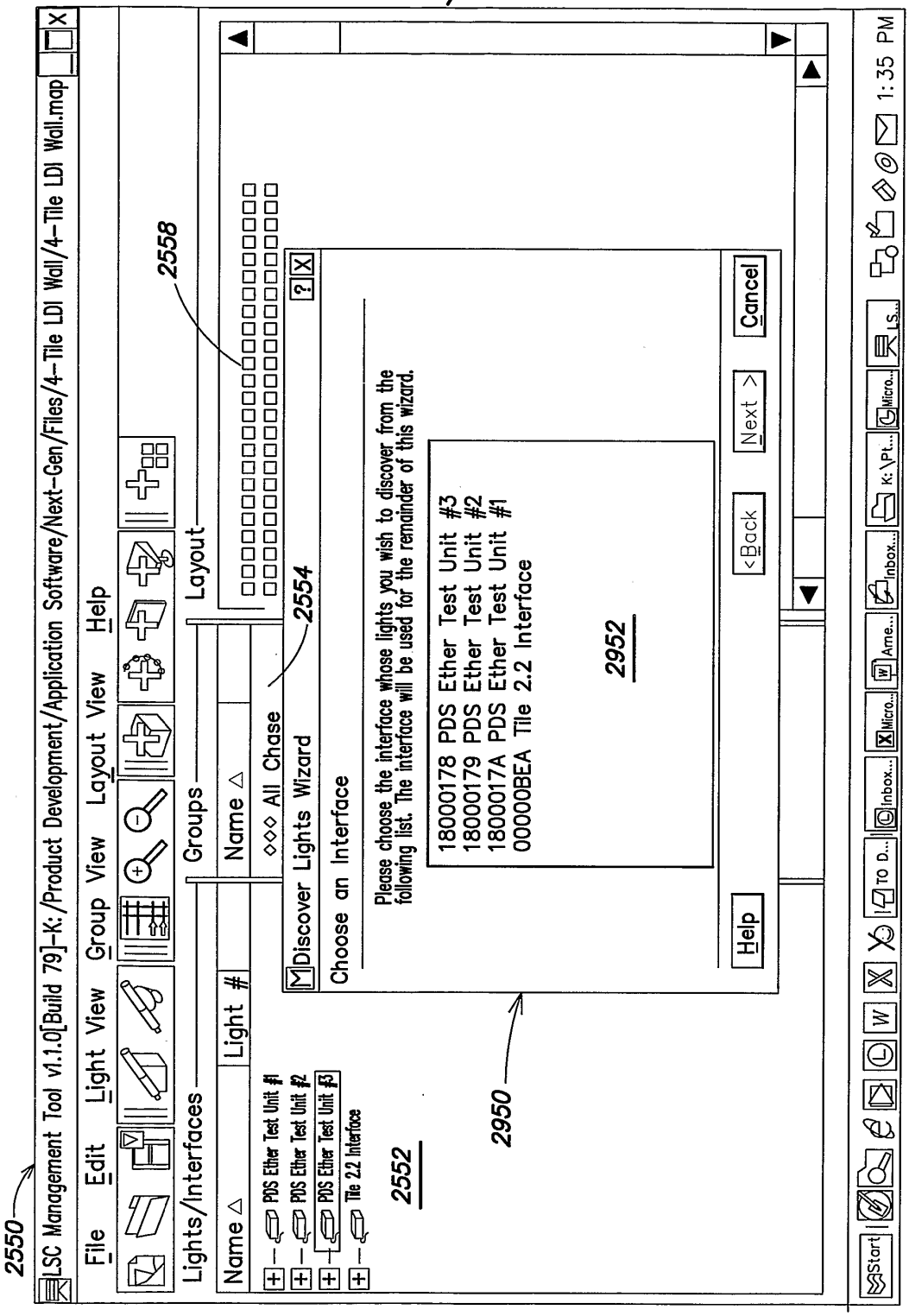

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Lights/Interfaces
Groups
Layout
2558
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
2552
Name △
◇◇◇ All Chase
2554
Discover Lights Wizard
Choose an Interface
Please choose the interface whose lights you wish to discover from the following list. The interface will be used for the remainder of this wizard.
18000178 PDS Ether Test Unit #3
18000179 PDS Ether Test Unit #2
1800017A PDS Ether Test Unit #1
00000BEA Tile 2.2 Interface
2952
2950
Help
<Back
Next >
Cancel
Start
1:35 PM

FIG. 29

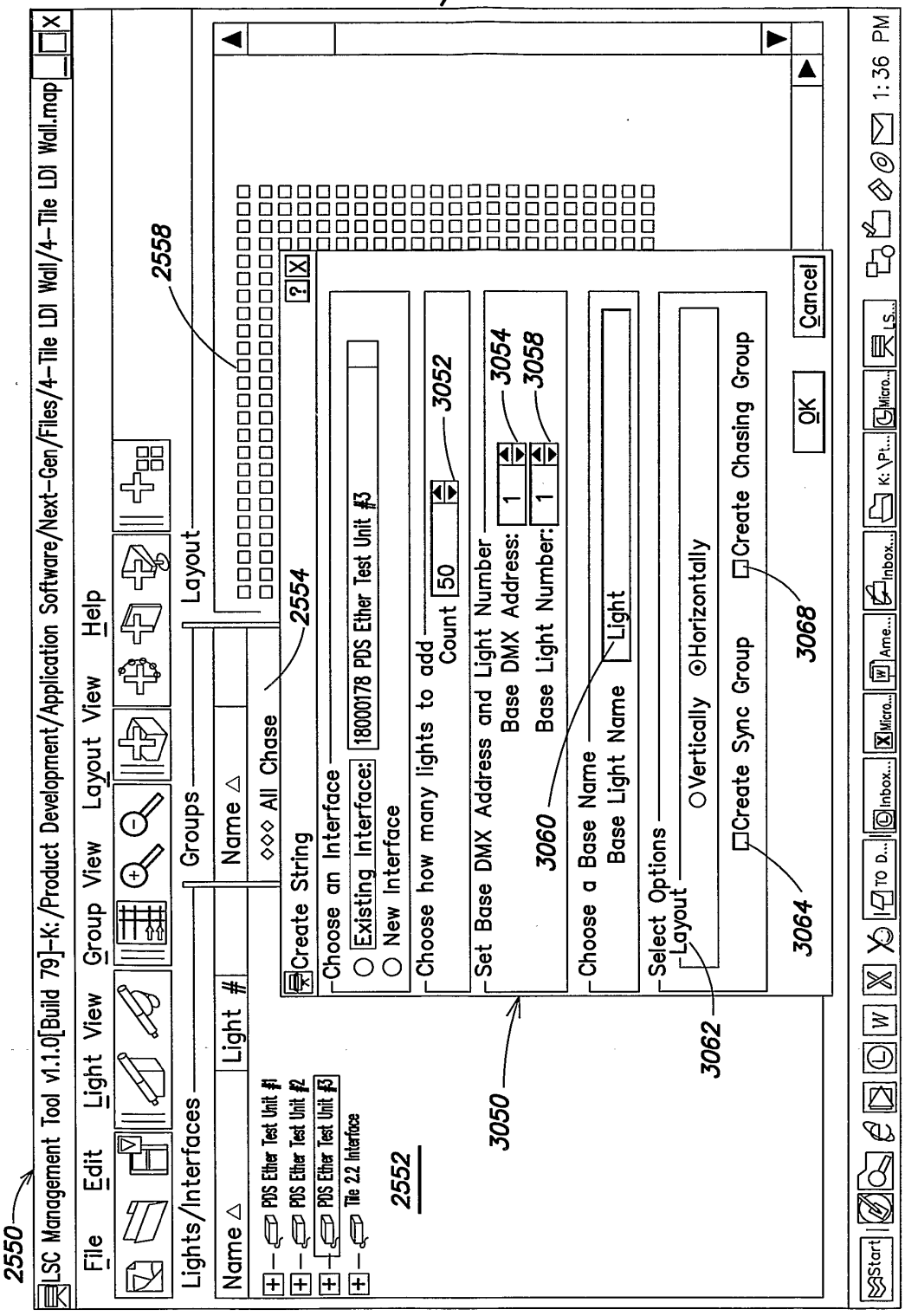

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Lights/Interfaces
Groups
Layout
2558
Name △ Light # Name △
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
2552
All Chase
2554
Create String
Choose an Interface
Existing Interface: 18000178 PDS Ether Test Unit #3
New Interface
Choose how many lights to add
Count 50
3052
Set Base DMX Address and Light Number
Base DMX Address: 1
Base Light Number: 1
3054
3058
3060
Choose a Base Name
Base Light Name
Light
Select Options
Layout
Vertically Horizontally
Create Sync Group
Create Chasing Group
3068
3064
OK
Cancel
3050
3062
Start
1:36 PM

FIG. 30

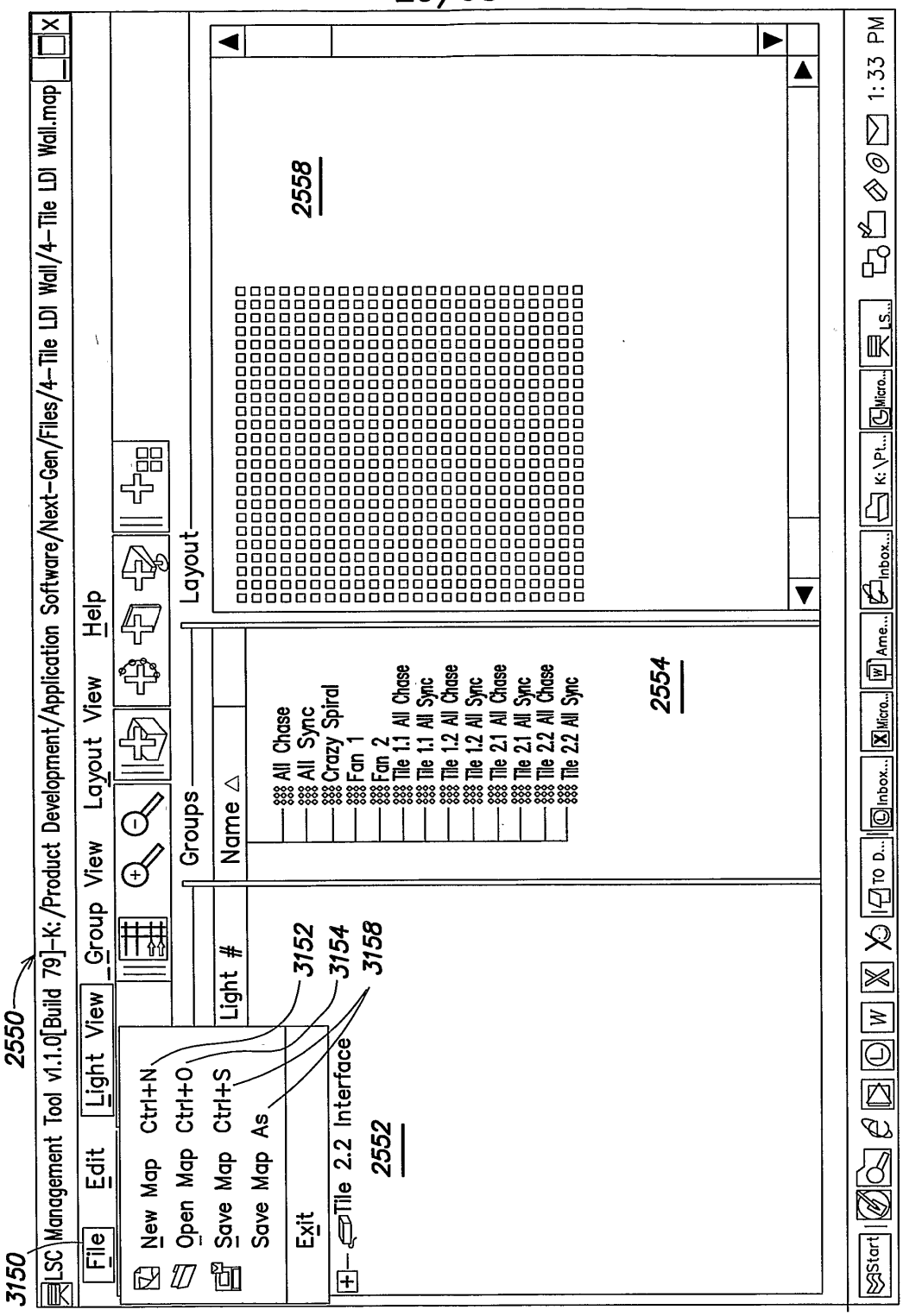

3150
2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File
Edit
Light View
Group View
Layout View
Help
New Map Ctrl+N
Open Map Ctrl+O
Save Map Ctrl+S
Save Map As
Exit
Tile 2.2 Interface
2552
3152
3154
3158
Groups
Layout
Light #
Name
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2554
2558
Start
1:33 PM

FIG. 31

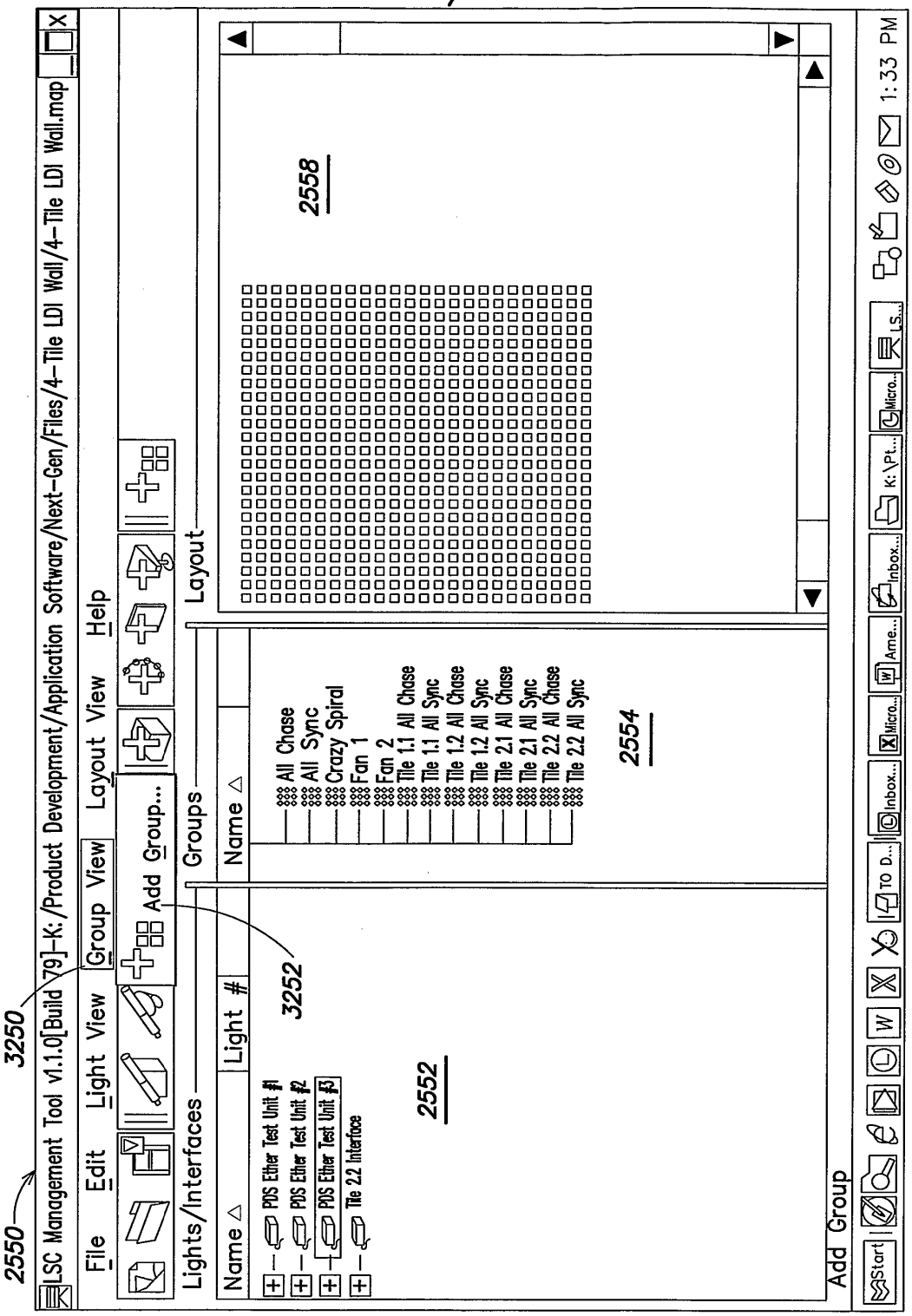

LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
Add Group...
Lights/Interfaces
Groups
Layout
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2550
3250
3252
2552
2554
2558
Add Group
Start
1:33 PM

FIG. 32

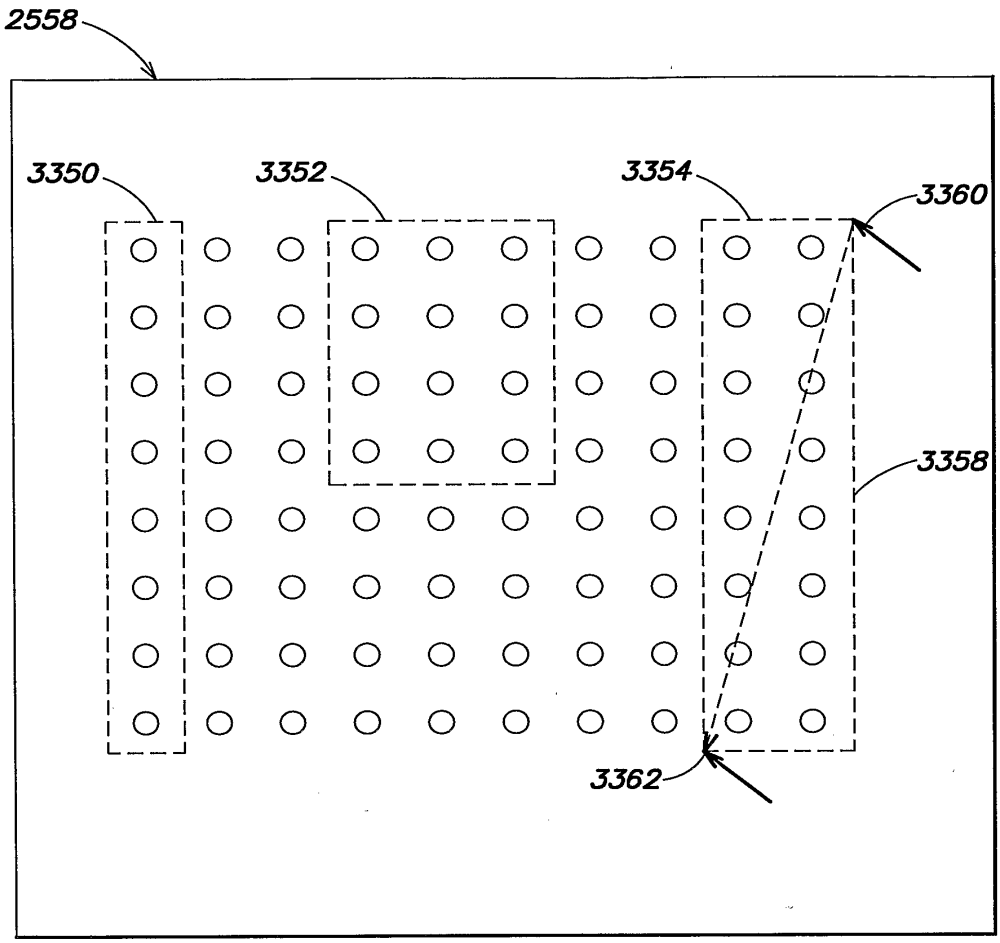


FIG. 33

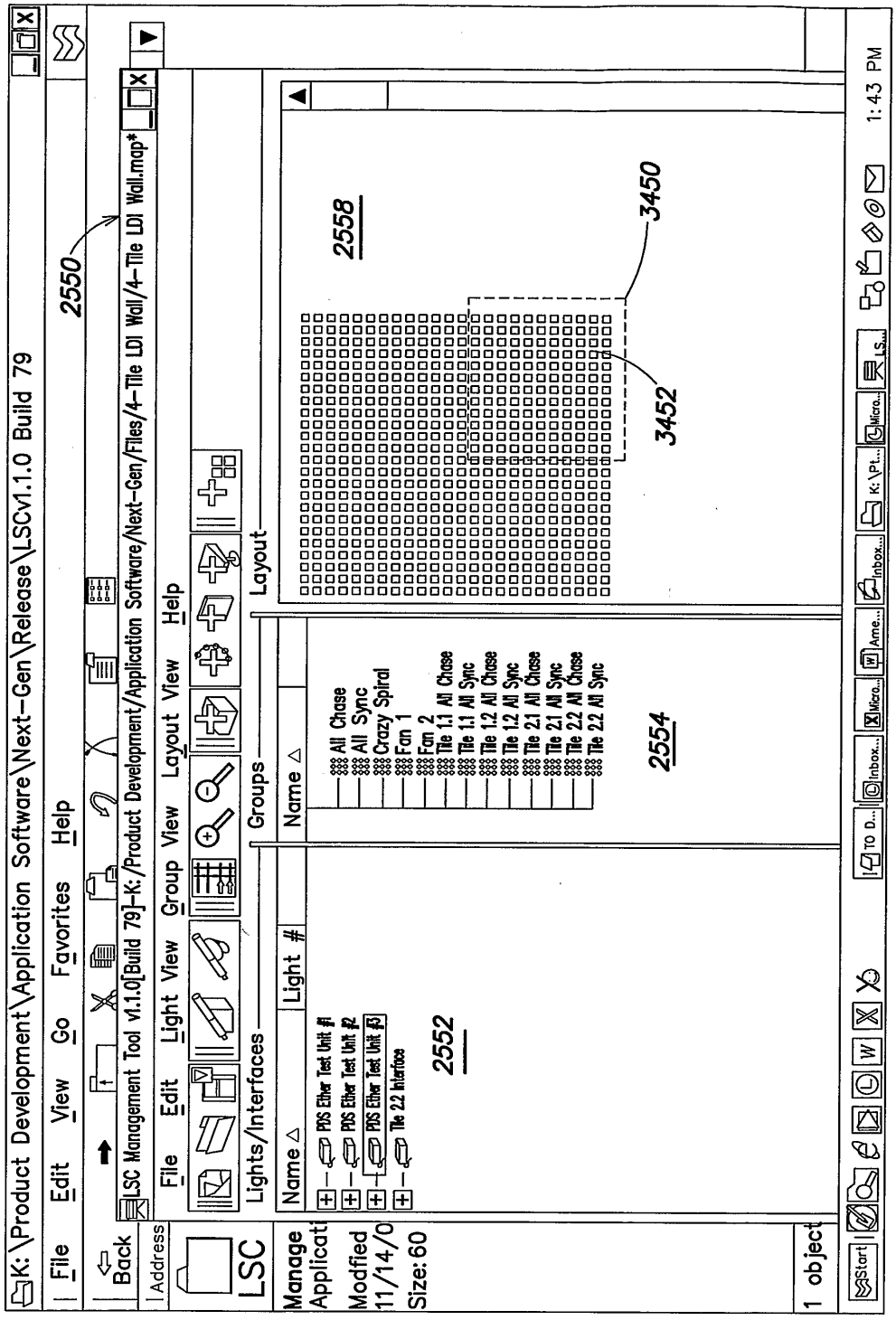

K:\Product Development\Application Software\Next-Gen\Release\LSCv1.1.0 Build 79
File Edit View Go Favorites Help
Back
Address
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map*
File Edit Light View Group View Layout View Help
LSC
Lights/Interfaces
Groups
Layout
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
Manage Applicati
Modfied 11/14/0
Size: 60
1 object
2550
2552
2554
2558
3450
3452
Start
1:43 PM

FIG. 34

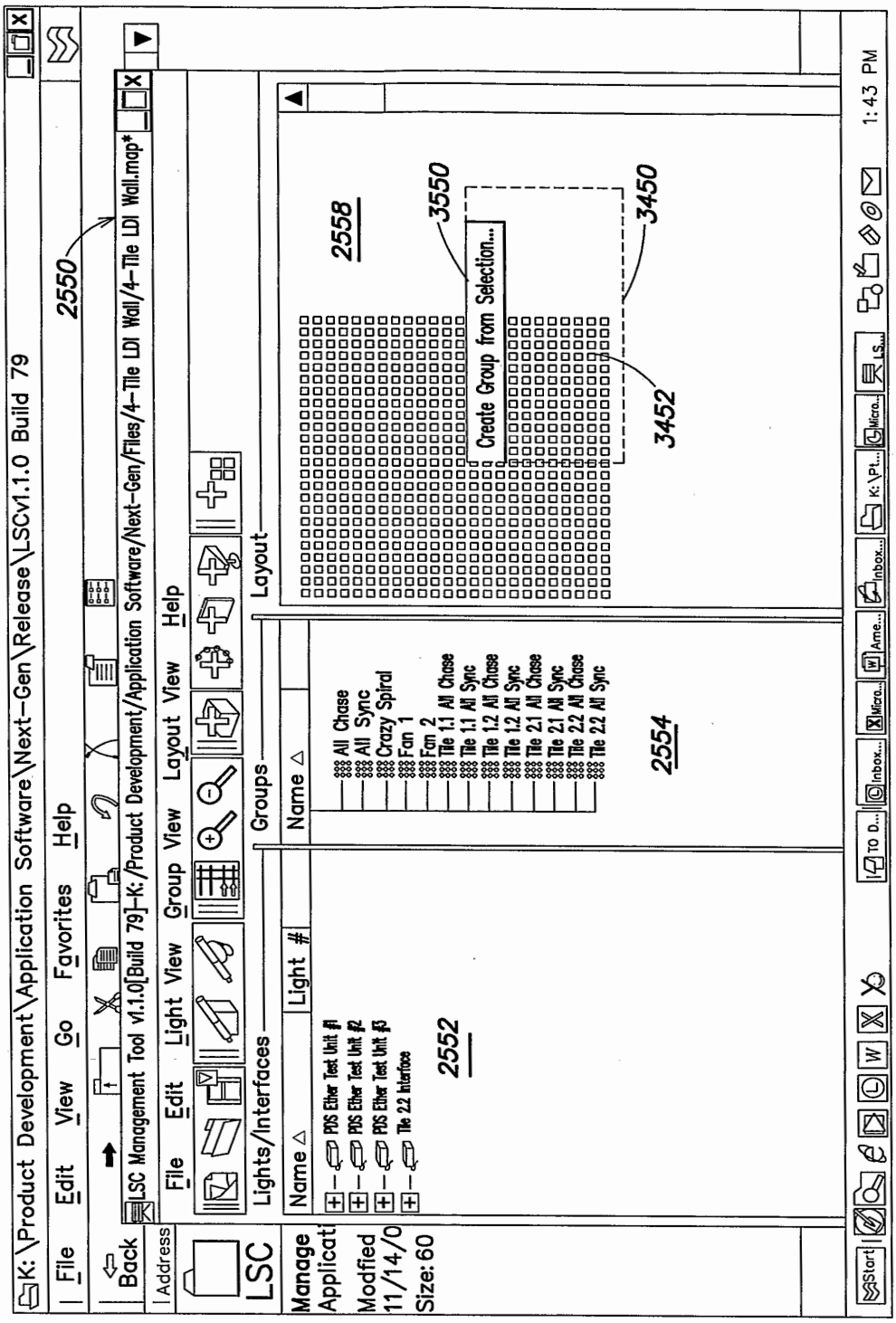

K:\Product Development\Application Software\Next-Gen\Release\LSCv1.1.0 Build 79
File Edit View Go Favorites Help
Back
Address
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map*
File Edit Light View Group View Layout View Help
LSC
Lights/Interfaces
Groups
Layout
Name △
Light #
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
All Chase
All Sync
Crazy Spiral
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
Create Group from Selection...
2550
2552
2554
2558
3450
3452
3550
Start
1:43 PM

FIG. 35

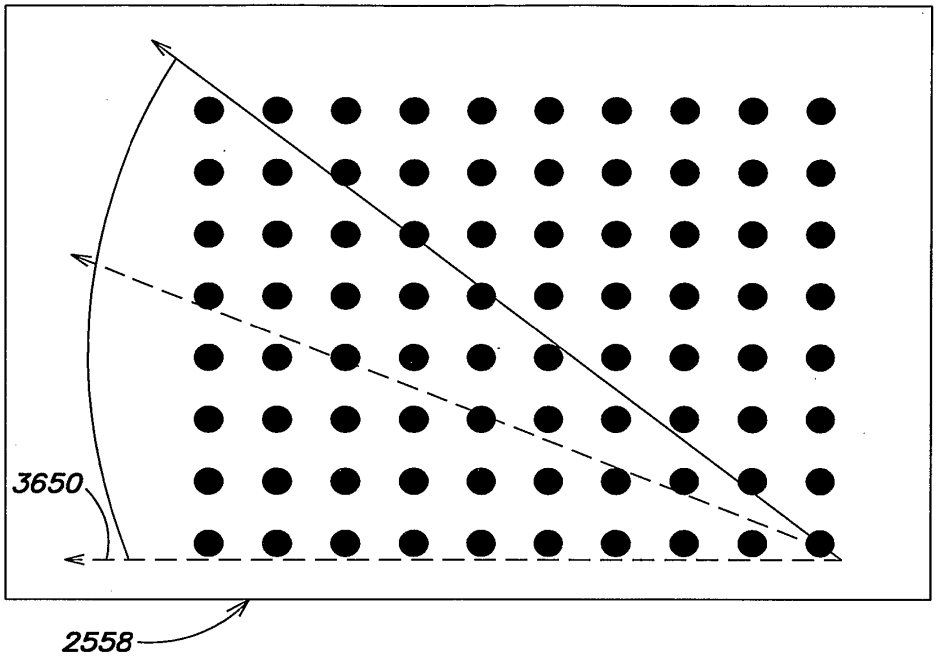


FIG. 36

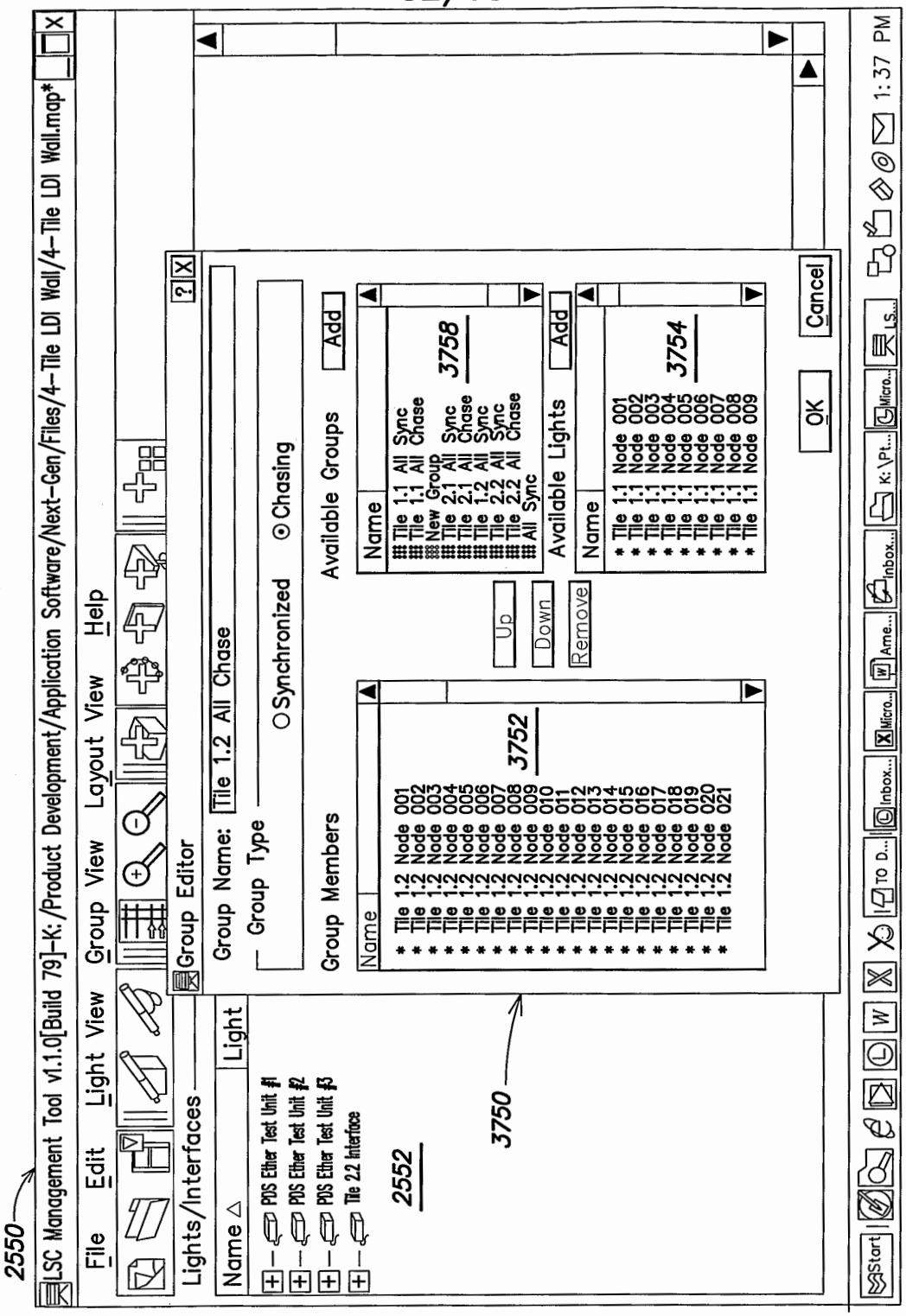

2550
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map*
File Edit Light View Group View Layout View Help
Lights/Interfaces
Name △ Light
PDS Ether Test Unit #1
PDS Ether Test Unit #2
PDS Ether Test Unit #3
Tile 2.2 Interface
2552
Group Editor
Group Name: Tile 1.2 All Chase
Group Type
Synchronized
Chasing
Group Members
Name
Tile 1.2 Node 001
Tile 1.2 Node 002
Tile 1.2 Node 003
Tile 1.2 Node 004
Tile 1.2 Node 005
Tile 1.2 Node 006
Tile 1.2 Node 007
Tile 1.2 Node 008
Tile 1.2 Node 009
Tile 1.2 Node 010
Tile 1.2 Node 011
Tile 1.2 Node 012
Tile 1.2 Node 013
Tile 1.2 Node 014
Tile 1.2 Node 015
Tile 1.2 Node 016
Tile 1.2 Node 017
Tile 1.2 Node 018
Tile 1.2 Node 019
Tile 1.2 Node 020
Tile 1.2 Node 021
3752
3750
Up
Down
Remove
Available Groups
Add
Name
Tile 1.1 All Sync
Tile 1.1 All Chase
New Group
Tile 2.1 All Sync
Tile 2.1 All Chase
Tile 1.2 All Sync
Tile 2.2 All Sync
Tile 2.2 All Chase
All Sync
3758
Available Lights
Add
Name
Tile 1.1 Node 001
Tile 1.1 Node 002
Tile 1.1 Node 003
Tile 1.1 Node 004
Tile 1.1 Node 005
Tile 1.1 Node 006
Tile 1.1 Node 007
Tile 1.1 Node 008
Tile 1.1 Node 009
3754
OK
Cancel
Start
1:37 PM

FIG. 37

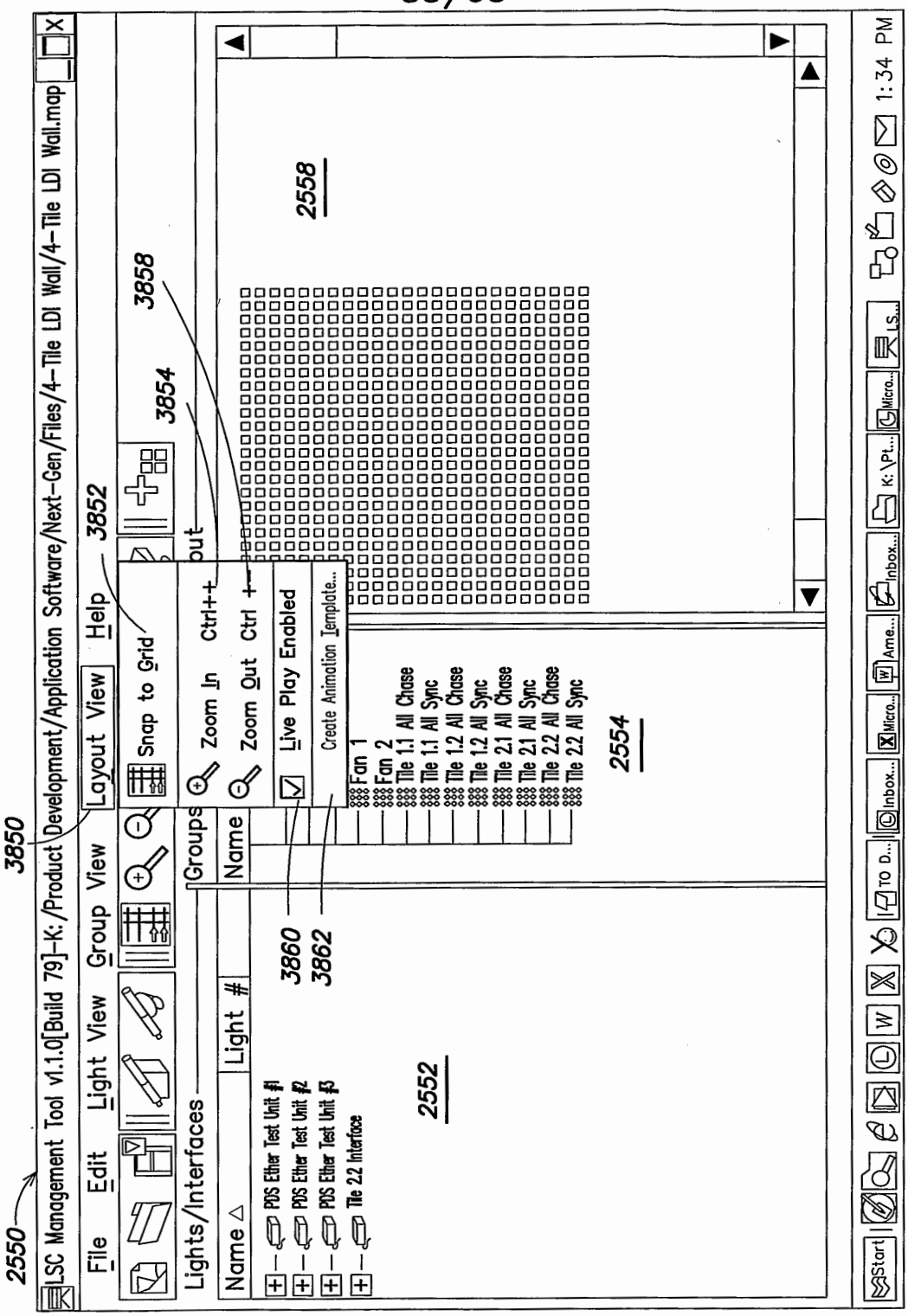

2550
3850
LSC Management Tool v1.1.0[Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/4-Tile LDI Wall.map
File Edit Light View Group View Layout View Help
3852
3854
3858
Snap to Grid
Zoom In Ctrl++
Zoom Out Ctrl +
Live Play Enabled
Create Animation Template...
Lights/Interfaces
Groups
Name
Light #
Name △
POS Ether Test Unit #1
POS Ether Test Unit #2
POS Ether Test Unit #3
Tile 2.2 Interface
3860
3862
2552
Fan 1
Fan 2
Tile 1.1 All Chase
Tile 1.1 All Sync
Tile 1.2 All Chase
Tile 1.2 All Sync
Tile 2.1 All Chase
Tile 2.1 All Sync
Tile 2.2 All Chase
Tile 2.2 All Sync
2554
2558
Start
1:34 PM

FIG. 38

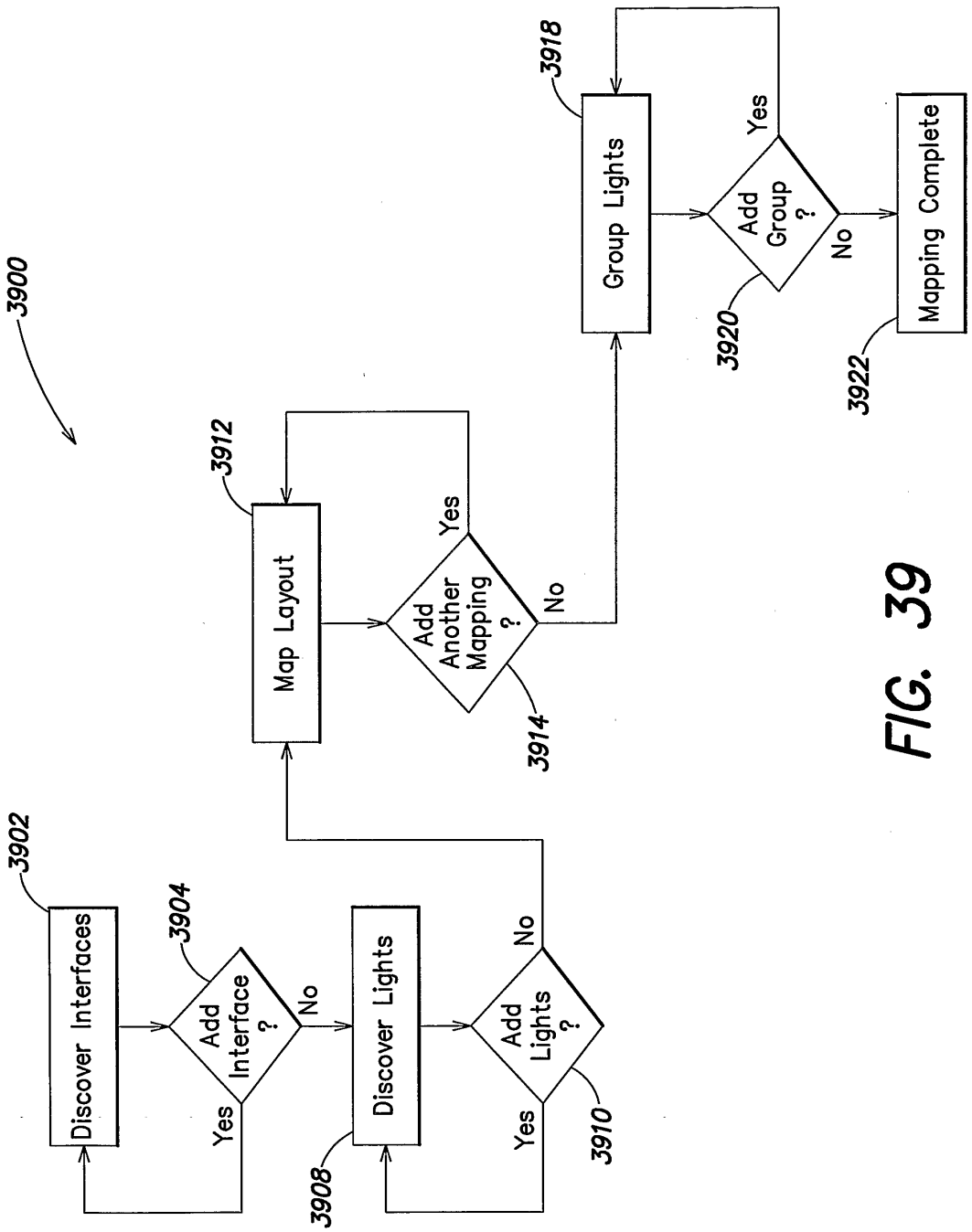

3900
3902
Discover Interfaces
3904
Add Interface ?
Yes
No
3908
Discover Lights
3910
Add Lights ?
Yes
No
3912
Map Layout
3914
Add Another Mapping ?
Yes
No
3918
Group Lights
3920
Add Group ?
Yes
No
3922
Mapping Complete

FIG. 39

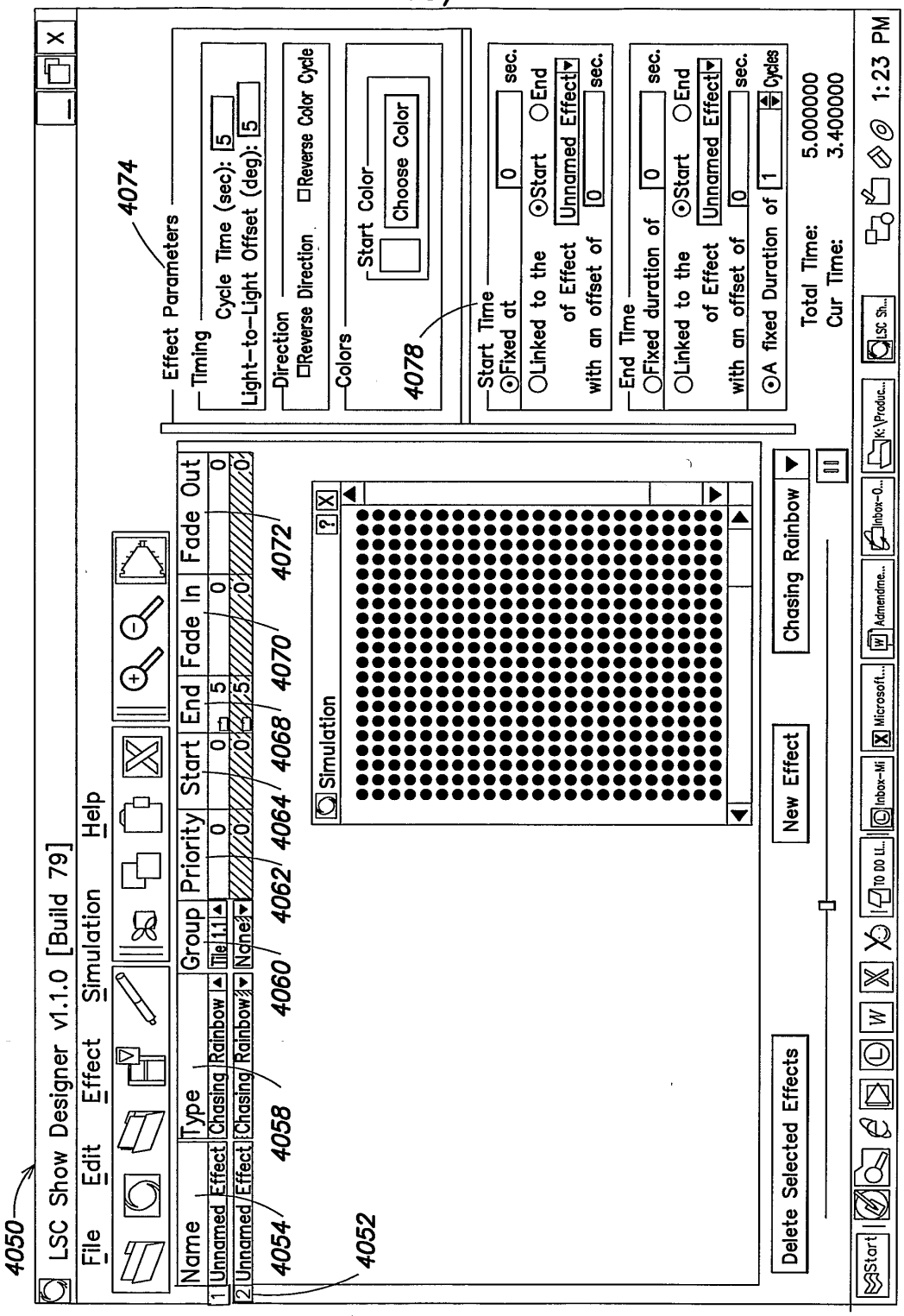

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 1,1,1 0 0 5 0 0
2 Unnamed Effect Chasing Rainbow None 0 0 5 0 0
4052
4054
4058
4060
4062
4064
4068
4070
4072
Simulation
Delete Selected Effects
New Effect
Chasing Rainbow
4074
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
4078
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 3.400000
Start
1:23 PM

FIG. 40

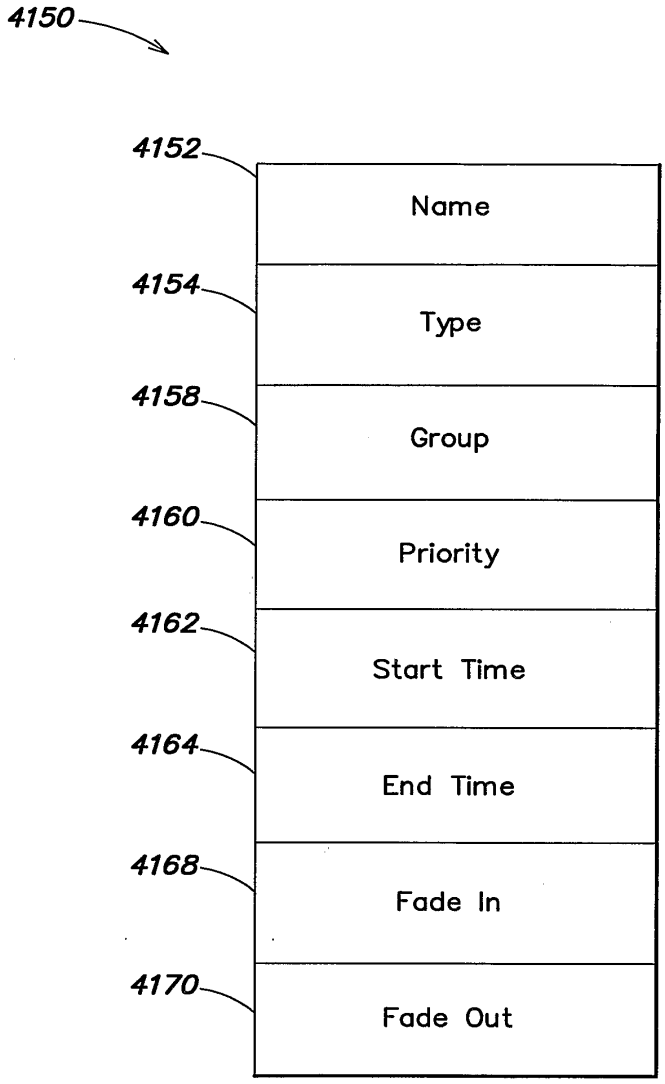

4150
4152
Name
4154
Type
4158
Group
4160
Priority
4162
Start Time
4164
End Time
4168
Fade In
4170
Fade Out

FIG. 41

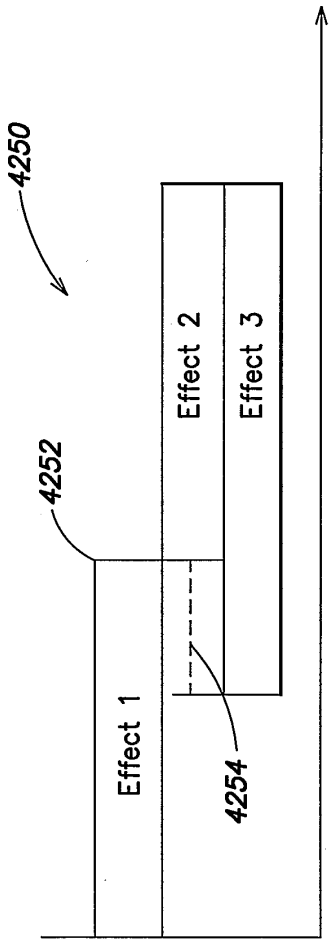

4250
4252
Effect 1
Effect 2
Effect 3
4254

FIG. 42

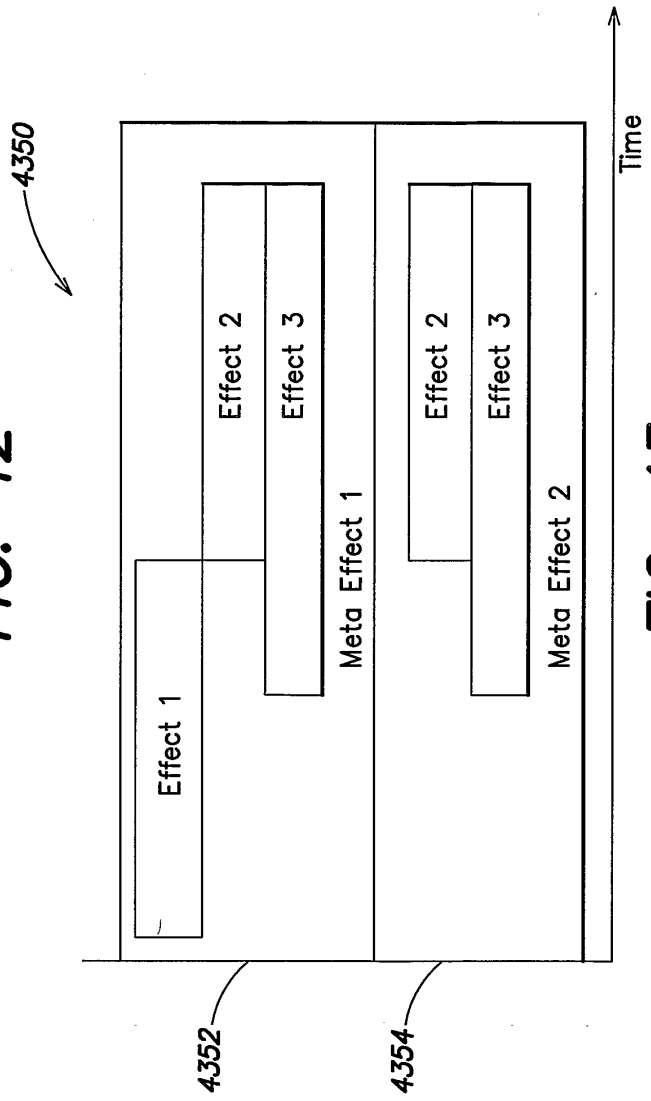

4350
Time
Effect 1
Effect 2
Effect 3
Meta Effect 1
Effect 2
Effect 3
Meta Effect 2
4352
4354

FIG. 43

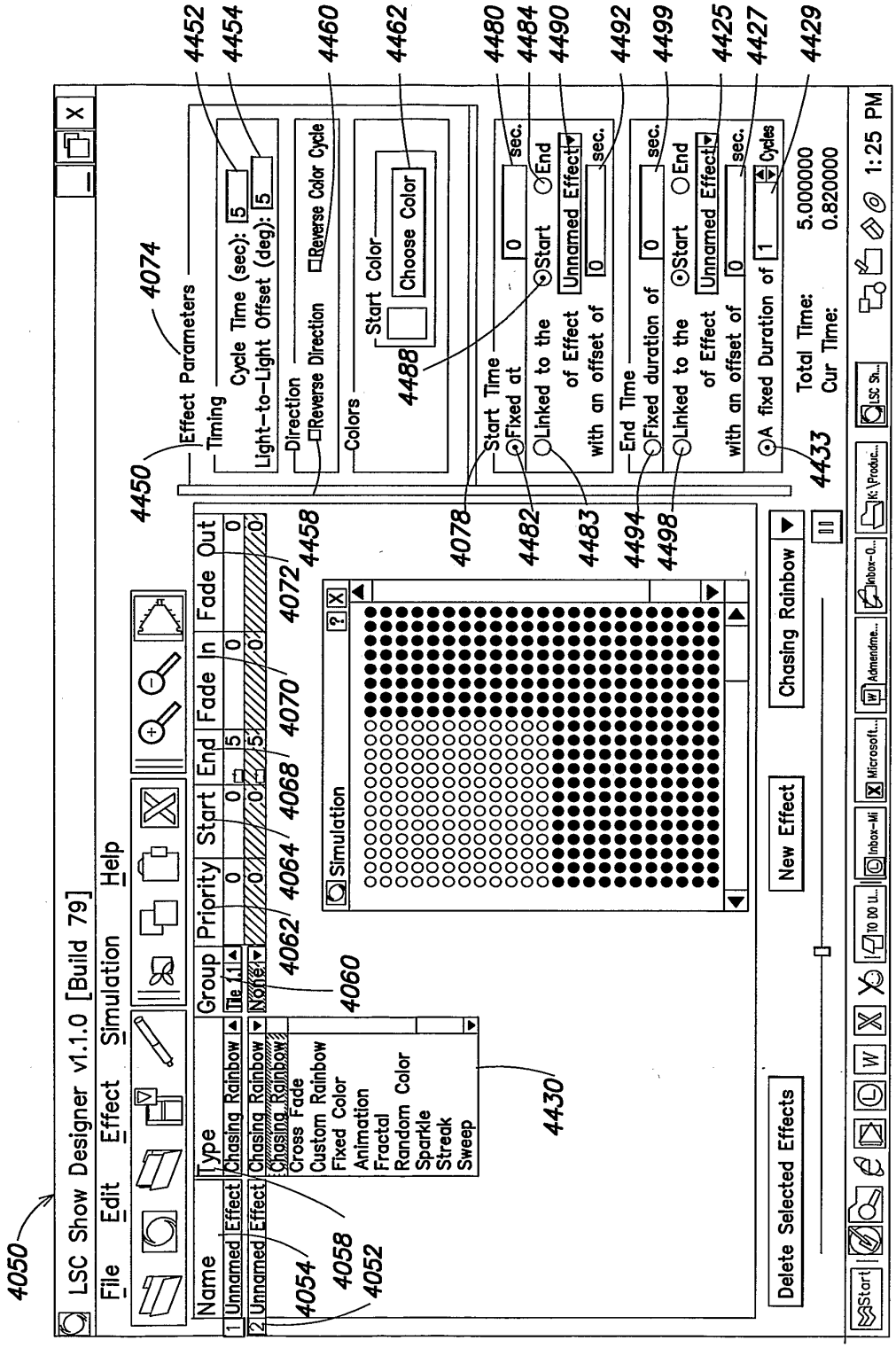

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 11
2 Unnamed Effect Chasing Rainbow None
Cross Fade
Custom Rainbow
Fixed Color
Animation
Fractal
Random Color
Sparkle
Streak
Sweep
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 0.820000
1:25 PM
4050
4052
4054
4058
4060
4062
4064
4068
4070
4072
4074
4078
4430
4433
4450
4452
4454
4458
4460
4462
4480
4482
4483
4484
4488
4490
4492
4494
4498
4499
4425
4427
4429

FIG. 44

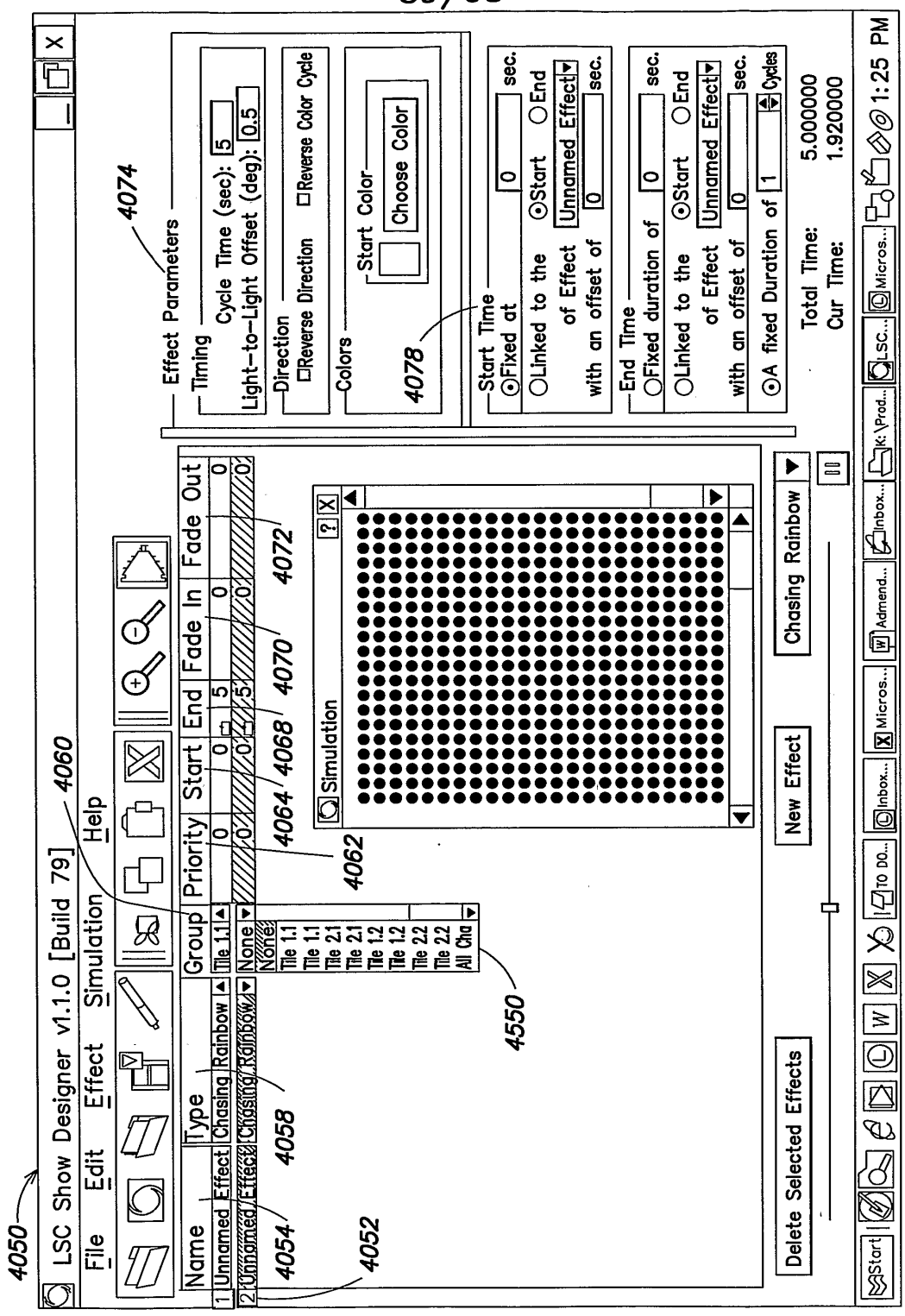

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 1.1 0 0 5 0 0
2 Unnamed Effect Chasing Rainbow None 0 0 5 0 0
None
Tile 1.1
Tile 1.1
Tile 2.1
Tile 1.2
Tile 1.2
Tile 2.2
All Cha
Simulation
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 1.920000
New Effect
Chasing Rainbow
Delete Selected Effects
4050
4052
4054
4058
4060
4062
4064
4068
4070
4072
4074
4078
4550
Start
1:25 PM

FIG. 45

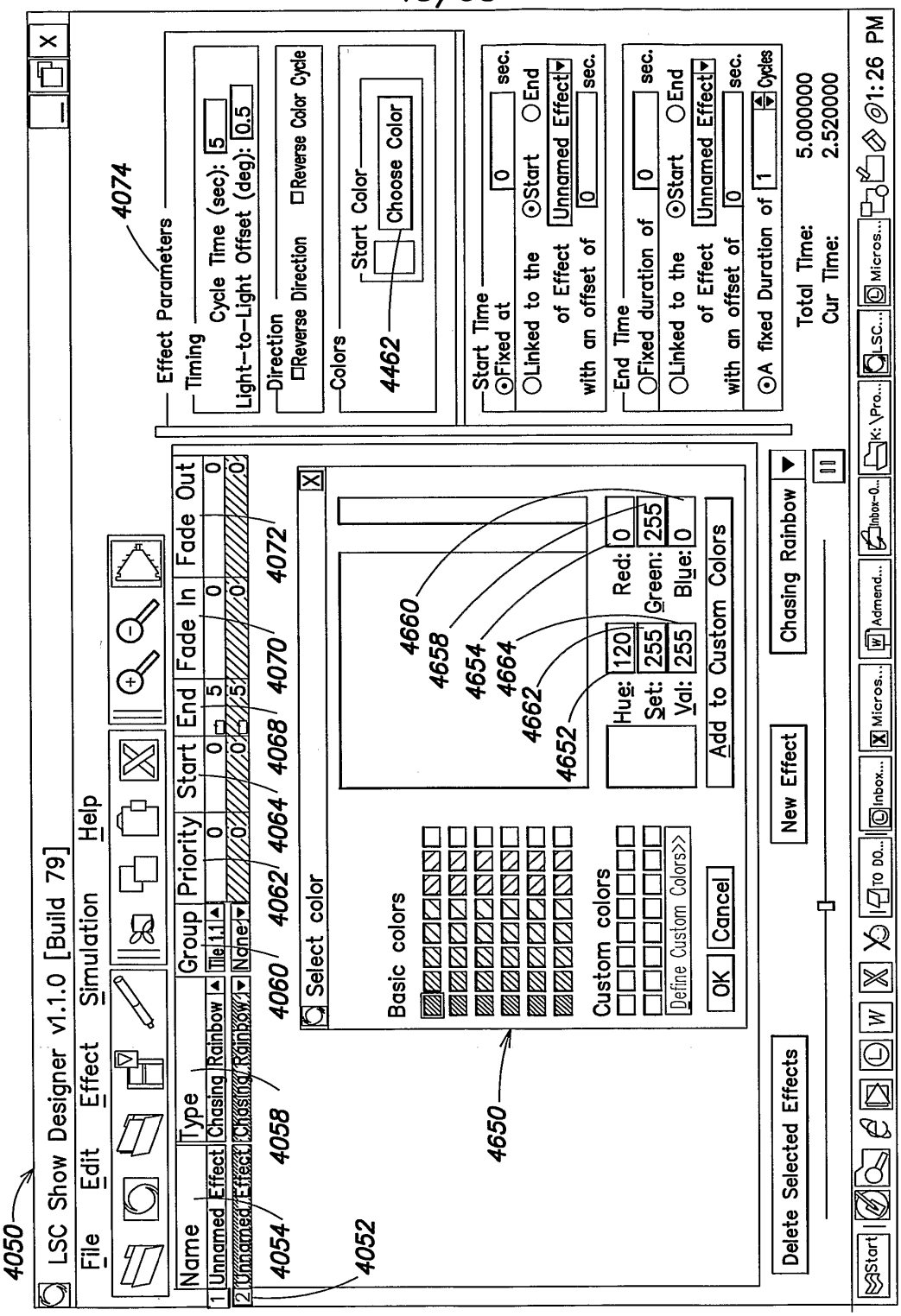

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile11 0 0 5 0 0
2 Unnamed Effect Chasing Rainbow None 0 0 0 5 0 0
4054
4052
4058
4060
4062
4064
4068
4070
4072
4074
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
4462
Start Time
Fixed at 0 sec.
Linked to the of Effect with an offset of 0 Start End Unnamed Effect sec.
End Time
Fixed duration of 0 sec.
Linked to the of Effect with an offset of 0 Start End Unnamed Effect sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.520000
Select color
Basic colors
Custom colors
Define Custom Colors>>
OK Cancel
4650
4652
4654
4658
4660
4662
4664
Hue: 120
Sat: 255
Val: 255
Red: 0
Green: 255
Blue: 0
Add to Custom Colors
Delete Selected Effects
New Effect
Chasing Rainbow
Start
1:26 PM

FIG. 46

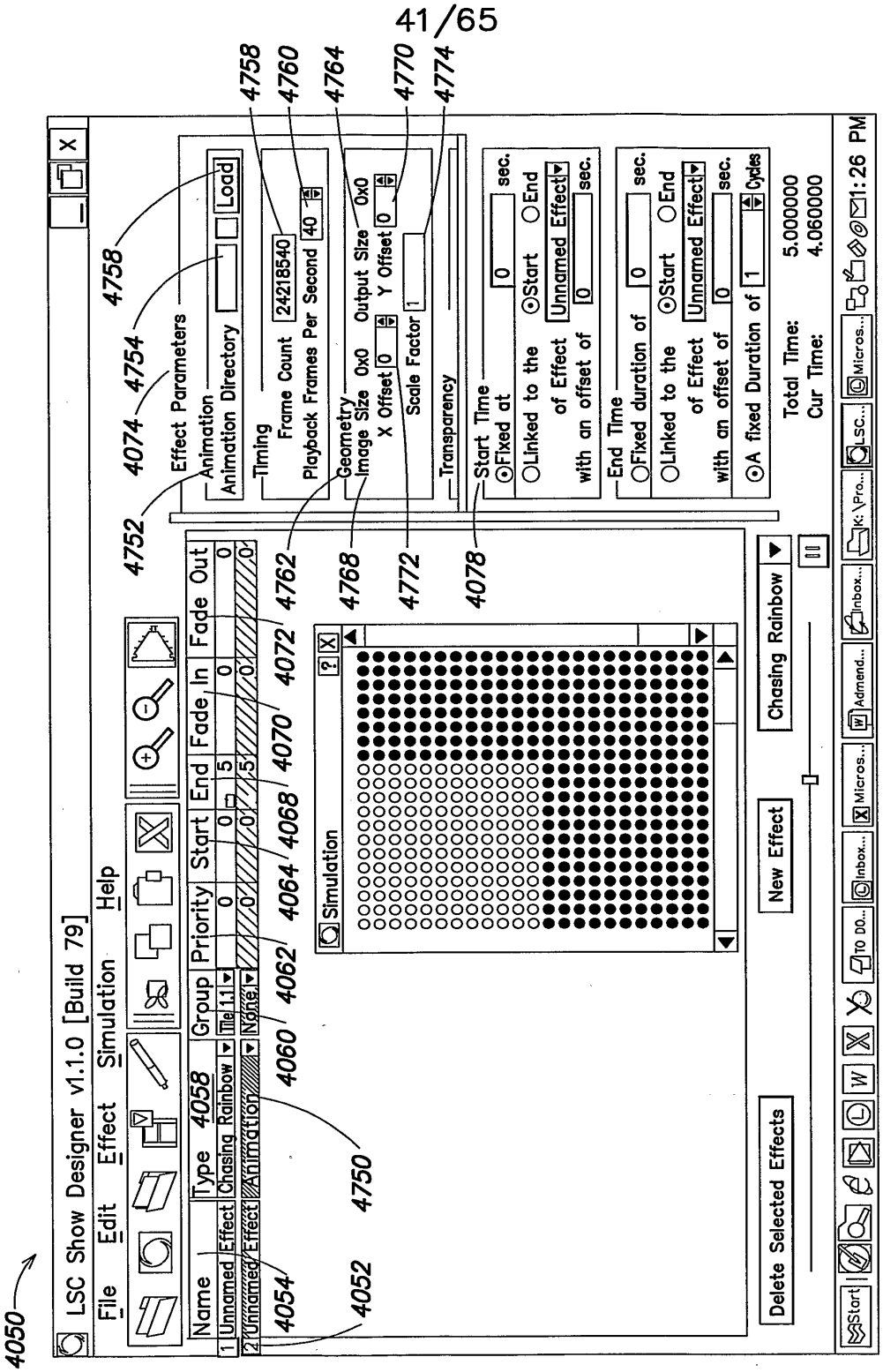

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type 4058 Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 1.1.1 0 0 5 0 0
2 Unnamed Effect Animation None 0 0 5 0 0
4052
4054
4060
4062
4064
4068
4070
4072
4762
4768
4772
4078
4750
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
4752
4074
4754
4758
Effect Parameters
Animation
Animation Directory
Load
Timing
Frame Count 24218540
Playback Frames Per Second 40
4758
4760
4764
Geometry
Image Size 0x0 Output Size 0x0
X Offset 0 Y Offset 0
Scale Factor 1
4770
4774
Transparency
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect
with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect
with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 4.060000
Start
TO DO...
Inbox...
Micros...
Admend...
K:\Pro...
LSC...
1:26 PM

FIG. 47

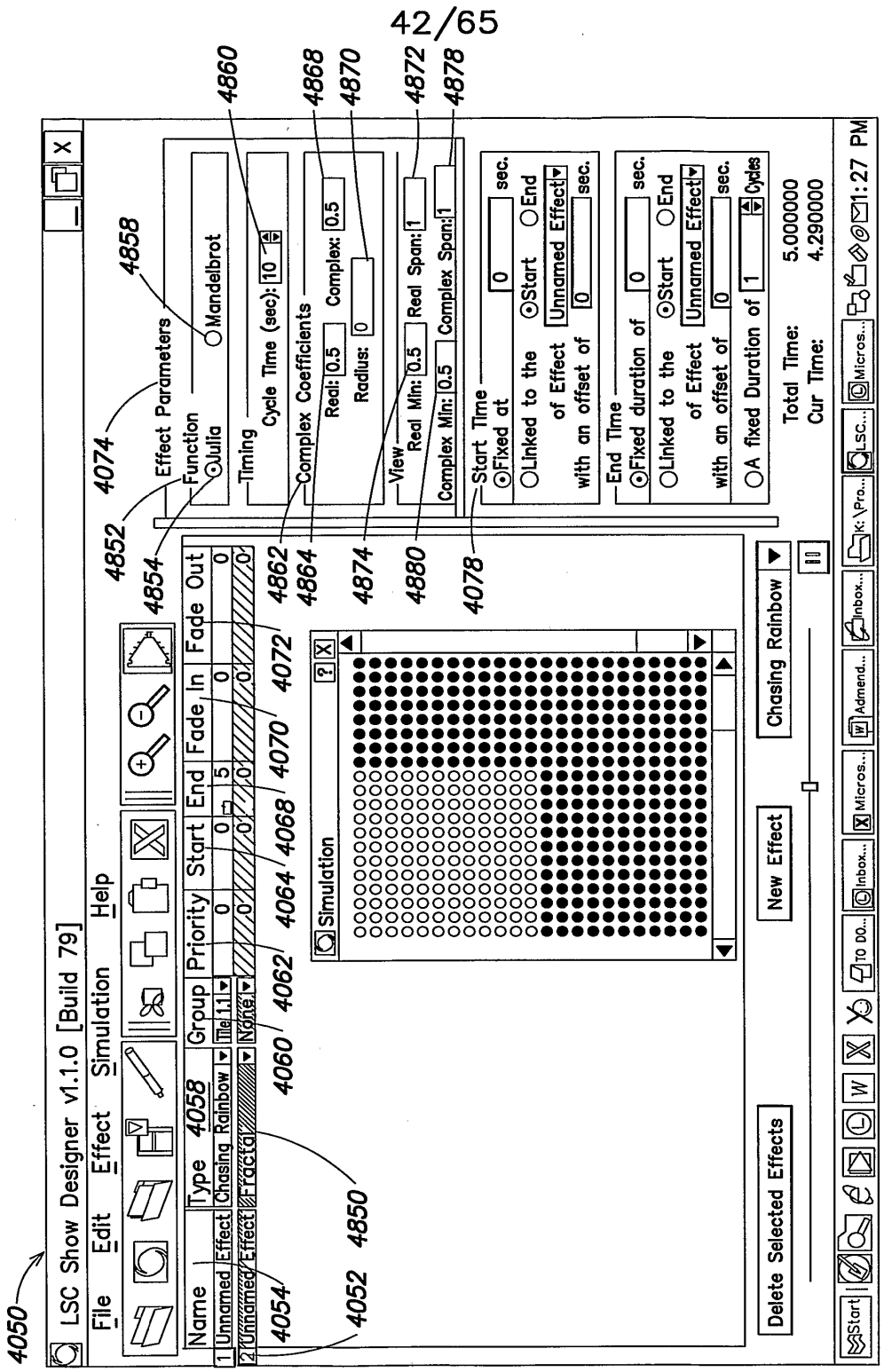

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type 4058 Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 1.1
2 Unnamed Effect Fractal None
4052 4850
4054
4060 4062 4064 4068 4070 4072
4852 4854 4074
4858
4860 4862 4864 4874 4880 4078
4868 4870 4872 4878
Effect Parameters
Function Julia Mandelbrot
Timing Cycle Time (sec): 10
Complex Coefficients Real: 0.5 Radius: 0 Complex: 0.5
View Real Min: 0.5 Complex Min: 0.5 Real Span: 1 Complex Span: 1
Start Time Fixed at Linked to the of Effect with an offset of Start End Unnamed Effect sec.
End Time Fixed duration of Linked to the of Effect with an offset of A fixed Duration of Start End Unnamed Effect Cycles sec.
Total Time: 5.000000
Cur Time: 4.290000
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
Start
1:27 PM

FIG. 48

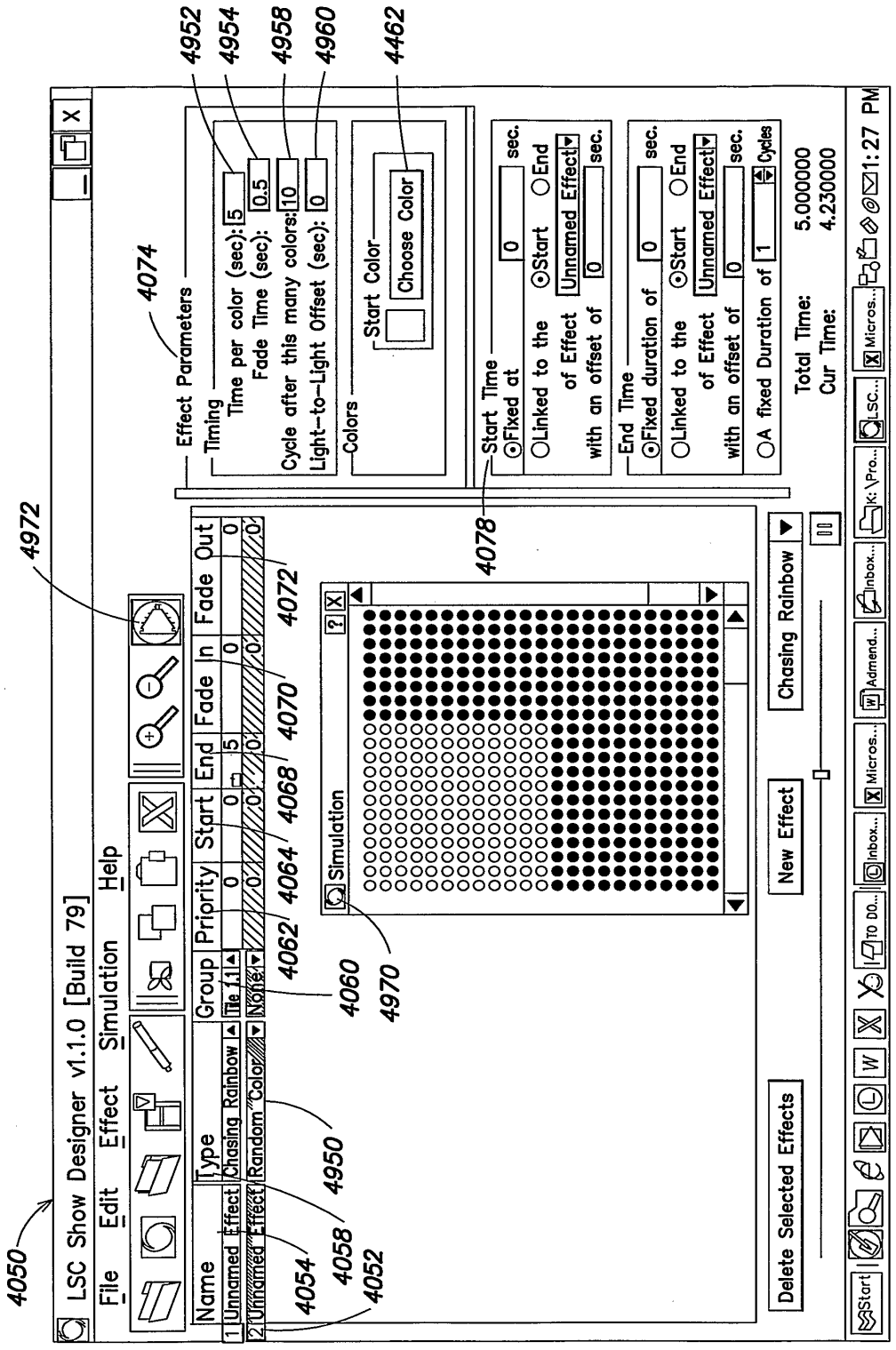

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name
Type
Group
Priority
Start
End
Fade In
Fade Out
1 Unnamed Effect
Chasing Rainbow
Tile 1,1
2 Unnamed Effect
Random Color
Simulation
Effect Parameters
Timing
Time per color (sec): 5
Fade Time (sec): 0.5
Cycle after this many colors: 10
Light-to-Light Offset (sec): 0
Colors
Start Color
Choose Color
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 4.230000
Chasing Rainbow
New Effect
Delete Selected Effects
4050
4052
4054
4058
4950
4060
4062
4064
4068
4070
4072
4078
4970
4972
4074
4952
4954
4958
4960
4462

FIG. 49

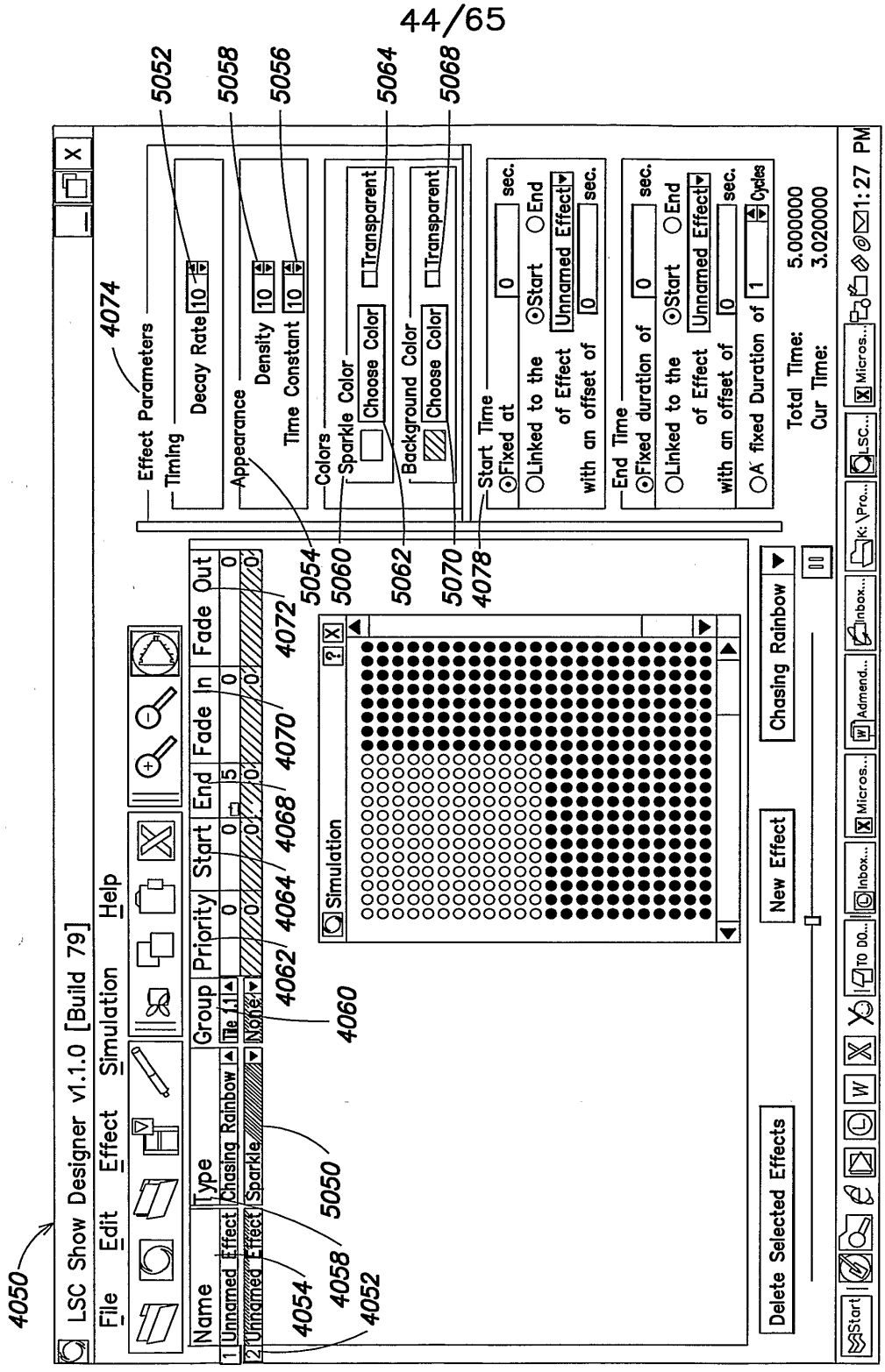

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 11 0 0 5 0 0
2 Unnamed Effect Sparkle None 0 0 0 0 0
Simulation
Effect Parameters
Timing
Decay Rate 10
Appearance
Density 10
Time Constant 10
Colors
Sparkle Color
Choose Color
Transparent
Background Color
Choose Color
Transparent
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 3.020000
New Effect
Chasing Rainbow
Delete Selected Effects
4050
4052
4054
4058
5050
4060
4062
4064
4068
4070
4072
5054
5060
5062
5070
4078
5064
5068
5056
5058
5052
4074

FIG. 50

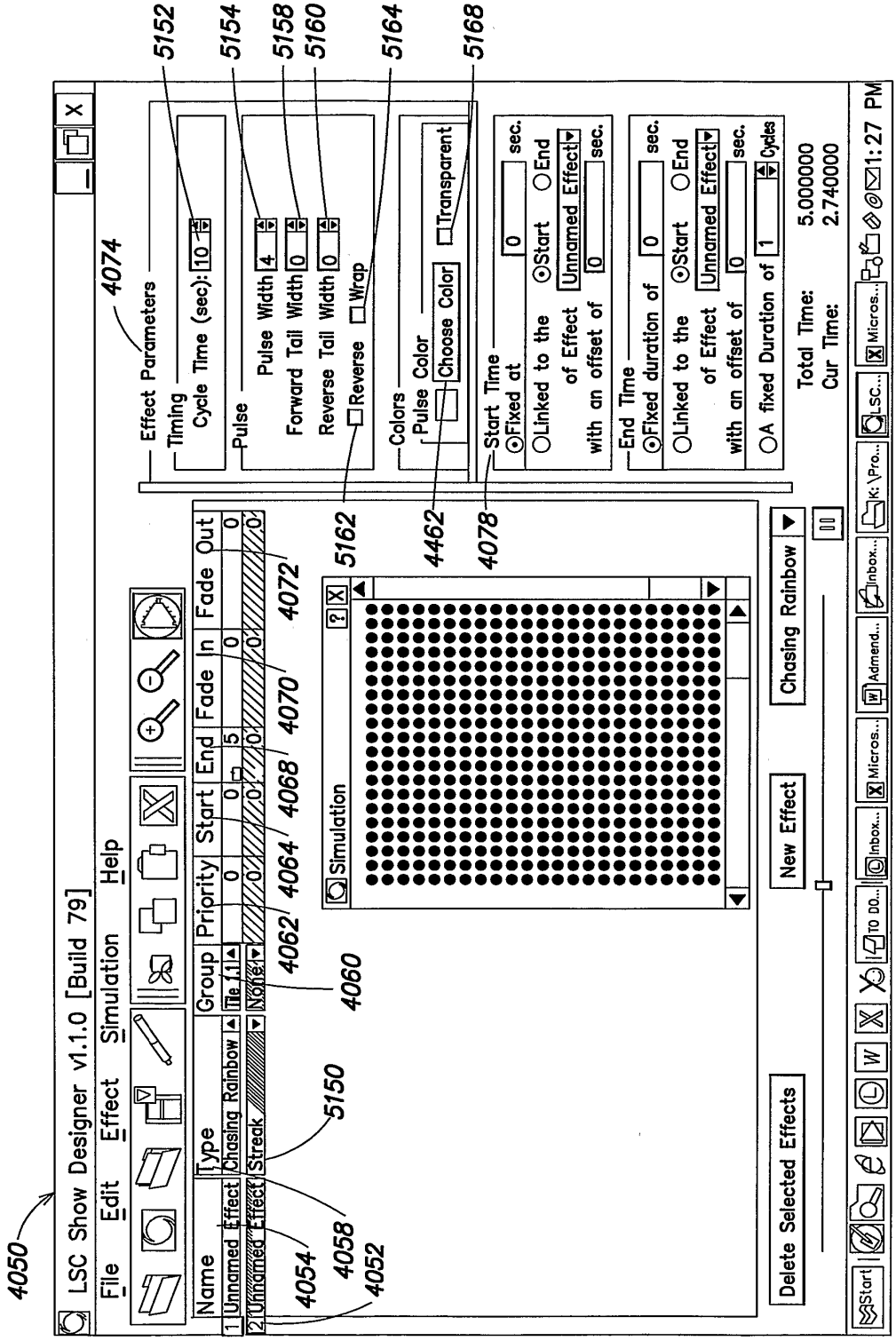

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 11
2 Unnamed Effect Streak None
Effect Parameters
Timing
Cycle Time (sec): 10
Pulse
Pulse Width 4
Forward Tail Width 0
Reverse Tail Width 0
Reverse Wrap
Colors
Pulse Color
Choose Color
Transparent
Start Time
Fixed at 0 sec.
Linked to the of Effect with an offset of Start End Unnamed Effect 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the of Effect with an offset of Start End Unnamed Effect 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.740000
Simulation
Chasing Rainbow
New Effect
Delete Selected Effects
4052
4054
4058
5150
4060
4062
4064
4068
4070
4072
5162
4462
4078
5152
5154
5158
5160
5164
5168
4074
1:27 PM

FIG. 51

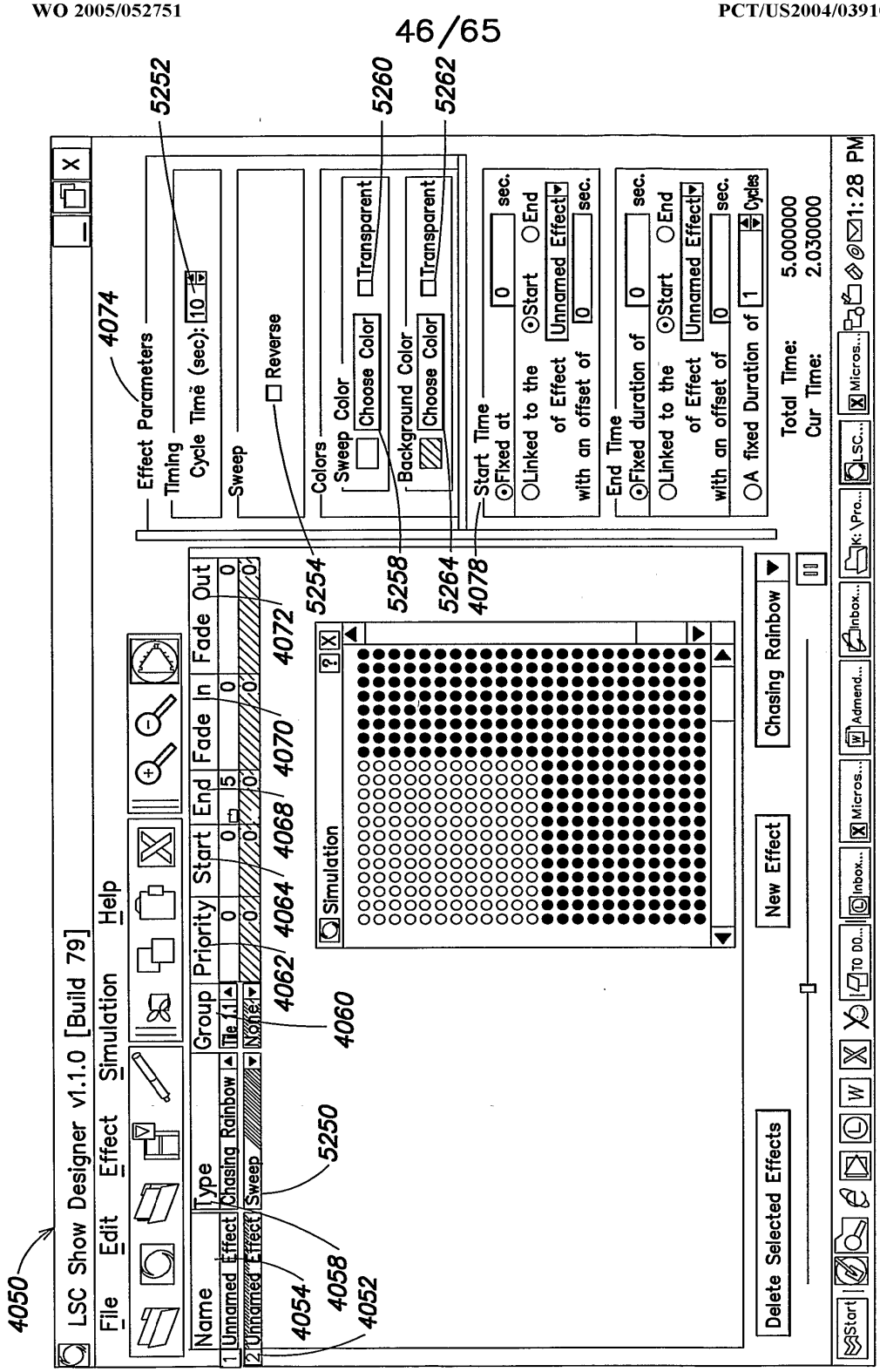

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 11
2 Unnamed Effect Sweep None
Effect Parameters
Timing
Cycle Time (sec): 10
Sweep
Reverse
Colors
Sweep Color
Choose Color
Transparent
Background Color
Choose Color
Transparent
Start Time
Fixed at
Linked to the of Effect with an offset of
Start End
Unnamed Effect
End Time
Fixed duration of
Linked to the of Effect with an offset of
A fixed Duration of
Cycles
Total Time: 5.000000
Cur Time: 2.030000
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
4050
4052
4054
4058
4060
4062
4064
4068
4070
4072
4074
4078
5250
5252
5254
5258
5260
5262
5264

FIG. 52

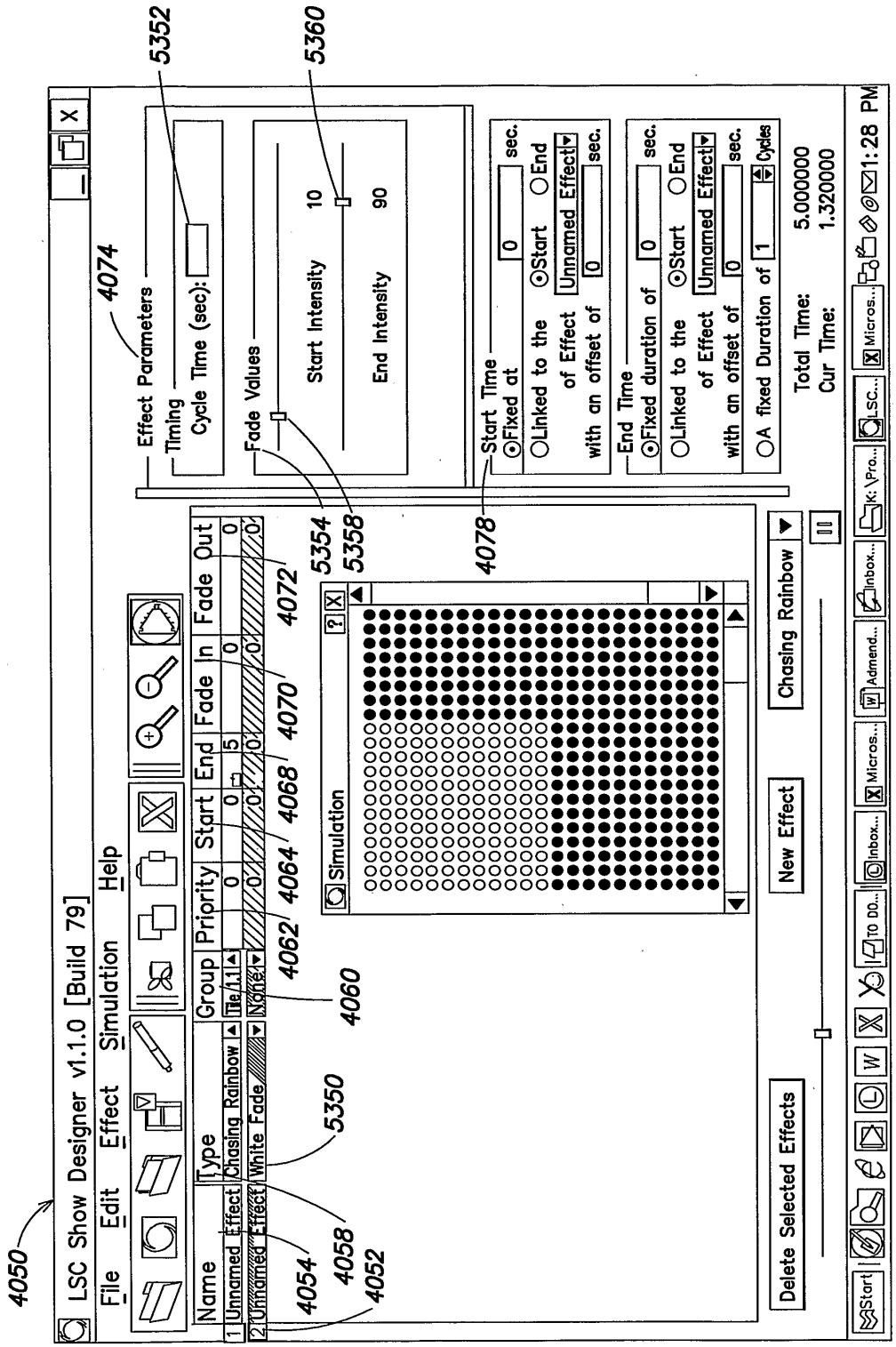

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow 0 0 5 0 0
2 Unnamed Effect White Fade None 0 0 0 0 0
Simulation
Effect Parameters
Timing
Cycle Time (sec):
Fade Values
Start Intensity 10
End Intensity 90
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 1.320000
Chasing Rainbow
New Effect
Delete Selected Effects
4050
4052
4054
4058
4060
4062
4064
4068
4070
4072
4074
4078
5350
5352
5354
5358
5360

FIG. 53

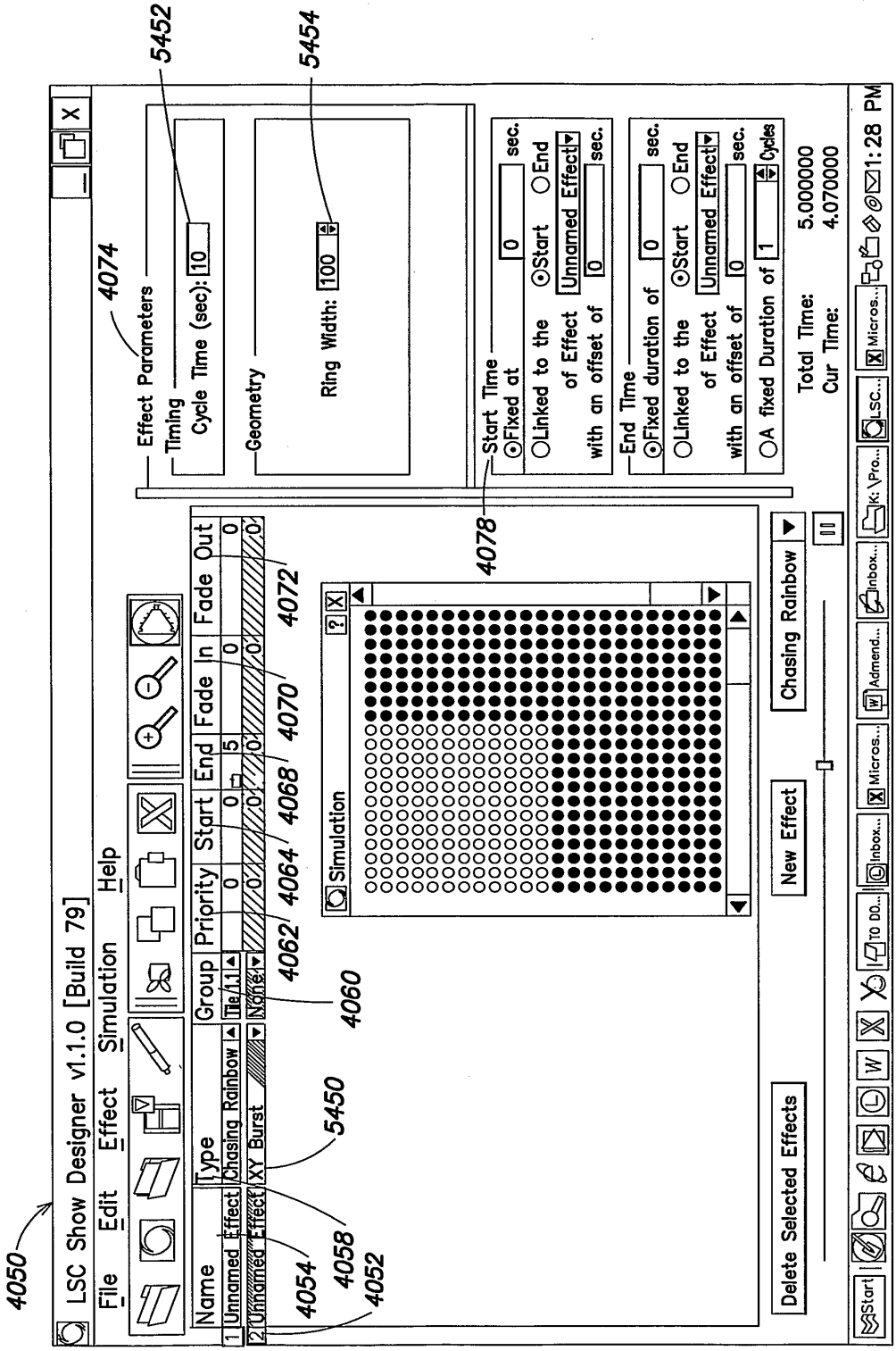

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile/All
2 Unnamed Effect XY Burst None
Simulation
Effect Parameters
Timing
Cycle Time (sec): 10
Geometry
Ring Width: 100
Start Time
Fixed at
Linked to the of Effect with an offset of
End Time
Fixed duration of
A fixed Duration of
Total Time: 5.000000
Cur Time: 4.070000
New Effect
Chasing Rainbow
Delete Selected Effects
4050
4052
4054
4058
5450
4060
4062
4064
4068
4070
4072
4074
4078
5452
5454

FIG. 54

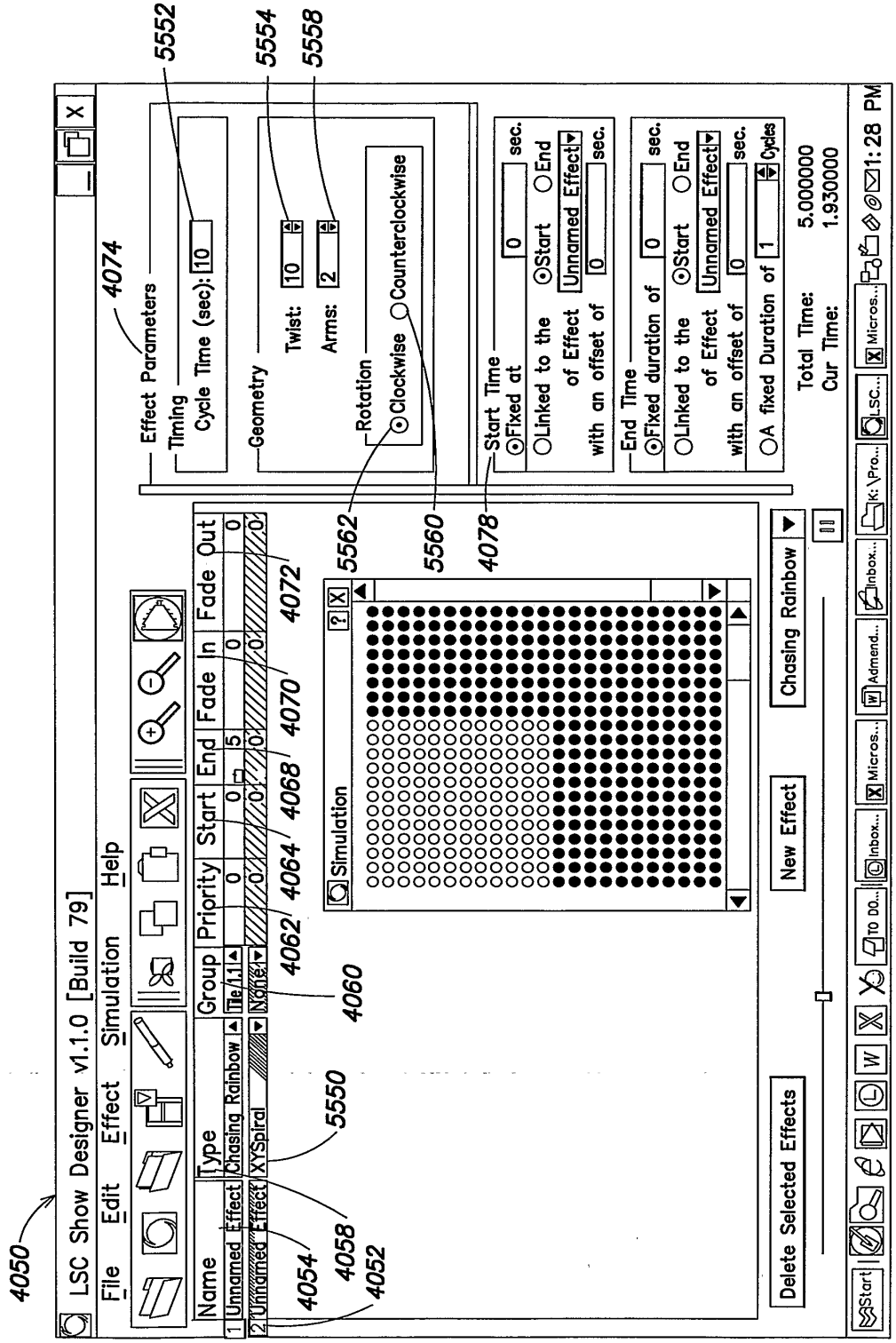

4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name
Type
Group
Priority
Start
End
Fade In
Fade Out
1 Unnamed Effect
Chasing Rainbow
Tile/1.1
0
0
5
0
0
2 Unnamed Effect
XYSpiral
None
0
0
0
0
0
4052
4054
4058
5550
4060
4062
4064
4068
4070
4072
Simulation
5562
5560
4078
New Effect
Chasing Rainbow
Delete Selected Effects
Effect Parameters
Timing
Cycle Time (sec): 10
Geometry
Twist: 10
Arms: 2
Rotation
Clockwise
Counterclockwise
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 1.930000
4074
5552
5554
5558
Start
1:28 PM

FIG. 55

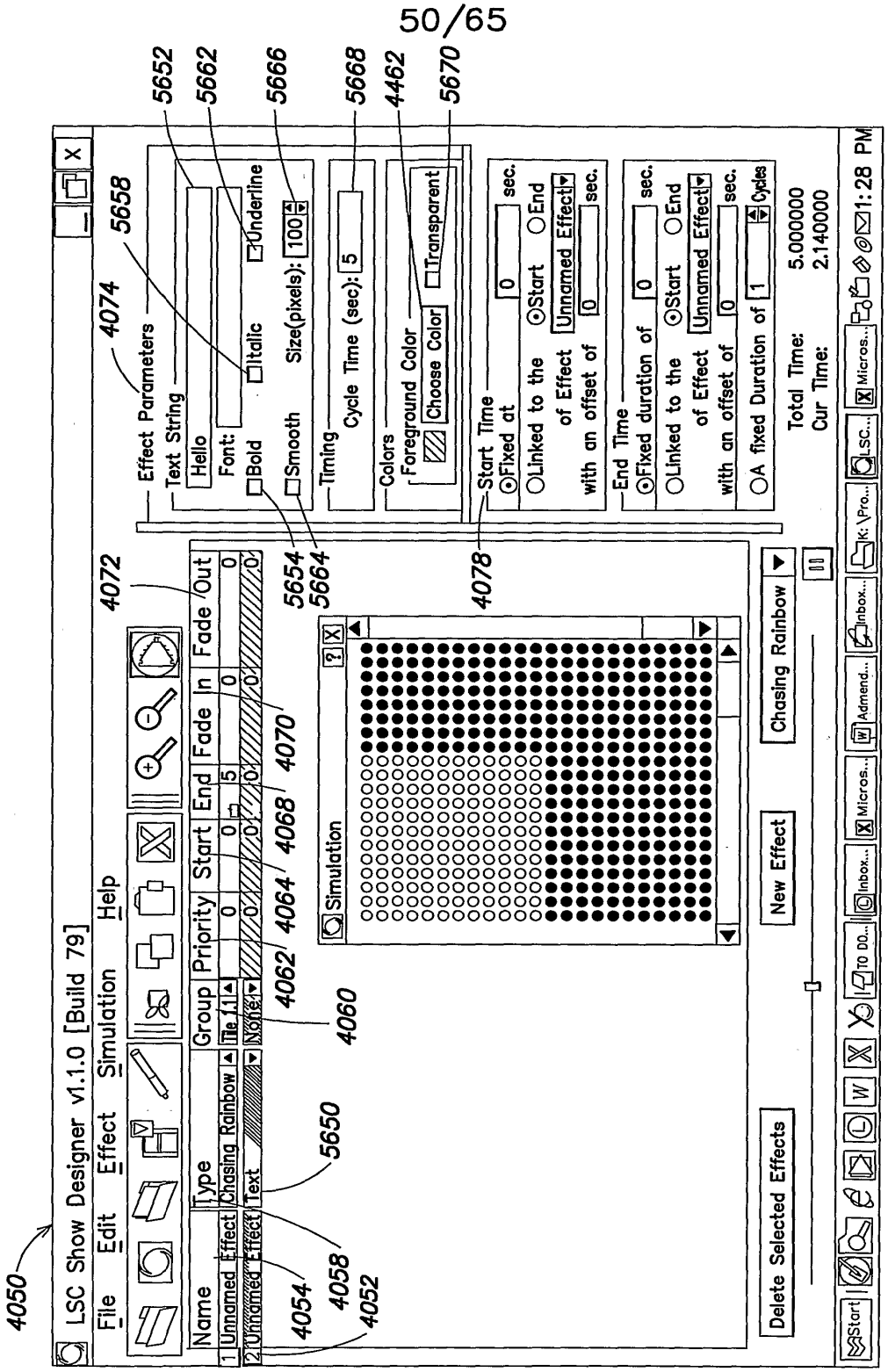

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect Chasing Rainbow Tile 11 0 0 5 0 0
2 Unnamed Effect Text None 0 0 0 0 0 0
Effect Parameters
Text String
Hello
Font:
Bold Italic Underline
Smooth Size(pixels): 100
Timing
Cycle Time (sec): 5
Colors
Foreground Color
Choose Color Transparent
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.140000
Simulation
Chasing Rainbow
New Effect
Delete Selected Effects
4050
4052
4054
4058
5650
4060
4062
4064
4068
4070
4072
5654
5664
4078
4074
5658
5652
5662
5666
5668
4462
5670

FIG. 56

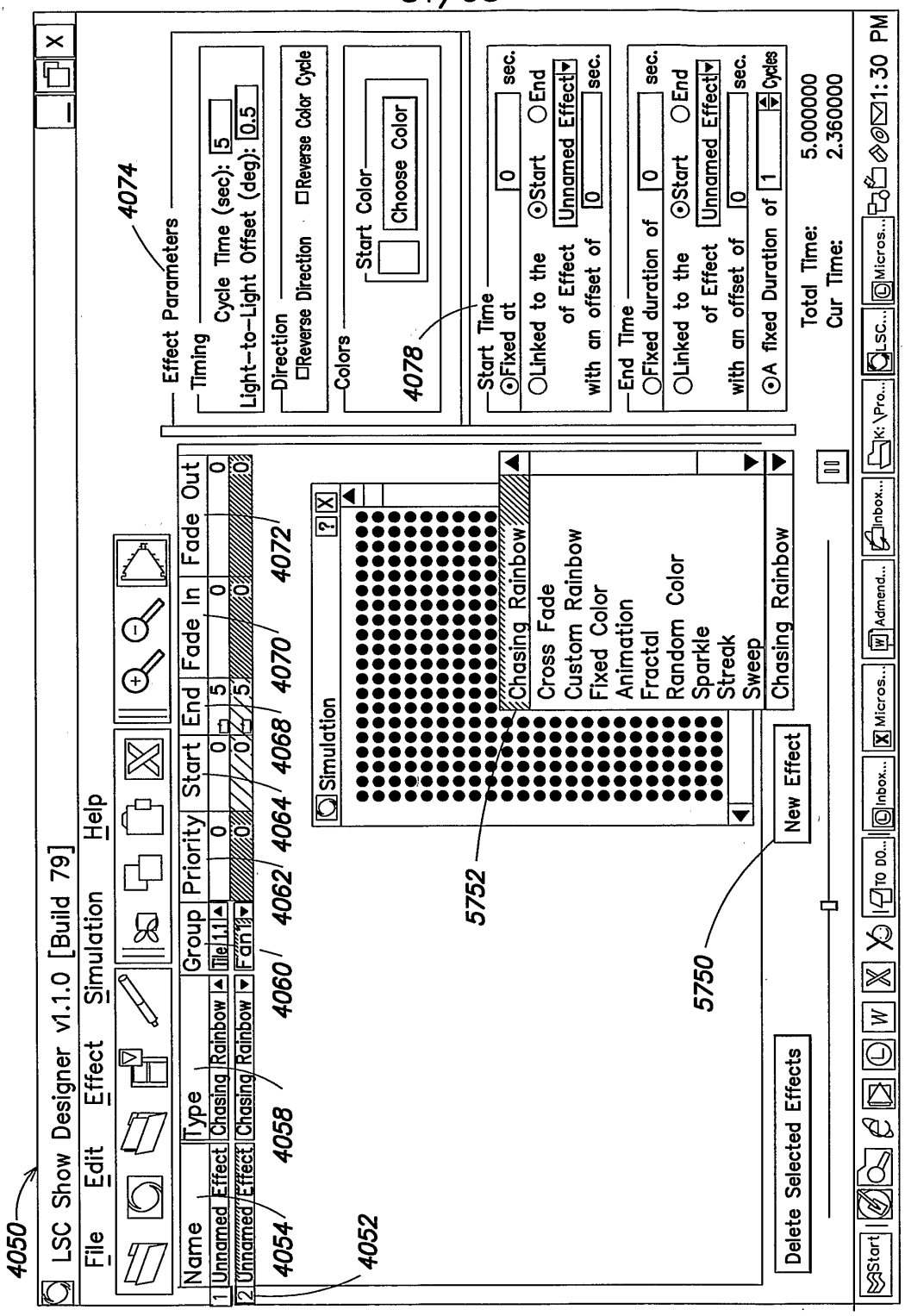

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Name Type Group Priority Start End Fade In Fade Out
Unnamed Effect Chasing Rainbow Tile 1,1 0 0 5 0 0
Unnamed Effect Chasing Rainbow Fan 0 0 5 0 0
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
Start Time
Fixed at 0 sec.
Linked to the of Effect with an offset of 0 Start End Unnamed Effect sec.
End Time
Fixed duration of 0 sec.
Linked to the of Effect with an offset of 0 Start End Unnamed Effect sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.360000
Simulation
Cross Fade
Custom Rainbow
Fixed Color
Animation
Fractal
Random Color
Sparkle
Streak
Sweep
Chasing Rainbow
New Effect
Delete Selected Effects
4050
4052
4054
4058
4060
4062
4064
4068
4070
4072
4074
4078
5750
5752

FIG. 57

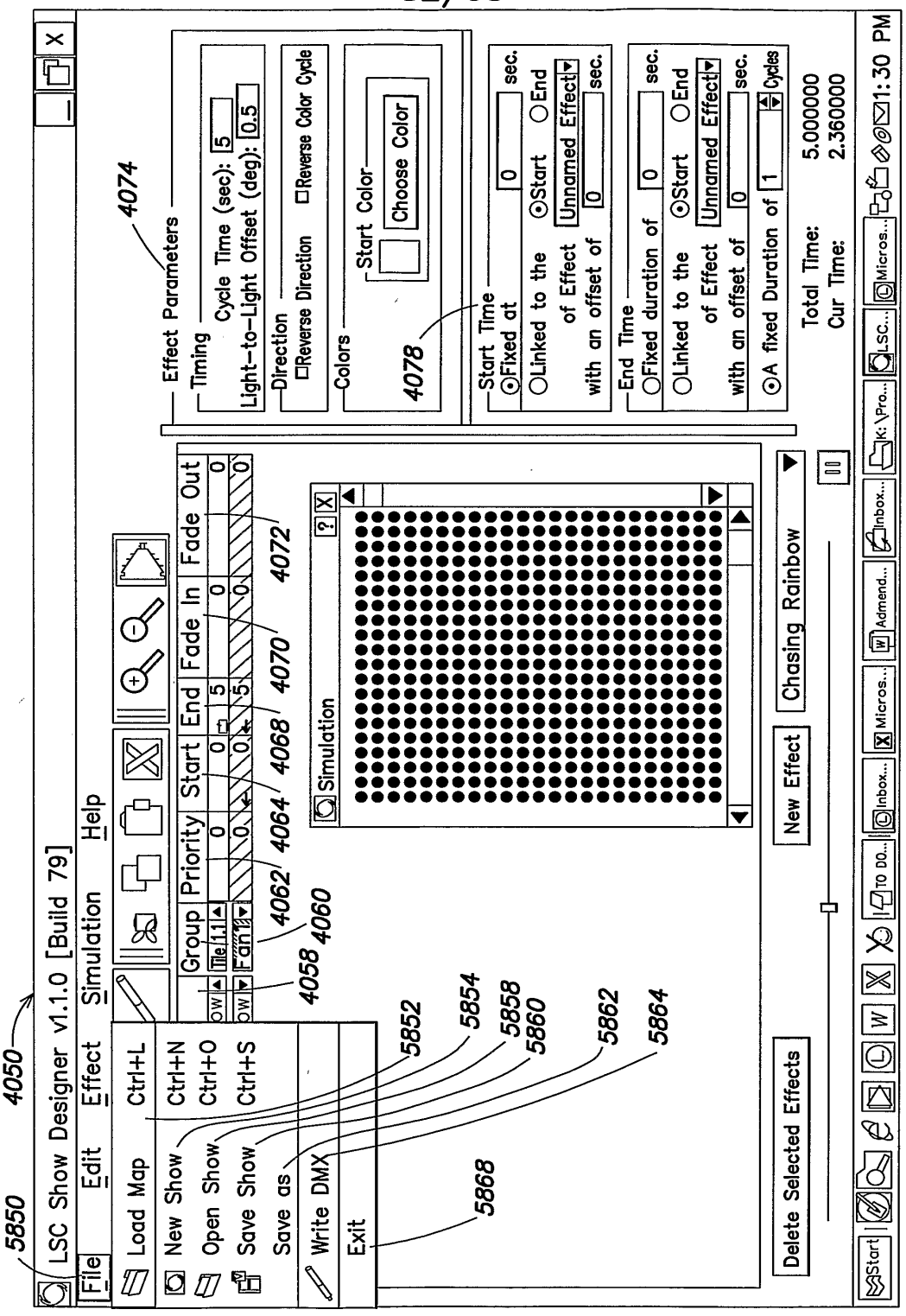

5850
4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Load Map Ctrl+L
New Show Ctrl+N
Open Show Ctrl+O
Save Show Ctrl+S
Save as
Write DMX
Exit
Group Priority Start End Fade In Fade Out
Tile 1.1.1
Fan 1
4062 4064 4068 4070 4072
4058 4060
5852 5854 5858 5860 5862 5864
5868
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
Effect Parameters
4074
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
4078
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.360000
Start
1:30 PM

FIG. 58

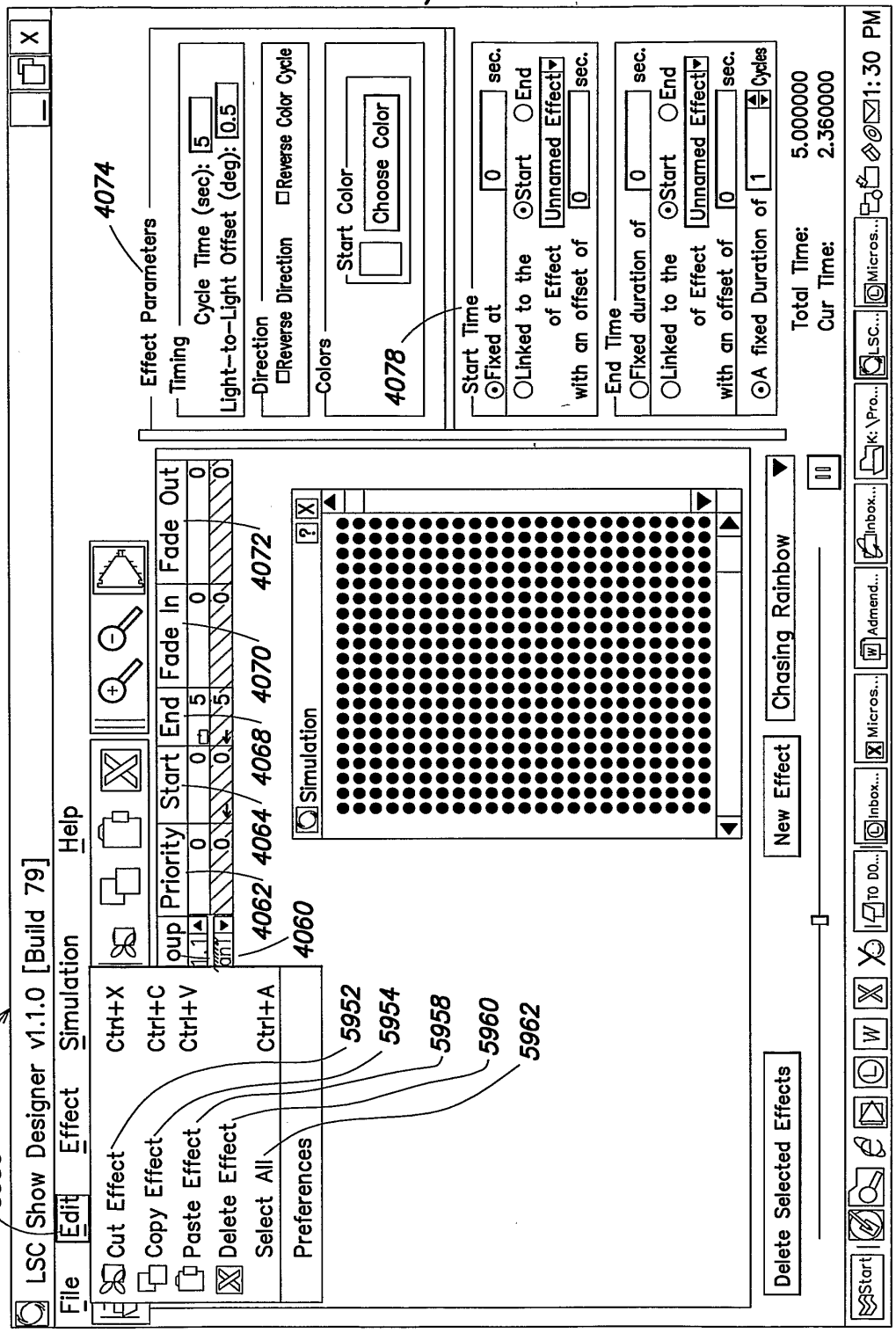

5950
4050
LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Cut Effect Ctrl+X
Copy Effect Ctrl+C
Paste Effect Ctrl+V
Delete Effect
Select All Ctrl+A
Preferences
5952
5954
5958
5960
5962
4062
4064
4068
4070
4072
4060
Priority Start End Fade In Fade Out
Simulation
New Effect
Chasing Rainbow
Delete Selected Effects
4074
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
4078
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 5.000000
Cur Time: 2.360000
1:30 PM

FIG. 59

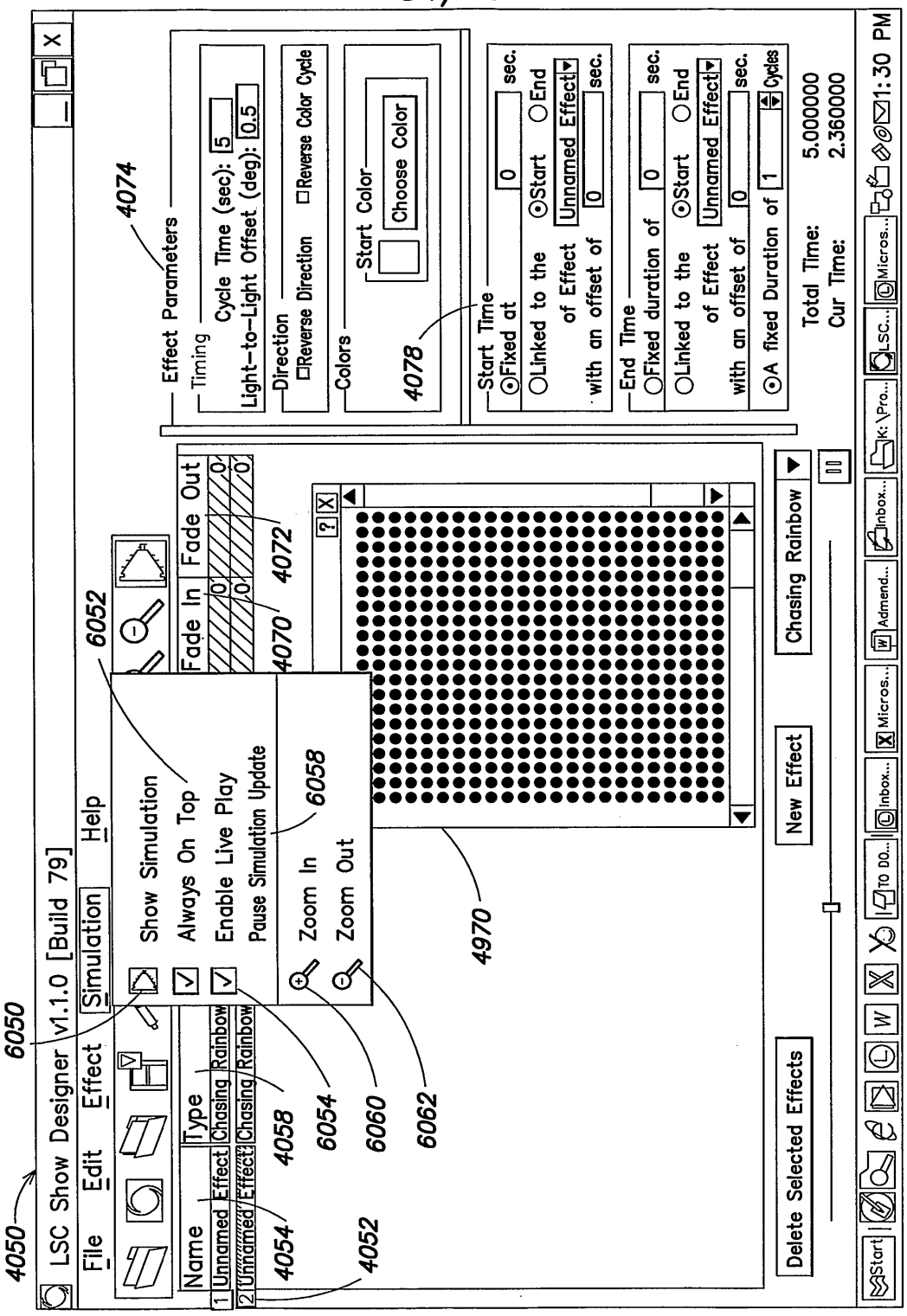

LSC Show Designer v1.1.0 [Build 79]
File Edit Effect Simulation Help
Show Simulation
Always On Top
Enable Live Play
Pause Simulation Update
Zoom In
Zoom Out
Name Type
1 Unnamed Effect Chasing Rainbow
2 Unnamed Effect Chasing Rainbow
Fade In Fade Out
Effect Parameters
Timing
Cycle Time (sec): 5
Light-to-Light Offset (deg): 0.5
Direction
Reverse Direction
Reverse Color Cycle
Colors
Start Color
Choose Color
Start Time
Fixed at
Linked to the of Effect with an offset of
End Time
Fixed duration of
Linked to the of Effect with an offset of
A fixed Duration of
Cycles
Total Time: 5.000000
Cur Time: 2.360000
Chasing Rainbow
New Effect
Delete Selected Effects
6050
4050
6052
4074
4072
4070
4078
4058
6054
6060
6062
6058
4970
4054
4052
Start
1:30 PM

FIG. 60

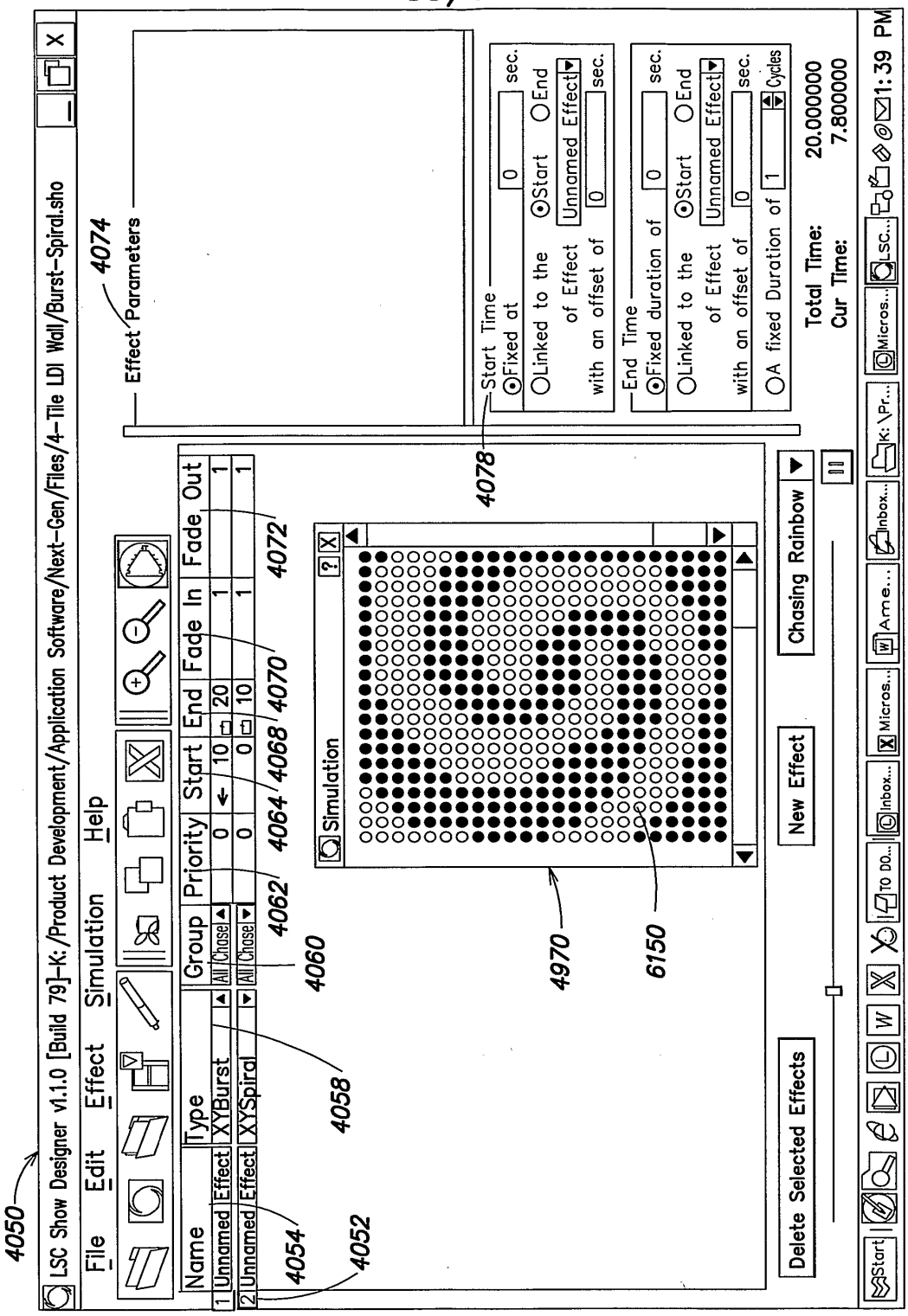

4050
LSC Show Designer v1.1.0 [Build 79]-K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/Burst-Spiral.sho
File Edit Effect Simulation Help
4074
Effect Parameters
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect XYBurst All Chase 0 10 20 1 1
2 Unnamed Effect XYSpiral All Chase 0 0 10 1 1
4072
4070
4068
4064
4062
4060
4058
4054
4052
Simulation
4970
6150
4078
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 20.000000
Cur Time: 7.800000
Delete Selected Effects
New Effect
Chasing Rainbow
Start
1:39 PM

FIG. 61

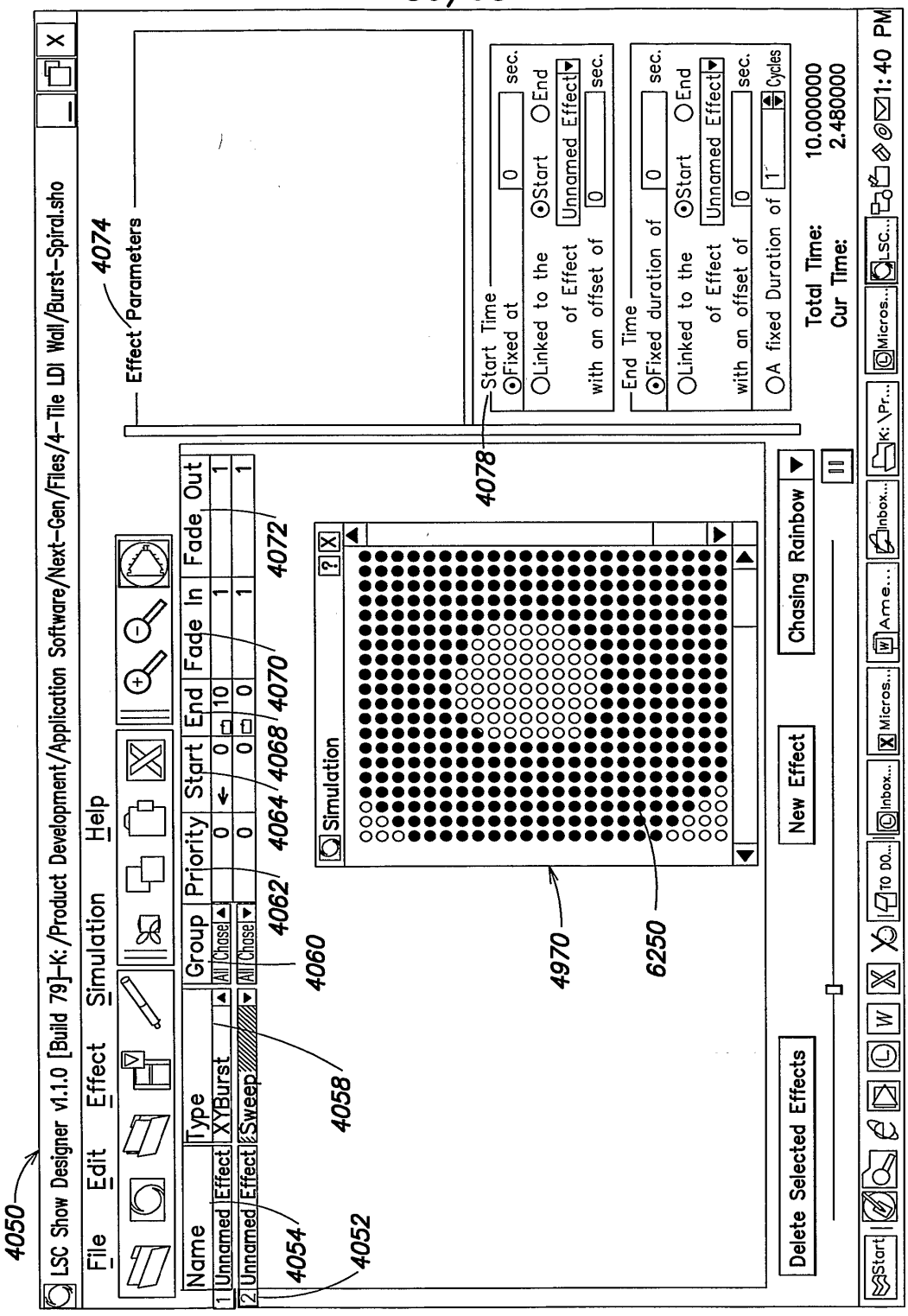

4050
LSC Show Designer v1.1.0 [Build 79] - K:/Product Development/Application Software/Next-Gen/Files/4-Tile LDI Wall/Burst-Spiral.sho
File Edit Effect Simulation Help
4074
Effect Parameters
Name Type Group Priority Start End Fade In Fade Out
1 Unnamed Effect XYBurst All Chase 0 0 10 1 1
2 Unnamed Effect Sweep All Chase 0 0 0 1 1
4072
4070
4068
4064
4062
4060
4058
4054
4052
4078
Start Time
Fixed at 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
End Time
Fixed duration of 0 sec.
Linked to the Start End of Effect Unnamed Effect with an offset of 0 sec.
A fixed Duration of 1 Cycles
Total Time: 10.000000
Cur Time: 2.480000
Simulation
4970
6250
Delete Selected Effects
New Effect
Chasing Rainbow
Start
1:40 PM

FIG. 62

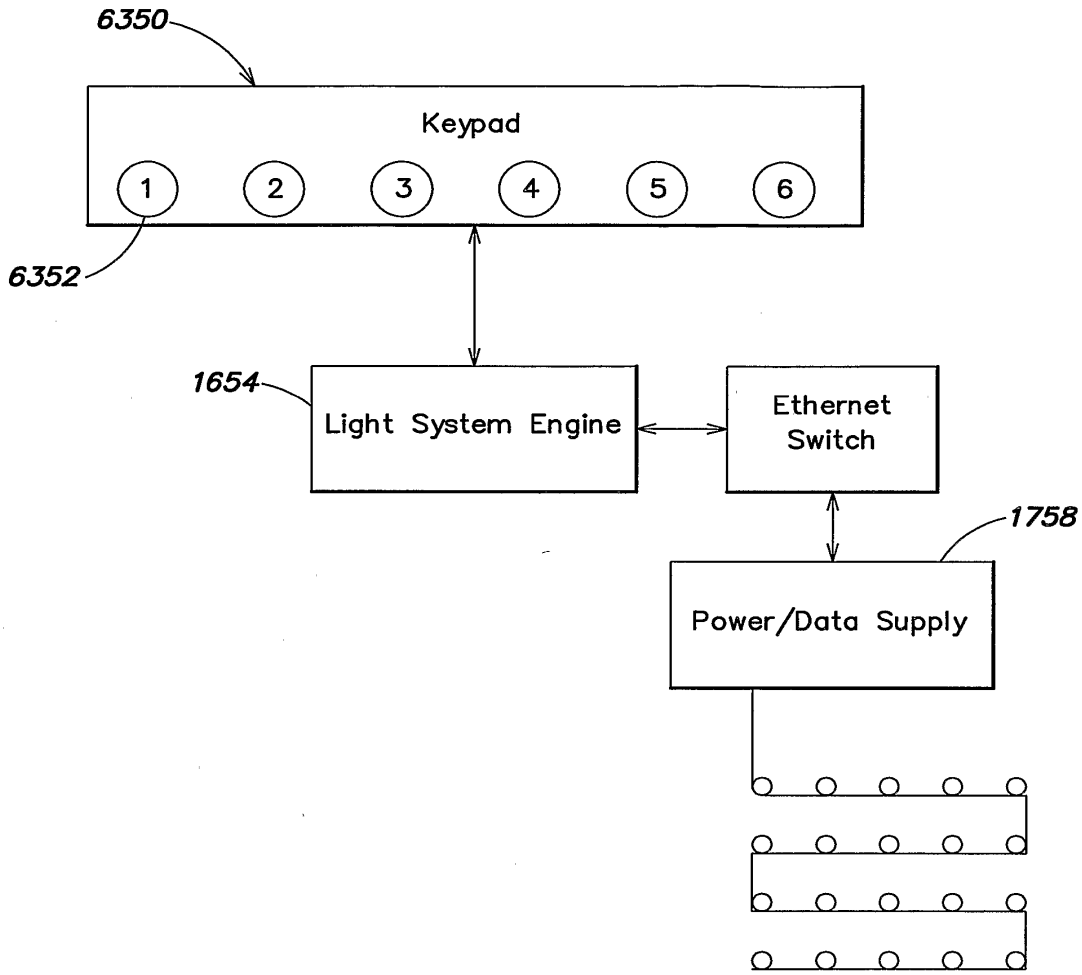

6350
Keypad
1
2
3
4
5
6
6352
1654
Light System Engine
Ethernet Switch
1758
Power/Data Supply

FIG. 63

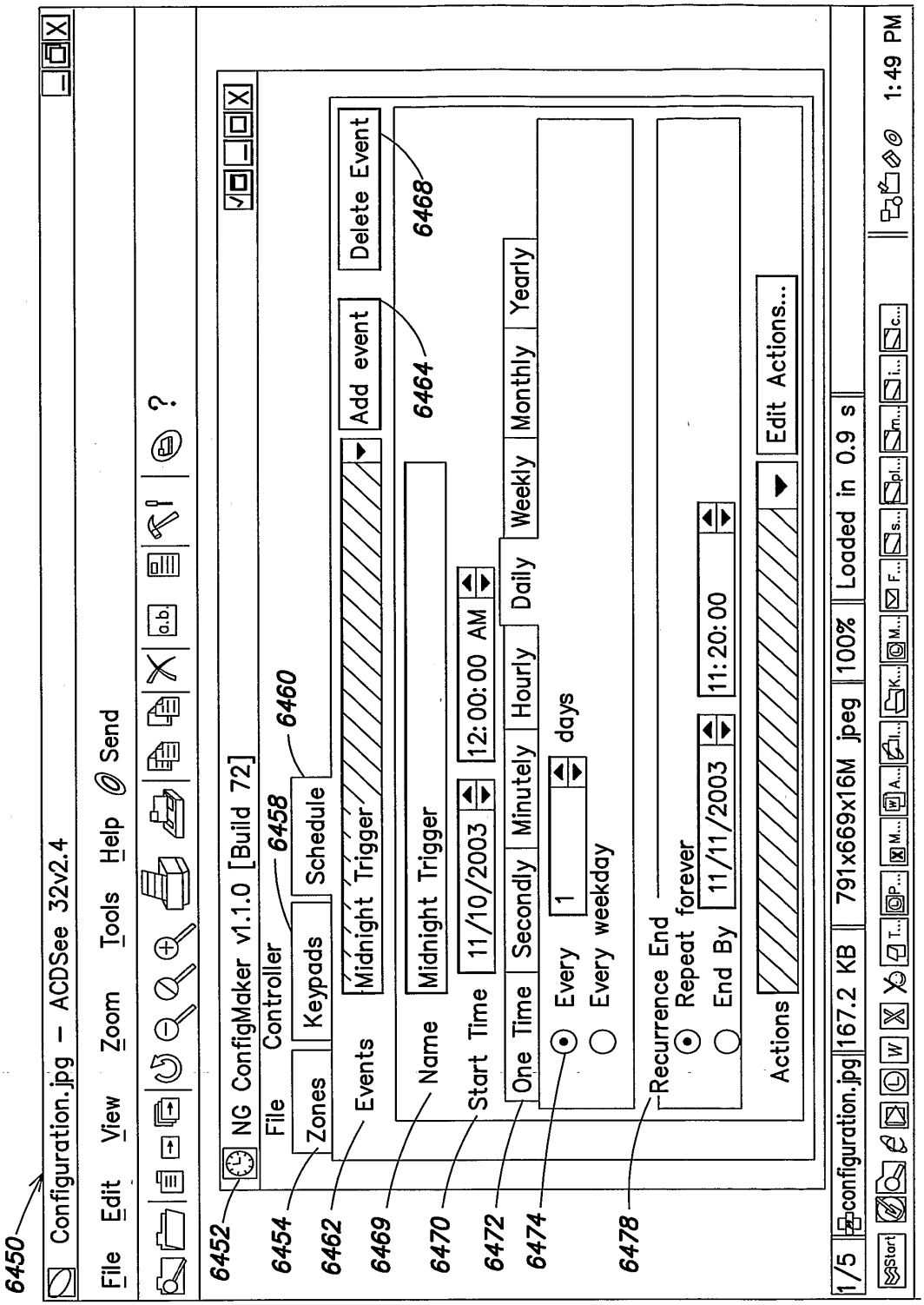

6450
Configuration.jpg – ACDSee 32v2.4
File Edit View Zoom Tools Help Send
6452
NG ConfigMaker v1.1.0 [Build 72]
File Controller
6454
Zones
6458
Keypads
Schedule
6460
6462
Events
Midnight Trigger
Add event
Delete Event
6468
6469
Name
Midnight Trigger
6464
6470
Start Time
11/10/2003
12:00:00 AM
6472
One Time
Secondly
Minutely
Hourly
Daily
Weekly
Monthly
Yearly
6474
Every 1 days
Every weekday
6478
Recurrence End
Repeat forever
End By
11/11/2003
11:20:00
Actions
Edit Actions...
1/5
configuration.jpg 167.2 KB
791x669x16M jpeg
100%
Loaded in 0.9 s
Start
1:49 PM

FIG. 64

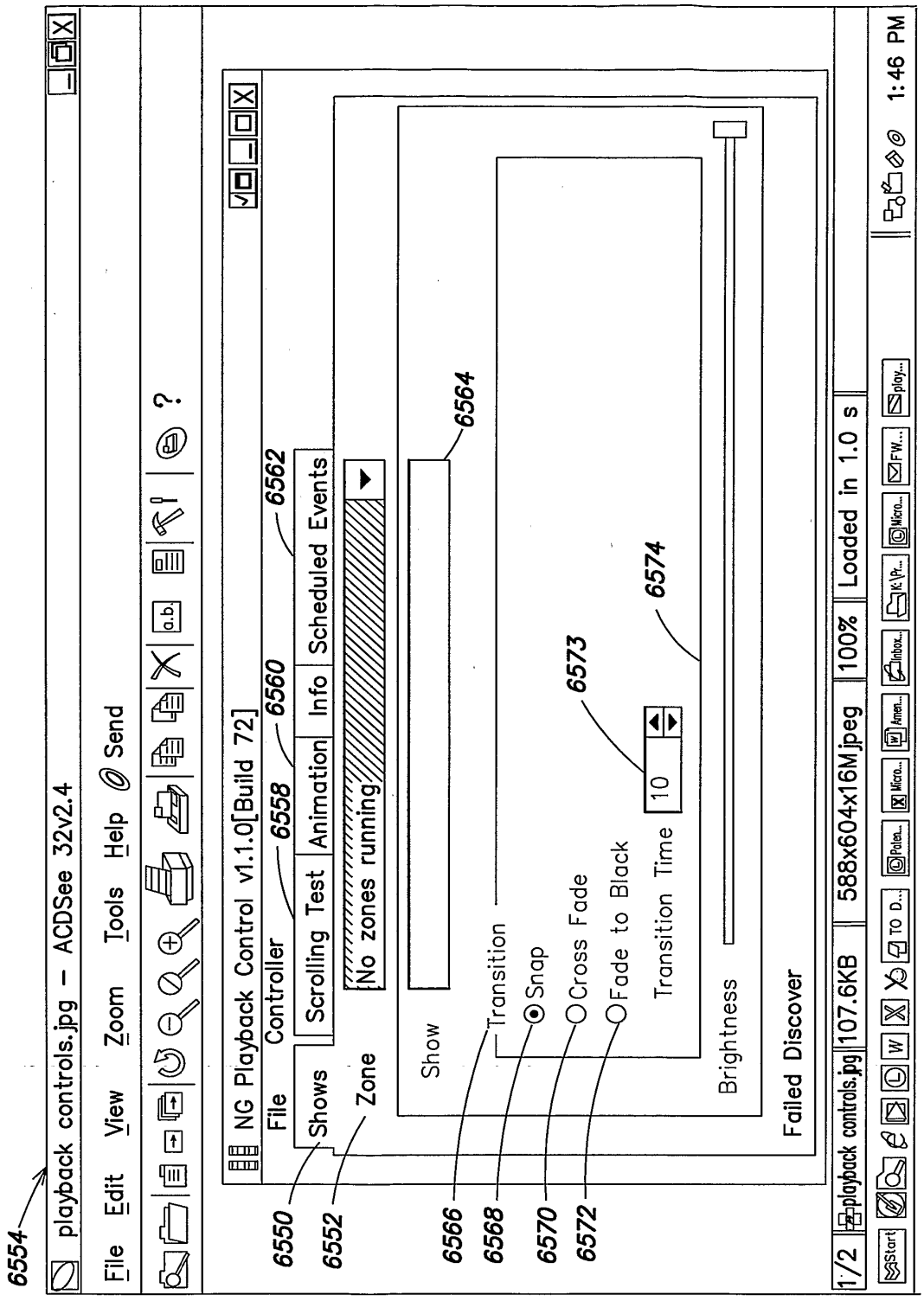

6554
playback controls.jpg – ACDSee 32v2.4
File Edit View Zoom Tools Help Send
NG Playback Control v1.1.0[Build 72]
File Controller
Shows
Zone
Scrolling Test
Animation
Info
Scheduled Events
No zones running
Show
Transition
Snap
Cross Fade
Fade to Black
Transition Time
10
Brightness
Failed Discover
6550
6552
6558
6560
6562
6564
6566
6568
6570
6572
6573
6574
1/2
playback controls.jpg 107.6KB
588x604x16Mjpeg
100%
Loaded in 1.0 s
1:46 PM

FIG. 65

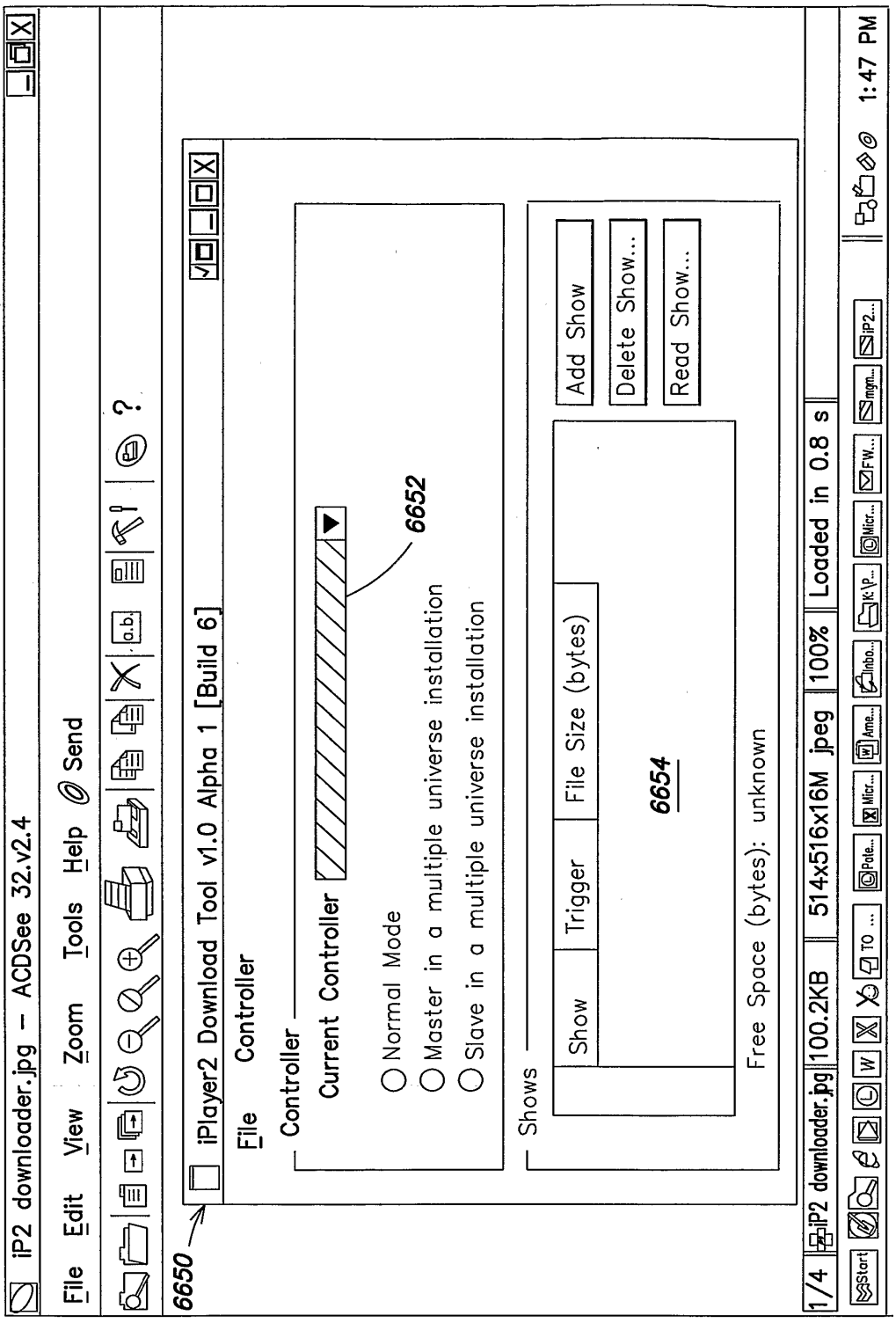

iP2 downloader.jpg – ACDSee 32.v2.4
File Edit View Zoom Tools Help Send
6650
iPlayer2 Download Tool v1.0 Alpha 1 [Build 6]
File Controller
Controller
Current Controller
6652
Normal Mode
Master in a multiple universe installation
Slave in a multiple universe installation
Shows
Show
Trigger
File Size (bytes)
6654
Free Space (bytes): unknown
Add Show
Delete Show...
Read Show...
1/4
iP2 downloader.jpg
100.2KB
514x516x16M jpeg
100%
Loaded in 0.8 s
Start
1:47 PM

FIG. 66

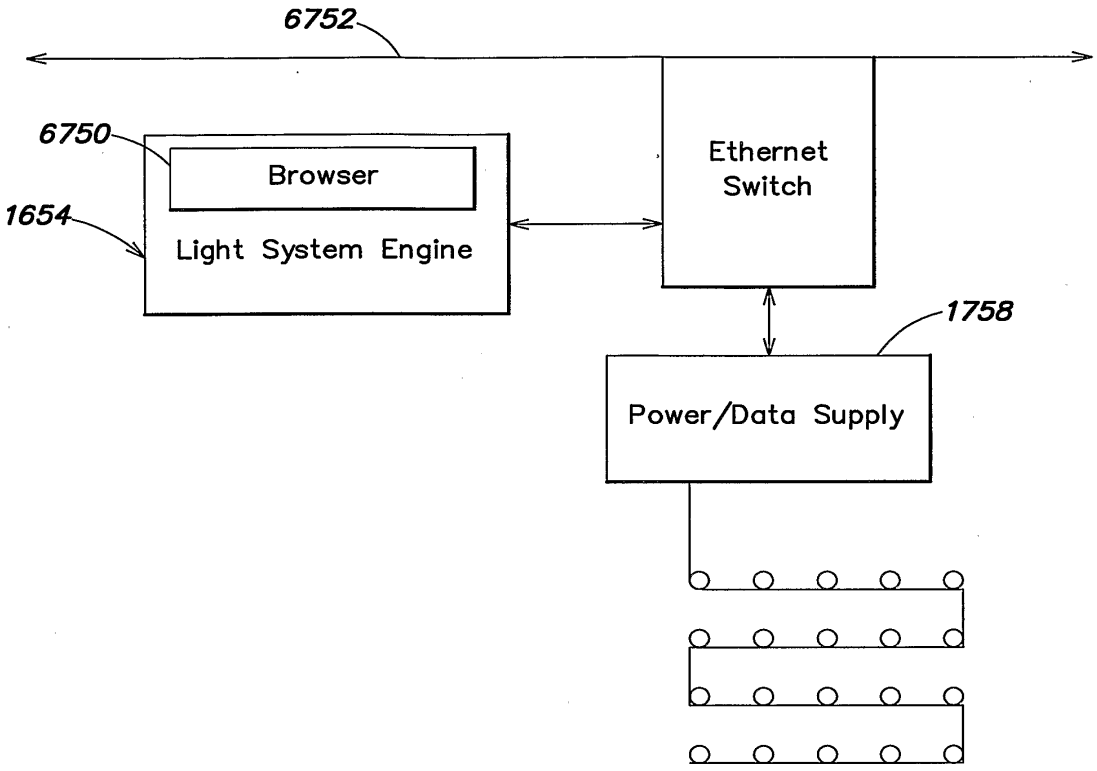

6752
6750
Browser
1654
Light System Engine
Ethernet Switch
1758
Power/Data Supply

FIG. 67

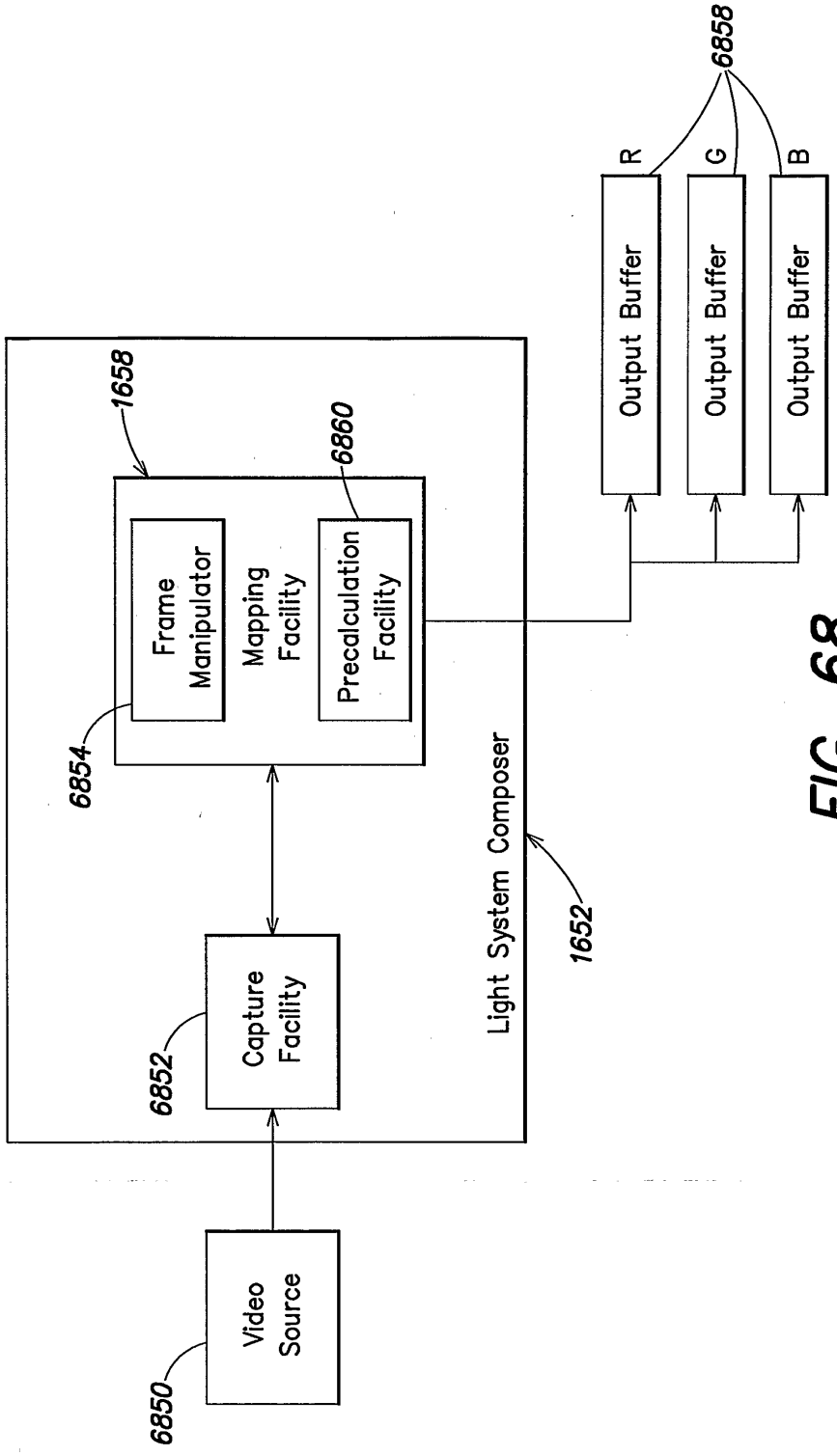

6858
R
G
B
Output Buffer
Output Buffer
Output Buffer
1658
6860
Frame Manipulator
Mapping Facility
Precalculation Facility
6854
Light System Composer
1652
Capture Facility
6852
Video Source
6850

FIG. 68

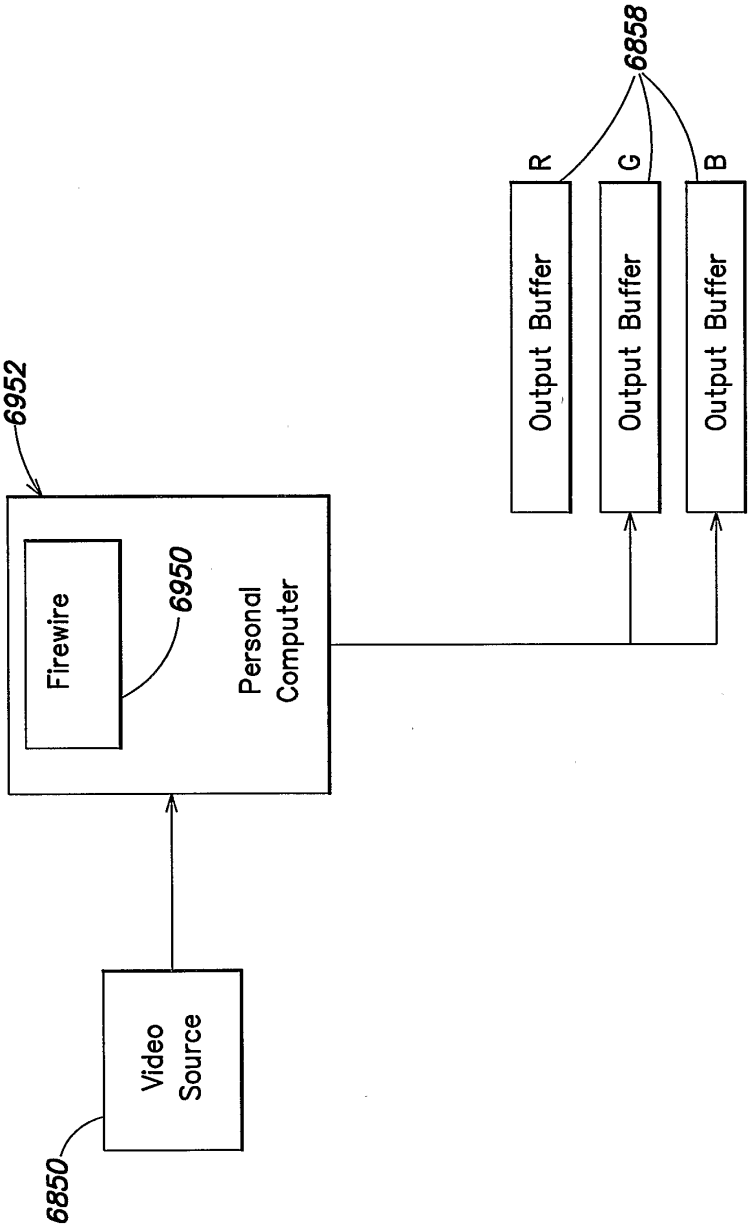

6858
R
G
B
Output Buffer
Output Buffer
Output Buffer
6952
Firewire
6950
Personal Computer
Video Source
6850

FIG. 69

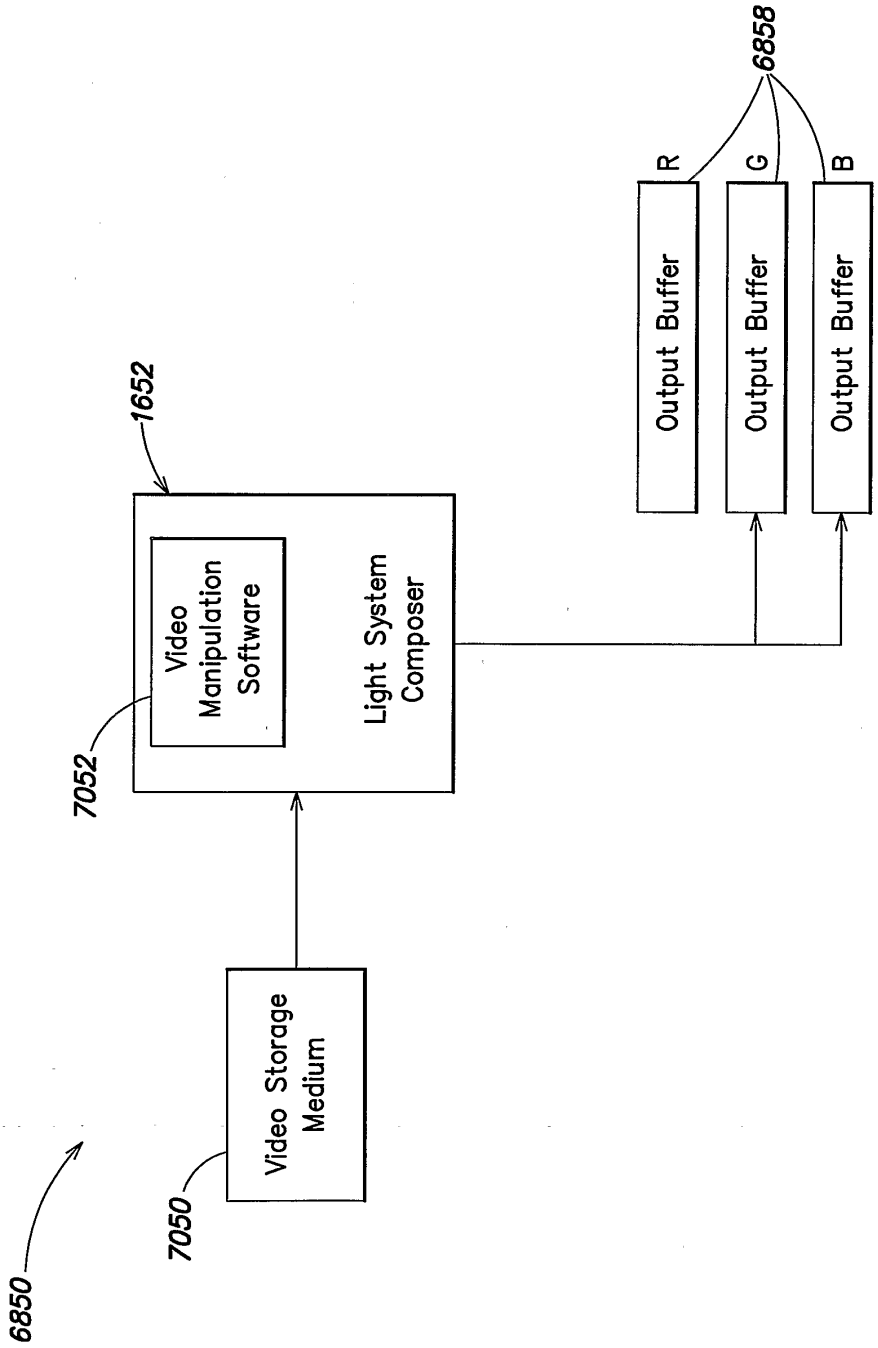

6858
R
G
B
Output Buffer
Output Buffer
Output Buffer
1652
Video Manipulation Software
Light System Composer
7052
Video Storage Medium
7050
6850

FIG. 70

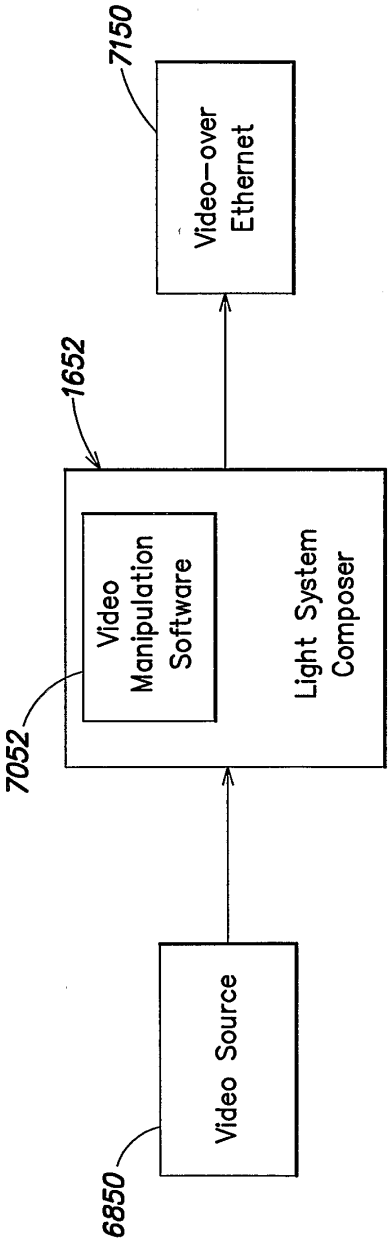

7150
Video–over Ethernet
1652
Video Manipulation Software
Light System Composer
7052
Video Source
6850

FIG. 71

Electronic Acknowledgement Receipt	
EFS ID:	31025384
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen GAMMONS
Customer Number:	67801
Filer:	Martin Dennis Moynihan/Benjamin Frohlinger
Filer Authorized By:	Martin Dennis Moynihan
Attorney Docket Number:	70945
Receipt Date:	22-NOV-2017
Filing Date:	
Time Stamp:	10:48:48
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	_form1449.pdf	555476 3442be5880bc5c29cc0a327d494345fba0872013	no	2
Warnings:					

Information:					
This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	_USPTOltr.pdf	22156 e390e2a408b58f24e9ac6a22ab6d32d2bf51ec0d	no	3
Warnings:					
Information:					
3	Foreign Reference	8-281764.pdf	688045 2f9f3e8007bab46a5302836539d1446f5449f97e	no	24
Warnings:					
Information:					
4	Foreign Reference	9-281783.pdf	191169 ea7c38129727e84bf78498309b2fa5edcc3d635d	no	14
Warnings:					
Information:					
5	Foreign Reference	10-281780.pdf	704477 43e6d1b3b8620348414e701a178a3087cc7a8562	no	33
Warnings:					
Information:					
6	Foreign Reference	11-281782.pdf	2128592 9868aed668f907b6d028aa32078116c8ace9beec	no	51
Warnings:					
Information:					
7	Non Patent Literature	12-281766.pdf	669939 51ce6fdc92ddab219f8cb3db9a53cc74073a0bf3	no	10
Warnings:					
Information:					
8	Foreign Reference	13-281756.pdf	2229886 0d16449bb71ecf896b70aaeb20d0cdbbedbec85c	no	47
Warnings:					
Information:					

9	Foreign Reference	14-281754.pdf	7670342 388cde656c2eaf30c1cdfee1026868ae2a2652a8	no	170
Warnings:					
Information:					
10	Non Patent Literature	15-281779.pdf	205510 98149ea566353ab264738c1814831ed3a5372e6f	no	7
Warnings:					
Information:					
11	Non Patent Literature	16-281753.pdf	269065 c2b84d20018cd8622538ddd4400fcd95510beaa8	no	7
Warnings:					
Information:					
12	Non Patent Literature	17-281770.pdf	339181 97f694a9776ecd7fbf4e9dd1583c86b72209af56	no	3
Warnings:					
Information:					
		Total Files Size (in bytes):	15673838		

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New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 15820469 Document Date: 11/22/2017

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013

PATENT APPLICATION FEE DETERMINATION RECORD

Substitute for Form PTO-875

Application or Docket Number: 15/820,469

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY FEE($)
BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A	N/A	70		N/A	
SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A	N/A	300		N/A	
EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A	N/A	360		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	20 minus 20 =	*	x 40 =	0.00	OR		
INDEPENDENT CLAIMS (37 CFR 1.16(h))	3 minus 3 =	*	x 210 =	0.00			
APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).			0.00			
MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))				0.00			
* If the difference in column 1 is less than zero, enter "0" in column 2.			TOTAL	730		TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT A

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	SMALL ENTITY RATE($)	SMALL ENTITY ADDITIONAL FEE($)	OR	OTHER THAN SMALL ENTITY RATE($)	OTHER THAN SMALL ENTITY ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

AMENDMENT B

	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA	RATE($)	ADDITIONAL FEE($)		RATE($)	ADDITIONAL FEE($)
Total (37 CFR 1.16(i))	*	Minus	**	=	x =		OR	x =	
Independent (37 CFR 1.16(h))	*	Minus	***	=	x =		OR	x =	
Application Size Fee (37 CFR 1.16(s))									
FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							OR		
					TOTAL ADD'L FEE		OR	TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".
The "Highest Number Previously Paid For" (Total or Independent) is the highest found in the appropriate box in column 1.

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United States Patent and Trademark Office
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APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/820,469	11/22/2017		730	70945	20	3

CONFIRMATION NO. 5873

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

FILING RECEIPT

OC000000098316808

Date Mailed: 12/28/2017

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Roderick Allen Gammons, Staines Upon Thames, UNITED KINGDOM;
Andrew Francis, Witham, UNITED KINGDOM;
Roderick Aaron Gammons, Winkfield, UNITED KINGDOM;

Applicant(s)

Rotolight Limited, London, UNITED KINGDOM;

Power of Attorney: The patent practitioners associated with Customer Number 67801

Domestic Priority data as claimed by applicant

This application is a CON of 15/481,460 04/07/2017
which claims benefit of 62/319,809 04/08/2016

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1606907.2 04/20/2016 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

If Required, Foreign Filing License Granted: 12/27/2017

The country code and number of your priority application, to be used for filing abroad under the Paris Convention, is **US 15/820,469**

Projected Publication Date: 04/05/2018

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

LIGHTING SYSTEM AND CONTROL THEREOF

Preliminary Class

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

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Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

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OFFICE OF PETITIONS

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON VA 22215

Doc Code: TRACK1.GRANT

Decision Granting Request for Prioritized Examination (Track I or After RCE)	Application No.: 15/820,469

1. THE REQUEST FILED November 22, 2017 IS **GRANTED.**

The above-identified application has met the requirements for prioritized examination

A. ☒ for an original nonprovisional application (Track I).
B. ☐ for an application undergoing continued examination (RCE).

2. **The above-identified application will undergo prioritized examination.** The application will be accorded special status throughout its entire course of prosecution until one of the following occurs:

A. filing a **petition for extension of time** to extend the time period for filing a reply;
B. filing an **amendment to amend the application to contain more than four independent claims, more than thirty total claims**, or a multiple dependent claim;
C. filing a **request for continued examination**;
D. filing a notice of appeal;
E. filing a request for suspension of action;
F. mailing of a notice of allowance;
G. mailing of a final Office action;
H. completion of examination as defined in 37 CFR 41.102; or
I. abandonment of the application.

Telephone inquiries with regard to this decision should be directed to Brian W. Brown at 571-272-5338.

/Brian W. Brown/
[*Signature*]

Petitions Examiner, Office of Petitions
(Title)

U.S. Patent and Trademark Office
PTO-2298 (Rev. 02-2012)

PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S.Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	OWENS Douglas W.
Attorney Docket Number	70945

Sheet	1	of	2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Document Number Number-Kind Code [2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2017/0343197	30-Nov-2017	Gammons et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Documents Country Code [3]-Number [4]-Kind Code [5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

[6] Applicant is to place a check mark here if English language translation is attached.

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PTO/SB/08a (08-03)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Group Art Unit	2844
Examiner Name	OWENS Douglas W.
Attorney Docket Number	70945

Sheet	2	Of	2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		§	
		§	
	GAMMONS Roderick Allen et al	§	
		§	Confirmation No.: 5873
Serial No.:	15/820,469	§	
		§	
Filed:	November 22, 2017	§	Group Art Unit: 2844
		§	
For:	LIGHTING SYSTEM AND CONTROL THEREOF [CineSFX]	§	
		§	Attorney Docket: 70945
Examiner:	OWENS Douglas W.	§	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☒ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement.

C. FEE

☐

☒ No Fee is Due.

This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

FOR PATENT TERM ADJUSTMENT CALCULATION PURPOSES ONLY:

Unless indicated otherwise, to the best of our knowledge and procedures, each item of information contained in the information disclosure statement was first known no more than thirty days prior to the filing of the information disclosure statement, either by the inventor named in the application, Attorney or agent who prepares or prosecutes the application, and every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, the applicant, an assignee, or anyone to whom there is an obligation to assign the application.

Respectfully submitted,

/ Martin D. Moynihan /

Martin D. Moynihan
Registration No. 40338
Telephone: (703)859-9634

Date: 02 February 2018

Electronic Acknowledgement Receipt	
EFS ID:	31733488
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan/Benjamin Frohlinger
Filer Authorized By:	Martin Dennis Moynihan
Attorney Docket Number:	70945
Receipt Date:	08-FEB-2018
Filing Date:	22-NOV-2017
Time Stamp:	06:59:54
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Information Disclosure Statement (IDS) Form (SB08)	_form1449.pdf	324992 109730a1aea9a2809e5f3014c682b93ab9b761d4	no	2
Warnings:					

Information:					
This is not an USPTO supplied IDS fillable form					
2	Transmittal Letter	_USPTOltr.pdf	22343 245d1d430826669fd2f0a86fa642946ef1f8ad2a	no	3
Warnings:					
Information:					
			Total Files Size (in bytes):	347335	

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New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
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If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

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APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/820,469	11/22/2017	Roderick Allen Gammons	70945

CONFIRMATION NO. 5873

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

PUBLICATION NOTICE

OC000000098580309

Title:LIGHTING SYSTEM AND CONTROL THEREOF

Publication No.US-2018-0094798-A1
Publication Date:04/05/2018

NOTICE OF PUBLICATION OF APPLICATION

The above-identified application will be electronically published as a patent application publication pursuant to 37 CFR 1.211, et seq. The patent application publication number and publication date are set forth above.

The publication may be accessed through the USPTO's publically available Searchable Databases via the Internet at www.uspto.gov. The direct link to access the publication is currently http://www.uspto.gov/patft/.

The publication process established by the Office does not provide for mailing a copy of the publication to applicant. A copy of the publication may be obtained from the Office upon payment of the appropriate fee set forth in 37 CFR 1.19(a)(1). Orders for copies of patent application publications are handled by the USPTO's Public Records Division. The Public Records Division can be reached by telephone at (571) 272-3150 or (800) 972-6382, by facsimile at (571) 273-3250, by mail addressed to the United States Patent and Trademark Office, Public Records Division, Alexandria, VA 22313-1450 or via the Internet.

In addition, information on the status of the application, including the mailing date of Office actions and the dates of receipt of correspondence filed in the Office, may also be accessed via the Internet through the Patent Electronic Business Center at www.uspto.gov using the public side of the Patent Application Information and Retrieval (PAIR) system. The direct link to access this status information is currently https://portal.uspto.gov/pair/PublicPair. Prior to publication, such status information is confidential and may only be obtained by applicant using the private side of PAIR.

Further assistance in electronically accessing the publication, or about PAIR, is available by calling the Patent Electronic Business Center at 1-866-217-9197.

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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	11/22/2017	Roderick Allen Gammons	70945	5873

67801 7590 04/10/2018

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

EXAMINER	
PHAM, THAI N	

ART UNIT	PAPER NUMBER
2844	

NOTIFICATION DATE	DELIVERY MODE
04/10/2018	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

usptomail@ipatent.co.il

Office Action Summary	Application No. 15/820,469	Applicant(s) GAMMONS ET AL.	
	Examiner THAI PHAM	Art Unit 2844	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTHS FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *11/22/2017*.

☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.

4)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims*

5)☒ Claim(s) *1-20* is/are pending in the application.

5a) Of the above claim(s) _____ is/are withdrawn from consideration.

6)☐ Claim(s) _____ is/are allowed.

7)☒ Claim(s) *1-20* is/are rejected.

8)☐ Claim(s) _____ is/are objected to.

9)☐ Claim(s) _____ are subject to restriction and/or election requirement.

* If any claims have been determined allowable, you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.

Application Papers

10)☐ The specification is objected to by the Examiner.

11)☒ The drawing(s) filed on *11/22/2017* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

Certified copies:

a)☒ All b)☐ Some** c)☐ None of the:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

** See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☒ Information Disclosure Statement(s) (PTO/SB/08a and/or PTO/SB/08b) Paper No(s)/Mail Date *11/22/2017 and 03/08/2018*.

3) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

4) ☐ Other: _____.

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

1. Receipt is acknowledged of certified copies of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Information Disclosure Statement

2. The information disclosure statements (IDSs) submitted on 11/22/2017 and 02/08/2018 are in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner.

Specification

3. The disclosure is objected to because of the following informalities:

a. In page 9, the reference number 120 should be label correctly as "the lamp device," because it is confused with “a light 102.”

b. Applicant should thoroughly review the specification and make corrections correspondingly.

Appropriate correction is required.

Drawings

4. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the limitation recites “**calculating a time varying lighting value based on at least one simulation parameter**" in claim 1 and 20

"**a controller for controlling the lighting device to produce a range of user customisable realistic lighting effects,**," "the controller comprises: **a calculating device adapted to calculate a time varying lighting value based on at least one simulation parameter**" in claim 15, and "the controller comprises **a wired or wireless communication interface adapted for communication with one or more lighting devices**," in claim 16, and "**a computer program product** for controlling a lighting device to produce a range of user customisable realistic lighting effects" in claim 20 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner,

the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

5. The drawings are objected to under 37 CFR 1.83(a) because they fail to show "**a controller for controlling the lighting device to produce a range of user customisable realistic lighting effects,**" "**a calculating device adapted to calculate a time varying lighting value based on at least one simulation parameter,**" **a wired or wireless communication interface adapted for communication with one or more lighting devices,**" and "**a computer program product for controlling a lighting device to produce a range of user customisable realistic lighting effects**" as described in the specification. Any structural detail that is essential for a proper understanding of the disclosed invention should be shown in the drawing. MPEP § 608.02(d). Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New

Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

6. Claims 1-20 are objected to because of the following informalities:

Claims 6 recites the limitation "wherein the random simulation parameter" in line 2-3. There is a lack of antecedent basis for this limitation in the claim.

In claims, 1, 5, 15 and 20, it is suggested the word "and/or" should be changed to either –and-- by itself or changed to –or--- by itself.

In claims 6-7, the phrase recites "a camera frequency" should be changed to --said user selectable camera frequency-- to make it clearer and to avoid antecedence basis.

Regarding claims 2-14, it is suggested the phase recites "A method according to…" should be changed to --The method according to...-- to make it clearer and to avoid antecedence basis.

Regarding claims 116-19, it is suggested the phrase recites "A controller according to..." should be changed to --The controller according to...-- to make it clearer and to avoid antecedence basis.

It is suggested that applicant should thoroughly review the claims and make corrections correspondingly in order to avoid a lot of antecedence basis.

Appropriate correction is required.

Claim Rejections - 35 USC § 112

7. The following is a quotation of 35 U.S.C. 112(b):
(b) CONCLUSION.—The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention.

The following is a quotation of 35 U.S.C. 112 (pre-AIA), second paragraph:
The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-20 are rejected under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention.

Regarding claims 1 and 15, the limitation recites "**a method for controlling the lighting device to produce a range of user customisable realistic lighting effects**" **and** "**a controller for controlling the lighting device to produce a range of user customisable realistic lighting effects**" is unclear, and leaves the reader in doubt as to the meaning of the technical feature to which it refers. It is unclear that what is **a range** of user customizable realistic lighting effects? What kind of range? And how does a controller controlling the lighting device t**o produce a range of user customisable realistic lighting effects**? Therefore, it renders the claims unclear and indefinite.

Regarding claim 15, some of the features in the apparatus relate to a method of using the apparatus (e.g. "a controller for controlling a lighting device, instead of "a controller adapted to control a lighting device" rather than clearly defining the apparatus

in terms of its technical features. The intended limitations are therefore not clear from this claim.

Furthermore, the wording of claims 1, 15 and 20 are misleading, because it is not clear which component is adapted to “calculate a time varying lighting value " and to "output said time varying lighting value thereby to simulate a lighting effect;” thus it is rendering the definition of the subject-matter of claims are unclear.

The claims fail to recite sufficiently definite structure, material or acts for achieving the functional result recited in the claim to reasonably apprise one of ordinary skill in the art of the scope of the claim.

Claims 2-19 are depending on claims 1 and 15, and are rejected the same reason under 35 U.S.C. 112(b) or 35 U.S.C. 112 (pre-AIA), second paragraph.

Note: for compact prosecution purposes, the examiner interprets the claims above as best understood in the rejections below.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a)(1) the claimed invention was patented, described in a printed publication, or in public use, on sale or otherwise available to the public before the effective filing date of the claimed invention.

9. Claims 1-20 are rejected under 35 U.S.C. 102(a1) as being anticipated by Dewitt (U.S Publication No. 20080129226 A1).

Regarding claims 1 and 20, Dewitt discloses a method and a computer program product for controlling a lighting device to produce a range of user

customisable realistic lighting effects for videography, broadcasting, cinematography, studio filming and/or location filming, the method and the computer program product adapted to perform, when executed, the steps of:

calculating a time varying lighting value (via a controller) based on at least one simulation parameter; wherein said at least one simulation parameter for characterising a lighting effect is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the lighting effect being simulated; and outputting said time varying lighting value thereby to simulate a lighting effect (see paragraph [0007] and [0036]).

Regarding claim 2, Dewitt discloses a method according to Claim 1, wherein the random brightness comprises a random peak brightness (see abstract and paragraph [0008]).

Regarding claim 3, Dewitt discloses a method according to Claim 1, wherein the random interval comprises at least one of a random interval between flashes, a random interval between groups of flashes, and a random frequency (see paragraph [0035]).

Regarding claim 4, Dewitt discloses a method according to any Claim 1, wherein the random duration comprises at least one of a random ramp-up time to peak brightness, a random fade- down time from peak brightness, and a random number of pulses (see paragraph [0035], [0061] and [0063]

Regarding claim 5, Dewitt discloses the method according to Claim 1, wherein said at least one simulation parameter for characterising a lighting effect is random within predefined boundaries and wherein the predefined boundaries comprise at least

one of an upper and/or lower duration; a number of flashes in a burst; an interval between bursts; an amplitude; and a ramp-up or fade-down time (see paragraph [0065]).

Regarding claim 6, Dewitt discloses a method according to Claim 1, wherein the random simulation parameter is determined in dependence on one or more user-selectable simulation parameters (see paragraph [0036]).

Regarding claim 7, Dewitt discloses a method according to Claim 1, wherein the simulation parameter is related to one or more of: a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation period (see paragraph [0025] through [0026], and paragraph [0073] through [0075]).

Regarding claim 8, Dewitt discloses a method according to Claim 1, further comprising receiving a user input of one or more user-selectable simulation parameters and adapting the simulation in dependence on the one or more user-selectable simulation parameters (see paragraph [0036]).

Regarding claim 9, Dewitt discloses a method according to Claim 1, wherein the simulation parameter comprises at least one of: a maximum brightness; a minimum brightness; a colour; and a trigger (see paragraph [0025] through [0026], and paragraph [0073] through [0075]).

Regarding claim 10, Dewitt discloses a method according to Claim 1, wherein the simulation iterates through repeated cycles of calculating a time varying lighting

value based on at least one random simulation parameter and simulating the lighting effect (see paragraph [0032]).

Regarding claim 11, Dewitt discloses a method according to Claim 1, wherein the lighting effect is designed to mimic at least one of fire flickering; police light; television; lightning flashing; electrical sparking; fireworks; a neon flickering sign; a gunshot; welding; a scan; a propeller; a (nuclear) explosion; a wormhole; paparazzi flashes; flashes (strobe), (see paragraph [0028], [0030], and [0071]).

Regarding claim 12, Dewitt discloses a method according to Claim 1, further comprising selecting a definition of a trigger event, said trigger event initiating said output of the time varying lighting value thereby to simulate a lighting effect (see abstract, paragraph [0007], [0031], and [0071]).

Regarding claim 13, Dewitt discloses a method according to Claim 1, further comprising storing the calculated lighting value corresponding to said user customisable realistic lighting effect, as a recallable preset (see paragraph [0007] and [0036]).

Regarding claim 14, Dewitt discloses A method according to Claim 1, comprising controlling a plurality of lights in dependence on the output (see fig. 10 and 11)

Regarding claim 15, Dewitt discloses a controller for controlling at least one lighting device to produce a range of user customisable realistic lighting effects for videography, broadcasting, cinematography, studio filming and/or location filming, the controller comprising:

a calculating device adapted to calculate a time varying lighting value (via a controller) based on at least one simulation parameter; wherein said at least one simulation parameter for characterising a lighting effect is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the lighting effect being simulated; and an output adapted to control a lighting device according to the determined variation of lighting over time (see paragraph [0007] and [0036]).

Regarding claim 16, Dewitt discloses a controller according to Claim 15, wherein the controller comprises a wired or wireless communication interface adapted for communication with one or more lighting devices (see fig. 10 and 11).

Regarding claim 17, Dewitt discloses a controller according to Claim 15, wherein the controller comprises an input interface adapted to receive a user input (see fig. 10 and 11).

Regarding claim 18, Dewitt discloses a lighting system comprising a controller according to Claim 15, and at least one lighting device; said lighting device comprising at least one light emitting diode (see fig. 10 and 11).

Regarding claim 19, Dewitt discloses a lighting system according to Claim 18, wherein said controller and said lighting device are integrated in a combined unit (see fig. 10 and 11).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to THAI PHAM whose telephone number is (571)270-5518. The examiner can normally be reached on 5/4/9 M-F 9:00 AM - 6:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on (571)272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/THAI PHAM/
Primary Examiner, Art Unit 2844
02/21/2018

Notice of References Cited	Application/Control No. 15/820,469	Applicant(s)/Patent Under Reexamination GAMMONS ET AL.	
	Examiner THAI PHAM	Art Unit 2844	Page 1 of 1

U.S. PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Name	CPC Classification	US Classification
*	A	US-2008/0129226 A1	06-2008	DeWitt; Donald E.	H05B37/029	315/307
*	B	US-2007/0159347 A1	07-2007	Weitzel; Scott	G08B5/36	340/691.2
*	C	US-7,038,399 B2	05-2006	Lys; Ihor A.	H05B33/0809	315/291
*	D	US-5,924,784 A	07-1999	Chliwnyj; Alex	F21S9/02	307/64
	E	US-				
	F	US-				
	G	US-				
	H	US-				
	I	US-				
	J	US-				
	K	US-				
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	M	US-				

FOREIGN PATENT DOCUMENTS

*		Document Number Country Code-Number-Kind Code	Date MM-YYYY	Country	Name	CPC Classification
	N					
	O					
	P					
	Q					
	R					
	S					
	T					

NON-PATENT DOCUMENTS

*		Include as applicable: Author, Title Date, Publisher, Edition or Volume, Pertinent Pages)
	U	
	V	
	W	
	X	

*A copy of this reference is not being furnished with this Office action. (See MPEP § 707.05(a).)
Dates in MM-YYYY format are publication dates. Classifications may be US or foreign.

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	Art Unit
	THAI PHAM	2844

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	03/03/2018								
	1	✓								
	2	✓								
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	5	✓								
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	7	✓								
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	18	✓								
	19	✓								
	20	✓								

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	Art Unit
	THAI PHAM	2844

CPC- SEARCHED		
Symbol	Date	Examiner
H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003	3/3/2018	TP

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
CPC search, Text search, Inventor name search, Assignment data search, backward and forward search	3/3/2018	TP
Looked at IDS	3/3/2018	TP
Looked at PCT and ISA search report	3/3/2018	TP

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

PTO/SB/08a (08-03)
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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	Thai Pham
Attorney Docket Number	70945

Sheet 1 of 2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Document Number Number-Kind Code[2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2007/0159347	12-Jul-2007	Weitzel	
	2	2008/0129226	05-Jun-2008	DeWitt et al.	
	3	5,307,295	26-Apr-1994	Taylor et al.	
	4	5,921,659	13-Jul-1999	Hunt et al.	
	5	5,924,784	20-Jul-1999	Chliwnyj et al.	
	6	7,038,399	02-May-2006	Lys et al.	
	7	7,353,071	01-Apr-2008	Blackwell et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Documents Country Code[3] Number[4] Kind Code[5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]
	8	GB 2209229	04-May-1989	Pearce-Harvey et al.		
	9	EP 2383608	02-Nov-2011	Wu		
	10	GB 2424525	27-Sep-2006	Rafter et al.		
	11	GB 2482562	08-Feb-2012	Hjerde		
	12	JP H0448588	18-Feb-1992	Iwata		
	13	WO 01/05195	18-Jan-2001	Lys et al.		
	14	WO 2005/052751	09-Jun-2005	Chemel et al.		

Examiner Signature	/Thai Pham/	Date Considered	02/20/2018

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Group Art Unit	2844
Examiner Name	Thai Pham
Attorney Docket Number	70945

Sheet 2 Of 2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	15	European Search Report and the European Search Opinion Dated 01 August 2017 From the European Patent Office Re. Application No. 17165609.3. (7 Pages)	
	16	Patents Act 1977: Combined Search and Examination Report Under Sections 17 and 18(3) Dated 13 June 2016 From the Intellectual Property Office of the United Kingdom Re. Application No. GB1606907.2. (7 Pages)	
	17	Patents Act 1977: Examination Report under Section 18(3) Dated 30 August 2017 From the Intellectual Property Office of the United Kingdom Re. Application No. GB1606907.2 (3 Pages)	

Examiner Signature	/Thai Pham/	Date Considered	02/20/2018

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EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"15481460"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:32
S2	4	(("GAMMONS") near3 ("Roderick") near3 ("Allen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:33
S3	378	(("FRANCIS") near3 ("Andrew")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:34
S4	3	(("GAMMONS") near3 ("Roderick") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:34
S5	3	S2 and S3 and S4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:34
S6	1	(("ROTOLIGHT") near3 ("LIMITED")).AANM.	USPAT	OR	ON	2018/02/20 11:35
S8	22	("20070159347" | "20080129226" | "5307295" | "5921659" | "5924784" | "7038399" | "7353071").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:44
S9	3	("3787752").PN. OR ("7365649").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:46
S10	26	"2424525"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:48
S11	48723	(H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 12:23
S12	4	"20080129226"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 12:24
S13	1	"15820469"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 15:21
S14	5	"2005052751"	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/01 18:49

S15	9	light$4 with control$4 with simulat$4 with (calculat$4 or comput$4) with random	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:39
S16	574	light$4 with control$4 with (calculat$4 or comput$4) with random	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S17	48822	(H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S18	37	S17 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S19	181	light$4 same control$4 same simulat$4 same (calculat$4 or comput$4) same random same (wire$1less or wifi or zigbee) same user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:50

3/3/2018 3:29:57 PM
C:\Users\tpham3\Documents\EAST\Workspaces\15481460.wsp

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BIB DATA SHEET

CONFIRMATION NO. 5873

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/820,469	11/22/2017	315	2844	70945

APPLICANTS
Rotolight Limited, London, UNITED KINGDOM;

INVENTORS
Roderick Allen Gammons, Staines Upon Thames, UNITED KINGDOM;
Andrew Francis, Witham, UNITED KINGDOM;
Roderick Aaron Gammons, Winkfield, UNITED KINGDOM;

**** CONTINUING DATA **************************
This application is a CON of 15/481,460 04/07/2017
which claims benefit of 62/319,809 04/08/2016

**** FOREIGN APPLICATIONS **************************
UNITED KINGDOM 1606907.2 04/20/2016

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
12/27/2017

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /THAI N PHAM/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		UNITED KINGDOM	5	20	3

ADDRESS
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES

TITLE
LIGHTING SYSTEM AND CONTROL THEREOF

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
730	No._____ to charge/credit DEPOSIT ACCOUNT No._____ for following:	☐ 1.16 Fees (Filing) ☐ 1.17 Fees (Processing Ext. of time) ☐ 1.18 Fees (Issue) ☐ Other _____ ☐ Credit

BIB (Rev. 05/07).

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(*use as many sheets as necessary*)

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First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	~~OWENS Douglas W.~~ Thai Pham
Attorney Docket Number	70945

Sheet 1 of 2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Document Number / Number-Kind Code[2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2017/0343197	30-Nov-2017	Gammons et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Documents — Country Code[3] Number[4] Kind Code[5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T[6]

Examiner Signature	/Thai Pham/	Date Considered	02/20/2018

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Sheet	2	Of	2

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ARLINGTON, VA 22215

Courtesy Reminder for
Application Serial No: 15/820,469

Attorney Docket No: 70945
Customer Number: 67801
Date of Electronic Notification: 04/10/2018

This is a courtesy reminder that new correspondence is available for this application. If you have not done so already, please review the correspondence. The official date of notification of the outgoing correspondence will be indicated on the form PTOL-90 accompanying the correspondence.

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:	Roderick Allen GAMMONS et al.		
Serial No.:	15/820,469	Confirmation No.:	5873
Filed:	November 22, 2017	Group Art Unit:	2844
For:	LIGHTING SYSTEM AND CONTROL THEREOF	Attorney Docket:	**70945**
Examiner:	Thain N. PHAM		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

RESPONSE

Sir:

This is in response to the United States Patent and Trademark Office Action mailed April 10, 2018, which response is being made on July 10, 2018, and for which no extension of time fee is due enclosed herewith.

Applicant submits this response for entry into the record, in which:

Amendments to the Specification begin on page 2.

Amendments to the Claims begin on page 5.

Amendments to the Drawings begin on page 9.

Remarks begin on page 10.

Please amend the above-identified application as follows:

In the Specification:

Please amend the Paragraph beginning at Page 8, line 2, as follows:

Figure 3a is a flow diagram of a method for adjusting a lighting device;

Figure 3b is a more detailed version of Figure 3a;

Please amend the Paragraph beginning at Page 8, line 23, as follows:

Figure 2 schematically shows an example where a lighting effect simulator 100 and the light 102 are integrated in a single studio lamp device 120. In one example, the light 102~~amp device~~ is an array of LEDs, preferably of differing colours. This arrangement does not require the DMX distribution hub 302, power elements 304, 306 as described above, and is more flexible in producing effects as will be described in more detail below. A microcontroller or other computing unit is integrated in the lamp device 120 for performing calculations.

Please amend the Paragraph beginning at Page 8, line 30, as follows:

An input interface 105 including a ~~A~~ control panel is provided at a back panel of the lamp device~~ight~~ 120. The control panel can include for example buttons, rotary knobs, sliders, and/or a display/input panel for user input of parameters for simulating an effect. In a variant a simple digital interface is provided on the light itself for user input of simulation parameters to control the lighting effect. In another variant the lamp device~~ight~~ 120 is adapted for communication with a wireless user device and receives user-selectable simulation parameters to control the lighting effect from the user device. The user device may for example be a tablet or smart phone with suitable hardware / software (e.g. an app) for receiving user input of simulation parameters and transmitting that data to the light 102~~0~~.The system of Figure 2 is simpler to set up and less expensive than that of Figure 1 as there are fewer pieces of hardware. Furthermore the energy inefficiency of 'hot light' systems (i.e. a 1K hot light consumes 1000 watt/hour, vs 38 watt per hour of current generation LED system), Systems such as that described in Figure 1 using a flicker box and typically 'hot lights' also suffer from the significant disadvantage that a hot light is a fixed colour of light, either daylight 5600K or most commonly tungsten 3200K. When recreating an effect such a lightning this effect would appear at the blue end of the colour spectrum i.e. 7000K+ so utilising a 3200K light for this would require an operator to climb up a ladder to apply one or more CTB (Colour temperature blue) filter(s) to the light in order to achieve the desired colour temperature.

Please amend the Paragraph beginning at Page 10, line 27, as follows:

Figure 3a illustrates a simple example of a method for simulating a lighting effect. Figure 3b illustrates in more detail the method for simulating a lighting effect In a first step S1 simulation parameters are received, such as random parameters and/or user-selectable parameters as shown in step S4. Where a random parameter is algorithmically generated it is only pseudo-random, but for the purposes of the simulation a pseudo-random parameter is sufficiently random for realistic simulation and is hence considered to be equivalent to a truly random parameter. In a second step S2 a simulation is performed based on a simulation model and the received parameters. The nature of the simulation model can vary greatly, depending on the lighting effect that is desired and the sophistication of the desired simulation. As shown in S5, ~~T~~the simulation calculates how the lighting changes over time in order to produce the desired lighting effect. Following simulation in a third step S3 the lighting information determined by the simulation is output, for example to a lighting device, as shown in step S6, in order to produce the desired lighting effect as shown in step S7.

Please amend the Paragraph beginning at Page 11, line 7, as follows:

Figure 4 schematically shows an example showing a master light source 102 built into a lighting control unit 130 and a 'slave' light source 102-1 separate from the lighting control unit. The lighting effect simulator 100 creates data 106 characterising a lighting effect and controls the master light 102 as described above. The data 106 is transmitted to the slave light 102-1 via (for example) a serial communication interface (e.g. RS232, USB or DMX) or by wireless transmission (e.g. Wi-Fi®, Bluetooth® Zigbee®, or via a mobile communication network utilising protocols such as GSM (Groupe Special Mobile) 3GPP (3rd Generation Partnership), or 4G LTE (Long term evolution)) via a wireless communication interface 108. The additional 'slave' light source 102-1 thereby allows the production of a lighting effect with more than one light device but without duplication of controllers 130. Such additional light sources can for example increase the area of illumination or increase the power of the lighting effect.

Please amend the Paragraph beginning at Page 14, line 27, as follows:

The lighting effect simulator 100 typically cycles round a loop calculating new lamp brightness and colour values. Alternatively the calculation can be triggered by an interrupt generated by a timer. The calculation is typically performed every 250μs.

Please amend the Paragraph beginning at Page 17, line 13, as follows:

The lighting effect simulator 100 may be provided by way of a suitably adapted computing device ~~120 or 130~~ such as a PC, tablet or smart phone, with suitable software for user input of simulation parameters. The computing device ~~120 or 130~~ may be a suitably adapted light controller device with suitable controls for user input of simulation parameters

In the Claims:

1. (Currently Amended) A method for controlling a lighting device to produce a ~~range of~~ user customisable ~~realistic~~ lighting effects ~~for videography, broadcasting, cinematography, studio filming and/or location filming~~, the method comprising:

   calculating, using an effect simulator, a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter characterises~~for characterising~~ a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein said at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

   outputting, from said effect simulator, said time varying lighting value thereby to simulate ~~a~~ the user customisable lighting effect.

2. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the random brightness comprises a random peak brightness.

3. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the random interval comprises at least one of a random interval between flashes, a random interval between groups of flashes, and a random frequency.

4. (Currently Amended) The ~~A~~ method according to any Claim 1 wherein the random duration comprises at least one of a random ramp-up time to peak brightness, a random fade-down time from peak brightness, and a random number of pulses.

5. (Currently Amended) The ~~A~~ method according to Claim 1 wherein said at least one simulation parameter ~~for characterising a lighting effect~~ is random within predefined boundaries and wherein the predefined boundaries comprise at least one of an upper and~~/or~~ lower duration; a number of flashes in a burst; an interval between bursts; an amplitude; and a ramp-up or fade-down time.

6. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the at least one of: a random brightness; a random duration; and a random interval ~~random simulation parameter~~ is determined in dependence on one or more user-selectable simulation parameters.

7. (Currently Amended) The ~~A~~ method according to Claim 1, wherein the simulation parameter is related to one or more of: a rate of increase of brightness; a rate of decrease of brightness; a rate of change of colour; a brightness; a local maximal brightness; a local minimal brightness; a brightness fluctuation period; and a colour fluctuation period.

8. (Currently Amended) The ~~A~~ method according to Claim 1 further comprising receiving a user input of one or more user-selectable simulation parameters and adapting the simulation in dependence on the one or more user-selectable simulation parameters.

9. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the simulation parameter comprises at least one of: a maximum brightness; a minimum brightness; a colour; and a trigger.

10. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the simulation iterates through repeated cycles of calculating a time varying lighting value based on at least one random simulation parameter and simulating the user customisable lighting effect.

11. (Currently Amended) The ~~A~~ method according to Claim 1 wherein the user customisable lighting effect is designed to mimic at least one of fire flickering; police light; television; lightning flashing; electrical sparking; fireworks; a neon flickering sign; a gunshot; welding; a scan; a propeller; a (nuclear) explosion; a wormhole; paparazzi flashes; flashes (strobe).

12. The ~~A~~ method according to Claim 1, further comprising selecting a definition of a trigger event, said trigger event initiating said output of the time varying lighting value thereby to simulate ~~a~~ the user customisable lighting effect.

13. (Currently Amended) The ~~A~~ method according to Claim 1, further comprising storing the at least one simulation parameter ~~calculated lighting value~~ corresponding to said user customisable ~~realistic~~ lighting effect~~, as a recallable preset~~.

14. (Currently Amended) The ~~A~~ method according to Claim 1 comprising controlling a plurality of lights in dependence on the output.

15. (Currently Amended) A controller ~~for controlling~~adapted to control at least one lighting device to produce a ~~range of~~ user customisable ~~realistic~~ lighting effect ~~effects for videography, broadcasting, cinematography, studio filming and/or location filming~~, the controller comprising:

an effect simulator~~-calculating device~~ adapted to calculate a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter ~~for characterising~~ characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

wherein an output of the effect simulator is adapted to control a lighting device according to the ~~determined~~ calculated variation of lighting over time.

16. (Currently Amended) ~~A~~ The controller according to Claim 15, wherein the controller comprises a wired or wireless communication interface adapted for communication with one or more lighting devices.

17. (Currently Amended) The ~~A~~ controller according to Claim 15, wherein the controller comprises an input interface adapted to receive a user input.

18. (Currently Amended) A lighting system comprising ~~a~~ the controller according to Claim 15 and at least one lighting device; said lighting device comprising at least one light emitting diode.

19. (Currently Amended) The ~~A~~ lighting system according to Claim 18 wherein said controller and said lighting device are integrated in a combined unit.

20. (Currently Amended) A computer program ~~product~~ comprising software code for controlling a lighting device to produce a ~~range of~~ user customisable ~~realistic~~ lighting ~~effects for videography, broadcasting, cinematography, studio filming and/or location filming~~, the computer program ~~product~~ adapted to perform, when executed, the steps of:

calculating using an effect simulator a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter for ~~characterising~~ characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein the at least one simulation parameter is at least one of: a random brightness; a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and

outputting, from said effect simulator, said time varying lighting value thereby to simulate ~~a~~ the user customisable lighting effect.

21. (New) The method according to Claim 13, further comprising recalling said stored at least one simulation parameter from a memory.

Amendments to the Drawings:

Applicant attaches herewith a set of drawings with amendments to Figures 2, 3 and 4, as required by the Examiner. A complete set of formal drawings (5 sheets) are also attached herewith as required by the Examiner.

REMARKS

Reconsideration of the above-identified application in view of the amendments above and the remarks following is respectfully requested. **Claims 1-20** are in this Application. New Claim 21 is added herein. No new subject matter has been added to the claims.

Specification

The disclosure was objected to because of informalities. Applicant amended these informalities and believes the specification is now clear and concise.

Drawing

Examiner requires that each feature of the claims should be shown in the figures. Examiner indicate the following features are not shown:

A. "*a controller for controlling the lighting device to produce a range of user customisable realistic lighting effects*",

B. *"the controller comprises: a calculating device adapted to calculate a time varying lighting value based on at least one simulation parameter"* in **Claim 15.**

C. *"the controller comprises a wired or wireless communication interface adapted for communication with one or more lighting devices,"* in **Claim 16.**

D. "*a computer program product for controlling a lighting device to produce a range of user customisable realistic lighting effects*" in **Claim 20**.

Regarding **feature A**: The feature "*controller for controlling at least one lighting device*", is labelled 130 in Figure 4 and basis for this interpretation of the figures can be found at page 11 line 8 of the specification as filed which refers to "*a lighting control unit 130*" and page 11 line 16-17 of the specification as filed refers to "*controllers 130*".

Regarding **feature B**: Claim 15 has been amended to refer to "*an effect simulator*" rather than "*a calculating device*". The effect simulator is shown in Figures 2 and 4 having reference numeral 100. Basis for replacing the *calculating device* with the *effect simulator* can be found at page 14 lines 27-28 of the specification as filed which states that "*the lighting effect simulator typically cycles round a loop calculating new lamp brightness and colour values*".

Regarding **feature C**: A wireless communication interface (108) as described in amended Claim 16 has now been added to Figure 4, and reference to the wireless communication interface has been added on page 11 of the attached specification.

Regarding **feature D**: The steps of amended Claim 20, which has now been amended to recite "*a computer program comprising software code ... adapted to perform, when executed ...*" [the method of Claim 1], are also now shown in new Figure 3b.

In addition, Figure 3 has been amended to reflect the method recited in amended **Claim 1**. Specifically, Figure 3a corresponds to previous Figure 3, while new Figure 3b corresponds to the method recited in amended Claim 1. It will be appreciated that Figure 3a is a more general form of Figure 3b. Basis for new Figure 3b can be found in the paragraph spanning pages 10 and 11 of the description as filed (which has itself been amended to refer to this new figure).

Claim Objections

Examiner indicates that **Claims 1-20** are objected to as the claims contain informalities. Applicant amended the claims according to the Examiner' remarks. In particular, *inter alia*:

a. **Claim 6** has been amended to positively recite "*at least one of: a random brightness; a random duration; and a random interval*" as recited in **Claim 1.**

b. Where necessary, each claim now refers to "*the*" rather than "*a*" method/controller/lighting system.

c. The wording '[A] and/or [B]' in **claims 1, 5, 15 and 20** has been removed.

Claim rejection under 35 USC § 112

Claims 1-20 are rejected under 35 U.S. C. 112(b) or 35 U.S. C. 112 (pre-AIA), second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which the inventor or a joint inventor, or for pre-AIA the applicant regards as the invention. Applicant has amended the claims per the Examiner's request. Specifically, and in response to each of the Examiner's questions/comments on pages 6 and 7 of the OA:

a. Claims 1, 15 and 20 have been amended to recite "*...to produce a user customisable ~~realistic~~ lighting effect*".

b. Claim 15 has been amended as suggested by the Examiner to recite "*a controller adapted to control a lighting device*".

c. Claims 1, 15 and 20 have been amended to recite *"calculating, using an effect simulator..."*. It is now clear that *"an effect simulator"* is the feature which is used to calculate the lighting value.

Claim rejection under 35 USC § 102

Claims 1-20 are rejected under 35 U.S.C. 102(a)(1) as being anticipated by Glucksman et al. US2008/129226A1 (hereinafter: "*DeWITT*").

In order to promote the examination Applicants amended **Claims 1 15, and 20** to further clarify that the simulation parameter(s) characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming. *DeWITT* teches a simulated 'tea light' candle having a random number generator that mimics dynamic characteristics of an open flame. This teaching does not even imply simulation parameter(s) characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming as currently recited claimed.

A claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference. *DeWITT* does not teach or imply characterizing simulation parameters as recited in amended **Claim 1 or** amended **Claim 15** or amended **Claim 20.**

In view of the above, the cited art, alone or in combination cannot disclose each and every limitation as recited in amended independent **Claim 1 or** amended independent **Claim 15 or** amended independent **Claim 20**, and independent **Claim 1** and independent **Claim 15** and independent **Claim 20** as recited are allowable. The dependent claims are allowable at least by virtue of their dependency from one of the allowable base claims. Accordingly, withdrawal of this rejection is respectfully requested.

Conclusion

No Disclaimers or Disavowals

Although the present response may include amendments to the application or claims, or characterizations of claim scope or referenced art, Applicants do not concede that previously pending claims in this application are not patentable over the cited references. Rather, any amendments or characterizations are being made to expedite the issuance. Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that relate to subject matter supported by the instant application, including subject matter specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this application, or any parent, child or related prosecution history should not infer that Applicants have made any disclaimers or disavowals of any subject matter supported by the instant application.

In view of the above amendments and remarks it is respectfully submitted that **Claims 1-21** are now in condition for allowance.

Should the Examiner have any questions or comments as to the form, content, or entry of this paper, the Examiner is requested to contact the undersigned at the telephone number below prior to mailing the next Official Action. Similarly, if there are any further issues yet to be resolved to advance the prosecution of this application to issue, the Examiner is requested to telephone the undersigned counsel.

Any fees associated with this paper, for its entry into the record, may be charged to Deposit Account No. 50-1407.

During the pendency of this application, the Commissioner for Patents is hereby authorized to charge payment of any filing fees for presentation of extra claims under 37 CFR § 1.16 and any patent application processing fees under 37 CFR § 1.17, or credit any overpayment, to Deposit Account No. 50-1407.

The Commissioner for Patents is hereby authorized to treat any concurrent or future reply, requiring a petition for extension of time under 37 CFR § 1.136 for its timely submission, as incorporating a petition for extension of time for the appropriate length of time if not submitted with the reply.

Recognizing that Internet communications are not secure, I hereby authorize the USPTO to communicate with the undersigned and practitioners in accordance with 37 CFR § 1.33 and 37 CFR § 1.34 concerning any subject matter of this application by video conferencing, instant messaging, or electronic mail. I understand that a copy of these communications may be made of record in the application file.

Respectfully submitted,

/Martin D. Moynihan/
Martin D. Moynihan
Registration No. 40338
Telephone: (703) 859-9634

Date: July 10, 2018

Enclosures:

- Additional Claims Transmittal Fee
- Letter to Chief Draftsman
- Annotated Drawing Sheets
- Formal Drawing Transmittal Sheet
- Complete Set of Replacement Drawing Sheets

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:		§		
		§		
	Roderick Allen GAMMONS et al.	§		
		§		
Serial No.:	15/820,469	§	Confirmation No.:	5873
		§		
Filed:	November 22, 2017	§	Group Art Unit:	2844
		§		
For:	LIGHTING SYSTEM AND CONTROL THEREOF	§		
		§		
		§	Attorney Docket:	**70945**
		§		
Examiner:	Thain N. PHAM	§		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

LETTER TO CHIEF DRAFTSMAN

Sir:

Permission is requested to correct Figures 2, 3 and 4 as shown in red ink on the attached photocopies.

Since the foregoing are all relative minor changes and do not include new matter, the formal drawings, which are being submitted herewith in an accompanying letter, include the above-requested changes.

Respectfully submitted,

/Martin D. Moynihan/
Martin D. Moynihan
Registration No. 40338
Telephone: (703) 859-9634

Date: July 10, 2018

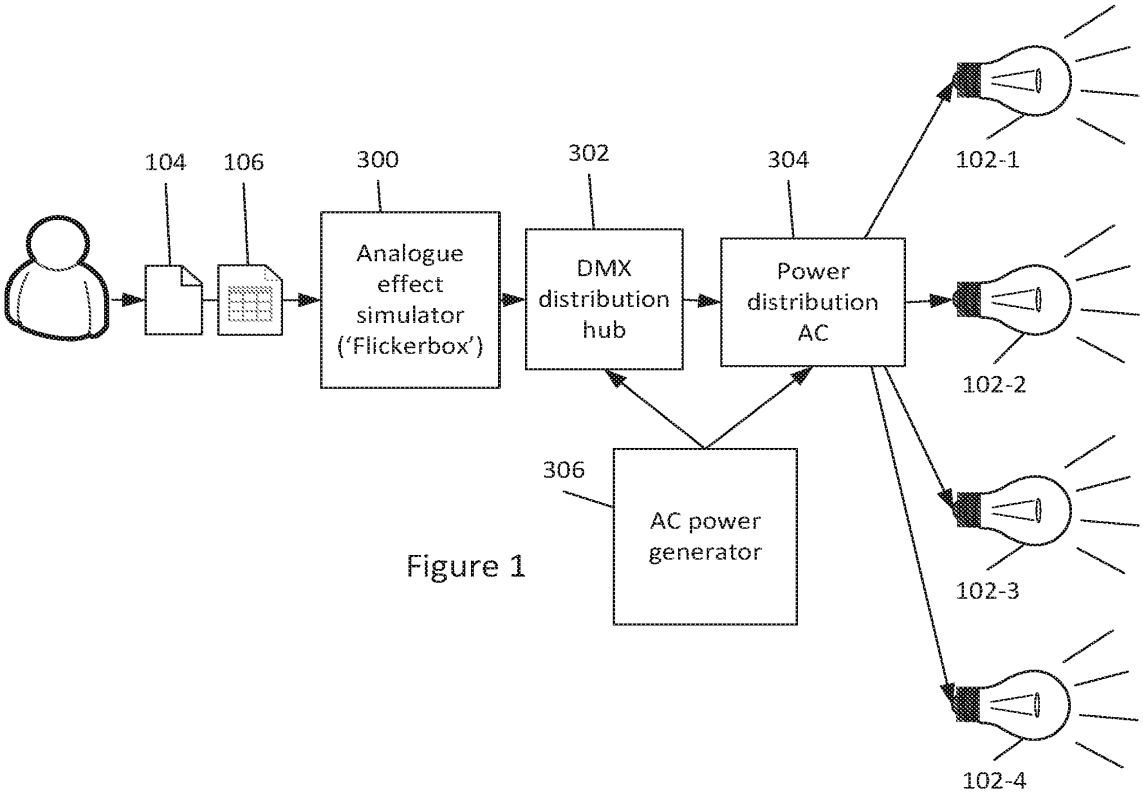


Figure 1

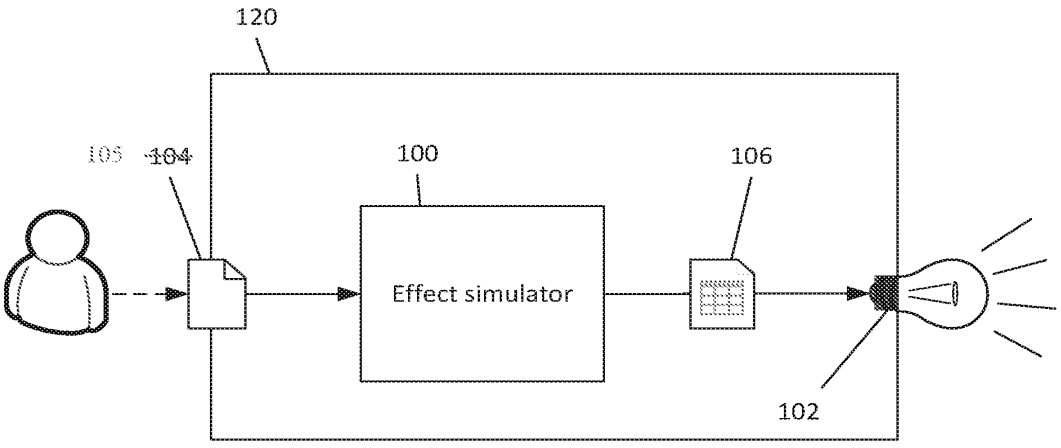


Figure 2

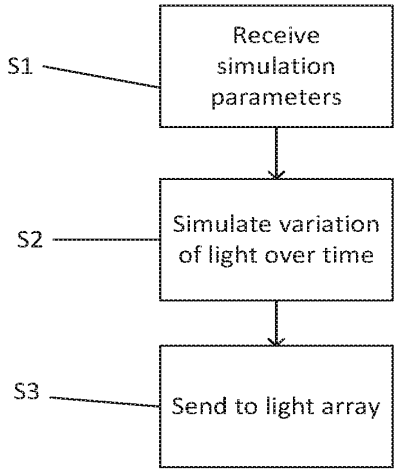


Figure 3a

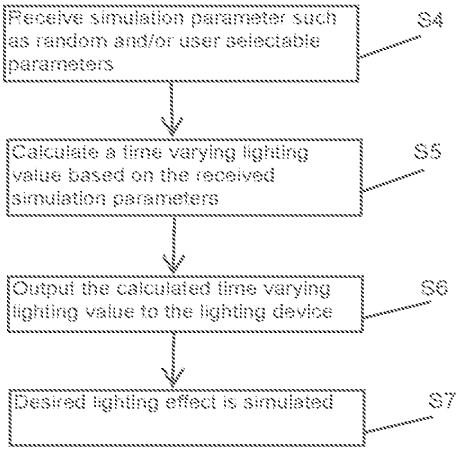


Figure 3b

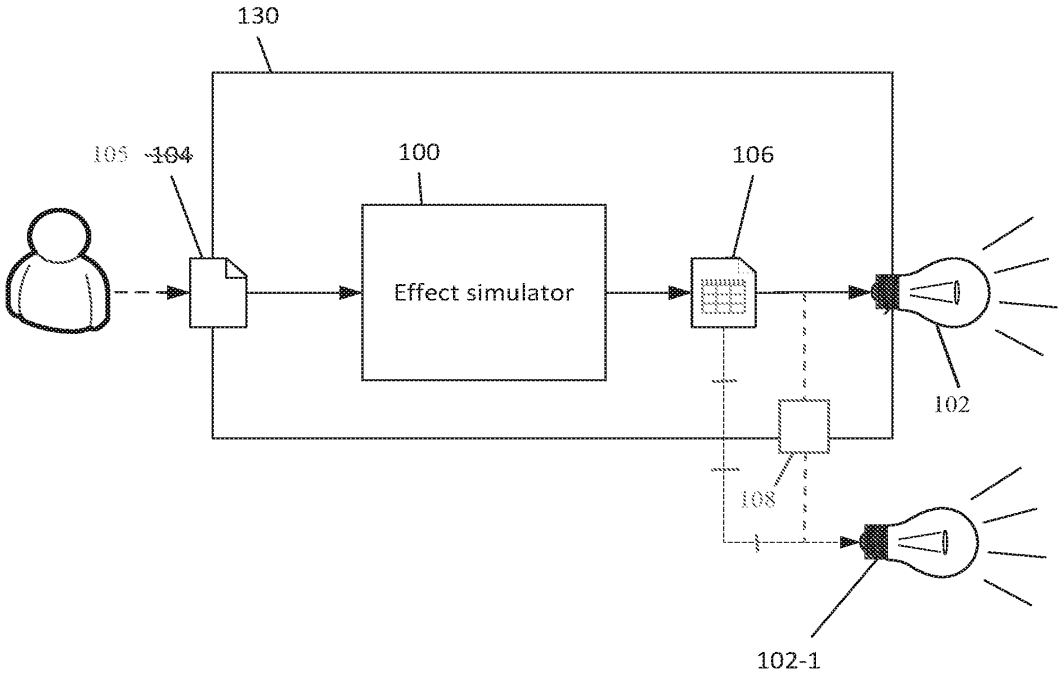


Figure 4

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:		§		
		§		
	Roderick Allen GAMMONS et al.	§		
		§		
Serial No.:	15/820,469	§	Confirmation No.:	5873
		§		
Filed:	November 22, 2017	§	Group Art Unit:	2844
		§		
For:	LIGHTING SYSTEM AND CONTROL THEREOF	§		
		§		
		§	Attorney Docket:	**70945**
		§		
Examiner:	Thain N. PHAM	§		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

FORMAL DRAWINGS

Sir:

Applicant encloses herewith a new set of formal drawings, five (5) sheets, for the above-identified patent application.

Statement

The content of the replacement drawings includes no new matter.

Respectfully submitted,

/Martin D. Moynihan/
Martin D. Moynihan
Registration No. 40338
Telephone: (703) 859-9634

Date: July 10, 2018

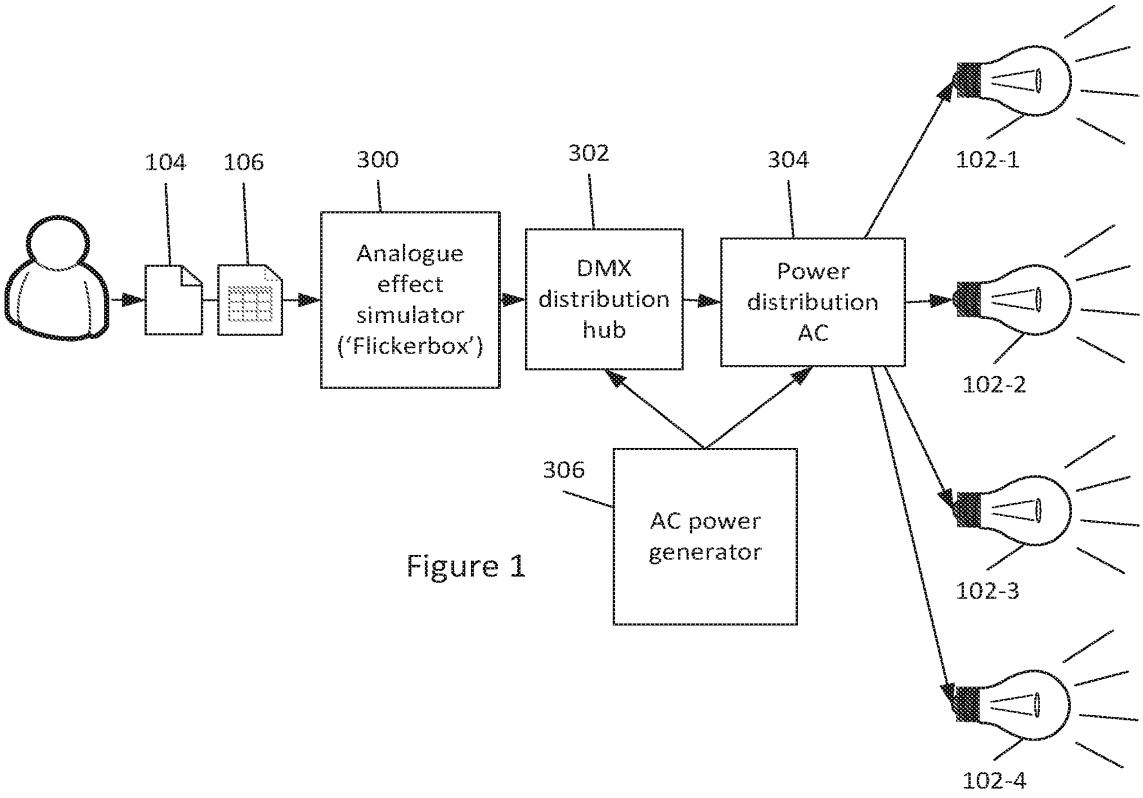


Figure 1

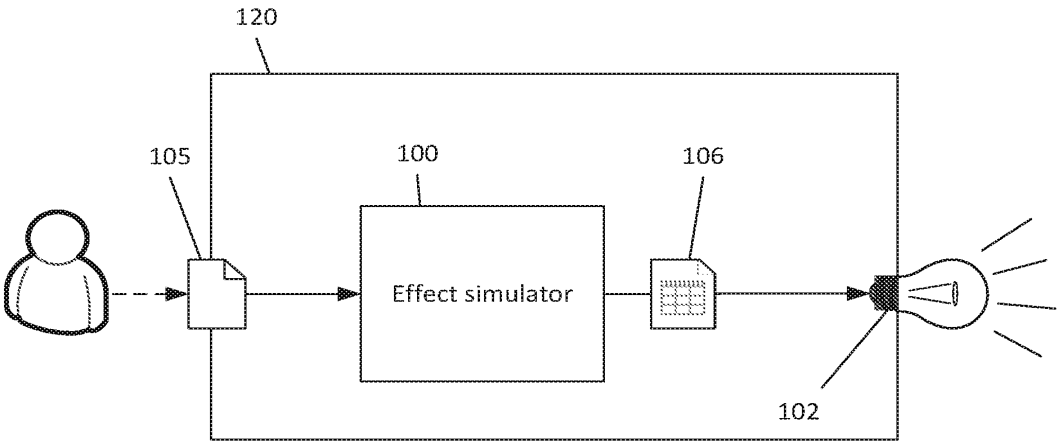


Figure 2

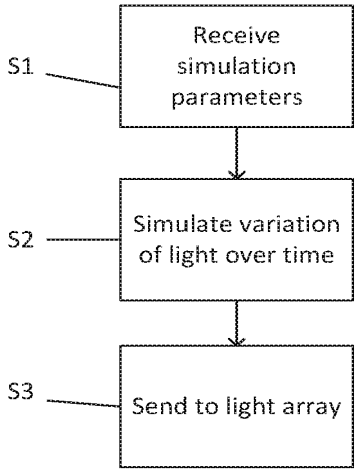


Figure 3a

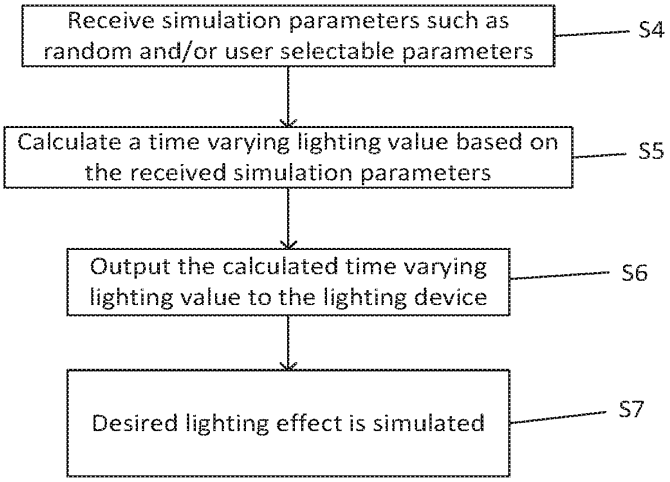


Figure 3b

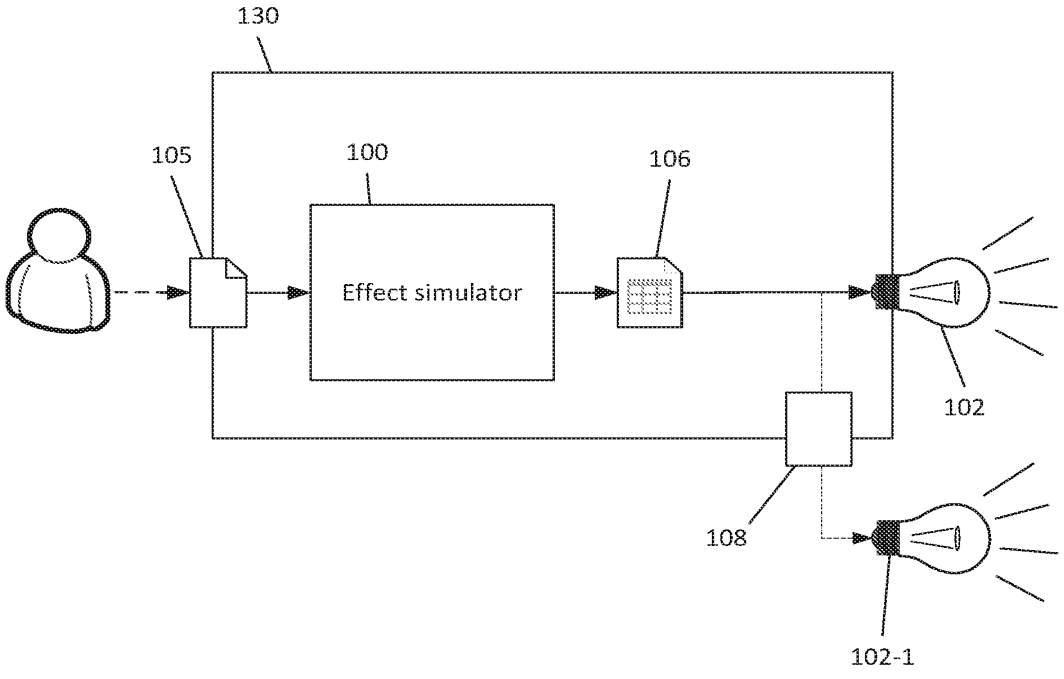


Figure 4

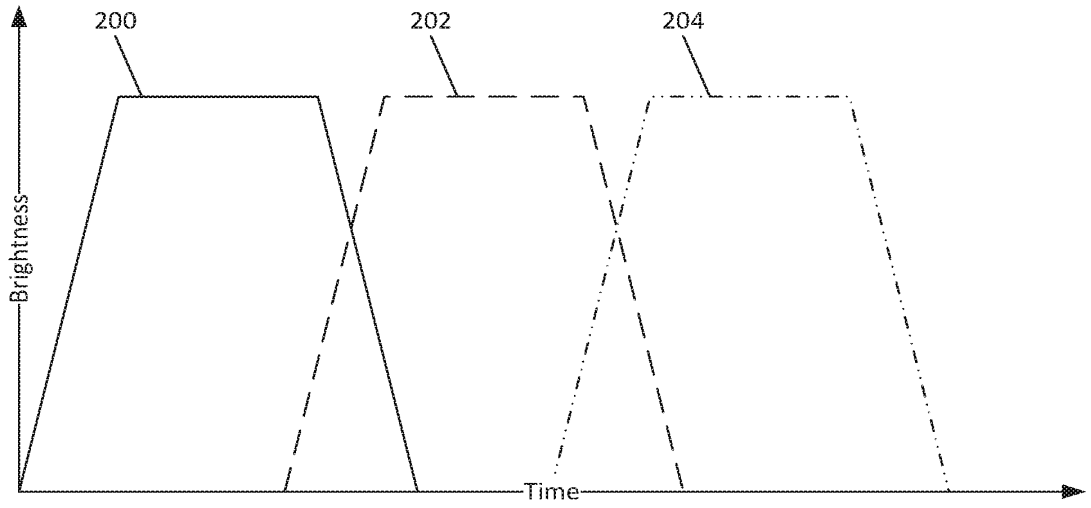


Figure 5

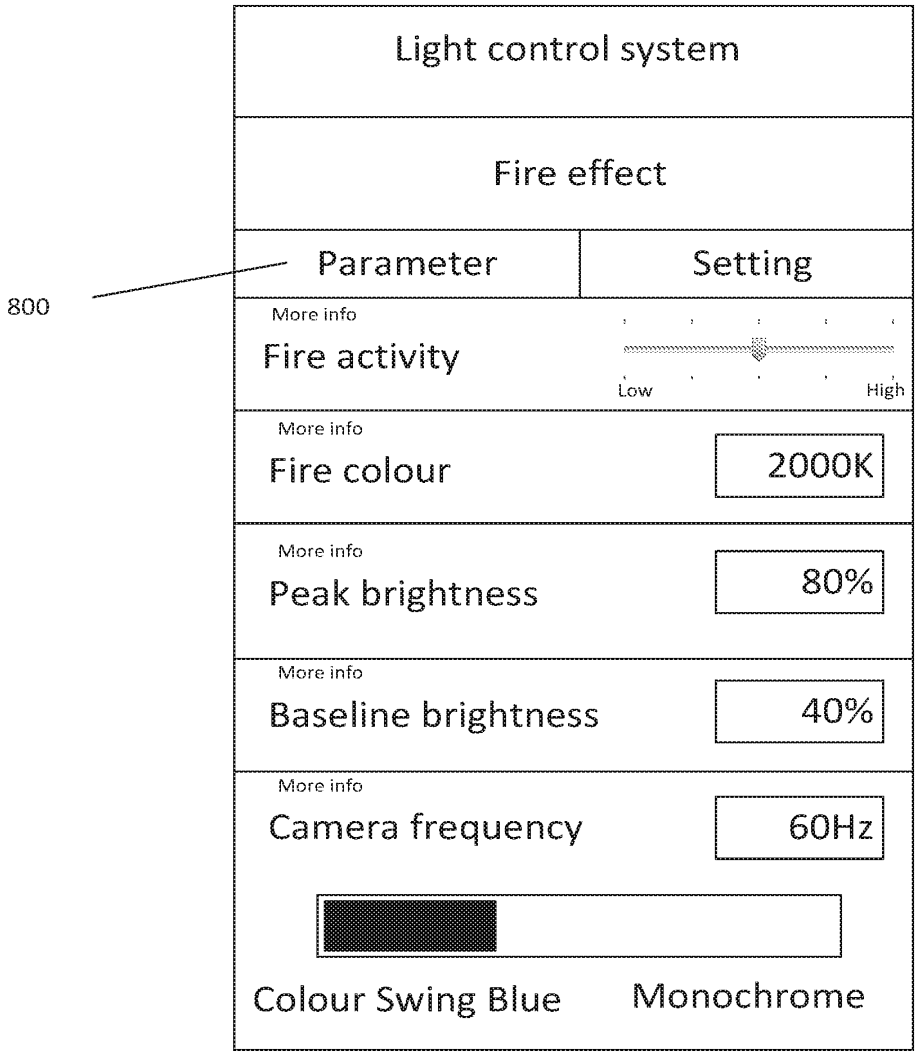

800
Light control system
Fire effect
Parameter
Setting
More info
Fire activity
Low
High
More info
Fire colour
2000K
More info
Peak brightness
80%
More info
Baseline brightness
40%
More info
Camera frequency
60Hz
Colour Swing Blue
Monochrome

Figure 6

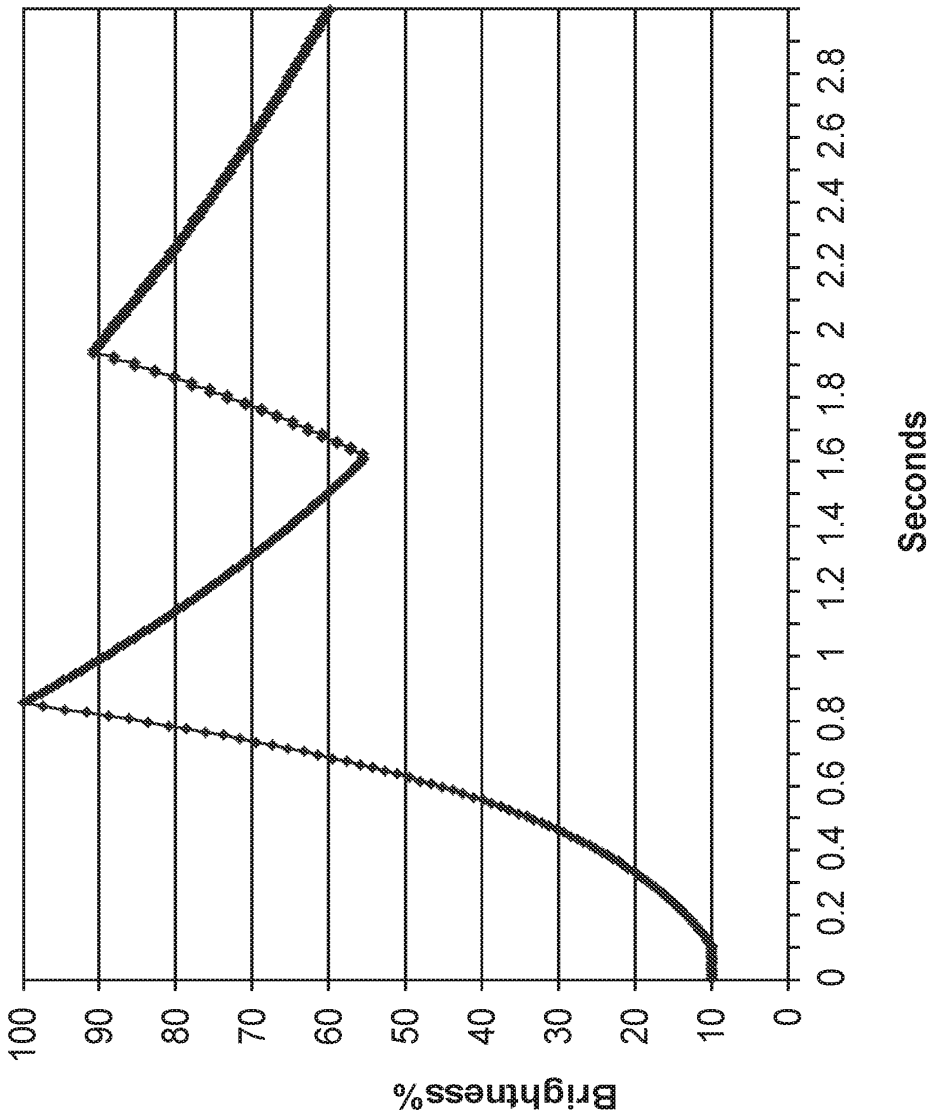

Brightness%
100
90
80
70
60
50
40
30
20
10
0
Seconds
0
0.2
0.4
0.6
0.8
1
1.2
1.4
1.6
1.8
2
2.2
2.4
2.6
2.8

Figure 7

Electronic Patent Application Fee Transmittal				
Application Number:	15820469			
Filing Date:	22-Nov-2017			
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF			
First Named Inventor/Applicant Name:	Roderick Allen Gammons			
Filer:	Martin Dennis Moynihan			
Attorney Docket Number:	70945			
Filed as Small Entity				
Filing Fees for **Utility under 35 USC 111(a)**				
Description	**Fee Code**	**Quantity**	**Amount**	**Sub-Total in USD($)**
Basic Filing:				
Pages:				
Claims:				
CLAIMS IN EXCESS OF 20	2202	1	50	50
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**50**

Electronic Acknowledgement Receipt	
EFS ID:	33129931
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan
Filer Authorized By:	
Attorney Docket Number:	70945
Receipt Date:	10-JUL-2018
Filing Date:	22-NOV-2017
Time Stamp:	08:17:19
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$50
RAM confirmation Number	071018INTEFSW00008791501407
Deposit Account	501407
Authorized User	Martin Moynihan
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1		70945ResponsetoOfficeActiond ated10Apr2018.pdf	686515 bc1906bfc472ebf5d015e5e8e908a98b8da c5ce8	yes	24

	Multipart Description/PDF files in .zip description		
	Document Description	**Start**	**End**
	Transmittal Letter	1	1
	Amendment/Req. Reconsideration-After Non-Final Reject	2	2
	Specification	3	5
	Claims	6	9
	Applicant Arguments/Remarks Made in an Amendment	10	10
	Applicant Arguments/Remarks Made in an Amendment	11	15
	Transmittal Letter	16	16
	Drawings-other than black and white line drawings	17	18
	Transmittal Letter	19	19
	Drawings-only black and white line drawings	20	24

Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29941 f72dedbbf14fd4ef3cae07046f2d701753cc7 dc1	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	716456		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:		§		
	Roderick Allen GAMMONS et al.	§		
Serial No.:	15/820,469	§	Confirmation No.:	5873
Filed:	November 22, 2017	§	Group Art Unit:	2844
For:	LIGHTING SYSTEM AND CONTROL THEREOF	§	Attorney Docket:	**70945**
Examiner:	Thain N. PHAM	§		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

AMENDMENT TRANSMITTAL

Sir:

(1) Applicant is a:
__X__ small entity
____ other than small entity

(2) The fee for claims 37 C.F.R. §1.16(b)-(d) has been calculated as shown below:

For	Claims after Amendment	Highest Claims Previously Paid
Total Claims	21	20
Indep. Claims	3	3

Small Entity	
Rate	**Fee**
1 x $ 50.00	$ 50.00
0 x $230.00	$ 0.00
TOTAL:	**$ 50.00**

(3) A response to the Office Action dated April 10, 2018 __X__ is filed herewith
____ has been filed

(4) Please charge the additional claim fee and any other amount required to Deposit Account No. **50-1407**.

Respectfully submitted,

/Martin D. Moynihan/
Martin D. Moynihan
Registration No. 40338
Telephone: (703) 859-9634

Date: July 10, 2018

DocCode – SCORE

SCORE Placeholder Sheet for IFW Content

Application Number: 15820469 Document Date: 07/10/2018

The presence of this form in the IFW record indicates that the following document type was received in electronic format on the date identified above. This content is stored in the SCORE database.

Since this was an electronic submission, there is no physical artifact folder, no artifact folder is recorded in PALM, and no paper documents or physical media exist. The TIFF images in the IFW record were created from the original documents that are stored in SCORE.

- Drawing

At the time of document entry (noted above):

- USPTO employees may access SCORE content via eDAN using the Supplemental Content tab, or via the SCORE web page.
- External customers may access SCORE content via PAIR using the Supplemental Content tab.

Form Revision Date: August 26, 2013

PTO/SB/06 (09-11)
Approved for use through 1/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

PATENT APPLICATION FEE DETERMINATION RECORD Substitute for Form PTO-875	Application or Docket Number 15/820,469	Filing Date 11/22/2017	☐ To be Mailed

ENTITY: ☐ LARGE ☑ SMALL ☐ MICRO

APPLICATION AS FILED - PART I

FOR	(Column 1) NUMBER FILED	(Column 2) NUMBER EXTRA		RATE ($)	FEE ($)
☐ BASIC FEE (37 CFR 1.16(a), (b), or (c))	N/A	N/A		N/A	
☐ SEARCH FEE (37 CFR 1.16(k), (i), or (m))	N/A	N/A		N/A	
☐ EXAMINATION FEE (37 CFR 1.16(o), (p), or (q))	N/A	N/A		N/A	
TOTAL CLAIMS (37 CFR 1.16(i))	minus 20 =	*		x $40 =	
INDEPENDENT CLAIMS (37 CFR 1.16(h))	minus 3 =	*		x $210 =	
☐ APPLICATION SIZE FEE (37 CFR 1.16(s))	If the specification and drawings exceed 100 sheets of paper, the application size fee due is $310 ($155 for small entity) for each additional 50 sheets or fraction thereof. See 35 U.S.C. 41(a)(1)(G) and 37 CFR 1.16(s).				
☐ MULTIPLE DEPENDENT CLAIM PRESENT (37 CFR 1.16(j))					
* If the difference in column 1 is less than zero, enter "0" in column 2.				TOTAL	

APPLICATION AS AMENDED - PART II

AMENDMENT	07/10/2018	(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	* 21	Minus	** 20	= 1		x $50 =	50
	Independent (37 CFR 1.16(h))	* 3	Minus	*** 3	= 0		x $230 =	0
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	50

AMENDMENT		(Column 1) CLAIMS REMAINING AFTER AMENDMENT		(Column 2) HIGHEST NUMBER PREVIOUSLY PAID FOR	(Column 3) PRESENT EXTRA		RATE ($)	ADDITIONAL FEE ($)
	Total (37 CFR 1.16(i))	*	Minus	**	=		x $0 =	
	Independent (37 CFR 1.16(h))	*	Minus	***	=		x $0 =	
	☐ Application Size Fee (37 CFR 1.16(s))							
	☐ FIRST PRESENTATION OF MULTIPLE DEPENDENT CLAIM (37 CFR 1.16(j))							
							TOTAL ADD'L FEE	

* If the entry in column 1 is less than the entry in column 2, write "0" in column 3.	LIE
** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 20, enter "20".	Theresa D Dawkins
*** If the "Highest Number Previously Paid For" IN THIS SPACE is less than 3, enter "3".	
The "Highest Number Previously Paid For" (Total or Independent) is the highest number found in the appropriate box in column 1.	

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet 1 of 2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Document Number Number-Kind Code [2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2004/0257007	23-Dec-2004	Lys et al.	
	2	2014/0139130	22-May-2014	Upton	
	3	2018/0112862	26-Apr-2018	Gammons et al.	
	4	2018/0135842	17-May-2018	Gammons et al.	
	5	7,777,427	17-Aug-2010	Stalker III	
	6	8,253,666	28-Aug-2012	Shteynberg et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Documents Country Code [3] Number [4] Kind Code [5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]
	7	CN 103090238	08-May-2013	Zheng et al.		
	8	CN 103313457	18-Sep-2013	Xing et al.		
	9	CN 103313458	18-Sep-2013	Xing et al.		
	10	CN 202841602	27-Mar-2013	Lv		
	11	EP 2120512	18-Nov-2009	Koninklijke Philips Electronics		
	12	EP 3002995	06-Apr-2016	Van de Sluis et al.		
	13	WO 2017/097741	15-Jun-2017	Van de Sluis et al.		

Examiner Signature		Date Considered	

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[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT

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Application Number	15/820,469
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Group Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet	2	Of	2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	14	Official Action Dated 09 March 2018 From the US Patent and Trademark Office Re. Application No. 15/481,460. (9 pages)	
	15	Official Action Dated 22 March 2018 From the US Patent and Trademark Office Re. Application No. 15/849,793. (14 pages)	
	16	Official Action Dated 28 March 2018 From the US Patent and Trademark Office Re. Application No. 15/849,819. (17 pages)	
	17	Philips "Controlling LED Lighting: Transform Environments, Provide Confort and Security, Save Energy", Philips Color Kinetics, Product Catalog, P.1-36, 2011.	

Examiner Signature		Date Considered	

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[1] Applicant's unique citation designation number (optional).

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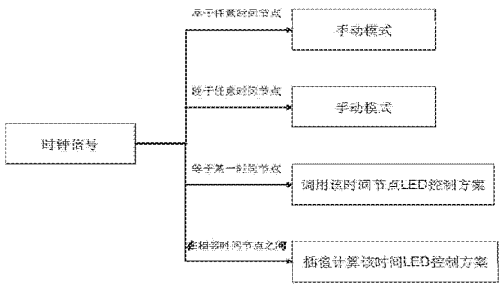
权利要求书2页 说明书5页 附图5页

(54)发明名称

色温随时间模拟自然光变化的LED光源照明的方法和装置

(57)摘要

本发明公开了一种色温随时间模拟自然光变化的LED光源照明的方法，首先在控制器中存储一系列不同时间节点和色温对应的LED光源的电流调整方案，控制器通过接受时钟的时间信号，并将时间信号和时间节点进行比较，然后提取相应的电流调整方案控制LED光源的电流，或者是手动选择色温，控制器根据该色温对应的电流调整方案，控制LED光源的电流，从而模拟自然光色温的变化，使LED照明模块的合成光具有较高的显色性。本发明还公开了一种色温随时间模拟自然光变化的LED光源照明的装置。



CN 103090238 A

1. 一种色温随时间模拟自然光变化的 LED 光源照明的方法，利用控制器调节 LED 光源的电流值以改变 LED 光源的发光特性，其特征在于，包括以下步骤：

1）预设一时间段，将该时间段内不同时间节点的色温以及所对应的实现该色温的 LED 电流值存储在控制器中；预设一色温范围，将该色温范围内不同色温以及所对应的实现该色温的 LED 电流值也存储在控制器中；

2）控制器将当前时间与步骤 1）中的时间段进行比较：

若当前时间对应步骤 1)中的某一时间节点，控制器向 LED 光源输出与该时间节点对应的 LED 电流值；

若当前时间处于步骤 1）中相邻两个时间节点之间，控制器通过插值算法得到调整后 LED 电流值，并向 LED 光源输出；

若当前时间不在步骤 1）的时间段内，则手动选择色温范围内的某一色温，控制器向 LED 光源输出与该色温对应的 LED 电流值。

2. 如权利要求 1 所述的色温随时间模拟自然光变化的 LED 光源照明的方法，其特征在于，所述 LED 光源由多个单色 LED 灯组成。

3. 如权利要求 2 所述的色温随时间模拟自然光变化的 LED 光源照明的方法，其特征在于，所述实现该色温的 LED 电流值的算法包括以下步骤：

1）设定目标色温为 CCTT，设 LED 光源合成光谱的色温为 CCTM，CCTz 和 CCT_M 应满足的边界条件为：

$$\begin{cases} \left|CCT_T - CCT_M\right| \le \Delta CCT \\ \Delta uv = \sqrt{(u_{T'} - u_m)^2 + (v_{T'} - v_m)^2} \le 0.005 \end{cases}$$

其中，Δ CCT 为 CCT_M 与 CCT_T 存在的偏差范围；

Δ uv 为 LED 光源合成光谱的色坐标与黑体辐射曲线之间的距离；

($u_{T'}$，$v_{T'}$) 和 (u_M, v_M) 分别为在 CIE1960-UCS 色品图中黑体辐射线上 CCT_M 处的色坐标与 LED 光源合成光谱的色坐标；

2)设多个单色 LED 灯的归一化的光谱分别为 $S_i(\lambda)$ (i = 1, 2, 3...n)，对应权重为 k_i (i = 1, 2, 3...n)；在 0~1 区间之间对权重 k_i (i = 1, 2, 3...n) 随机赋值，使 LED 光源合成光谱满足上述的边界条件；

3）建立显色性 CRI 的评价函数 f = 100-CRI，采用下山单纯形法局部优化算法寻找显色性 CRI 获得极大值时对应的权重 k_i；

4）将权重 k_i 转化为亮度权重 Y_i，其中 Y_i 为 k_i*$S_i(\lambda)$ 对应的 CIE1931XYZ 颜色空间中的亮度，根据电流值 C_i 与亮度权重 Y_i 的对应关系，将亮度权重 Y_i 转化为电流值 C_i，即得实现该色温的 LED 电流值。

4. 如权利要求 3 所述的色温随时间模拟自然光变化的 LED 光源照明的方法，其特征在于，所述多个单色 LED 灯包括红光 LED 灯、绿光 LED 灯、品蓝光 LED 灯和暖白光 LED 灯，所述电流值包括各个单色 LED 灯的电流值。

5. 如权利要求 4 所述的色温随时间模拟自然光变化的 LED 光源照明的方法，其特征在于，所述的红光 LED 灯的波长为 600~630nm，绿光 LED 灯的波长为 500~540nm，品蓝光 LED 灯的波长为 450~470nm，暖白光 LED 灯的色温为 2500K~3000K。

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6. 如权利要求 1 所述的色温随时间模拟自然光变化的 LED 光源照明的方法，其特征在于，所述插值算法为：

设当前时间为 t，且在控制器存储的相邻时间节点 t_1 与 t_2 之间，设 t_1 对应的 n 种 LED 的电流值分别为 C_{i1}（i = 1, 2, 3...n），t2 对应的 n 种 LED 的电流值分别为 C_{i2}（i = 1, 2, 3...n），那么 t 对应的 n 种 LED 的电流值分别为 C_i（i = 1, 2, 3...n）如下：

$$\begin{cases} C_1 = \dfrac{t-t_1}{t_2-t_1} * C_{12} + \dfrac{t_2-t}{t_2-t_1} * C_{11} \\ C_2 = \dfrac{t-t_1}{t_2-t_1} * C_{22} + \dfrac{t_2-t}{t_2-t_1} * C_{21} \\ C_3 = \dfrac{t-t_1}{t_2-t_1} * C_{32} + \dfrac{t_2-t}{t_2-t_1} * C_{31} \\ \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\ C_n = \dfrac{t-t_1}{t_2-t_1} * C_{n2} + \dfrac{t_2-t}{t_2-t_1} * C_{n1} \end{cases}$$ 。

7. 一种色温随时间模拟自然光变化的 LED 光源照明的装置，其特征在于，包括：LED 光源；

控制器，用于调整 LED 光源的电流值；

时钟，用于向控制器输送当前时间。

8. 如权利要求 7 所述的色温随时间模拟自然光变化的 LED 光源照明的装置，其特征在于，所述 LED 光源包括红光 LED 灯、绿光 LED 灯、品蓝光 LED 灯和暖白光 LED 灯。

9. 如权利要求 8 所述的色温随时间模拟自然光变化的 LED 光源照明的装置，其特征在于，所述的红光 LED 灯的波长为 600~630nm，绿光 LED 灯的波长为 500~540nm，品蓝光 LED 灯的波长为 450~470nm，暖白光 LED 灯的色温为 2500K~3000K。

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色温随时间模拟自然光变化的 LED 光源照明的方法和装置

技术领域

[0001] 本发明涉及 LED 照明领域，尤其涉及一种色温随时间模拟自然光变化的 LED 光源照明的方法和装置。

背景技术

[0002] 近年来，随着城市高层建筑增多，建筑内部自然采光不足的问题日益显现，通常需要人工照明进行补充，目前大多数人工照明采用的传统日光灯显色性较低且色温固定。

[0003] 显色性就是指不同光谱的光源照射在同一颜色的物体上时，所呈现不同颜色的特性。显色性光源对物体颜色呈现的程度，也就是颜色的逼真程度，显色性高的光源对颜色的再现较好，我们所看到的颜色也就较接近自然原色，显色性低的光源对颜色的再现较差，我们所看到的颜色偏差也较大。

[0004] 色温是表示光源光色的尺度，单位为 K（开尔文），色温指的是广播在不同的能量下，人眼所感受的颜色变化。色温是测量和标志波长的数值，光波长不同，呈现出光的颜色不同，尤其是自然光，随着时间、季节、地理位置的变化，其色温都会发生变化。

[0005] 公开号为 101561083 的中国发明专利公开了一种色温可变的 LED 发光装置及其实现方法，其原理是通过温度传感器采集外界环境的温度，控制器根据温度传感器所采集的数据来调整 LED 灯组的电压参数，以实现随着环境温度的变化而自动改变色温，使 LED 灯的光谱更接近自然光。

[0006] 上述专利的 LED 灯能随外界的温度而改变色温，但是温度不能完全准确体现色温的变化，造成色温变化的因素是多方面的，还有时间、季节和地理位置等。

[0007] 研究表明，维持正常的生理节律对人体健康十分重要，而光对人体的生理节律会产生明显影响。波长位于 450-470nm 的蓝光可以抑制褪黑素分泌，进而对生理节律产生重要影响。一天当中随着自然光色温的规律性的变化：即早晚色温较低，中午色温较高，蓝光部分的多少也随之变化，这一自然的变化过程维持了人体正常的生理节律。

发明内容

[0008] 为了实现色温随时间模拟自然光变化的人工照明，进而维持人体正常的生理节律，本发明提供了一种色温随时间模拟自然光变化的 LED 光源照明的方法和装置。

[0009] 一种色温随时间模拟自然光变化的 LED 光源照明的方法，利用控制器调节 LED 光源的电流值以改变 LED 光源的发光特性，包括以下步骤：

[0010] 1）预设一时间段，将该时间段内不同时间节点的色温以及所对应的实现该色温的 LED 电流值存储在控制器中；预设一色温范围，将该色温范围内不同色温以及所对应的实现该色温的 LED 电流值也存储在控制器中。

[0011] 2）控制器将当前时间与步骤 1）中的时间段进行比较：

[0012] 若当前时间对应步骤 1)中的某一时间节点，控制器向 LED 光源输出与该时间节点对应的 LED 电流值；

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[0013] 若当前时间处于步骤 1)中相邻两个时间节点之间，控制器通过插值算法得到调整后 LED 电流值，并向 LED 光源输出；

[0014] 若当前时间不在步骤 1）的时间段内，则手动选择色温范围内的某一色温，控制器向 LED 光源输出与该色温对应的 LED 电流值。

[0015] 所述 LED 光源由多个单色 LED 灯组成。

[0016] 所述实现该色温的 LED 电流值的算法包括以下步骤：

[0017] 1）设定目标色温为 CCT_T，设 LED 光源合成光谱的色温为 CCT_M，CCT_T 和 CCT_M 应满足的边界条件为：

[0018] $$\begin{cases} |CCT_T - CCT_M| \le \Delta CCT \\ \Delta uv = \sqrt{(u_{T'} - u_m)^2 + (v_{T'} - v_m)^2} \le 0.005 \end{cases}$$

[0019] 其中，Δ CCT 为 CCT_M 与 CCT_T 存在的偏差范围；

[0020] Δ uv 为 LED 光源合成光谱的色坐标与黑体辐射曲线之间的距离；

[0021] $(u_{T'}, v_{T'})$ 和 (u_M, v_M) 分别为在 CIE1960-UCS 色品图中黑体辐射线上 CCT_M 处的色坐标与 LED 光源合成光谱的色坐标；

[0022] 2）设多个单色 LED 灯的归一化的光谱分别为 $S_i(\lambda)$ (i = 1, 2, 3...n)，对应权重为 k_i (i = 1, 2, 3...n)；在 0~1 区间之间对权重 k_i (i = 1, 2, 3...n) 随机赋值，使 LED 光源合成光谱满足上述的边界条件；

[0023] 3）建立显色性 CRI 的评价函数 f = 100-CRI，采用下山单纯形法局部优化算法寻找显色性 CRI 获得极大值时对应的权重 k_i；

[0024] 4）将权重 k_i 转化为亮度权重 Y_i，其中 Y_i 为 $k_i * S_i(\lambda)$ 对应的 CIE1931XYZ 颜色空间中的亮度，根据电流值 C_i 与亮度权重 Y_i 的对应关系，将亮度权重 Y_i 转化为电流值 C_i，即得实现该色温的 LED 电流值。

[0025] 本发明 LED 电流值的方案均根据上述的算法得到，使电流值调整后的 LED 光源发出的合成光具有较高的显色性。

[0026] 所述多个单色 LED 灯包括红光 LED 灯、绿光 LED 灯、品蓝光 LED 灯和暖白光 LED 灯，所述电流值包括各个单色 LED 灯的电流值；且所述的红光 LED 灯的波长为 600~630nm，绿光 LED 灯的波长为 500~540nm，品蓝光 LED 灯的波长为 450~470nm，暖白光 LED 灯的色温为 2500K~3000K。LED 光源发出的光谱为上述四种单色 LED 灯的合成光谱，该合成光谱能模拟自然光。

[0027] 所述的时间段为北京时间上午 8 时至下午 17 时，该时间段内每隔半个小时设有一个时间节点。本发明的目的为实现色温随时间模拟自然光变化，因此时间段设置为北京时间上午 8 时至下午 17 时，弥补上述时间段内建筑内部自然光采光不足的缺陷。

[0028] 当前时间处于两个相邻时间节点之间，可通过插值算法得到单色 LED 灯的电流值，所述插值算法为：

[0029] 设当前时间为 t，且在控制器存储的相邻时间节点 t_1 与 t_2 之间，设 t_1 对应的 n 种 LED 的电流值分别为 C_{i1} (i = 1, 2, 3...n)，t_2 对应的 n 种 LED 的电流值分别为 C_{i2} (i = 1, 2, 3...n)，那么 t 对应的 n 种 LED 的电流值分别为 C_i (i = 1, 2, 3...n) 如下：

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[0030]
$$\begin{cases} C_1 = \frac{t-t_1}{t_2-t_1} * C_{12} + \frac{t_2-t}{t_2-t_1} * C_{11} \\ C_2 = \frac{t-t_1}{t_2-t_1} * C_{22} + \frac{t_2-t}{t_2-t_1} * C_{21} \\ C_3 = \frac{t-t_1}{t_2-t_1} * C_{32} + \frac{t_2-t}{t_2-t_1} * C_{31} \\ \cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots\cdots \\ C_n = \frac{t-t_1}{t_2-t_1} * C_{n2} + \frac{t_2-t}{t_2-t_1} * C_{n1} \end{cases}$$ 。

[0031] 本发明还提供了一种色温随时间模拟自然光变化的 LED 光源照明的装置，包括：LED 光源；

[0032] 控制器，用于调整 LED 光源的电流值；

[0033] 时钟，用于向控制器输送当前时间。

[0034] 本发明的 LED 照明装置具有两种控制模式，一是通过时间来自动控制 LED 光源的电流值，二是通过手动调节 LED 光源合成光的色温来控制 LED 光源的电流值。

[0035] 所述 LED 光源包括红光 LED 灯、绿光 LED 灯、品蓝光 LED 灯和暖白光 LED 灯，且所述的红光 LED 灯的波长为 600~630nm，绿光 LED 灯的波长为 500~540nm，品蓝光 LED 灯的波长为 450~470nm，暖白光 LED 灯的色温为 2500K~3000K。上述四种单色 LED 灯发出的合成光能很好的模拟自然光，且发出的合成光具有较高的显色性。

[0036] 本发明的有益效果是实现了与自然光色温变化相一致的人工照明，有利于维持人体正常的生理节律，并且在不同色温下都获得了较高的显色性。

附图说明

[0037] 图 1 为本发明的色温随时间模拟自然光变化的 LED 光源照明的装置的结构简图；

[0038] 图 2 为本发明选取的四种单色 LED 灯的参数；

[0039] 图 3 为本发明的四种单色 LED 灯的归一化光谱；

[0040] 图 4 为本发明的色温随时间模拟自然光变化的 LED 光源照明的工作流程；

[0041] 图 5 为本发明的色温对应的 LED 电流值的算法；

[0042] 图 6 为本发明的色温对应的 LED 电流值的算法的边界条件；

[0043] 图 7 为本发明高显色 LED 控制方案的相对亮度与电流值的对应关系；

[0044] 图 8 为本发明的不同时间节点的 LED 电流值控制方案；

[0045] 图 9 为本发明中不同色温的 LED 电流值控制方案。

[0046] 图中 1 为时钟，2 为控制器，3 为 LED 光源。

具体实施方式

[0047] 下面结合附图对本发明色温随时间模拟自然光变化的 LED 光源照明的方法及装置作进一步详细描述。

[0048] 如图 1 所示，一种色温随时间模拟自然光变化的 LED 光源照明的装置，包括时钟 1、控制器 2 和 LED 光源 3，LED 光源 3 包括红光 LED 灯、绿光 LED 灯、品蓝光 LED 灯和暖白光

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LED 灯。

[0049] 本实施例选择 Lumileds LUXEON Rebel 系列 LED，四种单色 LED 灯的参数如图 2 所示，四种单色 LED 灯的归一化光谱如图 3 所示，其中，暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的归一化的光谱分别为 $S_1(\lambda)$、$S_2(\lambda)$、$S_3(\lambda)$ 和 $S_4(\lambda)$。

[0050] 控制器 2 内存储有北京时间四种单色 LED 灯电流值的方案，包括晴天上午 8 点到下午 17 点中以半个小时为一时间节点的电流值方案（如图 4 所示），每个时间节点均对应有色温；以及色温为 2500K~6000K 内 8 组色温节点对应的 LED 电流值方案（如图 5 所示）。通过上述方案对四种单色 LED 灯的电流进行调整，调整后 LED 光源 3 发出的合成光具有较高的显色性，如图 6 所示，实现该色温的 LED 电流值的算法如下：

[0051] 1、设目标色温为 CCT_T，由目标色温确定边界条件，在实际应用时允许 LED 光源合成光谱色温 CCT_M 与 CCT_T 存在一定偏差，且允许 LED 光源合成光谱的色坐标与黑体辐射曲线存在一定距离（如图 7 所示），边界条件为：

[0052] $$\begin{cases} \left|CCT_T - CCT_M\right| \le \Delta CCT \\ \Delta uv = \sqrt{(u_{T'} - u_m)^2 + (v_{T'} - v_m)^2} \le 0.005 \end{cases}$$

[0053] 其中，ΔCCT 为 CCT_M 与 CCT_T 存在的偏差范围，Δuv 为 LED 光源合成光谱的色坐标与黑体辐射曲线之间的距离，其中 $(u_{T'}, v_{T'})$ 和 (u_M, v_M) 分别为在 CIE1960-UCS 色品图中黑体辐射线上 CCT_M 处的色坐标与 LED 光源合成光谱的色坐标，本发明中 ΔCCT = 50K；

[0054] 2、建立关于显色性（CRI）的评价函数 f = 100-CRI，因为以下采用的下山单纯形法局部优化算法只会寻找评价函数的极小值，故为使 CRI 获得极大值，需 f 取得极小值；

[0055] 3、设暖白、品蓝、绿、红 4 种 LED 灯的归一化的光谱分别为 $S_1(\lambda)$、$S_2(\lambda)$、$S_3(\lambda)$、$S_4(\lambda)$，对应权重为 k_1、k_2、k_3、k_4；如图 3 所示，k_i 在 0、1 区间之间，四种单色 LED 灯的光谱归一化的目的在于统一权重 k_i 的区间为 0、1 之间；随机赋值直至满足边界条件为止，并设此 $k_i(i = 1,2,3,4)$ 为初始值；

[0056] 4、在边界条件以内，采用下山单纯形法局部优化算法寻找显色性（CRI）获得极大值时对应的权重 k_i；

[0057] 5、将权重 k_i 转化为亮度权重 Y_i，其中 Y_i 为 $k_i * S_i(\lambda)$ 对应的 CIE1931XYZ 颜色空间中的亮度，通过实验测得控制电流 C_i 与亮度权重 Y_i 的对应关系，如图 8 所示，再将亮度权重 Y_i 转化为控制电流 C_i，即得实现该色温的 LED 电流值。

[0058] 如图 9 所示，本发明的色温随时间模拟自然光变化的 LED 光源照明的装置的工作步骤如下：

[0059] 1、设定时间段为北京时间上午 8 时至下午 17 时，该时间段内每隔半个小时设有一个时间节点，并将每个时间节点对应的 LED 电流值存储在控制器中；预设色温范围为 2500K~6000K，将色温节点间隔 500K，将色温节点对应的 LED 电流值也存储在控制器中；

[0060] 2、时钟将当前时间 t 传递至控制器，控制器将当前时间 t 与上述设定的时间段进行比较，判断当前时间与时间段的关系；

[0061] 若当前时间 t 不在时间段内，控制器处于手动模式，发出相应的声音信号提醒人们，可通过手动选择 2500K~6000K 之间间隔 500K 的某一色温，控制器根据该色温节点对应的 LED 电流值控制 LED 灯；

[0062] 例如：若实时的时间数据 t=18:00，根据图 5 中色温对应的调整方案，可人为选择

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LED 光源发出合成光的色温，假如人工选择色温为 3500K，控制器将暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的电流分别调整为 222.94mA、1.71mA、58.09mA、17.26mA。

[0063] 若当前时间 t 正好对应某一时间节点，控制器调取改时间节点的 LED 电流值。

[0064] 例如：当前时间 t=8:30，则由图 4 可知：暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的电流分别为 271.01mA、0mA、20.805mA、8.188mA；

[0065] 若当前时间 t 处于相邻两个时间节点之间，控制器通过插值算法得到调整后的电流值，并对应调整各单色 LED 灯的电流值，插值算法如下：

[0066] 设时钟传递的当前时间为 t，且 t 处于相邻时间节点 t_1 与 t_2 之间，t_1 对应的暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的电流值为 C_{w1}、C_{b1}、C_{g1}、C_{r1}，t_2 对应的暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的电流值为 C_{w2}、C_{b2}、C_{g2}、C_{r2}，则 t 对应的暖白光 LED 灯、品蓝光 LED 灯、绿光 LED 灯和红光 LED 灯的电流值 C_w、C_b、C_g、C_r 为：

[0067]
$$\begin{cases} C_w = \dfrac{t-t_1}{t_2-t_1} * C_{w2} + \dfrac{t_2-t}{t_2-t_1} * C_{w1} \\ C_b = \dfrac{t-t_1}{t_2-t_1} * C_{b2} + \dfrac{t_2-t}{t_2-t_1} * C_{b1} \\ C_g = \dfrac{t-t_1}{t_2-t_1} * C_{g2} + \dfrac{t_2-t}{t_2-t_1} * C_{g1} \\ C_r = \dfrac{t-t_1}{t_2-t_1} * C_{r2} + \dfrac{t_2-t}{t_2-t_1} * C_{r1} \end{cases}$$

[0068] 例如：当前时间 t=12:10 时刻，由图 4 可知：

[0069] t_1=12:00，C_{r1}=9.13mA，C_{g1}=84.91mA，C_{b1}=6.20mA，C_{w1}=199.76mA；

[0070] t_2=12:30，C_{r2}=10.92mA，C_{g2}=92.04mA，C_{b2}=6.93mA，C_{w2}=190.11mA；

[0071] 根据上面的插值算法，可得到得：

[0072] C_r=10.32mA，C_g=89.66mA，C_b=6.69mA，C_w=193.33mA。

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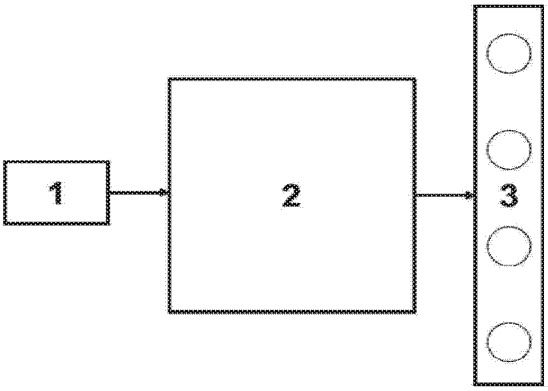


图 1

颜色	代码	主波长 (nm)
晶蓝色	LXM2-PR02-0100	450
绿色	LXM2-PM01-0090	525
红色	LXM2-PD01-0040	625
暖白色	LXML-PW30	3000K（色温）

图 2

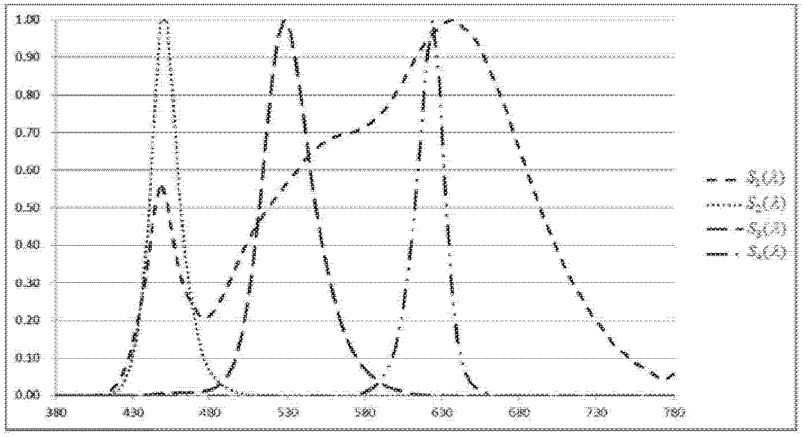


图 3

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时间	色温(CCT)(K)	暖白1ED(mA)	晶蓝LED(mA)	绿色LED(mA)	红色LED(mA)	显色性（CRI）
8:00	2500	262.39	0	14.145	23.469	93
8:30	2900	271.01	0	20.805	8.188	93
9:00	3350	231.4	0.7248	41.303	26.569	95
9:30	3600	245.36	2.6097	44.94	7.0924	92
10:00	3950	237.36	3.2564	53.963	5.423	95
10:30	4200	200.33	4.0388	78.79	16.842	93
11:00	4500	225.04	4.8781	64.089	5.9892	90
11:30	4900	158.83	5.7617	108.64	26.76	96
12:00	5200	199.76	6.1977	84.911	9.1306	93
12:30	5500	190.11	6.9322	92.039	10.917	93
13:00	5150	206.22	5.6586	83.335	4.7877	92
13:30	4850	228.14	5.4495	66.41	0	90
14:00	4500	230.07	4.2995	64.638	0.99155	89
14:30	4250	230.58	3.6549	61.222	4.5428	91
15:00	3900	243.71	2.9395	49.694	3.659	93
15:30	3550	253.6	2.5309	38.16	5.7065	95
16:00	3150	239.79	1.3159	40.594	18.302	90
16:30	2900	249.56	0.23753	33.682	16.522	92
17:00	2550	255.42	0	19.397	25.09	91

图 4

色温(CCT)	暖白1ED(mA)	晶蓝LED(mA)	绿色LED(mA)	红色LED(mA)	显色性（CRI）
2500	259.94	0.00	13.90	26.16	93.00
3000	253.97	0.00	31.83	14.21	92.00
3500	222.94	1.71	58.09	17.26	90.00
4000	222.87	3.07	64.05	10.01	92.00
4500	222.31	5.23	65.46	7.00	93.00
5000	217.80	5.49	74.28	2.43	91.00
5500	210.14	7.20	78.12	4.54	90.00
6000	203.43	7.74	85.92	2.91	89.00

图 5

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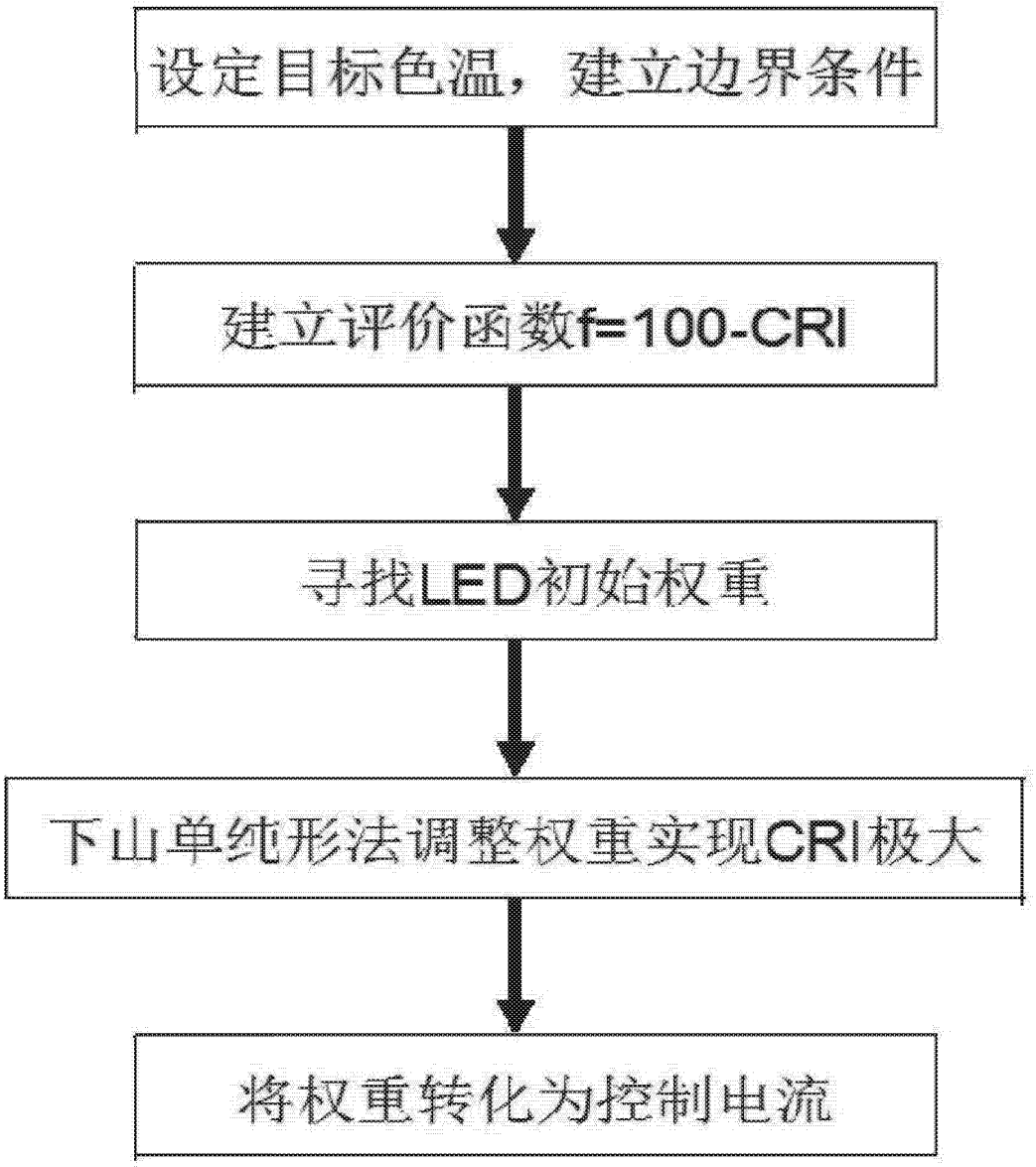


图 6

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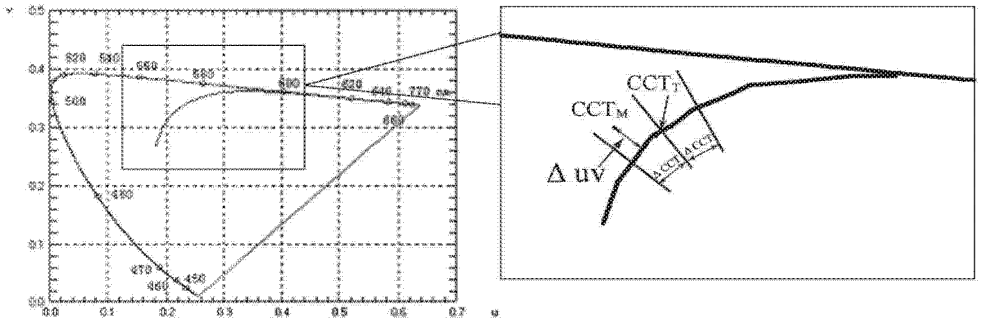


图 7

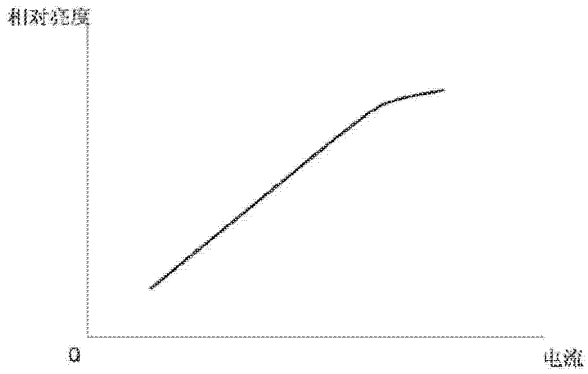


图 8

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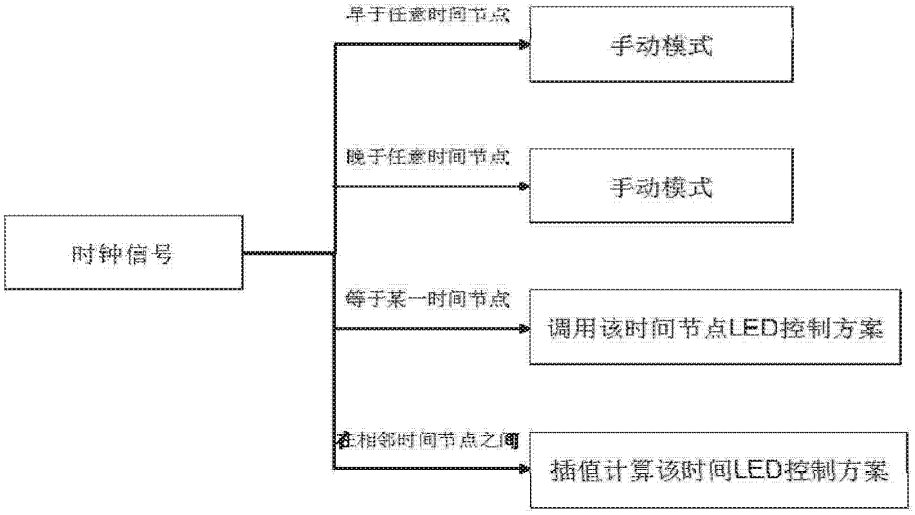


图 9

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Record 4/4 CN103313458A Method for realizing landscape lighting through system integration | through the system integrated method for landscape lighting

Publication Number: CN103313458A

Title: Method for realizing landscape lighting through system integration | through the system integrated method for landscape lighting *(Translation from Clarivate Analytics)*

Title - DWPI: Landscape illumination method for integrated testing device, involves selecting landscape illumination system, where landscape illumination system is provided with power distribution box, switch power supply unit, controller and LED lamp

Abstract:

Disclosed is a landscape lighting system integration technology. A landscape lighting system is composed of a mains supply, a power distribution box, a switching power supply, a controller, LED lamps and other lamps. An integration method for the system includes the following two steps: (1) choosing the landscape lighting system; and (2) organically integrating the landscape lighting system with specific task equipment and specific task software to form an integrated landscape lighting system. With the integrated landscape lighting system, instabilities in a landscape lighting system specially designed for an individual case can be addressed, and a landscape lighting system designed for a specific task is enabled to be lower in cost, higher in development efficiency and more stable and more reliable in operation.

A landscape lighting system integrated technology, the landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps, the integration method of the system is divided into two steps: (1) selecting the existing landscape illumination system, (2) the landscape lighting system and specific task device and specific task software landscape illumination system are organically integrated, are integrated. The integrated landscape lighting system can solve the unstable factors of specially designed for individual landscape lighting system, that is task-specific design of landscape lighting system cost is lower, the development efficiency is high, and the operation is more stable and reliable.

(Translation from Clarivate Analytics)

Abstract - DWPI:

Abstract - DWPI Novelty:

The method involves selecting a landscape illumination system, where the landscape illumination system is provided with a power distribution box, a switch power supply unit, a controller and an LED lamp.

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Abstract - DWPI Use:

Landscape illumination method for an integrated testing device.

Abstract - DWPI Advantage:

The method enables reducing operation cost and providing high working efficiency and stable and reliable operation.

Abstract - DWPI Drawing Description: The drawing shows a block diagram illustrating a landscape illumination method.'(Drawing includes non-English language text)'

Claims:

1. A through system integrated method for realizing illumination of landscape, the landscape lighting system comprising a city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps, through system integration for landscape lighting method comprising the following steps: (1) according to the requirement of engineering implementation effect site and landscape building or landscape landscape lighting, selecting light source and lamp, selecting an existing control system, through field test to obtain the basis of landscape lighting system, (2) to a dynamic change in landscape lighting illumination effect according to the computer simulation and field test. to meet dynamically changing requirements, (3) the landscape lighting system of the base and part or all is landscape lighting need of power distribution box, a switch power supply, a controller, an LED lamp and other lamps in integration, through system integration landscape lighting.

2. The through system integration according to claim 1 method for realizing landscape lighting, the dynamically changing lighting effect, which is through the LED lamp for simulating dynamic effect, realizing dynamic change by controlling display effect of chip control LED lamp illumination effect.

(Translation from Clarivate Analytics)

Description:

through the system integrated method for landscape lighting

Technology field

[0001] The technical field relates to landscape lighting integrated technology, through system integration method for landscape lighting, i.e., the existing landscape lighting system and specific

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task-specific landscape lighting system for system integration method.

Background technology

[0002] In recent years, with the continuous development of urbanization process to multicolor, variable is characteristic of, it has strong decorative effect, the dynamic change of the urban landscape lighting obtained rapid development in our country. but the landscape lighting system combines the latest technology of optical, art, electronics, computer, communication and many subjects such as production, large technical difficulty, and due to the particularity of the sight point so that the large part of landscape lighting system is a specially designed proprietary system.

[0003] the important technology in a landscape lighting system relates to the technical field of landscape lighting and lamp control device and finish the task of the device and software system integration can not be avoided, the former can complete basic illumination function, the latter transmits a specific task and the existing lamp system organically integrated. the traditional method is that it develops landscape illuminating lamp, the sample lot of product testing and analysis, and development of control software or control method to control it, then through commissioning, meet the design requirement of the landscape lighting system. This method needs a lot of money and manpower resource investment, and due to the more links, by circulation of multiple long time to finish the predetermined target task.

[0004] The technical problem to be solved by the invention

[0005] The purpose of the invention is to provide a new solving method through system integration to realize landscape lighting system method of the invention based on the existing landscape lighting system and specific task-specific landscape illumination system, providing for the traditional method, the method overcomes the defect that the traditional method of high investment, long period and low applicability, can fast meet various new landscape lighting systems use requirement.

[0006] content:

[0007] The technical solution of the invention is as follows:

[0008] A through system integrated method for realizing illumination of landscape, the landscape lighting system comprising a city power, a distribution box, a switch power supply, a controller, an

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LED lamp and other lamps, through system integration for landscape lighting method comprising the following steps:

[0009] (I) The effect to be implemented to project site and landscape building or landscape landscape lighting, selecting light source and lamp, selecting an existing control system, through field test to obtain the basis of landscape lighting system;

[2] (0010) to a dynamic change in landscape lighting illumination effect according to the computer simulation and field debugging, meets dynamic change requirement;

[3] (0011) the landscape lighting system of part or all of the foundation and organically integrates in landscape lighting need of power distribution box, a switch power supply, a controller, an LED lamp and other lamps, through system integration landscape lighting.

[0012] dynamically varying lighting effect is through the LED lamp for simulating dynamic effect, realizing dynamic change by controlling display effect of chip control LED lamp illumination effect.

[0013] According to the landscape effect and select the proper color temperature, light distribution curve and other technical parameters, if necessary, software programming the LED change effect, lighting effect such as dynamic change confirmation, to achieve final landscape lighting system.

[0014] Specific implement method of the invention is to provide a through system integrated method for realizing illumination of landscape, the landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps. the method comprises the steps of:

[0015] 1. according to the engineering field of building or scenery of the landscape lighting and landscape effect is required to be realized, the technical index is decomposed, according to these technical index to select an appropriate lamp system;

[0016] 2. for the lamp system evaluation, further improvement can not satisfy the performance;

[0017] 3. the system for dynamically varying lighting effect is required for software programming and field debugging, the computer simulation and to meet the dynamic change requirement;

[0018] 4. the light pollution to the color temperature, illumination intensity, field test, the power

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density required to satisfy the design requirement;

[0019] 5. The final requirement of landscape lighting system, selecting the final lamp brand, distribution scheme, a construction technology and power distribution scheme, the landscape lighting system are organically integrated.

[0020] wherein said lamp system evaluation comprises light source, colour temperature, illumination and power density, evaluation of light pollution, control protocol, control mode, dust-proof and water-proof grade, appearance size, construction technology.

[0021] evaluation of the light source apparatus, light source comprises an LED light source, a high-pressure gas lamp, fluorescent lamp, electric appliance comprises inductance ballast and compensation capacitor, electronic ballast, a switch power supply, an LED light source controller according to the requirement to select the proper light source and electrical appliance.

[0022] evaluation of the colour temperature, the warm color temperature value less than 3000k, the colour temperature value is 3000k to 5000k, cooling the colour temperature value is greater than 5000k, according to the design requirement to select the corresponding colour temperature value.

[0023] the illumination and power density evaluation, to satisfy the energy saving requirement. The city night lighting design specification (JGJ/T 163-2008) 6.6.2, selected corresponding power density value, such as a large city district, as white wall paint when building decoration material when power density is not greater than 6.7 Watts per square meter, the corresponding illumination intensity is not greater than 1501x.

[0024] the light pollution evaluation, according to city night lighting design specification (JGJ/T 163-2008) light pollution limits the requirement, selecting the proper lamp.

[0025] the control protocol in evaluation control protocol is X-1O, Internet, Lonworks, EIB-ZigBee, 1-Bus, T-Bus, *HBS, DAL1, DMX-512, CAN, ART-net, C-Bus, Dynet any one of selecting an appropriate control protocol according to the requirement.

[0026] evaluating the control mode, the control mode is a seesaw switch control, circuit breaker control, timing switch, acousto-optic control switch, a manual remote control, scene control, detecting control, constant illumination control in the any one kind of.

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[0027] evaluation of the dustproof and waterproof level, in open fields, a lamp protection level is not less than IP54; the ceiling, a lamp protection level is not less than IP43, when the serious environment pollution, the lamp protection level is not less than IP65.

[0028] the shape size evaluation, according to the installing condition in scene, the size can not interfere, which seriously affects the appearance of building.

[0029] The construction technique evaluation according to the scene condition evaluates whether a proper installation space, the installation position, whether the building and scenic spot appearance.

[0030] dynamically varying lighting effect is realized through the LED lamp needs to be dynamic effect software programming, the dynamic effect output forming corresponding instruction through address conversion, is transmitted to the control chip of the LED lamp so as to control the display effect of the LED lamp so as to realize dynamic change through the control chip of the lighting effect.

[0031] The landscape lighting system integrated technology is a system engineering, derived from many years of lighting engineering practice, the technology selection a lot of technology and experience data under a light source, color temperature, illumination and power density, comprehensive system light pollution, control protocol, control mode, dust-proof and water-proof level, shape size, items such as construction process of the optimization. Description

[0032] Picture 1 is the system of landscape illumination system frame.

Preferred Embodiment

:

[0033] Picture 1 is the system diagram, the system of landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps.

[0034] An embodiment of the present invention is sight lighting engineering of a museum, comprising the following detailed explanation of this system integration technology for realizing the method of:

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[0035] 1. according to the engineering field of building or scenery of the landscape lighting and landscape effect is required to be realized, the technical index is decomposed, according to these technical index to select an appropriate lamp system embodiment of the museum, the glass curtain wall designed to form waterfall effect, of the pillar museum front projector for projecting lighting, building side and roof decorative member needs illumination, colour temperature is warm tone and required to have the lamp remote switch. The previous engineering practice, selecting lamp system uses previous engineering project in the 8 watt of the LED line lamp, column bottom is 1000 watt narrow projecting upwards, colour temperature light high-pressure sodium is selected 2200k, the building entrance side is 150 watt high pressure sodium light projector, color temperature 2200k, building roof decorative member selected 70 watt high pressure sodium lamp light projector, color temperature 2200k.

[0036] 2. for the lamp system evaluation, further improvement can not satisfy the performance of remote controller fixing position according to experience the selected lamp system without problem, there is no need to change, only the glass curtain wall internal design line lamp, but the selected lamp system cannot realize remote switch lamp function, selecting the street lamp remote switch, the controller supports a mobile phone short message switching function. the system for dynamically varying lighting effect is required for software programming and field debugging, the computer simulation and to meet the dynamic change requirement; the glass curtain wall designed to form waterfall effect, making software programming again. the glare requirements, color temperature, illumination intensity, field test, the power density required to meet the design requirements, via the field test, it can satisfy the design requirement.

[0037] 3. The final requirement of landscape lighting system, selecting the final lamp brand, distribution scheme, a construction technology and power distribution scheme, the landscape lighting system are organically integrated. line lamp brand choose domestic factories and each lighting side uniformly. designing auxiliary fixing rod for fixing line lamp between the fixing claw of the glass curtain wall, a distribution from the building power supply.

[0038] maximum possible eliminates the redesign process in various factors affect the quality of through integrated landscape illumination system such that shorter work period and high efficiency, but also reduces the cost.

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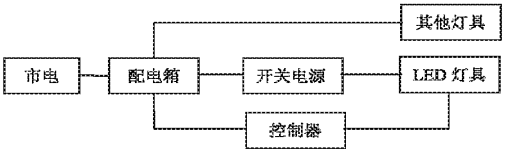
权利要求书1页 说明书3页 附图1页

(54)发明名称

通过系统集成实现景观照明的方法

(57)摘要

一种景观照明系统集成技术，该景观照明系统由市电、配电箱、开关电源、控制器、LED 灯具和其他灯具组成，系统的集成方法分两步：(1) 选择现有的景观照明系统；(2) 将上述景观照明系统和特定任务设备和特定任务软件进行有机集成，形成一体化的景观照明系统。通过集成的景观照明系统能够解决为个案特别设计的景观照明系统出现的不稳定因素，使得为特定任务设计的景观照明系统成本更低，开发效率更高，运行更加稳定可靠。



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1. 一种通过系统集成实现景观照明的方法，所述景观照明系统包括市电、配电箱、开关电源、控制器、LED 灯具和其他灯具，通过系统集成实现景观照明的方法步骤如下：

根据要实施景观照明的建筑物或景点的工程现场，结合景观的效果要求，将景观照明的技术指标进行分解，根据这些技术指标来选择灯具系统；

进行灯具系统评估，所述灯具系统评估包括光源电器、色温、照度及功率密度、光污染、控制协议、控制方式、防尘防水等级、外形尺寸、施工工艺的评估，对于性能不能满足要求的做出相应的调整；

对有动态变化照明效果要求的景观照明进行电脑模拟和现场联调，以满足动态变化要求；

对有光污染要求、色温、照度、功率密度要求的灯具进行现场试灯，以满足设计要求；

根据景观照明系统的最终要求，选取最终灯具品牌、布灯方案、施工工艺及配电方案，完成景观照明系统的有机集成。

2. 根据权利要求 1 所述的通过系统集成实现景观照明的方法，所诉动态变化照明效果，是通过 LED 灯实现，进行动态效果模拟，通过控制芯片控制 LED 灯的显示效果实现动态变化的照明效果。

3. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述光源电器的评估，其中的光源包括：LED 光源，高压气体灯，荧光灯；其中的电器包括：电感镇流器，补偿电容，电子镇流器，开关电源，LED 光源的控制器，根据需求选择合适的光源和电器。

4. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述色温评估，暖色色温值 <3000k，中间色色温值 3000k — 5000k，清凉色色温值 >5000k，根据设计要求选择对应的色温值。

5. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述控制协议评估，控制协议是 X-10、CEBus、Lonworks、EIB、I-Bus、T-Bus、HBS、DALI、DMX-512、ACN、ART-net、C-Bus、Dynet 中的任意一种，根据需求选择合适的控制协议。

6. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述控制方式评估，控制方式是跷板开关控制、断路器控制、定时开关、声光控开关、手动遥控控制、场景控制、动静探测控制、恒照度控制中的任意一种。

7. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述外形尺寸评估，根据现场安装条件，外形尺寸不能发生干涉、严重影响建筑物外观的情形。

8. 根据权利要求 2 所述的通过系统集成实现景观照明的方法，所述施工工艺评估，是根据现场情况评估是否具有适当的安装空间、安装位置，是否影响建筑和景点外观。

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通过系统集成实现景观照明的方法

技术领域

[0001] 本技术领域涉及景观照明集成技术，通过系统集成实现景观照明的方法，即，将现有景观照明系统和特定任务专用景观照明系统进行系统集成的方法。

背景技术

[0002] 近年来，随着城市化进程的不断深入，以“多彩、多变”为特征的、具有强烈装饰效果、动态变化的城市景观照明在我国得到迅速发展。但由于景观照明系统融合了光学、美术、微电子、计算机、通讯及生产制造等多学科的最新技术，技术难度大，同时由于其景观点的特殊性使得很大一部分景观照明系统是专门设计的专有系统。

[0003] 在景观照明系统涉及的技术领域中，景观照明灯具及其灯具控制设备和为完成该任务的设备及软件的系统集成是不可回避的重要技术，前者能够完成基本的照明功能，后者将特定任务和现有灯具系统进行有机整合。传统的做法是：研制景观照明灯具样品，进行大量的产品测试和分析，同时开发控制软件或控制方法对其进行控制，再通过试运行，完成满足设计要求的景观照明系统。这种做法需要大量的资金以及人力物力投入，且因为涉及环节较多，需经过多次长时间的循环才能完成既定的目标任务。

[0004] 本发明所要解决的技术问题

[0005] 本发明的目的是提出一种通过系统集成来实现景观照明系统的方法，本发明基于现有景观照明系统和特定任务专用景观照明系统，针对传统做法给出的新的解决方法，该方法克服了传统方法的高投入、长周期、低适用性的缺点，能够快速满足各种新型景观照明系统得使用要求。

[0006] 内容：

[0007] 本发明所采用的技术方案是：

[0008] 一种通过系统集成实现景观照明的方法，所述景观照明系统包括市电、配电箱、开关电源、控制器、LED灯具和其他灯具，通过系统集成实现景观照明的方法步骤如下：

[0009] (1)根据要实施景观照明的建筑物或景点的工程现场和景观的效果要求，选择光源及灯具，选择现有的控制系统，通过现场试验，得到基础的景观照明系统；

[0010] (2)对有动态变化照明效果要求的景观照明进行电脑模拟和现场联调，以满足动态变化要求；

[0011] (3)将上述基础的景观照明系统和为景观照明需要的配电箱、开关电源、控制器、LED灯具和其他灯具中的部分或全部进行有机集成，通过系统集成实现景观照明。

[0012] 动态变化照明效果，是通过LED灯进行动态效果模拟，通过控制芯片控制LED灯的显示效果实现动态变化的照明效果。

[0013] 根据景观效果的要求，选择合适的色温、配光曲线等技术参数，必要时对LED变化效果进行软件编程，对动态变化等照明效果确认，完成最终的景观照明系统。

[0014] 本发明的具体实施方法是提出一种通过系统集成实现景观照明的方法，该景观照明系统由市电、配电箱、开关电源、控制器、LED灯具和其他灯具组成。所述的方法包括步

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骤：

[0015] 1. 根据要实施景观照明的建筑物或景点的工程现场特点和要实现的景观效果要求，将技术指标进行分解，根据这些技术指标来选择适当的灯具系统；

[0016] 2. 进行灯具系统评估，对于性能不能满足的进一步改造；

[0017] 3. 对有动态变化照明效果要求的系统重新进行软件编程，并进行电脑模拟和现场联调，以满足动态变化要求；

[0018] 4. 对有光污染要求、色温、照度、功率密度要求的灯具进行现场试灯，以满足设计要求；

[0019] 5. 根据景观照明系统的最终要求，选取最终灯具品牌、布灯方案、施工工艺及配电方案，完成景观照明系统的有机集成。

[0020] 其中所述灯具系统评估包括进行光源电器、色温、照度及功率密度、光污染、控制协议、控制方式、防尘防水等级、外形尺寸、施工工艺的评估。

[0021] 所述光源电器的评估中，光源包括：LED 光源，高压气体灯，荧光灯；电器包括：电感镇流器，补偿电容，电子镇流器，开关电源，LED 光源的控制器，根据需求选择合适的光源和电器。

[0022] 所述色温的评估中，暖色色温值＜ 3000k，中间色色温值 3000k-5000k，清凉色色温值＞ 5000k，根据设计要求选择对应的色温值。

[0023] 所述照度及功率密度评估中，为满足节能要求，根据城市夜景照明设计规范（JGJ/T 1632008）表 6.6.2 的规定，选定对应功率密度值，比如：在大型城市商业区，当建筑物饰面材料为白色外墙涂料时功率密度不宜大于 6.7 瓦 / 平方米，对应照度不宜大于 1501x。

[0024] 所述光污染评估中，根据城市夜景照明设计规范（JGJ/T 163-2008）中对“光污染的限制”要求，选择合适的灯具。

[0025] 所述控制协议评估中，控制协议是 X-10、CEBus、Lonworks、EIB、I Bus、T Bus、HBS、DALI、DMX-512、ACN、ART-net、C-Bus、Dynet 中的任意一种，根据需求选择合适的控制协议。

[0026] 所述控制方式评估中，控制方式是跷板开关控制、断路器控制、定时开关、声光控开关、手动遥控控制、场景控制、动静探测控制、恒照度控制中的任意一种。

[0027] 所述防尘防水等级的评估，在露天场地，灯具防护等级不低于 IP54；在有顶棚场地，灯具防护等级不低于 IP43，当环境污染严重时，灯具防护等级不低于 IP65。

[0028] 所述外形尺寸评估，根据现场安装条件，外形尺寸不能发生干涉、严重影响建筑物外观的情形。

[0029] 所述施工工艺评估，是根据现场情况评估是否具有适当的安装空间、安装位置，是否影响建筑和景点外观。

[0030] 所诉动态变化照明效果，是通过 LED 灯实现的，需要进行动态效果软件编程，将该动态效果通过地址转换输出成相应的指令，传输到 LED 灯的控制芯片，从而通过控制芯片控制 LED 灯的显示效果从而实现动态变化的照明效果。

[0031] 本景观照明系统集成技术是一项系统工程，来源于多年的照明工程实践，是在大量的技术和经验数据下的技术选择，是光源电器、色温、照度及功率密度、光污染、控制协议、控制方式、防尘防水等级、外形尺寸、施工工艺等诸多项目的全面综合系统优化。

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附图说明：

[0032] 图 1 是景观照明系统的系统构成框图。

具体实施方式：

[0033] 图 1 是景观照明系统的系统构成框图，该系统由市电、配电箱、开关电源、控制器、LED 灯具和其他灯具组成。

[0034] 本发明的实施例是一个博物馆的景观照明工程，下面详细说明本系统集成技术的实现方法的具体步骤：

[0035] 1. 根据要实施景观照明的建筑物或景点的工程现场特点和要实现的景观效果要求，将技术指标进行分解，根据这些技术指标来选择适当的灯具系统；本实施例博物馆设计要求正面的玻璃幕墙形成瀑布效果，博物馆前的柱子用投光灯突出照明，建筑物侧面和屋顶装饰构件需要照亮，色温要求为暖色调，同时要求具有遥控开关灯。根据以前的工程实践，选用以前工程项目中选用的灯具系统：8 瓦的 LED 线条灯；柱子底部采用 1000 瓦窄光高压纳灯向上投光，色温选 2200k；建筑物入口侧面选择 150 瓦的高压纳灯宽光投光灯，色温 2200k；建筑物屋顶装饰构件选择 70 瓦的高压纳灯中光投光灯，色温 2200k。

[0036] 2. 进行灯具系统评估，对于性能不能满足的进一步改造；根据经验，所选灯具系统没有问题，不需要进行改造，只需要在玻璃幕墙内部设计线条灯的固定位置，但所选灯具系统原来不能实现遥控开关灯功能，选用现有路灯遥控开关的远程控制器，该控制器支持手机短信开关功能。对有动态变化照明效果要求的系统重新进行软件编程，并进行电脑模拟和现场联调，以满足动态变化要求；设计要求正面的玻璃幕墙形成瀑布效果，重新尽心软件编程。对有眩光要求、色温、照度、功率密度要求的灯具进行现场试灯，以满足设计要求；经过现场试灯，能够满足设计要求。

[0037] 3. 根据景观照明系统的最终要求，选取最终灯具品牌、布灯方案、施工工艺及配电方案，完成景 观照明系统的有机集成。灯具品牌选择国内某厂家的线条灯，各照明侧面均匀布灯。在玻璃幕墙的固定爪之间设计辅助固定杆来固定线条灯，配电箱从建筑物电源取电。

[0038] 通过集成的景观照明系统尽最大可能地消除了重新设计过程中各种因素对质量的影响，使得工期更短，效率更高，同时也降低了成本。

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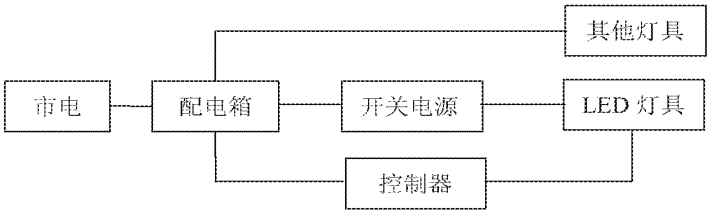


图 1

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Record 2/4 CN103313457A Method for realizing landscape lighting through system integration | through the system integrated method for landscape lighting

Publication Number: CN103313457A

Title: Method for realizing landscape lighting through system integration | through the system integrated method for landscape lighting *(Translation from Clarivate Analytics)*

Title - DWPI: Method for controlling integrated testing device of landscape lighting system, involves adjusting illuminating effect of landscape lighting system according to color temperature of light

Abstract:

Disclosed is a landscape lighting system integration technology. A landscape lighting system is composed of a mains supply, a power distribution box, a switching power supply, a controller, LED lamps and other lamps. An integration method for the system includes the following two steps: (1) choosing the landscape lighting system; and (2) organically integrating the landscape lighting system with specific task equipment and specific task software to form an integrated landscape lighting system. With the integrated landscape lighting system, instabilities in a landscape lighting system specially designed for an individual case can be addressed, and a landscape lighting system designed for a specific task is enabled to be lower in cost, higher in development efficiency and more stable and more reliable in operation.

A landscape lighting system integrated technology, the landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps, the integration method of the system is divided into two steps: (1) selecting the existing landscape illumination system, (2) the landscape lighting system and specific task device and specific task software landscape illumination system are organically integrated, are integrated. The integrated landscape lighting system can solve the unstable factors of specially designed for individual landscape lighting system, that is task-specific design of landscape lighting system cost is lower, the development efficiency is high, and the operation is more stable and reliable.

(Translation from Clarivate Analytics)

Abstract - DWPI:

Abstract - DWPI Novelty:

The method involves providing a commercial power supply, a power distribution box, a switch power supply, a controller, an LED lamp and other lamps and lanterns in a landscape lighting system. The software task is selected to form an integral landscape lighting system, according to

the technical index of the landscape light. The illuminating effect of the landscape lighting system is adjusted according to the color temperature of light. The power density of the lamp is to meet according to the requirement of landscape lighting system.

Abstract - DWPI Detailed Description:

An INDEPENDENT CLAIM is included for an integrated testing device of landscape lighting system.

Abstract - DWPI Use:

Method for controlling integrated testing device of landscape lighting system.

Abstract - DWPI Advantage:

The construction period and construction process of the landscape lighting system can be reduced. The efficiency, stability and stability of the landscape lighting system can be improved.

Abstract - DWPI Drawing Description: The drawing shows a block diagram of the landscape lighting system. (Drawing includes non-English language text)

Claims:

1. A through system integrated method for realizing illumination of landscape, the landscape lighting system comprising a city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps, the system is integrated to realize landscape lighting method comprising the following steps: according to the engineering field of building or landscape landscape lighting, combined effect to landscape, the technical index of the landscape lighting decomposition, according to the technical index to select the lamp system, the lamp system to evaluate. the lamp system evaluated comprises a light source, a colour temperature, illumination and power density, light pollution, control protocol, control mode, dust-proof and water-proof level, size, appearance evaluation construction process. the performance cannot satisfy the claim made by the corresponding adjusting, to a dynamic change in landscape lighting illumination effect according to the computer simulation and field debugging, meets dynamic change requirement, the light pollution to the color temperature, luminance, power density requirement for field test, to satisfy the design requirement according to the final requirement of landscape lighting system, selecting the final lamp brand, distribution scheme, a construction technology and power distribution scheme, the landscape lighting system are organically integrated.

2. The through system integrated for landscape lighting according to claim 1 method for dynamically varying lighting effect is realized through the LED lamp for simulating dynamic effect, realizing dynamic change by controlling display effect of chip control LED lamp illumination effect.
3. The through system integrated for landscape lighting according to claim 2 method for evaluation of the light source apparatus, wherein the light source comprises an LED light source, a high-pressure gas lamp, fluorescent lamp, and wherein the appliance comprises: a controller of inductive ballast and compensation capacitor, electronic ballast, a switch power supply, an LED light source, selecting the proper light source and electrical appliance.
4. The through system integration according to claim 2 method for landscape lighting, the color temperature estimation, warm color temperature value 3000k, the middle colour temperature value is 3000k-5000k, and colour temperature value is greater than 5000k, according to the design requirement to select the corresponding colour temperature value.
5. The through system integration according to claim 2 method for landscape lighting, the control protocol evaluation control protocol is X-10, Internet, Lonworks, EIB, -Bus, T-Bus, *HBS, DAL1, DMX-512, CAN, ART-net, C-Bus, Dynet any one of selecting an appropriate control protocol according to the requirement.
6. The integrated method for realizing landscape lighting the through system according to claim 2, said controlling way evaluation, control mode is a control rocker switch, breaker control, timing switch, acousto-optic control switch, a manual remote control, scene control, activity detection control, a constant luminance control in the any one kind of.
7. The through system integration according to claim 2 method for realizing landscape lighting, the size evaluation, according to the installing condition in scene, size is not capable of generating interference, seriously influence the appearance of building.
8. The through system integration according to claim 2 method for realizing landscape lighting, the construction technology evaluation according to the scene condition evaluates whether a proper installation space, the installation position, whether the building and scenic spot appearance.

(Translation from Clarivate Analytics)

Description:

through the system integrated method for landscape lighting

Technology field

[0001] The technical field relates to landscape lighting integrated technology, through system integration method for landscape lighting, i.e., the existing landscape lighting system and specific task-specific landscape lighting system for system integration method.

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Background technology

[0002] In recent years, with the continuous development of urbanization process to multicolor, variable is characteristic of, it has strong decorative effect, the dynamic change of the urban landscape lighting obtained rapid development in our country. but the landscape lighting system combines the latest technology of optical, art, electronics, computer, communication and many subjects such as production, large technical difficulty, and due to the particularity of the sight point so that the large part of landscape lighting system is a specially designed proprietary system.

[0003] the important technology in a landscape lighting system relates to the technical field of landscape lighting and lamp control device and finish the task of the device and software system integration can not be avoided, the former can complete basic illumination function, the latter transmits a specific task and the existing lamp system organically integrated. the traditional method is that it develops landscape illuminating lamp, the sample lot of product testing and analysis, and development of control software or control method to control it, then through commissioning, meet the design requirement of the landscape lighting system. This method needs a lot of money and manpower resource investment, and due to the more links, by circulation of multiple long time to finish the predetermined target task.

[0004] The technical problem to be solved by the invention

[0005] The purpose of the invention is to provide a new solving method through system integration to realize landscape lighting system method of the invention based on the existing landscape lighting system and specific task-specific landscape illumination system, providing for the traditional method, the method overcomes the defect that the traditional method of high investment, long period and low applicability, can fast meet various new landscape lighting systems use requirement.

[0006] content:

[0007] The technical solution of the invention is as follows:

[0008] A through system integrated method for realizing illumination of landscape, the landscape lighting system comprising a city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps, through system integration for landscape lighting method comprising

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the following steps:

[0009] (I) The effect to be implemented to project site and landscape building or landscape landscape lighting, selecting light source and lamp, selecting an existing control system, through field test to obtain the basis of landscape lighting system;

[2] (0010) to a dynamic change in landscape lighting illumination effect according to the computer simulation and field debugging, meets dynamic change requirement;

[3] (0011) the landscape lighting system of part or all of the foundation and organically integrates in landscape lighting need of power distribution box, a switch power supply, a controller, an LED lamp and other lamps, through system integration landscape lighting.

[0012] dynamically varying lighting effect is through the LED lamp for simulating dynamic effect, realizing dynamic change by controlling display effect of chip control LED lamp illumination effect.

[0013] According to the landscape effect and select the proper color temperature, light distribution curve and other technical parameters, if necessary, software programming the LED change effect, lighting effect such as dynamic change confirmation, to achieve final landscape lighting system.

[0014] Specific implement method of the invention is to provide a through system integrated method for realizing illumination of landscape, the landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps. the method comprises the steps of:

[0015] 1. according to the engineering field of building or scenery of the landscape lighting and landscape effect is required to be realized, the technical index is decomposed, according to these technical index to select an appropriate lamp system;

[0016] 2. for the lamp system evaluation, further improvement can not satisfy the performance;

[0017] 3. the system for dynamically varying lighting effect is required for software programming and field debugging, the computer simulation and to meet the dynamic change requirement;

[0018] 4. the light pollution to the color temperature, illumination intensity, field test, the power density required to satisfy the design requirement;

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[0019] 5. The final requirement of landscape lighting system, selecting the final lamp brand, distribution scheme, a construction technology and power distribution scheme, the landscape lighting system are organically integrated.

[0020] wherein said lamp system evaluation comprises light source, colour temperature, illumination and power density, evaluation of light pollution, control protocol, control mode, dust-proof and water-proof grade, appearance size, construction technology.

[0021] evaluation of the light source apparatus, light source comprises an LED light source, a high-pressure gas lamp, fluorescent lamp, electric appliance comprises inductance ballast and compensation capacitor, electronic ballast, a switch power supply, an LED light source controller according to the requirement to select the proper light source and electrical appliance.

[0022] evaluation of the colour temperature, the warm color temperature value less than 3000k, the colour temperature value is 3000k to 5000k, cooling the colour temperature value is greater than 5000k, according to the design requirement to select the corresponding colour temperature value.

[0023] the illumination and power density evaluation, to satisfy the energy saving requirement. The city night lighting design specification (JGJ/T 1632008) 6.6.2, selected corresponding power density value, such as a large city district, as white wall paint when building decoration material when power density is not greater than 6.7 Watts per square meter, the corresponding illumination intensity is not greater than 1501x.

[0024] the light pollution evaluation, according to city night lighting design specification (JGJ/T 163-2008) light pollution limits the requirement, selecting the proper lamp.

[0025] the control protocol in evaluation control protocol is X 10, Internet, Lonworks, EIB, I Bus, T Bus> HBS> DAL1, DMX-512, CAN, ART-net, C-Bus, Dynet any one of selecting an appropriate control protocol according to the requirement.

[0026] evaluating the control mode, the control mode is a seesaw switch control, circuit breaker control, timing switch, acousto-optic control switch, a manual remote control, scene control, detecting control, constant illumination control in the any one kind of.

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[0027] evaluation of the dustproof and waterproof level, in open fields, a lamp protection level is not less than IP54; the ceiling, a lamp protection level is not less than IP43, when the serious environment pollution, the lamp protection level is not less than IP65.

[0028] the shape size evaluation, according to the installing condition in scene, the size can not interfere, which seriously affects the appearance of building.

[0029] The construction technique evaluation according to the scene condition evaluates whether a proper installation space, the installation position, whether the building and scenic spot appearance.

[0030] dynamically varying lighting effect is realized through the LED lamp needs to be dynamic effect software programming, the dynamic effect output forming corresponding instruction through address conversion, is transmitted to the control chip of the LED lamp so as to control the display effect of the LED lamp so as to realize dynamic change through the control chip of the lighting effect.

[0031] The landscape lighting system integrated technology is a system engineering, derived from many years of lighting engineering practice, the technology selection a lot of technology and experience data under a light source, color temperature, illumination and power density, comprehensive system light pollution, control protocol, control mode, dust-proof and water-proof level, shape size, items such as construction process of the optimization. Description

[0032] Picture 1 is the system of landscape illumination system frame.

Preferred Embodiment

:

[0033] Picture 1 is the system diagram, the system of landscape lighting system of city power, a distribution box, a switch power supply, a controller, an LED lamp and other lamps.

[0034] An embodiment of the present invention is sight lighting engineering of a museum, comprising the following detailed explanation of this system integration technology for realizing the method of:

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[0035] 1. according to the engineering field of building or scenery of the landscape lighting and landscape effect is required to be realized, the technical index is decomposed, according to these technical index to select an appropriate lamp system embodiment of the museum, the glass curtain wall designed to form waterfall effect, of the pillar museum front projector for projecting lighting, building side and roof decorative member needs illumination, colour temperature is warm tone and required to have the lamp remote switch. The previous engineering practice, selecting lamp system uses previous engineering project in the 8 watt of the LED line lamp, column bottom is 1000 watt narrow projecting upwards, colour temperature light high-pressure sodium is selected 2200k, the building entrance side is 150 watt high pressure sodium light projector, color temperature 2200k, building roof decorative member selected 70 watt high pressure sodium lamp light projector, color temperature 2200k.

[0036] 2. for the lamp system evaluation, further improvement can not satisfy the performance of remote controller fixing position according to experience the selected lamp system without problem, there is no need to change, only the glass curtain wall internal design line lamp, but the selected lamp system cannot realize remote switch lamp function, selecting the street lamp remote switch, the controller supports a mobile phone short message switching function. the system for dynamically varying lighting effect is required for software programming and field debugging, the computer simulation and to meet the dynamic change requirement; the glass curtain wall designed to form waterfall effect, making software programming again. the glare requirements, color temperature, illumination intensity, field test, the power density required to meet the design requirements, via the field test, it can satisfy the design requirement.

[0037] 3. The final requirement of landscape lighting system, selecting the final lamp brand, distribution scheme, a construction technology and power distribution scheme, the landscape lighting system are organically integrated. line lamp brand choose domestic factories and each lighting side uniformly. designing auxiliary fixing rod for fixing line lamp between the fixing claw of the glass curtain wall, a distribution from the building power supply.

[0038] maximum possible eliminates the redesign process in various factors affect the quality of through integrated landscape illumination system such that shorter work period and high efficiency, but also reduces the cost.

(Translation from Clarivate Analytics)

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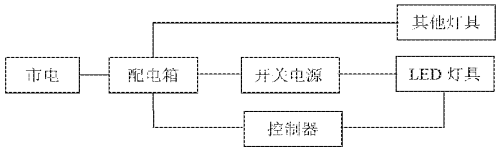
权利要求书1页 说明书3页 附图1页

(54)发明名称

通过系统集成实现景观照明的方法

(57)摘要

一种景观照明系统集成技术，该景观照明系统由市电、配电箱、开关电源、控制器、LED 灯具和其他灯具组成，系统的集成方法分两步：(1) 选择现有的景观照明系统；(2) 将上述景观照明系统和特定任务设备和特定任务软件进行有机集成，形成一体化的景观照明系统。通过集成的景观照明系统能够解决为个案特别设计的景观照明系统出现的不稳定因素，使得为特定任务设计的景观照明系统成本更低，开发效率更高，运行更加稳定可靠。



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1. 一种通过系统集成实现景观照明的方法，所述景观照明系统包括市电、配电箱、开关电源、控制器、LED 灯具和其他灯具，通过系统集成实现景观照明的方法步骤如下：

（1）根据要实施景观照明的建筑物或景点的工程现场和景观的效果要求，选择光源及灯具，选择现有的控制系统，通过现场试验，得到基础的景观照明系统；

（2）对有动态变化照明效果要求的景观照明进行电脑模拟和现场联调，以满足动态变化要求；

（3）将上述基础的景观照明系统和为景观照明需要的配电箱、开关电源、控制器、LED 灯具和其他灯具中的部分或全部进行有机集成，通过系统集成实现景观照明。

2. 根据权利要求 1 所述的通过系统集成实现景观照明的方法，所述动态变化照明效果，是通过 LED 灯进行动态效果模拟，通过控制芯片控制 LED 灯的显示效果实现动态变化的照明效果。

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通过系统集成实现景观照明的方法

技术领域

[0001] 本技术领域涉及景观照明集成技术，通过系统集成实现景观照明的方法，即，将现有景观照明系统和特定任务专用景观照明系统进行系统集成的方法。

背景技术

[0002] 近年来，随着城市化进程的不断深入，以“多彩、多变”为特征的、具有强烈装饰效果、动态变化的城市景观照明在我国得到迅速发展。但由于景观照明系统融合了光学、美术、微电子、计算机、通讯及生产制造等多学科的最新技术，技术难度大，同时由于其景观点的特殊性使得很大一部分景观照明系统是专门设计的专有系统。

[0003] 在景观照明系统涉及的技术领域中，景观照明灯具及其灯具控制设备和为完成该任务的设备及软件的系统集成是不可回避的重要技术，前者能够完成基本的照明功能，后者将特定任务和现有灯具系统进行有机整合。传统的做法是：研制景观照明灯具样品，进行大量的产品测试和分析，同时开发控制软件或控制方法对其进行控制，再通过试运行，完成满足设计要求的景观照明系统。这种做法需要大量的资金以及人力物力投入，且因为涉及环节较多，需经过多次长时间的循环才能完成既定的目标任务。

[0004] 本发明所要解决的技术问题

[0005] 本发明的目的是提出一种通过系统集成来实现景观照明系统的方法，本发明基于现有景观照明系统和特定任务专用景观照明系统，针对传统做法给出的新的解决方法，该方法克服了传统方法的高投入、长周期、低适用性的缺点，能够快速满足各种新型景观照明系统得使用要求。

[0006] 内容：

[0007] 本发明所采用的技术方案是：

[0008] 一种通过系统集成实现景观照明的方法，所述景观照明系统包括市电、配电箱、开关电源、控制器、LED 灯具和其他灯具，通过系统集成实现景观照明的方法步骤如下：

[0009] (1) 根据要实施景观照明的建筑物或景点的工程现场和景观的效果要求，选择光源及灯具，选择现有的控制系统，通过现场试验，得到基础的景观照明系统；

[0010] (2) 对有动态变化照明效果要求的景观照明进行电脑模拟和现场联调，以满足动态变化要求；

[0011] (3) 将上述基础的景观照明系统和为景观照明需要的配电箱、开关电源、控制器、LED 灯具和其他灯具中的部分或全部进行有机集成，通过系统集成实现景观照明。

[0012] 动态变化照明效果，是通过 LED 灯进行动态效果模拟，通过控制芯片控制 LED 灯的显示效果实现动态变化的照明效果。

[0013] 根据景观效果的要求，选择合适的色温、配光曲线等技术参数，必要时对 LED 变化效果进行软件编程，对动态变化等照明效果确认，完成最终的景观照明系统。

[0014] 本发明的具体实施方法是提出一种通过系统集成实现景观照明的方法，该景观照明系统由市电、配电箱、开关电源、控制器、LED 灯具和其他灯具组成。所述的方法包括步

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骤：

[0015] 1. 根据要实施景观照明的建筑物或景点的工程现场特点和要实现的景观效果要求，将技术指标进行分解，根据这些技术指标来选择适当的灯具系统；

[0016] 2. 进行灯具系统评估，对于性能不能满足的进一步改造；

[0017] 3. 对有动态变化照明效果要求的系统重新进行软件编程，并进行电脑模拟和现场联调，以满足动态变化要求；

[0018] 4. 对有光污染要求、色温、照度、功率密度要求的灯具进行现场试灯，以满足设计要求；

[0019] 5. 根据景观照明系统的最终要求，选取最终灯具品牌、布灯方案、施工工艺及配电方案，完成景观照明系统的有机集成。

[0020] 其中所述灯具系统评估包括进行光源电器、色温、照度及功率密度、光污染、控制协议、控制方式、防尘防水等级、外形尺寸、施工工艺的评估。

[0021] 所述光源电器的评估中，光源包括：LED 光源，高压气体灯，荧光灯；电器包括：电感镇流器，补偿电容，电子镇流器，开关电源，LED 光源的控制器，根据需求选择合适的光源和电器。

[0022] 所述色温的评估中，暖色色温值＜ 3000k，中间色色温值 3000k-5000k，清凉色色温值＞ 5000k，根据设计要求选择对应的色温值。

[0023] 所述照度及功率密度评估中，为满足节能要求，根据城市夜景照明设计规范（JGJ/T 163-2008）表 6.6.2 的规定，选定对应功率密度值，比如：在大型城市商业区，当建筑物饰面材料为白色外墙涂料时功率密度不宜大于 6.7 瓦 / 平方米，对应照度不宜大于 150lx。

[0024] 所述光污染评估中，根据城市夜景照明设计规范（JGJ/T 163-2008）中对“光污染的限制”要求，选择合适的灯具。

[0025] 所述控制协议评估中，控制协议是 X-10、CEBus、Lonworks、EIB、I-Bus、T-Bus、HBS、DALI、DMX-512、ACN、ART-net、C-Bus、Dynet 中的任意一种，根据需求选择合适的控制协议。

[0026] 所述控制方式评估中，控制方式是跷板开关控制、断路器控制、定时开关、声光控开关、手动遥控控制、场景控制、动静探测控制、恒照度控制中的任意一种。

[0027] 所述防尘防水等级的评估，在露天场地，灯具防护等级不低于 IP54；在有顶棚场地，灯具防护等级不低于 IP43，当环境污染严重时，灯具防护等级不低于 IP65。

[0028] 所述外形尺寸评估，根据现场安装条件，外形尺寸不能发生干涉、严重影响建筑物外观的情形。

[0029] 所述施工工艺评估，是根据现场情况评估是否具有适当的安装空间、安装位置，是否影响建筑和景点外观。

[0030] 所诉动态变化照明效果，是通过 LED 灯实现的，需要进行动态效果软件编程，将该动态效果通过地址转换输出成相应的指令，传输到 LED 灯的控制芯片，从而通过控制芯片控制 LED 灯的显示效果从而实现动态变化的照明效果。

[0031] 本景观照明系统集成技术是一项系统工程，来源于多年的照明工程实践，是在大量的技术和经验数据下的技术选择，是光源电器、色温、照度及功率密度、光污染、控制协议、控制方式、防尘防水等级、外形尺寸、施工工艺等诸多项目的全面综合系统优化。

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附图说明：

[0032] 图 1 是景观照明系统的系统构成框图。

具体实施方式：

[0033] 图 1 是景观照明系统的系统构成框图，该系统由市电、配电箱、开关电源、控制器、LED 灯具和其他灯具组成。

[0034] 本发明的实施例是一个博物馆的景观照明工程，下面详细说明本系统集成技术的实现方法的具体步骤：

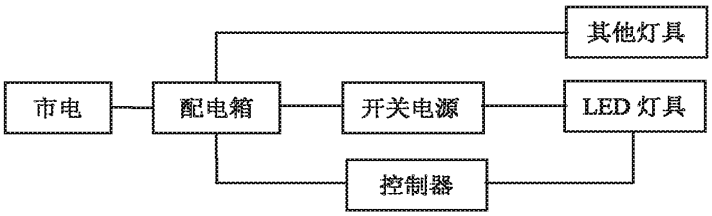
[0035] 1. 根据要实施景观照明的建筑物或景点的工程现场特点和要实现的景观效果要求，将技术指标进行分解，根据这些技术指标来选择适当的灯具系统；本实施例博物馆设计要求正面的玻璃幕墙形成瀑布效果，博物馆前的柱子用投光灯突出照明，建筑物侧面和屋顶装饰构件需要照亮，色温要求为暖色调，同时要求具有遥控开关灯。根据以前的工程实践，选用以前工程项目中选用的灯具系统：8 瓦的 LED 线条灯；柱子底部采用 1000 瓦窄光高压纳灯向上投光，色温选 2200k；建筑物入口侧面选择 150 瓦的高压纳灯宽光投光灯，色温 2200k；建筑物屋顶装饰构件选择 70 瓦的高压纳灯中光投光灯，色温 2200k。

[0036] 2. 进行灯具系统评估，对于性能不能满足的进一步改造；根据经验，所选灯具系统没有问题，不需要进行改造，只需要在玻璃幕墙内部设计线条灯的固定位置，但所选灯具系统原来不能实现遥控开关灯功能，选用现有路灯遥控开关的远程控制器，该控制器支持手机短信开关功能。对有动态变化照明效果要求的系统重新进行软件编程，并进行电脑模拟和现场联调，以满足动态变化要求；设计要求正面的玻璃幕墙形成瀑布效果，重新尽心软件编程。对有眩光要求、色温、照度、功率密度要求的灯具进行现场试灯，以满足设计要求；经过现场试灯，能够满足设计要求。

[0037] 3. 根据景观照明系统的最终要求，选取最终灯具品牌、布灯方案、施工工艺及配电方案，完成景 观照明系统的有机集成。灯具品牌选择国内某厂家的线条灯，各照明侧面均匀布灯。在玻璃幕墙的固定爪之间设计辅助固定杆来固定线条灯，配电箱从建筑物电源取电。

[0038] 通过集成的景观照明系统尽最大可能地消除了重新设计过程中各种因素对质量的影响，使得工期更短，效率更高，同时也降低了成本。

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附图 1

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Record 1/4 CN103090238A Light emitting diode (LED) light source illumination method and device with color temperature simulating natural light change along with time | LED light source lighting method and device for colour temperature simulating natural light changes over time;

Publication Number: CN103090238A

Title: Light emitting diode (LED) light source illumination method and device with color temperature simulating natural light change along with time | LED light source lighting method and device for colour temperature simulating natural light changes over time; ***(Translation from Clarivate Analytics)***

Title - DWPI: Natural LED light source color temperature changing time simulating method, involves manually selecting time period of color temperature to simulate natural light color temperature changing time of LED light source

Abstract:

The invention discloses a light emitting diode (LED) light source illumination method and device with color temperature simulating natural light change along with time. Firstly a series of different time nodes and a current adjustment scheme of an LED light source relative to color temperature are stored in a controller, the controller is used for comparing time signals with the time nodes by accepting the time signals of time and then extracting relative current adjustment scheme to control the LED light source current, or choosing the color temperature manually; the controller controls the LED light source current and then simulates natural light color temperature change according to the current adjustment scheme relative to the color temperature, and therefore composite light of an LED illumination module has high color rendering. The invention further discloses an LED light source illumination device with the color temperature simulating natural light change along with time.

The invention claims a colour temperature simulating natural light changes with time of LED light source illuminating method, firstly storing a series of different time nodes and current regulation scheme of LED light source colour temperature corresponding to the controller; the controller through receiving the clock of the time signal and the time signal and the time node, then extracting the corresponding current regulation plan control LED light source current, or manually selecting the color temperature controller according to the colour temperature corresponding to the current adjustment scheme. current for controlling the LED light source, so as to simulate change of natural light colour temperature, the LED illumination module synthetic light with higher color rendering. The invention further claims a colour temperature simulating natural light changes with time of LED light source illumination device.

(Translation from Clarivate Analytics)

Abstract - DWPI:

Abstract - DWPI Novelty:

The method involves adjusting a current value of an LED light source via a controller to change light emitting characteristics of the LED light source. Preset time period of color temperature and the current value of the LED light source are stored in the controller. The time period of the color temperature is manually selected to simulate natural light color temperature changing time of the LED light source according to a LED light source current adjustment scheme. The LED light source is provided with multiple single-color LED lamps.

Abstract - DWPI Detailed Description:

An INDEPENDENT CLAIM is also included for a natural LED light source color temperature changing time simulating device.

Abstract - DWPI Use:

Natural LED light source color temperature changing time simulating method.

Abstract - DWPI Advantage:

The method enables realizing LED light source natural light color temperature changing time simulating process in an effective manner and improving LED illuminating module synthesis light color rendering efficiency.

Abstract - DWPI Drawing Description: The drawing shows a block diagram illustrating a natural LED light source color temperature changing time simulating method.'(Drawing includes non-English language text)'

Claims:

1. A colour temperature simulating natural light changes with time of LED light source illuminating method, uses the controller adjusting LED light source current value to change the LED light source light-emitting characteristic, wherein it comprises the following steps: O presetting a time period, the time period in the colour temperature of different time corresponding to the node and realizing the colour temperature of the LED current value stored in the controller, a preset color temperature range, the color temperature range in corresponding to different colour temperature

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and realize the colour temperature of the LED current value is also stored in the controller; a certain time node 2) controller compares the current time with the step I) in the time space for comparison: if the current time corresponding to the step I), the controller node corresponding to the time to output by the LED light source of the LED current value; in the time space of adjacent between two time nodes if the current time is in the step I), the controller adjusting LED current value is obtained through interpolation algorithm, and output to the LED light source, if the current time is not in the step I), then manually selecting a colour temperature in colour temperature range, the controller corresponding to LED light source output with the color temperature value of the LED current.

2. The colour temperature according to claim 1 simulating natural light changes with time of LED light source illuminating method, wherein said LED light source is composed of multiple single-colour LED lamp.

3. The colour temperature according to claim 2 simulating natural light changes with time of LED light source illumination, wherein the method realizing the color temperature of the LED current value algorithm comprises the following steps: setting target colour temperature is CCTT O, synthetic spectrum set LED light source color temperature is CCTM, CCTz and CCTm should satisfy the boundary conditions are:wherein CAP-ACCT is the presence of CCTm and CCTt deviation range, the distance between the colour coordinate and the blackbody radiation curve of Auv synthetic spectrum for the LED light source, (uT. , v) and (u, vM) is a synthetic spectrum with the LED light source colour coordinate in the black body radiation is CCTm is the CIE1960-UCS chromaticity diagram of the color coordinate, 2) is set a plurality of spectral normalization of monochromatic LED lamps are Si ([lambda]) (i = 1, 2, 3. .. n), the corresponding weight is ni (i= 1, 2, 3. .. n), the (interval between the weight i*n; (i = 1, 2, 3. .. n) random assignment, synthetic spectrum satisfy the boundary condition of the LED light source, 3) establishing evaluation function f of the CRI colour rendering = 100-CRI, adopting the simplex method corresponding to the downward weight Iii local optimization algorithm to find the CRI colour rendering obtained maximum value, 4) the weight Ici is converted into brightness weights Yi, wherein Yi is the brightness IijSi (lambda) corresponding to the CIE1931XYZ color space. The corresponding relation between the current value Ci and luminance weighting, weighting the luminance Yi into current value Ci, obtaining the colour temperature of the LED current value.

4. The colour temperature according to claim 3 simulating natural light changes with time of LED light source illuminating method, wherein said multiple monochromatic LED lamp comprises a red light LED lamp, a green LED lamp, the blue-light LED lamp and warm white light LED lamp, the current value comprises a current value of each single-colour LED lamp.

5. The colour temperature according to claim 4 simulating natural light changes with time of LED light source illuminating method, wherein the wavelength of the red light LED lamp is 60 (T630nm

wavelength of green light LED lamp is 50 (T540nm wavelength of the blue-light LED lamp is 45 T470nm, the colour temperature of the warm white light LED lamp is 2500K to 3000K.

6. The colour temperature according to claim 1 simulating natural light changes with time of LED light source illuminating method, wherein the interpolation algorithm is as follows: set the current time is t, and the controller stores the adjacent time node h to between t2, the set current value of h corresponding to n LED are Cil (i = 1, 2, 3. .. n), current value of t2 corresponding to a n LED are respectively Ci2 (i = 1, 2, 3. .. n), then the current value of t corresponding to n LED respectively is Ci (i= 1, 2, 3. .. n) as follows:

7. A colour temperature simulating natural light changes with time of LED light source illumination device, wherein it comprises an LED light source, a controller for adjusting the LED light source current value, a clock for conveying the current time to the controller.

8. device of LED light source illumination of simulating natural light changes over time the color temperature according to claim 7, wherein the LED light source comprises a red light LED lamp, a green LED lamp, the blue-light LED lamp and warm white light LED lamp.

9. device of LED light source illumination of simulating natural light changes over time the color temperature according to claim 8, wherein the wavelength of the red light LED lamp is 60 (T630nm wavelength of green light LED lamp is 50 (T540nm wavelength of the blue-light LED lamp is 45 T470nm, the colour temperature of the warm white light LED lamp is 2500K to 3000K.

(Translation from Clarivate Analytics)

Description:

LED light source lighting method and device for colour temperature simulating natural light changes over time;

Technology field

[0001] The invention relates to the LED illumination field, specifically to a colour temperature simulating natural light changes with time of LED light source illuminating method and device.

Background technology

[0002] In recent years, with increased city high-rise building, building interior natural lighting problem of insufficient increasingly appears, it is often necessary to artificial lighting, the present most artificial illumination traditional fluorescent lamp is low and the colour temperature is fixed.

[0003] rendering means different spectrum of light source shine on the object of the same color,

the present characteristic of different color. degree, namely the vivid in color rendering light source of the object colour and high colour rendering light source reproduction of the colour is good, we see the colour closer to natural colors, light source of low color rendering reproduction of the colour is poor, we see the color deviation is larger.

[0004] the color temperature is represented by light source light colour scale, the unit is K (Kelvin), color temperature refers to the broadcast in different energy, human eyes feel the color change. is the measured numerical value and mark wavelength color temperature, light different in wavelength, exhibit a different colour of light, especially natural light, along with the change of time, season, geographic location, its color temperature will be changed.

[0005] China invention patent public number is 101561083 claims a LED light-emitting device with changeable colour temperature and implementation method thereof, wherein the principle is collecting external environment through temperature sensor of temperature, controller according to temperature data collected by the sensor to adjust the voltage parameter of the LED lamp group to realize with the change of environment temperature and automatically changing color temperature, so that the spectrum of the LED lamp is more close to natural light.

[0006] The patent of LED lamp temperature of the outside and changing color temperature, but temperature can not completely accurately reflects the change of colour temperature, the colour temperature change factor in many aspects, further with time, season and geographical location.

(0007) research shows that maintain the normal physiological rhythm is very important for human health and light physiological rhythm of human body will generate obvious effect. blue light wavelength is 450-470nm can suppress melatonin secretion so as to produce important influence on physiological rhythm. one day with the regularity of change of the color temperature of the natural light is low colour temperature, high noon colour temperature, blue-light part is also changed, the changing process of the natural maintain normal human physiological rhythm.

Invention contents

[0008] artificial illumination simulating natural light changes with time in order to realize colour temperature so as to maintain the human body normal physiological rhythm, the present invention provides a color temperature simulating natural light changes with time of LED light source illuminating method and device.

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[0009] A color temperature simulating natural light changes with time of LED light source illuminating method, uses the controller adjusting LED light source current value to change the luminous characteristics of LED light source, comprising the following steps:

[0010] I) presetting a time period, the time period in the colour temperature of different time corresponding to the node and realizing the colour temperature of the LED current value stored in the controller, a preset color temperature range, the color temperature range in corresponding to different colour temperature and realize the colour temperature of the LED current value is also stored in the controller.

[0011] 2) controller compares the current time with the step I) in the time space by comparing:

[0012] if the current time corresponding to the step I) in the certain time node, output node corresponding to the time of the LED current value to LED light source controller;

[0013] if the current time is in the step I) adjacent between two time nodes, the controller adjusting LED current value is obtained through interpolation algorithm, and output to the LED light source;

[0014] If the current time is not in step I) of the time space in, then manually select a color temperature in the colour temperature range, the controller corresponding to LED light source output with the color temperature value of the LED current.

[0015] said LED light source is composed of multiple single-colour LED lamp.

(0016) realizing the colour temperature of the LED current value algorithm comprises the following steps:

[0017] I) setting target colour temperature is CCTt, synthetic spectrum set LED light source color temperature is CCTM, CCTt and CCTm should satisfy the boundary conditions are:

[0018]Formula(refer to the tiff*

[0019] wherein CAP-ACCT is CCTm with CCTt the presence of deviation range;

the distance between the colour coordinate and the blackbody radiation curve of (0020] lambda Uv synthetic spectrum for the LED light source;

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[0021] (uT, v) and (u, vM) is a synthetic spectrum with the LED light source colour coordinate in the black body radiation is CCTm is the CIE1960-UCS chromaticity diagram color coordinate;

[0022] 2) a plurality of spectrum of the normalized single-colour LED lamps are Si (lambda) (i = 1, 2, 3. .. n), the corresponding weight is ki (i = l, 2, 3. .. n), the (interval between the weights ki (i = 1, 2, 3. .. n) random assignment, synthetic spectrum satisfy the boundary condition of the LED light source;

[0023] 3) establishing evaluation function f of the CRI colour rendering = 100-CRI, using simplex method corresponding to the downward weight Iii local optimization algorithm to find the CRI colour rendering obtained maximum value;

[0024] 4) the weight Iii into brightness weight Yi, wherein Yi is the brightness MSix (lambda) corresponding to the CIE1931XYZ color space, according to the corresponding relation of the current value Ci and luminance weight Yi, Yi luminance weight into current value Ci, obtaining the colour temperature of the LED current value.

[0025] solution of the invention LED current value are obtained according to the above algorithm, synthesizing light emitted after adjusting the LED light source the current value has a higher color rendering.

[0026] said multiple monochromatic LED lamp comprises a red light LED lamp, a green LED lamp, the blue-light LED lamp and warm white light LED lamp, the current value comprises a current value of each single-colour LED lamp; and the wavelength of the LED light of the red light is 60 (T630nm wavelength of green light LED lamp is 50 (T540nm, product blue-light LED lamp with wavelength of 45 nm (T470nm, warm white light LED lamp is 2500 M 3000 K color temperature. the LED light source is emitted spectrum is the spectrum for synthesizing single-colour LED lamp, the synthetic spectrum can simulate natural light.

[0027] the time is Beijing time is 8 am to 17 pm, in this time every half an hour a time node is set. The purpose of the invention is to realize colour temperature simulating natural light changes with time, so the time period is set as the Beijing time 8 am to 17 pm, makes up the defect of insufficient natural light lighting of the building interior in the time period.

[0028] current time is in between two adjacent time node can be through interpolation algorithm to

obtain the single-colour LED lamp current value, the interpolation algorithm is as follows:

[0029] set the current time is t, and the controller stores the adjacent time node A and between t2, the set current value of h corresponding to n LED are CilQ = (1, 2, 3. .. n), current value of t2 corresponding to a n LED are respectively Ci2 (i = 1, 2, 3. .. n), then the current value of t corresponding to n LED respectively is CiQ = (1, 2, 3. .. n) as follows:

[0031] The invention also provides a colour temperature simulating natural light changes with time of LED light source illumination device, comprising an LED light source;

[0032] a controller for adjusting the LED light source current value;

[0033] clock, for conveying the current time to the controller.

[0034] LED lighting device of this invention has two kinds of control modes, one is to automatically control the LED light source through time of current value, the second is through color temperature manual adjustment synthetic light of the LED light source to control the LED light source current value.

[0035] The LED light source comprises red light LED lamp, a green LED lamp, the blue-light LED lamp and warm white light LED lamps, and the red light LED lamp whose wavelength is 60 (T630nm wavelength of green light LED lamp is 50 (T540nm wavelength of the blue-light LED lamp is 45 (T470nm, D lamp colour temperature warm white light LE is 2500 gamma 3000 . the four-colour synthetic light emitted by the LED lamp imitating natural light, and synthetic light emitted with high color rendering.

[0036] The beneficial effect of the invention is to realize the artificial illumination consistent with the natural light colour temperature change, which is helpful for keeping human body normal physiological rhythm, and to obtain high color rendering at different color temperatures.

Description according to claim claimimages

[0037] Picture 1 is the structure sketch of the device of LED light source illumination colour temperature of the invention simulating natural light changes over time;

[0038] Picture 2 is the parameter of the four-colour LED lamp selected by this invention;

[0039] Picture 3 is the invention of the four normalized spectrum monochromatic LED lamp;

[0040] Picture 4 is the colour temperature of the invention simulating natural light changes with time of LED light source illumination of the work flow;

[0041] Picture 5 is the algorithm of the LED current value corresponding to the colour temperature of the invention;

[0042] Picture 6 is the boundary condition of the algorithm of the LED current value corresponding to the colour temperature of the invention;

[0043] Picture 7 is the corresponding relationship of the relative brightness of the invention has high colour rendering LED control scheme and the current value;

[0044] Picture 8 is the LED current value control scheme of different time nodes of the present invention;

[0045] Picture 9 is the LED current value control scheme with different color temperature in the invention.

[0046] In the picture I is clock, 2 is a controller, 3 is a LED light source.

Preferred Embodiment

[0047] Following combine the accompanying drawings to make simulating natural light changes with time of the invention colour temperature of the LED light source lighting method and device to make further detailed description.

[0048] device of LED light source illumination simulating natural light changes with time as shown in FIG. 1, a colour temperature, comprising a clock 1, controller 2 and LED light source 3. LED light source 3 comprises a red light LED lamp, a green LED lamp, the blue-light LED lamp and warm white light LED lamp.

[0049] This embodiment select Lumileds LUXEON Rebel series LEDs, four monochromatic LED lamp parameter as shown in FIG. 2, four normalized spectrum monochromatic LED lamp 3 shown

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in FIG. wherein the warm white light LED lamp, the blue-light LED lamp, a green LED lamp and red light LED lamp of the normalized spectrum is S1 (lambda), S2 (lambda), S3 (lambda) and S4 (lambda).

[0050] controller 2 is stored with Beijing time four single-colour LED lamp current value of solution, comprising a sunny morning 8 point is a time value solution of the current node (as shown in FIG. 4) for half an hour in the afternoon 17 points, each time node corresponding to color temperature and color temperature is 2500 Gln-Glu 6000 8 group colour temperature corresponding to the node of the LED current value scheme (as shown in FIG. 5). the four-colour LED lamp through the solution of current to adjust, after adjusting LED light source 3 emits the synthesized light with higher color rendering, as shown in FIG. 6, the algorithm realizing the colour temperature of LED current value as follows:

[0051] 1, a target color temperature is CCTt, the target colour temperature confirming boundary condition, in practical application allows the LED light source synthetic spectrum colour temperature CCTm and CCTt there is a certain deviation, and the colour coordinate and the blackbody radiation curve and there is a certain distance (as shown in FIG. 7) allows the LED light source synthetic spectrum, boundary conditions are as follows:

[0052]Formula(E)(refer to the tiff*

[0053] wherein CAP-ACCT is CCTm with CCTt the presence of deviation range, the distance between the colour coordinate and the blackbody radiation curve of Auv synthetic spectrum for the LED light source, wherein,) and (u, vM) lambda CCT = 50 K is a synthetic spectrum with the LED light source colour coordinate in the black body radiation is CCTm is the CIE1960-UCS chromaticity diagram of colour coordinates in the present invention;

[0054] 2, establishing the evaluation function f with respect to color rendering (CRI) 100-CRI, because the following is the downhill simplex method local optimization algorithm will find the minimum evaluation function, so to obtain maximum, the CRI to obtain minimum;

[0055] 3, a warm white, blue, green, and red 4 LED lamp of the normalized spectrum are respectively S1 (lambda), S2 (lambda), S3 (lambda), S4 (A.), the corresponding weight is k1, k2, k3, k4, as shown in FIG. 3, ki-Ras between the 0, 1 interval, for the purpose of spectral normalization of monochromatic LED lamp uniform interval of weight h is between O, l, random assignment until satisfy the boundary condition. and set the k, i = 1, 2, 3, 4) as an initial value;

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[0056] 4, within the boundary condition, using the downhill simplex method local optimization algorithm to find color rendering (CRI) weight h corresponding to the obtained maximum value

[0057] 5, the weight i*n; is converted to brightness weights Yi, wherein Yi is the brightness MSix (lambda) corresponding to the CIE1931XYZ color space, through experiment measured control current Ci Yi corresponding relation with the luminance weight, as shown in FIG. 8, then the luminance weight Yi into control current Ci to obtain the colour temperature of the LED current value.

device [0058] as shown in FIG. 9, the colour temperature of the invention simulating natural light changes with time of LED light source illumination of the working steps are as follows:

[0059] 1, setting time is Beijing time is 8 am to 17 pm, in this time every half an hour a time node is set, and the LED current value corresponding to each time node stored in the controller; the preset colour temperature range of 2500 Gln-Glu 6000 K, the color temperature node interval 500K, nodes corresponding to the colour temperature LED current value is also stored in the controller;

[0060] 2, clock the current time t to the controller, the controller sends the current time t and the time space of the set by comparing and judging the relationship between the current time and the time period;

[0061] if the current time t is in the time period, the controller is in the manual mode, sends the corresponding sound signal to remind people, between through manual selection 2500 M 6000 K 500K of a certain color temperature, controller according to the colour temperature corresponding to the node of the LED current value controlling the LED lamp;

[0062] e.g.: if the time data t = 18: 00, according to FIG. 5 in corresponding colour temperature adjustment scheme, can manually select LED light source emits synthetic light color temperature, if manual selection color temperature is 3500K, the warm light LED lamp controller, the blue-light LED lamp, a green LED lamp and red light LED lamp current are respectively adjusted to 222.94mA, 1.71mA, 58.09mA, 17.26mA.

[0063] If certain time node corresponding to the current time t, the controller calls the time changing node value of the LED current.

[0064] example: current time t=8: 30, it can be known from FIG. 4, the warm white light LED lamp, the blue-light LED lamp, a green LED lamp and red light LED lamp current are respectively 271.0lmA, Tropicalis, 20.805mA, 8.188mA;

[0065] if the current time t is adjacent between two time nodes, controller through interpolation algorithm to obtain the adjusted current value and correspondingly adjusts current value of each colour LED lamp, interpolation algorithm is as follows:

[0066] set clock transmission of current time is t, and t is time interval between two adjacent node A and between t2, corresponding to warm white light LED lamp, the blue-light LED lamp; the green light LED lamp and red light LED lamp current value is CwlX1 CglXrt, corresponding to t2 warm white light LED lamp, the blue-light LED lamp, a green LED lamp and red light LED lamp current value is Cw2, Cb2, Cg2, (2, t corresponding to warm white light LED lamp. the blue-light LED lamp, a green LED lamp and red light LED lamp current value, Cb, Cg, Cr is:

[0067] TABLES(refer to the tiff*

[0068] example: current time t=12: time 10, it can be known from FIG. 4:

[0069] 1 to 00: =12, Crl=9.13mA, Cgl=84.91mA, Cbl=6.20mA, Cwl=199.76mA;

[0070] t2 = 12 30, Cr2 = l0.92mA, Cg2 = 92.04mA, Cb2 = 6.93mA, Cw2 = 190.1lmA;

[0071] The interpolation algorithm, can be obtained:

[0072] Cr=l0.32mA, Cg=89.66mA, Cb=6.69mA, Cw=193.33mA.

(Translation from Clarivate Analytics)

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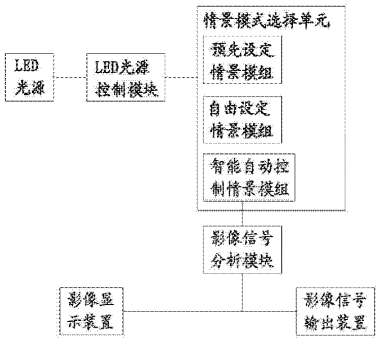
权利要求书 1 页 说明书 2 页 附图 2 页

(54)实用新型名称

可调适的LED气氛照明系统

(57)摘要

可调适的LED气氛照明系统，包括LED光源，还包括可调节LED光源亮度、色温、颜色、闪烁频率的LED光源控制模块和情景模式选择单元，情景模式选择单元、LED光源控制模块和LED光源依次电连接；所述情景模式选择单元包括并联的预先设定情景模组和自由设定情景模组。本实用新型既具备多种不同的固定照明效果，又具备可智能自动实时调适光气氛的变化照明效果，能够满足阅读、休憩、观影及游戏等各种不同场所的照明需求，不但可以达到护眼及缓解视觉疲劳的功效，而且可以使得用户的视觉环境与影像画面的情境相适配，使其享受身临其境的视觉效果。



CN 202841602 U

1. 可调适的LED气氛照明系统，包括LED光源，其特征是：还包括可调节LED光源亮度、色温、颜色、闪烁频率的LED光源控制模块和情景模式选择单元，情景模式选择单元、LED光源控制模块和LED光源依次电连接；所述情景模式选择单元包括并联的预先设定情景模组和自由设定情景模组。

2. 根据权利要求1所述的可调适的LED气氛照明系统，其特征是：还包括可综合解析影像信号的影像信号分析模块，所述情景模式选择单元还包括与预先设定情景模组、自由设定情景模组并联的智能自动控制情景模组；可与给影像显示装置传输影像信号的影像信号输出装置电连接的影像信号分析模块，与情景模式选择单元中智能自动控制情景模组电连接。

3. 根据权利要求2所述的可调适的LED气氛照明系统，其特征是：所述LED光源、LED光源控制模块、情景模式选择单元和影像信号分析模块，可为一体式组件，或为分体式组件。

4. 根据权利要求2所述的可调适的LED气氛照明系统，其特征是：所述LED光源与LED光源控制模块之间、LED光源控制模块与情景模式选择单元之间、情景模式选择单元与影像信号分析模块之间，可为有线电连接，或为无线电连接。

5. 根据权利要求1所述的可调适的LED气氛照明系统，其特征是：所述LED光源是指以LED作为照明光源的灯具，包括台灯、立灯、灯箱、筒灯。

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可调适的 LED 气氛照明系统

技术领域

[0001] 本实用新型涉及一种照明系统，具体地说是一种可调适的 LED 气氛照明系统。

背景技术

[0002] 目前，市场上的 LED 照明系统主要强调 LED 光源的光线亮度、色温等光学特性参数以及 LED 光电转换效率，一般所产生的照明效果都是单一不可调适的，无法根据不同的照明需求提供多种不同的固定照明效果，更无法提供可智能自动实时调适光气氛的变化照明效果。

[0003] 最新有一种使用于 5D 影院的场景气氛照明系统，为实现智能自动变化光气氛的照明效果，需搭配复杂的控制系统以及预先针对个别画面进行场景气氛照明变化的编辑，需求大量的人力及技术支持，很难适用于一般消费市场。

发明内容

[0004] 本实用新型的目的是提供一种可调适的 LED 气氛照明系统，使其既具备多种不同的固定照明效果，又具备可智能自动实时调适光气氛的变化照明效果。

[0005] 为达到上述目的，本实用新型所采取的技术方案是：可调适的 LED 气氛照明系统，包括 LED 光源，还包括可调节 LED 光源亮度、色温、颜色、闪烁频率的 LED 光源控制模块和情景模式选择单元，情景模式选择单元、LED 光源控制模块和 LED 光源依次电连接；所述情景模式选择单元包括并联的预先设定情景模组和自由设定情景模组。

[0006] 进一步，所述可调适的 LED 气氛照明系统，还包括可综合解析影像信号的影像信号分析模块，所述情景模式选择单元还包括与预先设定情景模组、自由设定情景模组并联的智能自动控制情景模组；可与给影像显示装置传输影像信号的影像信号输出装置电连接的影像信号分析模块，与情景模式选择单元中智能自动控制情景模组电连接。

[0007] 所述 LED 光源、LED 光源控制模块、情景模式选择单元和影像信号分析模块，可为一体式组件，或为分体式组件。

[0008] 所述 LED 光源与 LED 光源控制模块之间、LED 光源控制模块与情景模式选择单元之间、情景模式选择单元与影像信号分析模块之间，可为有线电连接，或为无线电连接。

[0009] 所述 LED 光源是指以 LED 作为照明光源的灯具，包括但不限于台灯、立灯、灯箱、筒灯。

[0010] 本实用新型的工作原理是：可通过情景模式选择单元选择预先设定情景模组，再通过 LED 光源控制模块调适 LED 光源，使其呈现预设的照明效果，以满足不同场景的照明需求；亦可通过情景模式选择单元选择自由设定情景模组，再通过 LED 光源控制模块实现自行调适 LED 光源，使其呈现自定义的照明效果，以满足不同使用者的个人照明需求；还可通过情景模式选择单元选择智能自动控制情景模组，再通过影像信号分析模块综合解析来自影像信号输出装置的影像信号后，利用 LED 光源控制模块实时自动调适 LED 光源，使其能够配合影像画面实时变化照明效果，以达到创造光气氛的效果。

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[0011] 本实用新型既具备多种不同的固定照明效果，又具备可智能自动实时调适光气氛的变化照明效果，能够满足阅读、休憩、观影及游戏等各种不同场所的照明需求，不但可以达到护眼及缓解视觉疲劳的功效，而且可以使得用户的视觉环境与影像画面的情境相适配，使其享受身临其境的视觉效果。

附图说明

[0012] 图 1 是本实用新型第一实施例的结构示意图；

[0013] 图 2 是本实用新型第二实施例的结构示意图。

具体实施方式

[0014] 下面结合附图对本实用新型作进一步的详细说明：

[0015] 实施例 1：参看图 1，本实用新型可调适的 LED 气氛照明系统，包括 LED 光源、LED 光源控制模块和情景模式选择单元，情景模式选择单元、LED 光源控制模块和 LED 光源依次电连接；所述情景模式选择单元包括并联的预先设定情景模组和自由设定情景模组。

[0016] 实施例 2：参看图 2，本实用新型可调适的 LED 气氛照明系统，包括 LED 光源、LED 光源控制模块、情景模式选择单元和影像信号分析模块，情景模式选择单元、LED 光源控制模块和 LED 光源依次电连接；所述情景模式选择单元包括并联的预先设定情景模组、自由设定情景模组和智能自动控制情景模组；可与给影像显示装置传输影像信号的影像信号输出装置电连接的影像信号分析模块，与情景模式选择单元中智能自动控制情景模组电连接。

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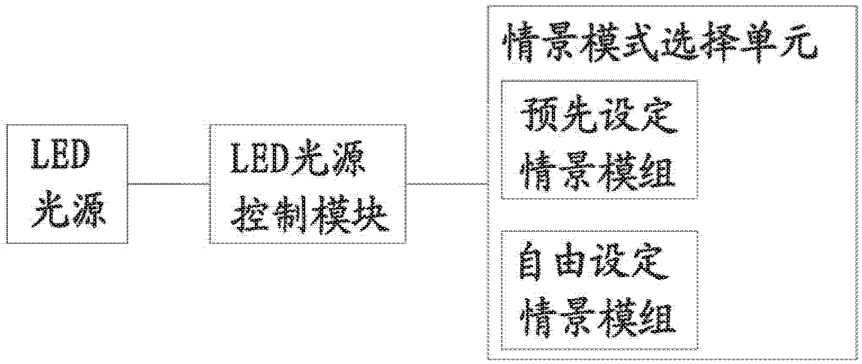


图 1

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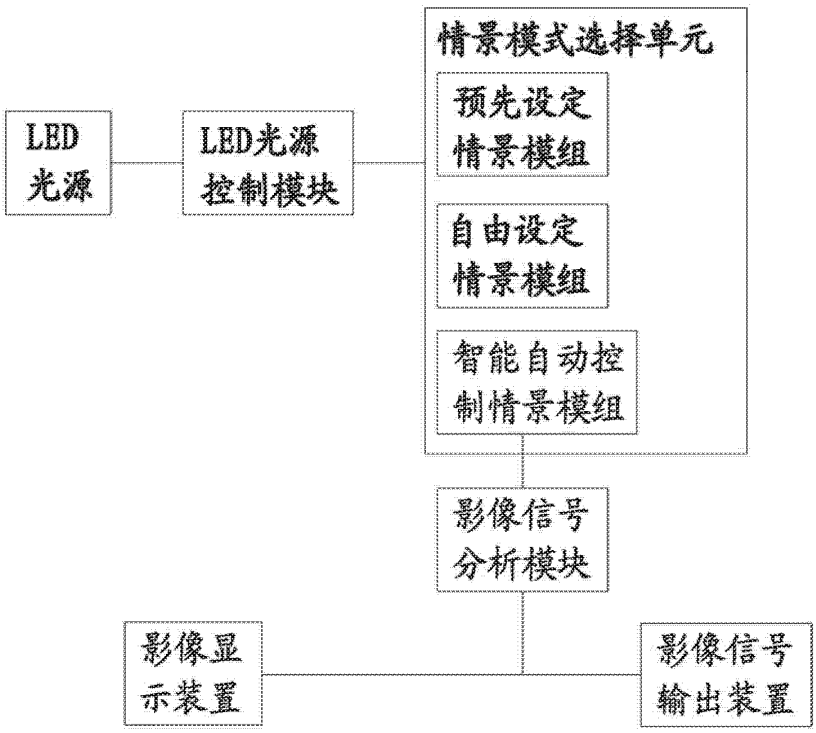


图 2

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Record 3/4 CN202841602U Adjustable LED atmosphere illumination system | An adaptable LED atmosphere lighting system

Publication Number: CN202841602U

Title: Adjustable LED atmosphere illumination system | An adaptable LED atmosphere lighting system *(Translation from Clarivate Analytics)*

Title - DWPI: Adjustable LED atmospheric lighting system has LED light source and LED light source control module that are electrically connected with scene mode selecting unit comprising preset scene module

Abstract:

The utility model relates to an adjustable LED atmosphere illumination system comprising an LED light source, an LED light source control module and a situation mode selection unit. The LED light source control module is used for adjusting the brightness, the color temperature, the color and the flicker frequency of the LED light source. The situation mode selection unit, the LED light source control module and the LED light source are successively and electrically connected. The situation mode selection unit includes a preset situation module group and a freely-set situation module group, wherein the two groups are connected in parallel. According to the utility model, the adjustable LED atmosphere illumination system enables various fixed illuminating effects as well as the changed illuminating effect of intelligent, automatic and real-time light atmosphere adjustment to be realized, thereby meeting illuminating requirements at different occasions like reading, resting, film watching and game playing and the like. Therefore, the efficacies of eye protection and visual fatigue relieving can be realized and the visual environment of the user can be matched with a scene in an image picture, so that the user can enjoy the visual immersive effect.

An adaptable LED atmosphere lighting system, comprising an LED light source, further comprising an adjustable LED light source brightness, LED light source control module and contextual model of color temperature, color, flashing frequency selecting unit, a contextual model selection unit, LED light source control module and the LED light source are electrically connected, the contextual model selection unit that comprises, in parallel, a predetermined scene module and freely set the scene module. The utility model not only has a plurality of different fixing lighting effect, and it has intelligent automatic real-time adapted light atmosphere of varying lighting effect, it can satisfy the illuminating requirement of reading, resting, viewing and game and so on all kinds of different places, which not only can reach the eye and visual fatigue relieving function, but also can be matched so that the context of the visual environment and the image picture of the user, so

as to enjoy the immersive visual effect.

(Translation from Clarivate Analytics)

Abstract - DWPI:

Abstract - DWPI Novelty:

Capable of adapting the system of atmosphere lighting of LED, comprising an LED light source, further comprising a LED light source brightness, colour temperature, colour, twinkling frequency of the LED light source control module and a scene mode selecting unit, scene mode selection unit, an LED light source control module and an LED light source electrically connected with the scene mode selecting unit comprises a preset scene module and the scene module. This utility model not only visual effect comprises a plurality of different fixed illumination effect, but also has a capable of being electrically heated intelligently automatically real-time adjusting lighting atmosphere to change the illumination effect, can meet reading, resting, and game watching different places such as the illumination requirement, it not only can reach the eye-protecting function and relieving visual fatigue, and it can make the scenes of visual environment and the image picture of the user, to enjoy the experience.

Claims:

1. An adaptable LED atmosphere lighting system, comprising an LED light source, wherein it further comprises an adjustable LED light source brightness, LED light source control module and contextual model of color temperature, color, flashing frequency selecting unit, a contextual model selection unit, LED light source control module and the LED light source are electrically connected, said scene mode selecting unit comprises, in parallel, a preset scene module and freely set the scene module.

2. The LED atmosphere lighting system of adjustable according to claim 1, wherein it further comprises a comprehensive analysis of image signal of the image signal analyzing module, the contextual model selection unit further comprises a preset scene module. free setting intelligent automatic control scene module scene modules in parallel, electrically connect the image signal analyzing module and transmitting image signal to the image display device of the image signal output device, and contextual model selection unit intelligent automatic control scene module electrical connection.

3. The said adaptable LED atmosphere lighting system according to claim 2, wherein the LED light source, the LED light source control module, scene mode selecting unit and the image signal analyzing module, can be integrated components, or separated component.

4. The said adaptable LED atmosphere lighting system according to claim 2, wherein the LED light source between the LED light source control module, an LED light source control module and contextual model selection unit between the contextual model selection unit and the image signal

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analyzing module is can be cable connection, or a wireless connection.

5. The LED atmosphere lighting system of adjustable according to claim 1, wherein said LED light source is that using LED as the illumination light source of the lamp, comprises a lamp stand, a lamp box, the lamp tube.

(Translation from Clarivate Analytics)

Description:

An adaptable LED atmosphere lighting system

Technology field

[0001] This utility model relates to an illuminating system, specifically an adaptable LED atmosphere lighting system.

Background technology

[0002] Currently, LED lighting system on the market mainly emphasize the LED light source of the light brightness, color temperature and the like optical characteristics parameter and LED photoelectric conversion efficiency, generally are singly generated lighting effect can not be adapted, cannot provide a plurality of different fixing lighting effect according to different illumination requirements, and cannot provide intelligent automatic real-time adapted light atmosphere of varying lighting effect.

[0003] A scene atmosphere lighting system used in theatre, to achieve the lighting effect of the intelligent automatic change light atmosphere, with complex control system and for individual picture for editing the scene atmosphere lighting change, needs a lot of manpower and technical support, it is difficult for general consumer market.

Invention contents

[0004] This utility model aims at providing a LED atmosphere lighting system capable of adapting to make it not only has a plurality of different fixing lighting effect, and it has intelligent automatic real-time adapted light atmosphere of varying lighting effect.

[0005] In order to reach said purpose, this utility model adopts the technical solution is as follows: the adjustable LED atmosphere lighting system, comprising an LED light source, further

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comprising an adjustable LED light source brightness, color temperature, color, LED light source control module and the scene mode of a flicker frequency selecting unit, a contextual model selection unit, LED light source control module and the LED light source are electrically connected, the contextual model selection unit that comprises, in parallel, a predetermined scene module and freely set the scene module.

[0006] Further, the LED atmosphere lighting system of the adjustable, further comprising a comprehensive analysis of the image signal of the image signal analyzing module, the contextual model selection unit further comprises a preset scene module. free setting intelligent automatic control scene module scene modules in parallel, electrically connect the image signal analyzing module and transmitting image signal to the image display device of the image signal output device, and contextual model selection unit intelligent automatic control scene module electrical connection.

[0007] the LED light source, the LED light source control module, scene mode selecting unit and the image signal analyzing module, can be integrated components, or separated component.

, contextual model selection unit between the image signal analyzing module, can be a cable connection, or a wireless connection (0008) of the LED light source between the LED light source control module, an LED light source control module and contextual model selection unit between

[0009] The LED light source refers to lamp using LED as lighting source, including but not limited to desk lamp, surface-decorative lamp box, the lamp tube.

[0010] This utility model of the working principle is: through scene mode selecting unit selects the preset scene module, and adapting the LED light source through LED light source control module, to make it present preset lighting effect. to satisfy the illumination requirements of different scene, also can through scene mode selecting unit selects the free setting scene module, and realizing self-adaptation LED light source through LED light source control module, to make it present custom lighting effect to satisfy the individual illumination demand of different users; it also can through scene mode selecting unit selects the intelligent automatic control scene module, then through image signal analyzing module comprehensively analyzes the image signal output device of image signal, and uses LED light source control module real time self-adapting LED light source, so that it can be matched image real-time varying lighting effect, so as to reach the effect of creating light atmosphere.

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[0011] This utility model not only has a plurality of different fixing lighting effect, and it has intelligent automatic real-time adapted light atmosphere of varying lighting effect, and can meet the reading, resting, cando and game lighting requirements of different places, which not only can reach the eye and visual fatigue relieving function, but also can be matched so that the context of the visual environment and the image picture of the user, so as to enjoy the immersive visual effect.

Description according to claim claimimages

[0012] picture 1 is the utility model structure schematic diagram of the first embodiment;

[0013] picture 2 is the utility model structure schematic diagram of the second embodiment.

Preferred Embodiment

[0014] Following combine the accompanying drawings of this utility model to make further detailed explanation:

[0015] Embodiment 1: refer to picture 1, this utility model adjustable LED atmosphere lighting system, comprising an LED light source, an LED light source control module and contextual model selection unit, scene mode selection unit, an LED light source control module and the LED light source are electrically connected, the contextual model selection unit that comprises, in parallel, a predetermined scene module and freely set the scene module.

[0016] Embodiment 2: refer to picture 2, this utility model adjustable LED atmosphere lighting system, comprising an LED light source, an LED light source control module, scene mode selection unit and the image signal analyzing module, a contextual model selection unit, LED light source control module and the LED light source are electrically connected, the contextual model selection unit comprises a preset scene module in parallel, freely setting the context module and the intelligent automatic control scene module, can electrically connect the image signal analyzing module and transmitting image signal to the image display device of the image signal output device. and contextual model selection unit intelligent automatic control scene module is electrically connected.

(Translation from Clarivate Analytics)

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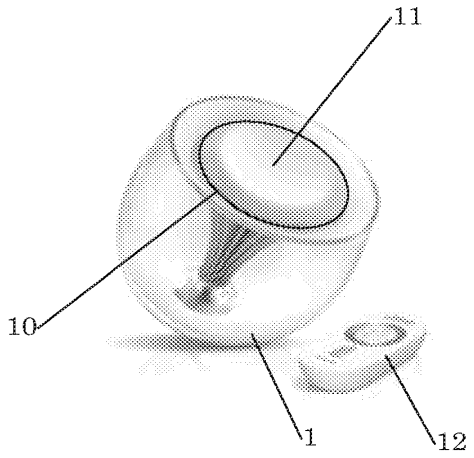
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(54) **Stochastic dynamic atmosphere**

(57) The invention concerns a lighting device for creating dynamic atmospheres, said lighting device comprising: at least one light source; the light source being adapted to operate in a plurality of color states, the light source emitting differing colors for each color state; a controller for controlling the color state of the light source; the controller further comprising a random generator to provide a transition between a previous and a subsequent state the controller is adapted to provide the transition based on probabilistic output provided by the random generator implementing a stochastic model, the probabilistic output dependent on at least the previous color state. In addition, a method is provided for generating the stochastic model; and a method for creating dynamic atmospheres based on probabilistic output provided by the stochastic model.

Figure 1



EP 2 120 512 A1

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Description

FIELD OF INVENTION

[0001] The invention relates to a lighting device with changing colors.

DESCRIPTION OF THE PRIOR ART

[0002] People have been listening to music for a long time for distraction and relaxation. More recently, alternative entertainment may be found in watching television or even more recently, watching movies on video or dvd. It is also known for quite some time that creating additional atmospheric effects, accompanying the audio or video entertainment source greatly enhances the user experience.

[0003] One way to create an additional atmosphere is to provide additional graphics, functionality present in most media players. Graphical effects are shown while listening to a song. These effects are generated on basis of the rhythm or the frequency (often represented by the Fast Fourier Transform (FFT) signal) of the song that is playing.

[0004] A more profound way to create an atmosphere is by generating light effects.
An exemplary application hereof is a light organ. In a light organ, a number of colored lights are flashing on the rhythm or on the frequency of the music. These light effects are also directly derived from the song that is playing.

[0005] However, these light effects are unable to reflect natural atmospheres and light transitions as found in nature. Both methods have the disadvantage that similar input will provide similar effects. Therefore the effects will be predictable and repetitive. Another disadvantage is that creating the effects depends on playing the entertainment source. In the above methods, sometimes noise - e.g. from a (pseudo)random generator - is added to the effects to make the effects look less repetitive and predictable. However, this is only a makeshift measure for camouflaging the drawbacks of the methods. It does not really make the effects unpredictable and natural. Another example of creating a natural atmosphere with light effects is by providing an extra illumination signal with the entertainment source. This is e.g. described in the prior art document US6166496. Although this approach avoids scripting and therefore repetition and predictability may be avoided, other disadvantages are present. The first drawback is that a significant amount data needs to be stored and transported to the lighting device. Another disadvantage, as in the previous examples is that the additional effects can only be created in combination with the entertainment source. It is not possible recreate an atmosphere without playing the entertainment source.

SUMMARY OF THE INVENTION

[0006] In one aspect, the invention aims to provide a natural and unpredictable atmosphere. In another aspect, the invention regards a device for autonomously creating dynamic atmospheres. According to an aspect of the invention, a lighting device for creating dynamic atmospheres, said lighting device comprising: at least one light source; the light source being adapted to operate in a plurality of color states, the light source emitting differing colors for each color state; a controller for controlling the color state of the light source; the controller further comprising a random generator to provide a transition between a previous and a subsequent state wherein the controller is adapted to provide the transition based on probabilistic output provided by the random generator implementing a stochastic model, the probabilistic output dependent on at least the previous color state.

[0007] According to another aspect, a method for creating dynamic atmospheres is provided, the method comprising: operating a multimedial source in a plurality of states, each state associated with a perceptual differing atmosphere; and providing a transition between a previous and subsequent state, based on probabilistic output provided by a stochastic model, the probabilistic output dependent on at least the previous state.

[0008] According to another aspect, a method is provided for generating a stochastic model, comprising: receiving multimedial input, clustering the multimedial input according to a predefined aspect; computing a statistic on subsequent transitions between the clusters; and generating probability parameters associated with the computed statistic so as to implement the stochastic model.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009] The invention will be further elucidated in the figures:

Fig. 1 shows a first embodiment according to the invention;
Fig. 2 shows a detail of the embodiment in Fig. 1.
Fig. 3 shows a schematic example of a stochastic model implementing transitions between subsequent states; and
Fig. 4 shows schematic diagram of a method for generating a stochastic model according to the invention and of a

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method for creating dynamic based on the stochastic model; and
Fig. 5 shows subsequent steps according to an embodiment of the invention.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0010] Turning to Figure 1, a schematic drawing is shown of a lighting device 1 for creating dynamic atmospheres, implementing an illuminator 11 housed on a mounting plate 10. The illuminator 11 comprises a controller 20 that controls the coloring of the device 1 according to an aspect of the invention. The controller 20 is provided, as can be seen in Figure 2 on a mounting plate 10 (printed circuit board) housing essential circuitry for controlling the light sources 21, in particular, as in this example, a plurality of sources of any RGB composition, such as: one or two red high brightness LED sources, a green and a blue source. Alternatively, other light sources, such as an incandescent light source may also be used, or any other multiprimary light source, or color temperature adjustable light source. More in particular, the light source (in this example comprising an RGB triplet) is adapted to operate in a plurality of color states, wherein a color state is defined by the (composite) light source emitting a specific color. Thus, a color state may be defined by a specific CIE XYZ coordinate, or coordinated in any derived color space, e.g. an RGB combination. This defines the perceived coloring of the light, in addition to a controlled intensity of the respective RGB sources 21. Otherwise, the light source may vary the radiated wavelength, to generate a specific color in the visible light spectrum.

[0011] To control the color state, controller 20 is provided, which can inter alia be programmed to drive the light sources to emit a specific coloring. In particular, the light source 1 can thus operate in different subsequent color states, that is, first, the light source 1 emits a first specific color, and, after a certain time, the light source 1 changes color under control of the controller 20.

[0012] The controller 20 may be preset by control parameters that may be preprogrammed, but, in a preferred embodiment, may also be uploaded, for example, as an added feature on a remote device 12, conventionally used for varying the color. In particular, the color states may be predefined and uploaded via a terminal or wireless data controller 22. In addition, other control parameters may be preprogrammed or uploadable. For example, the transition dynamics may be variable or presettable. Thus, a user can define the dynamic behavior between subsequent states, so that the state transitions can proceed in a pace and a manner that is desired or that fits a certain ambiance. The transition dynamics presetting circuitry may are also be part of the controller 20 as here depicted. In addition, the probabilistic parameters as further described hereinbelow may also be preprogrammed or uploadable via the data controller 22.

[0013] For defining spatial configurations based on a probabilistic model, to be explained further herein below, the data controller may also be used as a data link is adapted to communicate with other light sources comprised in the device.

[0014] Accordingly, where several lighting devices of the type illustrated in Figure 1 are used, the lighting device 1 could also comprise detectors for detecting physical location with respect to neighboring lighting devices and the model and the processor/stochastic modeling means is arranged to co-operate with the model and the processor/stochastic modeling means of the neighboring lighting devices to provide the random/stochastic atmosphere.

[0015] Thus, by a negotiating mechanism, the devices 1 may communicate their respective states to each other or to a central control system, which may decide how the spatial and/or temporal dynamics of subsequent color states will evolve.

[0016] Herein, a temporal color transition will be defined as a change in color states of a color device that evolves over time. A spatial color transition will be defined as a change in color states between two spatially annexed devices, for example, in particular, in a system comprising a geometric arrangement (for instance: a matrix array or random clustered arrangement) of a plurality lighting devices, each having a specific color state. In may be appreciated, that the stochastic relations between timely and spatially annexed states may be controlled independently of each other, and one or both of them may be controlled by the probabilistic output provided by the random generator implementing the stochastic model. In particular, a 'previous state' may be understood in a spatial sense, in that a previous and a subsequent state may be formed by two annexed lighting devices.

[0017] In addition, the data link may be attached to communicate with other multimedial sources, such as audio, and or video sources. Thus, in addition to the color transitions, other perceptual ambiance transitions, such as audio sounds or imaging effects may be controlled by the inventive principle.

[0018] Figure 3 shows in more detail a schematic example of a stochastic model defining transitions between subsequent states (1)-(5), as implemented in the controller 20. To this end, the processor comprises a random generator (not shown). The output of this generator defines which transition between a previous and a subsequent state will take place. That is, based on the probabilistic outcome of the generator, and starting from a present state (which will become the previous state) the controller decides and controls which subsequent state (1)-(5) is realized, based on this present state. Figure 3 implements a Markov type chain model that is a probabilistic/stochastic (instead of deterministic) process for describing transitions of a system from one state to another. However, the stochastic model is not limited to (purely) Markov type processes but could also be implementing other probabilistic models like probabilistic automata and Bayesian networks.

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[0019] In this preferred example, given the present state, future states are independent on the past states. However, this dependency can also be added in a more generalized form. At each instant the system may change its state from the current state to another state, or remain in the same state, according to a certain probability distribution. The probabilities associated with various state-changes are termed transition probabilities.

[0020] A finite state machine may be used as a representation of a Markov chain. If the machine is in state x at time n, then the probability that it moves to state y at time n + 1. However, this is not limited to temporal transitions, but could also apply to spatial transitions. Also, a combined temporal and spatial transition model can be applied, where, for instance a plurality of light sources can be used in a predefined spatial configuration, each of which apply a color state that may have a spatial probabilistic correlation. A way to describe such relations are Markov Random Fields known in the art. Thus, a probabilistic correlation may exist that neighboring light sources are in predefined mutual states; wherein the terms previous and 'subsequent' are used in a generalized spatial context which may be defined by a nearest neighbor principle. In addition, a probabilistic correlation may exist that each light state will evolve, in a temporal manner from a previous to a subsequent state.

[0021] In Figure 3, the nodes (30) represent the possible states of the system. Arrows (31) between nodes i and j represent the probability that the system changes from state i to j in a single time step.

[0022] In the exemplary state machine it can be seen that a system in state 1 at a time n, has a probability of 95% that the system continues to stay in state 1 at time n + 1 and a probability of 5% that the system moves to state 2 at time n + 1. Furthermore, the diagram shows that a system in state 3 at time n has a probability of 85% to continuing this state at n + 1, a probability of 12% of moving to state 4 at time n + 1 and a probability of 3 % to state 1 at time n + 1.

[0023] The probability parameters of a Markov chain model may also be represented in a transition probability matrix:

	1	2	...	n
1	p_{11}	p_{12}		p_{1n}
2	p_{21}	p_{22}		p_{2n}
...				
N	p_{n1}	p_{n2}		p_{nn}

[0024] Figure 4 shows a schematic diagram of a method for generating a stochastic model according to the invention and of a method for creating dynamic based on the stochastic model. In this diagram, the parameters of the probability model, as implemented in controller 20 need to be determined, e.g. from a video source or an image 40 (as shown in Figure 4) displaying natural (temporal and/or spatial) color transitions. Second, the model has to be loaded in the controller 20 of lighting device 1, where it has to be executed.

[0025] The modeling and rendering of arrangement of colors from image 40 is schematically indicated in subsequent model generating step 41. A rendering device 21 includes at least one light source that renders a sequence of colors based on the generated model.

[0026] The model generating step 41 will be described further in detail with reference to Figure 5. First, it can be seen from Figure 4, that the image is clustered in certain areas, each area defining a mean color weight. In another example, dynamic lighting effects, associated with temporal color transitions may be derived from video content of for example natural scenes, such as water, fire or scenery. Accordingly, a stochastic (Markov) model is generated from a temporal color distribution of a video source sequence; or from a spatial color distribution of an image. As a distance measure, delta E (CIE Lab), known in the art may be used. In addition, the smallest clusters of the color distribution are removed, and a centroid of each cluster can be used as node in the Markov chain.

[0027] Accordingly, the step 501 in Figure 5 wherein multimedial input is clustered according to a predefined aspect, such as color, chromaticity, lightness in one example, concerns:

1. Extracting representative color features (fi) from each frame $0 \leq i \leq m$ of the source video.
The extracted color features from every frame represent the overall color composition of the frame or the illumination color in the frame. As example features the mean color of the frame, the median and the trimean color can be used, as well as the lighting color estimate using for example the grayworld, the whitepatch or the PCA (principal component analysis) algorithm.
2. Reduce the number of colors by clustering the extracted colors (fi) into color classes (cj), $0 \leq j \leq n$ and substituting every color (fi) with its class representative (fi*). The variance in every class (Vj) is also learned.
Any general non-supervised clustering algorithm can be used to find the clusters of colors. In our example implementation, k-means clustering and blurring mean shift are used.
3. Taking the classes (cj) as states of the Markov Chain. The transition probabilities (pa,b) $0 \leq a,b \leq n$ of the Markov

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Chain are estimated in a step 502 using the observed transitions in the clustered source colors (fi*).

[0028] Another clustering aspect can be according to a time integral aspect, such as average color or sound level over a predetermined time.

[0029] Alternatively, the source material can be a static image. In this case, the transition probabilities are estimated from the neighborhood probabilities of states (color classes) and the speed of rendering is manually controlled.

[0030] Alternatively, the model can be manually crafted. A light design artist may manually 'VJ like' create the color states and the transition probabilities. For the latter there are several possibilities. A designer could only determine the probabilities between predetermined color states. Another possibility is to let the user determine both the colors (distribution) in the range and the probabilities for each state transition. This could be done with software on a computer and the resulting model may be transferred to the lighting device, for example, through downloading from a website.

[0031] The Markov model generated this way is then incorporated into a (standalone) lighting device which can autonomously render the random/stochastic atmospheres.

[0032] For the learning process of these models, the input is not limited to video and pictures, but may include audio, all kinds of sensors (pressure, temperature or physiological) or a combination of the above.

[0033] Rendering of color states according to the derived model:

[0034] Given the number of colors N and update frequency f:

The model uses:

N^2 numbers for the state transition probabilities
3N numbers for the RGB values for the colors
In terms of processing power:
f (pseudo) random numbers generated per second
f log(N) table look-ups per second
[f operations of a low pass filter per second]

Hence, for realistic N ($5 \leq N \leq 20$) and f ($25 \leq f \leq 50$), implementations are possible on very small processing platforms. Step 503, wherein probabilistic output is derived from a model implementing a stochastic process, will be further explained based on an example. Suppose a model with 4 states and four state transitions. For example, the probabilities to stay in state 1,or go to states 2, 3 and 4 when in state 1 may be 0.7, 0.05. 0.1 and 0.15 respectively.

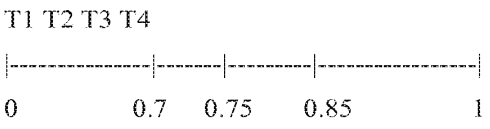
The probability of going to another state while in state 1:

Transition from S1 to

S1	70%
S2	5%
S3	10%
S4	15%

One possibility to map the random numbers on the transition is a linear search.

This means that the random numbers between 0 - 0.7 will result in staying in the same state, random numbers between 0.7 - 0.75 will result in transition 2, 0.75 - 0.85 to transition 3 and 0.85 - 1 to transition 4.



Of course the order of the transitions may be changed.

Accordingly, in step 504, the outcome of the model is used to generate a state transition to change the color state of the device.

The rendering of a model is a simple operation that only requires one random draw from a uniform [0, 1] distribution and a linear search per time interval at which the model is rendered (usually for models learned from video material 25 Hz). An alternative mapping method is binary search.

For a single light source, the rendering process was done by a random generator that picks the state transitions. For an

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Markov Random Field (MRF), a technique like Gibb's sampling can be used to generate a sequence of colors for all light devices.

The embodiments in this invention disclosure include lighting devices. The invention though is not limited to only light as output, but covers sound (soundscapes), smell, vibration and tactile output as additional modalities as well. It also covers a combination of these output modalities. More in particular, it may be understood that the invention also covers embodiments, without express indication to the contrary, of combined features as described hereabove.

Claims

1. A lighting device for creating dynamic atmospheres, said lighting device comprising:

   - at least one light source; the light source being adapted to operate in a plurality of color states, the light source emitting differing colors for each color state;
   - a controller for controlling the color state of the light source; the controller further comprising a random generator to provide a transition between a previous and a subsequent color state; wherein
   - the controller is adapted to provide the transition based on probabilistic output provided by the random generator implementing a stochastic model, the probabilistic output dependent on at least the previous color state.

2. A lighting device according to claim 1, wherein the transition regards a temporal and/or spatial color transition between previous and subsequent color states.

3. A lighting device according to claim 1, further comprising a transition dynamics presetting circuit, for defining the transition dynamics between subsequent states.

4. A lighting device according to claim 1 further comprising a terminal for exchanging stochastic model parameters; transition dynamic parameters and/or color state parameters.

5. A lighting device according to claim 1, further comprising multimedial output devices associated with the color state.

6. A system comprising a geometric arrangement of a plurality of coupled lighting devices according to claim 1.

7. A lighting device according to claim 1, further comprising:

   - multimedial output devices driven by multimedial sources,
   - a clustering circuit for clustering the multimedial output according to a predefined aspect;
   - a computational circuit for computing a statistic on subsequent transitions between the clusters;
   - a processing circuit for generating probability parameters associated with the computed statistic; and
   - an output circuit for outputting the probability parameters to the random generator so as to implement the stochastic model.

8. A device for generating a stochastic model for a device according to claim 1, comprising:

   - an input for receiving multimedial input,
   - a clustering circuit for clustering the multimedial input according to a predefined aspect;
   - a computational circuit for computing a statistic on subsequent transitions between the clusters;
   - a processing circuit for generating probability parameters associated with the computed statistic; and
   - an output circuit for outputting the probability parameters so as to implement the stochastic model.

9. A method for creating dynamic atmospheres, the method comprising:

   - operating a multimedial source in a plurality of states, each state associated with a perceptually differing atmosphere; and
   - providing a transition between a previous and subsequent state, based on probabilistic output provided by a stochastic model, the probabilistic output dependent on at least the previous state.

10. The method according to claim 9, wherein the multimedial source is a light source, and wherein the state is a color state.

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11. A method for generating a stochastic model, comprising:

- receiving multimedial input,
- clustering the multimedial input according to a predefined aspect;
- computing a statistic on subsequent transitions between the clusters; and
- generating probability parameters associated with the computed statistic so as to implement the stochastic model.

12. The method according to claim 11, wherein the parameters of the stochastic model are extracted from a temporal color distribution of a video source sequence.

13. The method according to claim 11, wherein the parameters of the stochastic model are extracted from a spatial color distribution of an image.

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Figure 1

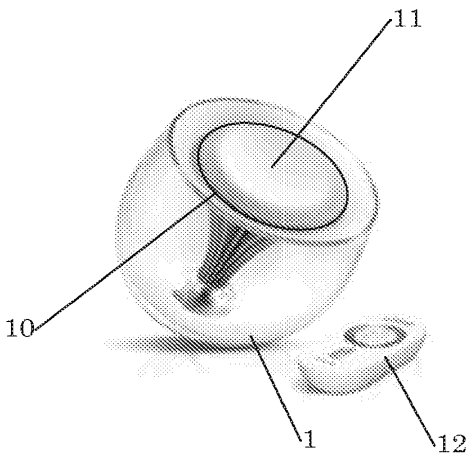
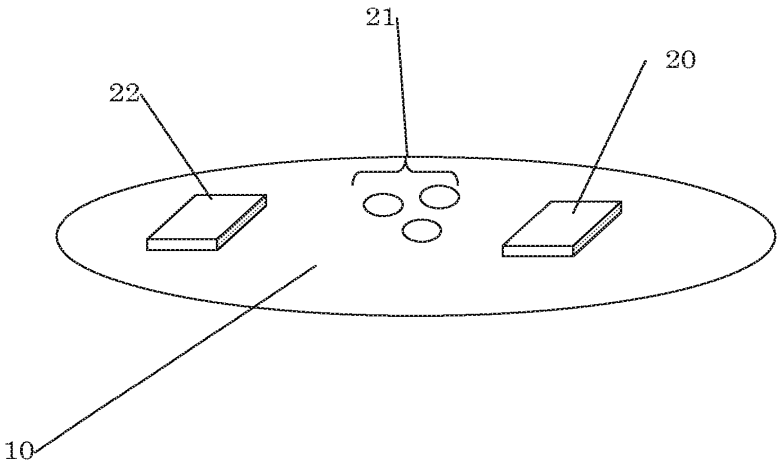
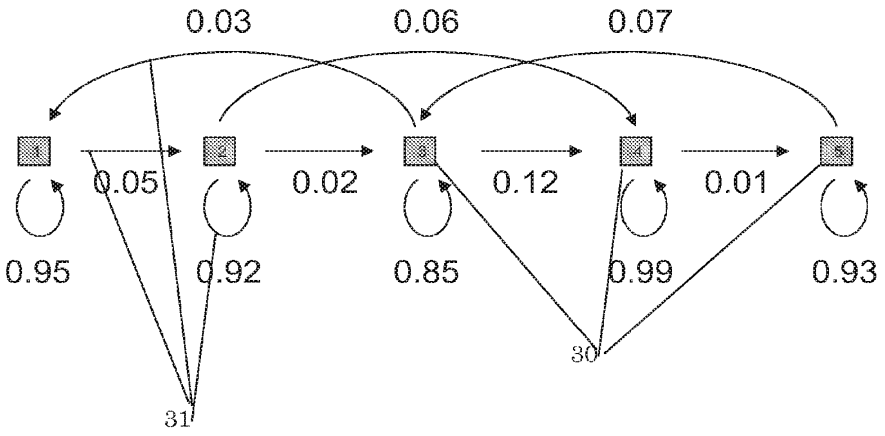


Figure 2



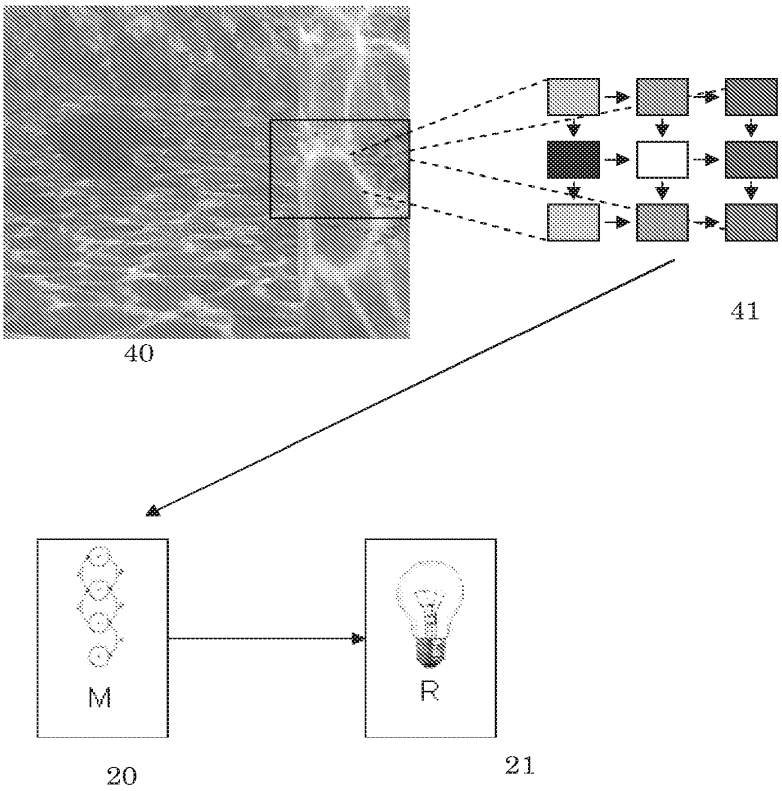
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Figure 3



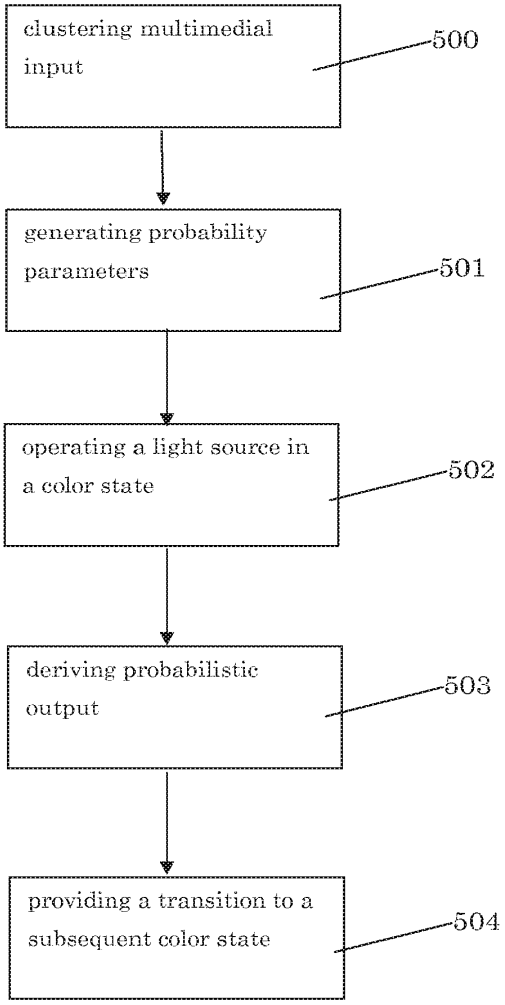
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Figure 4



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Figure 5



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EUROPEAN SEARCH REPORT

Application Number
EP 08 15 6094

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
Y	US 6 611 297 B1 (AKASHI YUKIO [JP] ET AL) 26 August 2003 (2003-08-26) * column 3, lines 55-62 * * column 14, lines 6-9 * * column 30, lines 8-59 *	1-7,9-13	INV. H05B37/02
Y	US 5 924 784 A (CHLIWNYJ ALEX [US] ET AL) 20 July 1999 (1999-07-20) * column 6, lines 25-36; figure 1 * * column 7, lines 14-19 * * column 7, lines 36-42 * * column 10, lines 19-24 *	1-7,9-13	
X	US 2006/233437 A1 (DIEHL HANS-PETER [DE]) 19 October 2006 (2006-10-19) * page 3, paragraph 37 * * page 3, paragraph 39 *	8	
A	US 5 061 997 A (REA MARK S [US] ET AL) 29 October 1991 (1991-10-29) * abstract * * column 6, line 4 *		TECHNICAL FIELDS SEARCHED (IPC) H05B
A	US 2003/161145 A1 (LIU MONITA [US] ET AL GUTSTEIN ROBERT A [US] ET AL) 28 August 2003 (2003-08-28) * page 2, paragraph 34 * * page 3, paragraph 49 *		

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	19 September 2008	Benedetti, Gabriele

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 08 15 6094

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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19-09-2008

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 6611297 B1	26-08-2003	WO 9953728 A1	21-10-1999
US 5924784 A	20-07-1999	NONE	
US 2006233437 A1	19-10-2006	AT 382853 T	15-01-2008
		CA 2528469 A1	29-12-2004
		DE 10328322 A1	27-01-2005
		EP 1642098 A1	05-04-2006
		WO 2004113855 A1	29-12-2004
		ES 2298770 T3	16-05-2008
US 5061997 A	29-10-1991	NONE	
US 2003161145 A1	28-08-2003	AU 2003212429 A1	09-09-2003
		CA 2477648 A1	04-09-2003
		CN 1650130 A	03-08-2005
		EP 1488447 A2	22-12-2004
		MX PA04008219 A	16-05-2005
		WO 03073466 A2	04-09-2003
		US 2004252498 A1	16-12-2004

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- US 6166496 A **[0005]**

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(19) Europäisches Patentamt
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(54) LIGHTING DEVICE

(57) There is provided a wearable or portable lighting device for playing out, together with a plurality of other wearable or portable lighting devices, a predetermined time-varying lighting pattern over a space occupied by said device and the other devices; said device comprising: at least one light source; memory for storing a representation of the time-varying lighting pattern; and at least one controller configured to determine a current location of said device, to receive a timing signal for determining a current stage of the time-varying lighting pattern in synchronization with the other devices, and based on said determination and said timing signal, with reference to the representation in memory, to select a portion of the time-varying lighting pattern corresponding to the current location and stage and to cause the at least one light source to play-out said portion.

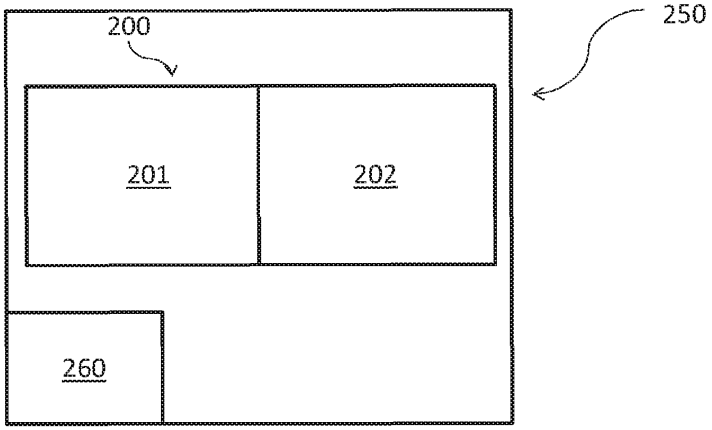


Figure 2

EP 3 002 995 A1

Printed by Jouve, 75001 PARIS (FR)

Description

FIELD OF THE INVENTION

[0001] The present invention generally relates to a lighting device, a centralized control unit and a lighting system comprising the same.

BACKGROUND OF THE INVENTION

[0002] A plurality of wearable and/or handheld lighting devices located within a space can each be controlled to collectively render a synchronized lighting effect that creates an immersive light experience as part of concerts and other events with large crowds. In one example involving a concert, a plurality of user-held lighting devices within an arena are each configured to emit a light corresponding to a respective part of a preconfigured light show. The light emitted by each of the plurality of devices is configured such that, at a distance from the user-held devices, an overall image/lighting effect is formed. This is shown in Figure 1.

[0003] Figure 1 shows an arena comprising a plurality of lighting devices 100 in the form of handheld user lighting devices. The arena is divided into a plurality of light regions 101a-101d, with one or more of the lighting devices 100 falling within each of the regions. In other words, each region comprises at least one lighting device 100. The lighting devices 100 may be arranged to output a particular sequence of colored light in dependence on which region they are located in. For example, assume that the arena is divided into quadrants. The handheld lighting devices in the upper left quadrant 101a are initially configured to emit a blue light, before cycling through red, green and yellow lights. The handheld lighting devices in the upper right quadrant 101b are initially configured to emit a red light before cycling through green, yellow and blue lights. The handheld lighting devices in the lower left quadrant 101c are initially configured to emit a green light before cycling through yellow, blue and red lights. Finally, the handheld lighting devices in the lower right quadrant are initially configured to emit a yellow light before cycling through blue, red and green lights. In this manner, a particular large-scale lighting effect can be achieved. A camera directed towards these handheld lighting devices may then record the lighting effect before outputting the recorded lighting effect to a display that the users of the handheld lighting devices can view in real-time. The lighting effect may be synchronized to an audio track being played at the concert.

[0004] There are numerous ways of coordinating the lighting show provided by the handheld lighting devices. One way of doing this is for a centralized control unit to periodically send respective lighting control information for a particular time period to each of the plurality of lighting devices based on a determined location of the lighting devices.

SUMMARY OF THE INVENTION

[0005] When such lighting effects are based on time-varying pattern, such as a video file, a robust and reliable way to control thousands of such lighting devices is required. Streaming the data to every wearable or portable lighting device in real time is technologically challenging, expensive and reduces the battery time of the wearable or portable lighting devices.

[0006] To address this, the present application proposes a system for controlling multiple wearable or portable lighting devices.

[0007] According to one aspect, there is provided a wearable or portable lighting device for playing out, together with a plurality of other wearable or portable lighting devices, a predetermined time-varying lighting pattern over a space occupied by said device and the other devices; said device comprising: at least one light source; memory for storing a representation of the time-varying lighting pattern; and at least one controller configured to determine a current location of said device, to receive a timing signal for determining a current stage of the time-varying lighting pattern in synchronization with the other devices, and based on said determination and said timing signal, with reference to the representation in memory, to select a portion of the time-varying lighting pattern corresponding to the current location and stage and to cause the at least one light source to play-out said portion.

[0008] Advantageously, the predetermined time-varying lighting pattern has elements (or portions) that are accessed via both a current location of the lighting device and a current time. Thus, as either of these quantities change, the portion of the predetermined time-varying lighting pattern currently being played-out by the lighting device also changes. This allows for multiple lighting devices to be synchronized so as to, together, play out a predetermined time-varying pattern over a space without the need for users to stay in a predetermined location (e.g. their seats). To avoid sending substantial amounts of data during an event, the predetermined time-varying lighting pattern mentioned above can comprise the entire time-varying lighting pattern to be played out during that event. It is thus understood that a lighting device only plays out a portion of the stored predetermined time-varying lighting pattern during a single event.

[0009] In another embodiment, there is provided a centralized control unit comprising a controller configured to: send a predetermined time-varying lighting pattern for forming a lighting pattern over a space to a plurality of lighting devices; and send to each of the lighting devices a timing signal, wherein for each lighting device the timing signal can be used in combination with a current location of said device to identify a portion of the predetermined time-varying lighting pattern for playing-out said portion.

BRIEF DESCRIPTION OF THE DRAWINGS

[0010] These and other aspects will now be described

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in more detail, with reference to the appended figures showing embodiments.

Fig. 1 illustrates an example lighting system;
Fig. 2 illustrates an example lighting system; and
Fig. 3 illustrates a schematic of an example lighting device.

[0011] All the figures are schematic, not necessarily to scale, and generally only show parts for elucidating various embodiments or aspects of the invention, wherein other parts may be omitted or merely suggested.

DETAILED DESCRIPTION

[0012] Figure 2 shows a lighting system 200 comprising a plurality of light regions 201, 202. Although only two regions are shown (and described below) for the sake of illustration, it will be understood that more than two of such regions may be comprised within the lighting system 200. The lighting system 200 may be dedicated to provide illumination for a specific space comprising the plurality of light regions 201, 202, such as (in the present example) an arena of a concert hall 250 during a concert. One light region 201 may be constituted by one or a group of lighting devices (such as is described below) for illuminating a specific region of the concert hall 250. The other light region 202 may be constituted by one or a group of lighting devices (such as is described below) for illuminating a different specific region of the concert hall 250. The light regions 201, 202 do not necessarily have to be immediately adjacent to each other, though that is one possibility.

[0013] The lighting system 100 may further comprise a centralized control unit 260 for controlling the light regions 201, 202, although this not essential to some embodiments described herein. The centralized control unit 260 may receive instructions for controlling the light regions 201, 202 either from a remote source or a local source. As an example of a remote source, the centralized control unit 260 may receive an instruction regarding how the arena should be lit during a subsequent time period from a control unit located outside of the arena (e.g. from a remote computer terminal or server). In this case, the centralized control unit 260 would comprise an interface suitable for receiving communications according to at least one communication protocol. Therefore, the centralized control unit 260 would comprise an interface allowing external control of the lighting system 200, such as an API (application programming interface). For example, the lighting system 200 may be externally controlled according to an IP (internet protocol) based standardized lighting control and management protocol and/or a Web Service based lighting control and management protocol, which may be defined on top of a CoAP (constrained application protocol) or a HTTP (hypertext transfer protocol) application protocol. As an example of a local source, the centralized control unit 260 may receive an instruction regarding how the arena should be lit during a subsequent time period from an input provided by a local operator. In this latter case, the centralized control unit 260 would comprise a user interface for receiving the input from the local operator e.g. the centralized control unit 260 may take the form of a computer terminal or lighting desk. In both of these cases, the instruction may indicate a particular predetermined time-varying lighting pattern to be played out, and/or timings associated with that predetermined time-varying lighting pattern.

[0014] As mentioned above, the lighting system is configured to provide an immersive lighting experience to users located within the specific space. To do this, there is provided a plurality of wearable or portable lighting devices suitable for playing out a predetermined time-varying lighting pattern over a space occupied by the plurality of the lighting devices. Embodiments of such lighting devices are now described.

[0015] Each of the lighting devices comprises: at least one light source; memory for storing a representation of the time-varying lighting pattern; and at least one controller configured to determine a first current location of that lighting device, to receive a timing signal for determining a current stage of the time-varying lighting pattern in synchronization with the other lighting devices, and based on said determination and said timing signal, with reference to the representation in memory, to select a portion of the time-varying lighting pattern corresponding to the current location and stage and to cause the at least one light source to play-out said portion.

[0016] Thus, assuming that the predetermined time-varying lighting pattern is stored in memory as a video, each lighting device receives an input on its location and a play-out time and determines a pixel in the video file based on both this location information and play-out time. This pixel represents the lighting to be emitted by that lighting device at that time at the location of the lighting device and so the lighting device controls its light output at that time so as to be representative of this pixel.

[0017] A schematic of such a lighting device 300 is shown in Figure 3. The lighting device 300 of Figure 3 comprises data storage 301, a receiver 302 for (in suitable embodiments) receiving a location input, a processor 303 and at least one light source 304. In this instance, the processor 303 implements the functionality of the above (and below) described controller. The data storage is configured to store the entire video content of the predetermined time-varying lighting pattern to be played over the course of an event (although it is understood that a lighting device will not play out the entire light show stored in the memory). The processor 303 is configured to derive partial content (such as a pixel/segment of a light show) from the entire stored predetermined time-varying light sequence based on a determination of a current location and on a timing signal received by the controller suitable for determining a current stage of the time-varying lighting pattern. The processor 303 is further configured to cause a lighting control signal to be passed

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to the at least one light source 304 based on this partial content. The lighting control signal controls the light emitted by the at least one light source 304.

[0018] The at least one light source may be a single light source in isolation, such as a light emitting diode. The at least one light source of the lighting device may be a pixel of a display, such as a liquid crystal (LCD) display, comprising multiple pixels. The at least one light source of the lighting device may be a set number of pixels of a display of the lighting device. The set number may be equal to or less than the total number of pixels on the display. This is useful where the display of the lighting device is to be configured to function as either one or multiple pixels in an overall image to be formed by a collection of similarly configured lighting devices. Thus, when the display of the lighting device is configured to act as two pixels in the overall image, half of the pixels of the display may form one of the overall-image pixels whilst the other half of the pixels of the display may form the other overall-image pixel. It is understood that there does not have to be an equal number of pixels of the display for both of the overall-image pixel. The overall-image produced by the similarly configured lighting devices is discernible from a distance at which the light emitted from all of the similarly configured lighting devices can be viewed. It is understood that the term "image" is merely illustrative and intended to convey a predetermined configuration of lighting elements across the specific space.

[0019] The lighting device 300 may comprise multiple types of memory. For example, there may be a read-only portion and a flash portion. The memory may be embedded in the lighting device and/or may reside on a removable drive. By "removable", it is meant that the drive is configured for repeated easy insertion and removal from the lighting device.

[0020] The controller may be a processor, or a bank of processors, configured to execute instructions loaded into the temporary memory (such as random-access memory).

[0021] Now, various features and/or embodiments associated with the lighting device and the functionality executed thereby is described.

[0022] The lighting device 300 is preferably a lighting device 300 that is wearable by a user in the space or may otherwise be held by or attached to a user in the space. For example, the lighting device 300 may be any of: a mobile phone of the user, a wristband, a t-shirt and/or a wand.

[0023] The controller of the lighting device 300 is configured to select a first portion of the predetermined time-varying lighting pattern in dependence on both the first current location and the timing signal. Thus the ways in which a current location can be determined will be explored first, before looking at different timing signals.

[0024] The controller of the lighting device 300is configured to determine a current location of the lighting device 300. This may be determined in any of a variety of ways.

[0025] For example, the controller may determine the location following receipt at the lighting device 300 of a location indication from a centralized control unit 260 (as described above and/or below). In other words, the centralized control unit 260 is able to determine the location of the lighting device 300 and to inform the controller of the lighting device 300 of its locality via a suitable wireless channel. The camera and/or the projector embodiments described below may be used by the centralized control unit 260 to determine the location of the lighting device 300. The centralized control unit 260 may be local. By local, it is meant within the vicinity of the lighting device 300. For example, a controller in the vicinity of the concert hall. The local centralized control unit may have previously provided the video data to the lighting device 300.

[0026] Described below are some of the examples of how the centralized control unit 260 and/or the controller of the lighting device 300 may obtain location information (although the following is described in terms of the controller of the lighting device 300 determining the location, the centralized control unit 260 may receive this information instead and forward it on to the controller of the lighting device 300).

[0027] The controller of a lighting device 300 may determine the location of its lighting device 300 based on the receipt of location information from a location services provider, such as from a global positioning system and/or via a cellular services provider.

[0028] The controller may determine the location following receipt at the lighting device 300 of location information from similar adjacent lighting devices 300.

[0029] The lighting device 300 may determine its location using location information received via receiver 302 from a camera directed towards the lighting device 300. In this case, the camera is orientated such that the lighting device 300 is viewable within the lens-view of the camera. The information received from the camera may be used to determine the location of the lighting device 300. For example, the camera may observe a lighting device 300 cycling through a particular light sequence and that information may be used to locate the lighting device 300 in the view of the camera. The camera information may be relayed via another lighting device 300 in the vicinity. In an example, the lighting devices may be turned on one-by-one and/or lighting devices in different segments of the crowds may be turned on simultaneously. The corresponding view captured by the camera may be used to determine the location of at least one of the active lighting devices.

[0030] Alternatively or additionally, the lighting device 300 may determine its location using location information received via receiver 302 from a projector directed towards the lighting device 300. The projector (such as an infra-red projector), may be configured to project lighting coordinates to individual lighting devices. The projector may project a first light signal or flash to facilitate localization. This first light signal or flash may also be used as

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the above-mentioned timing signal (e.g. as a trigger and/or an indication of the time at which the selected portion of the time-varying pattern should be played out). However, it is understood that a second light signal or flash may be used as the above-mentioned timing signal. This latter system has an advantage of allowing the lighting device more time to select the portion for play-out whereas the other system has an advantage of minimizing the number of transmissions to be made. The projector may convey such information as is mentioned above using coded, modulated light. Another manner of determining the location of a lighting device is to using an electrical signal (such as a radio frequency signal) comprising the absolute or relative location of the lighting device. A relative or absolute location measurement may also be made by the lighting device itself.

[0031] Alternatively or additionally, the lighting device 300 may determine its location using location information received from at least one of a variety of location service providers. For example, from satellite based GPS-like system. The lighting device 300 may also obtain location information from neighboring lighting devices 300. This includes both relative and absolute location information.

[0032] Now the role of, and different types of timing signal are discussed.

[0033] The timing signal is received by the controller of the lighting device 300 and used by that controller to determine a time at which the first portion should be played out.

[0034] The timing signal may be a trigger signal received from the centralized control unit.

[0035] Alternatively or in addition, the timing signal may be received in advance from an external source (such as the above-mentioned centralized control unit 260). In this case, the controller on the lighting device 300 assesses the timing signal relative to an internal determination of an absolute or relative time made by the lighting device 300 itself i.e. each lighting device 300 may comprise a respective local clock operable to keep time in synchronization with the other lighting devices 300, wherein the timing signal specifies a timing of the time-varying pattern in advance. For example, the timing signal may comprise an advance schedule for the lighting pattern, or the timing inherent in the video. Said selection by a particular lighting device 300 may then be performed by reference to its local clock.

[0036] Now, the predetermined time-varying lighting pattern is discussed.

[0037] The predetermined time-varying lighting pattern is preferably the lighting pattern to be played out during an entire show e.g. a concert. In other words, the predetermined time-varying lighting pattern comprises lighting information for the entire specific space for the duration of the event. This means that each lighting device 300 does not have to receive multiple data updates throughout the event/show that comprise video and/or image data. Thus this system can reduce the transmission overhead that takes place during the show.

[0038] The time-varying lighting pattern is preferably entirely stored in the read only memory in the lighting device 300. During execution, the portion of the time-varying lighting pattern is loaded into temporary memory (such as RAM) for execution by the controller.

[0039] The predetermined time-varying lighting pattern may be stored as video data. In this case, the timing signal could help determine a frame synchronization with the video. Further, the first current location may be used to locate an area in the determined frame e.g. a pixel, as described above. The predetermined time-varying pattern and/or the mapping between time, location and video pixels may be stored such that a range of times and/or locations corresponds to the same pixel. Further, it is preferable for the spatial resolution of the video to be selected in dependence on the number of the plurality of the lighting devices to be used in the system. For example, a lower number of lighting devices may require a video having a higher spatial resolution than the spatial resolution used for a higher number of lighting devices 300. The video to be used in the system may be sent wirelessly to all lighting devices 300 before the start of the event, e.g. sent out wirelessly by the centralized control unit 260. Alternatively, the video to be used in the system may be stored on flash cards that can be inserted into respective lighting devices.

[0040] The portion of the time-varying pattern may be further selected in dependence on at least one of: the age of a user of the lighting device 300; and/or a status of the user while the portion is being played-out. For example, when near a bar at the venue, the lighting pattern emitted by the lighting device 300 may change to indicate whether the user is of or over the minimum purchase age for alcohol.

[0041] Preferably, when a change in location is detected by a device, the portion of the time-varying lighting pattern output by that lighting device 300 is updated using the same procedure. Thus the controller may be further configured to: determine a second current location of the lighting device 300 during a subsequent stage of time-varying lighting pattern and to cause the at least one light source to play-out a further portion of the time-varying potion of the time-varying lighting pattern corresponding to the second current location. In other words, the controller is configured to update the portion of video data being played out via a display if the lighting device 300 moves into a region associated with a different portion of the image mentioned above. In other words, the lighting device 300 will play out the video data associated with that different portion of the image. In this manner, even if the lighting device 300 moves around with a user, the overall-image will remain clear and unmixed. The second current location may thus be associated with a different portion of the time-varying lighting pattern than the first current location. In other words, the further portion may be different to the portion of claim 1.

[0042] Now, further operations of the controller of the lighting device 300 in embodiments are discussed.

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[0043] The controller is further configured to cause the at least one light source to initiate play-out of said first portion of the predetermined time-varying lighting pattern. As described above, there are a plurality of lighting devices 300 configured to operate as described in close proximity to each other e.g. within an arena or concert hall. Together, the light emitted by each of the plurality of lighting devices 300 cooperates to form an image that is visible from a distance at which all of the plurality of lighting devices 300 can be viewed simultaneously. The portion of the predetermined time-varying lighting pattern output by the lighting 300 device corresponds to a fraction (e.g. a pixel) of this image. Thus, said play-out can be said to cause a fraction of an image to be output from the lighting device 300. It is understood that, by "image", it is merely meant a particular preconfigured orientation of lights (or a particular instant of the time-varying lighting pattern). As time and/or the location of a lighting device 300 changes, the selected frame and/or pixel of the predetermined time-varying lighting pattern being played out also changes.

[0044] The controller of the lighting device 300 may be further configured to only cause the at least one light source to play-out the further portion on condition that the second current location is different than the first current location by more than a predetermined amount. This means that the at least one light source will not needlessly oscillate between different portions where a user is close to a boundary region. Also, this process allows a lighting device 300 to not use as much battery power compared to the case where location information is always used to determine a frame/pixel synchronization, as repeated reloading different portions of the time-varying lighting pattern is avoided. The predetermined amount may be dependent on the size of the space in which the lighting devices 300 are and/or on the resolution of an image to be made by the time-varying lighting pattern at a given instant.

[0045] The controller may be configured to control a lighting parameter (e.g. the intensity, the number of pixels/the fractional number of light sources of the device to be used for playing out the selected portion, etc.) of the portion played out by the at least one light source in dependence on the number of similarly configured lighting devices 300 in the immediate locality of the lighting device 300. For example, if there are lots of similarly configured lighting devices 300 in the immediate locality of the lighting device 300, the intensity of the portion played out may be lower than in the event of there being fewer similarly configured lighting devices 300 in the immediate locality of the lighting device 300. The lighting parameter can be selected or configured so that the image mentioned above appears to be of relatively uniform intensity across the space in which the plurality of devices is located. The number of similarly configured lighting devices 300 in the immediate locality may be determined by determining the number of lighting devices 300 within a predetermined number of meters of the lighting device 300. For example, the number of lighting devices 300 within a radius of 1m of the lighting device 300 under consideration may be determined. The lighting parameter may then be selected based on the number of similarly configured lighting devices 300 determined to be in the immediate locality and the total number of the plurality of lighting devices 300.

[0046] The lighting device 300 may be flexible and further comprise a sensor configured to determine the shape and/or orientation of the lighting device 300. The controller 303 of the lighting device 300 may be further configured to use the determined shape and/or orientation of the lighting device 300 to modify the first portion played out in order to customize the played out portion for the current shape and/or orientation of the lighting device 300. In this manner, the overall-image formed by the plurality of lighting devices 300 may have less distortion than when the configuration and/or shape of the lighting device 300 is not taken into account.

[0047] It is further understood that the lighting device 300 may receive additional signals that may be used in the selection of a portion of the time-varying lighting pattern corresponding to the first current location and stage. For example, the lighting device 300 may receive a signal to select the portion as an initial step in the process outlined above. In response to this received signal, the lighting device 300 may then determine the current location and the current stage for selecting the portion as described above. Alternatively or in addition, the lighting device 300 may receive a signal that indicates a particular time-varying lighting pattern (e.g. that indicates one video file out of multiple stored video files) stored in the memory of the lighting device 300 from which the portion is to be selected.

[0048] Some more detail is now discussed regarding the centralized control unit 260 in accordance with some embodiments of the present disclosure. The centralized control unit 260 may operate in the lighting system 200 described above. The centralized control unit 260 is configured to send the predetermined time-varying lighting pattern for forming a lighting pattern over a space to a plurality of lighting devices 300; and send to each of the lighting devices 300 the timing signal, wherein for each lighting device the timing signal can be used in combination with a current location of said lighting device to identify a portion of the predetermined time-varying lighting pattern for playing-out said portion.

[0049] This centralized control unit 260 may be used in conjunction with the above-mentioned plurality of lighting devices 300. The centralized control unit is preferably located locally to the space in which the plurality of lighting devices 300 is operating.

[0050] The centralized control unit 260 may be configured to determine a location for each of the plurality of lighting devices 300 and to send to each lighting device 300 an indication of the respective location of that lighting device 300 for any lighting device 300 whose location has changed. Preferably, to reduce the amount of over-

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head during a concert, the location is only transmitted if it has changed from the previous location by more than a predetermined amount.

[0051] The centralized control unit 260 may be further configured to provide at least one of the plurality of lighting devices with a timing indication for use in selecting said portion of said video data.

[0052] Note however that the centralized control unit 260 is not necessarily required in all possible embodiments. For example, the time-varying pattern may be pre-loaded onto each of the lighting devices (e.g. by means of a memory stick or even at the time of manufacture), and/or the timing signal could be shared wirelessly between the lighting devices in a distributed fashion.

[0053] A particular embodiment of a lighting system 200 is now described.

[0054] In the system, there are a plurality of such wearable/attachable lighting devices, each of which is associated with a respective user. Each wearable lighting device has an entire video stored locally (e.g. on a flash card) that is accessible to that lighting device.

[0055] During the experience, the plurality of lighting devices 300 are in the same locality as each other such that their users form a crowd. Just before the start of the experience, the lighting devices receive input on their location in the crowd from the centralized control unit. The lighting devices may also receive location information from the centralized control unit during the experience to update the location. Each wearable lighting device 300 is also configured to receive timing signals from a centralized control unit 260 during play-out of the video that corresponds to a time in the video file.

[0056] Based on the determined location, the wearable lighting device plays-out only a part of the video during the subsequent segment, for example, one or a set (not all) of spatially adjacent pixels in the video. The part of the video may comprise one or more pixels. In other, words, the output may have both a left-handed and a right-handed component that are the same or different. It may be desirable to include sensing means to determine the orientation or shape of the output of the lighting device. For example, it would be useful for the lighting device to determine the orientation of its light output relative to the lens of a camera recording the space in which the lighting device is located. Further, when the lighting device is flexible, it would be useful for both the shape and orientation of the lighting device to be determined.

[0057] A camera, such as the one mentioned above, captures the light pattern effect resulting from each lighting device playing their selected part of the video. This resulting light pattern is then displayed to the crowd via a display screen directed towards the crowd.

[0058] In addition to the location and timing information, the selection of the part of the video to be played out in a subsequent time period may be performed in dependence on the function of the lighting device. For example, the lighting device may be used to indicate a user's age (e.g. above or below 18 years old) at the bar, or a color indicative of the person's role at the event while at the reception desk.

[0059] Each of the plurality of lighting devices may determine when to start playing out the selected part of the video following the receipt of a trigger signal. Alternatively, each of the plurality of lighting devices may determine when to start playing out the selected part of the video following receipt of an absolute or relative time stamp until the start of the play-out time.

[0060] Where the centralized control unit operates in an area having a camera having a field of view that encompasses the plurality of lighting devices, the centralized control unit comprises a processor for determining location information for each of the plurality of lighting devices from information received from the camera relating to the field of view recorded by the camera.

[0061] Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. A single processor or other unit may fulfil the functions of several items recited in the claims. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage.

[0062] A computer program may be stored/distributed on a suitable medium, such as an optical storage medium or a solid-state medium supplied together with or as part of other hardware, but may also be distributed in other forms, such as via the Internet or other wired or wireless telecommunications systems. Any reference signs in the claims should not be construed as limiting the scope.

Claims

1. A wearable or portable lighting device (300) for playing out, together with a plurality of other wearable or portable lighting devices, a predetermined time-varying lighting pattern over a space occupied by said device (300) and the other devices; said device (300) comprising:

    - at least one light source (304);
    - memory (301) for storing a representation of the time-varying lighting pattern; and
    - at least one controller (303) configured to determine a first current location of said device (300), to receive a timing signal for determining a current stage of the time-varying lighting pattern in synchronization with the other devices, and based on said determination and said timing signal, with reference to the representation in memory (301), to select a portion of the time-varying lighting pattern corresponding to the first

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current location and stage and to cause the at least one light source (304) to play-out said portion.

2. A device (300) as claimed in claim 1, wherein the timing signal is a trigger signal from a centralized control unit remote from the device (300).

3. A device (300) as claimed in claim 1, further comprising a local clock operable to keep time in synchronization with the other devices, wherein the timing signal specifies a timing of the time-varying pattern in advance, and said selection is performed by reference to the local clock.

4. A device (300) as claimed in any preceding claim, further comprising a receiver configured to receive information from a camera directed towards the device (300), wherein said information is used to determine the location of the device (300).

5. A device (300) as claimed in any of claims 1 to 3, further comprising a receiver configured to receive information from a projector directed towards the device (300), wherein said information is used to determine the location of the device (300).

6. A device (300) as claimed in any preceding claim, wherein the controller (303) is configured to control a lighting parameter of the portion played out by the at least one light source (304) in dependence on the number of other devices in a locality of the device (300).

7. A device (300) as claimed in any preceding claim, wherein said portion is further selected in dependence on at least one of: the age of a user of the device (300); and/or a status of the user while the portion is being played out.

8. A device (300) as claimed in any preceding claim, wherein the controller (303) is further configured to determine a second current location of the device at a subsequent stage of the time-varying lighting pattern, and to cause the at least one light source (304) to play-out of a further portion of the time-varying lighting pattern corresponding to the second current location and stage.

9. A device (300) as claimed in claim 8, wherein the controller (303) is configured to cause the at least one light source (304) to play-out the further portion on condition that the second current location is different than said first current location by more than a predetermined amount.

10. A device (300) as claimed in any preceding claim, wherein the device (300) comprises a sensor configured to determine the shape and/or orientation of the at least one light source (304) in the device (300).

11. A centralized control unit (260) comprising a controller configured to;

- send a predetermined time-varying lighting pattern for forming a time-varying lighting pattern over a space to a plurality of devices (300) within the space; and
- send to each of the devices (300) a timing signal for determining a current stage of the time-varying lighting pattern, wherein for each device (300) the timing signal can be used in combination with a current location of said device (300) to identify and select a portion of the predetermined time-varying lighting pattern for playing-out.

12. A centralized control unit (260) as claimed in claim 11, wherein the controller is further configured to determine a location for each of the plurality of devices (300) and to transmit to each device (300) an indication of the respective location of that device (300) for any device (300) for use as the current location.

13. A centralized control unit (260) as claimed in any of claims 11 and 12, wherein the timing indication is one of: a trigger signal; an absolute time; and a relative time.

14. A centralized control unit (260) as claimed in any of claims 11 to 13, wherein the centralized control unit receives information from a camera having a field of view that encompasses said plurality of devices (300) and wherein the centralized control unit comprises a processor for determining location information for each of the plurality of devices (300) from this received information.

15. A lighting system comprising;

- a plurality of devices (300) as claimed in claim 1; and
- a centralized control unit (260) as claimed in claim 11,

wherein the centralized control unit is configured to transmit information to each of the plurality of devices (300) for determining the current location in each device (300).

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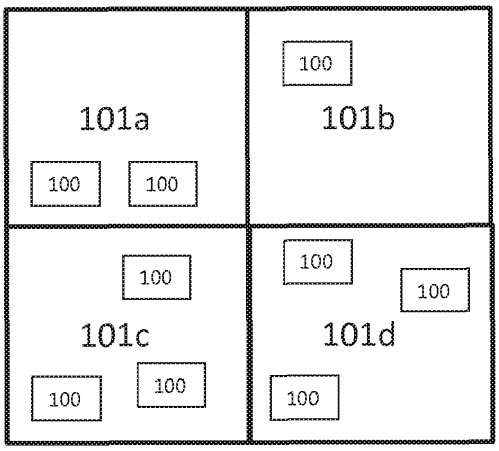


Figure 1

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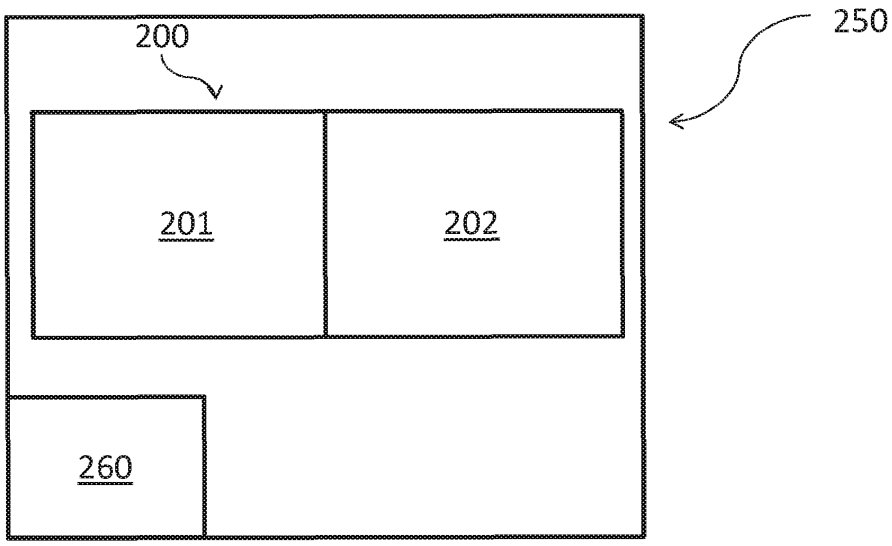


Figure 2

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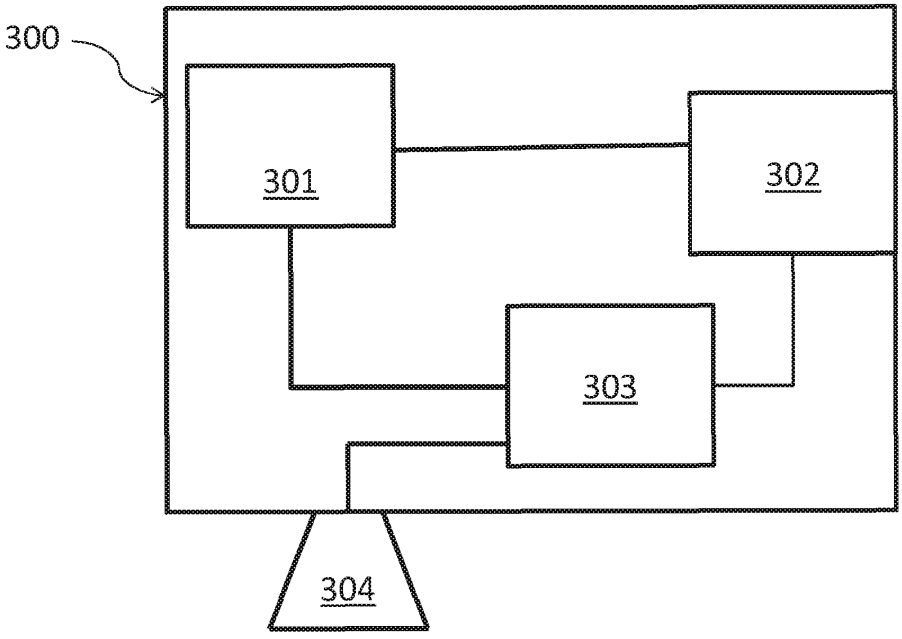


Figure 3

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Europäisches Patentamt
European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 15 18 7578

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X Y A	WO 2013/021209 A1 (RB CONCEPTS LTD [GB]; REGLER JASON CHARLES [GB]; WANT DAVID [GB]; DEAR) 14 February 2013 (2013-02-14) * the whole document *	1-3,6, 11,13,15 4,5,7, 10,14 8,9,12	INV. H05B37/02
X Y	GB 2 440 784 A (BAILEY PETER JAMES [GB]) 13 February 2008 (2008-02-13) * the whole document *	1-3,6-9, 11-13,15 4,5,10, 14	
Y	EP 1 870 802 A1 (BARCO NV [BE]) 26 December 2007 (2007-12-26) * column 9, paragraph 45 *	4,5,14	
Y	WO 2006/126122 A2 (KONINKL PHILIPS ELECTRONICS NV [NL]; DUINE PETER A [NL]; CORNELISSEN H) 30 November 2006 (2006-11-30) * page 8, line 11 - page 9, line 13; figure 3 *	4,5,7, 10,14	

TECHNICAL FIELDS SEARCHED (IPC)
H05B
G09F
G06F
H04R

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
Munich	11 February 2016	Brosa, Anna-Maria

CATEGORY OF CITED DOCUMENTS
X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
A : technological background
O : non-written disclosure
P : intermediate document

T : theory or principle underlying the invention
E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons
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EPO FORM 1503 03.82 (P04C01)

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ANNEX TO THE EUROPEAN SEARCH REPORT ON EUROPEAN PATENT APPLICATION NO. EP 15 18 7578

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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11-02-2016

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 2013021209 A1	14-02-2013	CN 103975374 A	06-08-2014
		EP 2742500 A1	18-06-2014
		JP 2014529844 A	13-11-2014
		US 2014184386 A1	03-07-2014
		WO 2013021209 A1	14-02-2013
GB 2440784 A	13-02-2008	NONE	
EP 1870802 A1	26-12-2007	EP 1870802 A1	26-12-2007
		EP 2041643 A1	01-04-2009
		US 2009184837 A1	23-07-2009
		US 2009230895 A1	17-09-2009
		WO 2007147223 A1	27-12-2007
		WO 2007147638 A1	27-12-2007
WO 2006126122 A2	30-11-2006	AT 437381 T	15-08-2009
		CN 101180563 A	14-05-2008
		EP 1889112 A2	20-02-2008
		JP 4808250 B2	02-11-2011
		JP 2008542989 A	27-11-2008
		KR 20080022118 A	10-03-2008
		TW I406009 B	21-08-2013
		US 2008192209 A1	14-08-2008
		WO 2006126122 A2	30-11-2006

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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(74) Agents: **VERWEIJ, Petronella, Danielle** et al.; High Tech Campus 45, 5656 AE Eindhoven (NL).

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Declarations under Rule 4.17:

— *as to applicant's entitlement to apply for and be granted a patent (Rule 4.17(ii))*

[Continued on next page]

(54) Title: DYNAMIC LIGHT EFFECT BASED ON AN IMAGE

(57) Abstract: A method is provided for controlling one or more lighting devices to generate a dynamic light effect based on an image. A first area in the image is selected based on first selection criteria (e.g. object recognition). Within this first area, a sequence of sub-areas (260, 262, 264) are selected based on second selection criteria (e.g. zooming in to a recognized object). Color values are extracted from each sub-area and the one or more lighting devices are controlled based on the extracted color values.

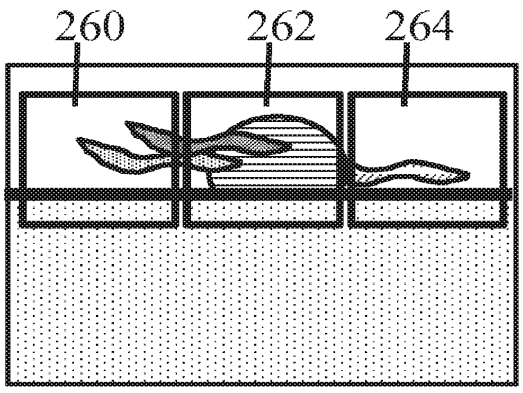


Fig. 2c

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— *with international search report (Art. 21(3))*

Dynamic light effect based on an image

FIELD OF THE INVENTION

The invention generally relates to a method of controlling a lighting device, and more specifically to a method for generating a dynamic light effect. The invention further relates to a computer program product for performing the method.

BACKGROUND OF THE INVENTION

Modern lighting devices offer advanced control features, such as color control and dim level control. Output of a lighting device can be controlled through a user interface, for example, an application on a smart phone. Current user interfaces allow individual control of lighting devices, such as picking individual colors based on which the light output of a lighting device is controlled. The light output can be static or dynamic (i.e. changing over time). Especially when a dynamic light effect is required, it is tedious for a user to select a large number of colors to provide input for such an effect. There is a need for a simplified and intuitive control option for generating a dynamic light effect.

SUMMARY OF THE INVENTION

The inventors have realized that controlling a lighting device based on an image provides intuitive control to a user. Methods known in the state of the art, requiring a user to pick a sequence of colors in an image (e.g. using a color picker) are burdensome for the user when applied to generating a dynamic light effect. An automated method in which fully random colors in an image are picked can provide undesirable light effects. The method proposed by the inventors offers intuitive control based on an image (e.g. a single, static image), yet also simplified control.

In a first aspect, a method of controlling a lighting device to generate a dynamic light effect is provided. The method comprises: receiving an image; selecting a first area in the received image based on first selection criteria; selecting a sequence of sub-areas in the first area based on second selection criteria; extracting a set of color values, each color value extracted from a sub-area in the sequence of sub-areas; and controlling the lighting device based on the extracted set of color values to render a dynamic light effect. The image

can be displayed to a user via a user interface, for example: if the user has to select an image, the same interface in which a user selects the image can display the image; the image can be shown through a wall panel, smart phone or other device when the image is selected automatically or selected by the user.

To create a dynamic light effect, the lighting device is controlled to emit light of a first color from the set of colors and subsequently of a second color from the set of colors, and so on. The dynamic light effect can loop (i.e. emit a first color, a second color, .., a Nth color; and start again from the first color) or bounce (i.e. emit a first color, a second color, …, a Nth color and traverse back via N-1, N-2, …, to the first color), such that a single dynamic light effect is rendered multiple times. The dynamic light effect can comprise transitions, such as a transition from a first color to a second color, each comprised in the set of colors, through a third color, not necessarily comprised in the set of colors.

The sub-areas in the sequence of sub-areas can be overlapping, for example to support smooth transitions in a dynamic light effect, or non-overlapping. As part of extracting color values from a sub-area, the color values extracted from one or more other sub-areas in the sequence of sub-areas can be taken into account. For example, color values can be extracted that are similar in hue and/or brightness to the ones already part of the set of color values.

The extracted colors can be rendered in a particular order, such as in the same order as the sub-areas in the sequence of sub-areas from which the colors have been extracted. The sequence of the sub-areas then determines the order of the colors in the set of colors. The set of colors is thus, in this example, an ordered set of colors and the dynamic light effect is generated based on the ordered set of colors, such that at least a part of the dynamic light effect comprises rendering colors, by a lighting device, in a sequence following the sequence of the sub-areas from which the colors have been extracted. The color(s) extracted from a first sub-area would then be rendered first, those from a second sub-area would then be rendered second and those from a third sub-area would then be rendered last, or vice-versa.

In an embodiment of the method according to the first aspect, selecting the first area in the received image based on the first selection criteria comprises: detecting a focal point in the received image; and selecting as the first area an area in the received image comprising the detected focal point. This is beneficial as it allows automatic selection of the first area to support further ease of use for a user. As an example, the selection can be

performed without user intervention, or the user can be presented multiple first areas, each based on a focal point or other criteria, to select from.

In another embodiment of the method according to the first aspect, selecting the first area in the received image based on the first selection criteria comprises: determining a color homogeneity of each of a plurality of areas in the received image; and selecting one of the plurality of areas as the first area based on the determined color homogeneity of the one of the plurality of areas. This allows, for example, to detect an area in the received image made up of a color set that is more homogenous than the color set that the remainder of the image outside the area is made up out of; and selecting this area as the first area. This is advantageous as it allows a color, and indirectly possibly also an object, that is visually dominant in the image to be selected. A dynamic light effect based on this principle of selection of the first area can be highly recognizable by a user as being related to the image.

In yet another embodiment of the method according to the invention, selecting the first area in the received image based on the first selection criteria comprises: detecting an object in the received image; and selecting as the first area an area comprising the detected object. The detected object can be one of a set of natural phenomena, the set of natural phenomena comprising: a fire, a cloud, a body of water, a waterfall, and a heavenly body. Detecting a salient feature and computer vision methods supporting such are known to the person skilled in the art. Applying object selection to perform the selection of the first area is beneficial as it enables further automated creation of the dynamic light effect requiring even less user intervention, while resulting in a generated light effect that matches a user's expectations based on the received image.

In an especially advantageous embodiment of the method according to the first aspect, receiving the image comprises a user selecting the image from a set of images. For example, the user can select an image from an image library of images (s)he has taken, the user can take an image with a camera integrated into a smart phone executing the method, the user can download an image from a remote service, etc.

In yet further embodiments of the method according to the invention, selecting the sequence of sub-areas in the first area based on the second selection criteria comprises: determining a path in the first area in the received image; and selecting the sequence of sub-areas in the first area along the determined path. The determined path can run parallel to an axis of the received image. Determining the path in the first area of the received image can comprise: detecting one or more objects in the first area of the received image, such that the path crosses at least one of the one or more detected objects. As another example, the path in

the first area of the received image can be selected by a user. For example, a user can draw a line om the received image as displayed in a user interface, such as through a touch screen of a smart phone.

In an especially beneficial embodiment of the method according to the first aspect, the sub-areas in the sequence of sub-areas in the first area are of different sizes. As an example, the sub-areas in the sequence of sub-areas can be of an increasingly smaller size. This creates a zoom effect, whereby, for example, when a first area is selected based on object recognition, the object is zoomed in on. Other options comprise zooming out of an object, panning across an image to an object and then zooming in or out, etc.

In an embodiment of the method according to the first aspect, extracting a color value from a sub-area in the sequence of sub-areas comprises: extracting a dominant color value. This increases the likelihood of a user recognizing the dynamic light effect as being related to the image the user has seen on which the effect is based. The dominant colors are highly recognizable in both the image and the light effect.

In a further embodiment of the method according to the first aspect, the method further comprises: determining a particular order of the extracted color values based on at least one of: hue, saturation and brightness of the extracted color values, such that the one or more lighting devices are controlled based on the determined order of extracted color values. This allows the dynamic light effect to be rendered such that colors of the same hue are rendered in sequence (or out of sequence). An examplary use of such is a dynamic effect wherein the light level dims up as the various colors are rendered.

In a second aspect, a computer program product is provided for performing the method according to the first aspect and any of its embodiments. Such a computer program product can reside on a smart phone, tablet, wall panel or other device as an application. As a further example, the computer program product can be made downloadable through an application store accessible to the smart device. The computer program product can run on a single device, such as a single smart phone, or across multiple devices. For example, user input can be acquired through a user interface on a smart device, whereas image processing steps are performed on a server. As yet another example, control commands to control the one or more lighting devices to generate the dynamic light effect can be sent from the smart device or from a controller, such as a bridge device, arranged for controlling the one or more lighting devices.

These and other aspects of the invention will be apparent from and elucidated with reference to the embodiments described hereinafter.

BRIEF DESCRIPTION OF THE DRAWINGS

In the drawings:

Fig. 1 shows schematically and exemplarily a method of controlling one or more lighting devices to generate a dynamic light effect based on an image,

Figs. 2a, 2b, 2c and 2d show schematically and exemplarily respectively an image, selection of a first area in the image, selection of a sequence of sub-areas in the first area of the image, and extraction of color values from the sequence of sub-areas,

Figs. 3a and 3b show schematically and exemplarily determination of a path in a first area in an image and selection of a sequence of sub-areas in the first area along the determined path, and

Fig. 4 shows schematically and exemplarily a selection of a sequence of sub-areas in a first area of an image to zoom in on an object in the image.

DETAILED DESCRIPTION OF EMBODIMENTS

Fig. 1 shows an embodiment of a method 100 of controlling one or more lighting devices to generate a dynamic light effect. The method 100 comprising: receiving 110 an image; selecting a first area 120 in the received image based on first selection criteria; selecting a sequence of sub-areas 130 in the first area based on second selection criteria; extracting at least one color value 140 from each sub-area in the sequence of sub-areas; and controlling 150 the one or more lighting devices based on the extracted color values.

The number of sub-areas in the sequence of sub-areas, the size of the sub-areas and the number of colors extracted from each sub-area can depend on the desired length and variation of the light scene. These can, for example, be user selectable, predetermined or dependent on the received image or selection of the first area. An intelligent system can be capable of generating a dynamic light scene based on a few inputs. For example, two colors are provided and intermediate colors are determined. In another implementation of the method, the colors rendered are those comprised in the color set only and a system executing the method does not need to be arranged to create, for example, transitions between colors. If a system executing the method has more intelligence (e.g. processing power) to generate variations based on a limited number of sub-areas, as an example only, two or three sub-areas could suffice. A larger number, such as over ten sub-areas, would help to realize some more natural variation in the scene or can be used with a system having less intelligence.

Sub-areas can be overlapping or non-overlapping. Again, the amount of overlap can be user selectable, predetermined or dependent on the received image or selection of the first area. Selecting overlapping sub-areas can help to create smooth transitions. For example, if a user wants to have calm dynamics, subsequent sub-areas in the sequence of sub-areas can largely overlap (e.g. for a shifting window, only move a few percent along one sub-area axis such that sub-areas almost fully overlap) whereas if more vivid dynamics are desired, subsequent sub-areas can have a small overlap (e.g. 50% overlap or less).

The sequence of sub-areas can be selected based on a path. Such a path can be provided by a user, for example, by providing (touch) input via a user interface to indicate the path in the first area of the image. As an example, path input can be received from a user first; such that the first area is selected based on the sub-areas selected along the path. Further examples of determining a path are: using object detection such that a path can be determined that crosses and/or avoids certain objects or features in the image; or zooming into or out of an object in the image. As a simple example, a path can be determined by detecting a (substantially) linear element in the image, or by taking an axis of the image as a basis for determining a path. Linear elements in an image, such as a horizon, can be recognized using image analysis or an assumption can be made that a horizon is a horizontal line in an image between two areas of different (sets of) colors. The latter allows the path to simply run parallel along an image axis.

Fig. 2a shows a static image 200 of a sky 205 and body of water 210 with, along the horizon 215, a setting sun 220. The sky 205 comprises clouds 225, 230, 240. In Fig. 2b a selection of a first area 250 in the image is shown. Fig. 2c shows the selection of a sequence of sub-areas 260, 262, 264 in the first area. Fig. 2d shows three sets of colors 270, 280, 290 extracted from the sub-areas 260, 262, 264 respectively. The first set of colors 270 comprises the color 272 of cloud 225, the color 274 of the body of water 210, and the color 276 of cloud 230. The second set of colors 280 comprises the color 282 of the sun 220, the color 284 of the body of water 210, and the color 286 of cloud 230. The third set of colors 290 comprises the color 292 of the sky 205, the color 294 of cloud 240, and the color 296 of the body of water 210. As an example, a lighting system (not shown) comprising three lighting devices can be controlled to generate a dynamic lighting effect based on the three sets of colors 270, 280, 290. A first lighting device in the system can first emit light of color 272, then of color 282 and finally of color 292; similarly a second lighting devices emits a sequence of colors 274, 284, 294; and a third lighting device emits a sequence of colors 276,

286, 296. Other options for the dynamic light effect are for all three lighting devices to render the same colors synchronously (e.g. to create a more intense effect) or non-synchronously (e.g. to simulate clouds moving). The colors may be rendered in a particular order, for example colors from the same sub-area are rendered in a random sequence, yet a lighting device first renders the colors extracted from the first sub-area 260, and only then from the next sub-areas 262, 264 in sequence.

Fig. 3a shows an image 200 in which a first area 250 has been selected. A path 300 has been determined in the first area 250. The path can be determined based on an axis of the image (e.g. to horizontally cross the image), on object recognition (e.g. to encircle a recognized object), on a user providing the path as input, or on other criteria. In Fig. 3b, a sequence of sub-areas 310 has been plotted along the path 300. The set of colors can then be extracted from these sub-areas, and the dynamic light effect can be rendered.

Fig. 4 shows an image 400 comprising an object 410 (e.g. a log fire, the object set against a beach background). Using image processing the object (i.e. the log fire, continuing the example) can be recognized as an area of interest and/or a salient feature in the image. For example, image processing can determine that the object 410 is a focal point in the image (e.g. the object 410 being in-focus and the remainder of the image, the beach background, being out-of-focus). As a further example, image processing can identify the object 410 and based on this determine that it should form the basis in the image 400 for generating a dynamic light effect. A first area 420 in the image 400 is selected, the first area 420 comprising the object 410. A sequence of sub-areas 430, 440 within the first area 420 is selected. In this example, sub-areas 430, 440 in the sequence are of increasingly smaller dimensions. Further, in this example, sub-area 440 is fully comprised in sub-area 430 and sub-area 430 is fully comprised in first area 420. This creates a zoom-effect, wherein the colors extracted to create the dynamic light effect are increasingly determined by the colors present in the object 410. The zoom effect can be based on the aforementioned image processing, such that a recognized object is zoomed in on for example. Another option is for a user to zoom into (an object in) the image, for example by performing a zoom gesture (e.g. pinch) on a touch screen.

The method can be executed by a computer program product, such as an application for a smart phone or an embedded software component on a controller for a lighting system. Selection of the first area, the sequence of sub-areas and performing the extraction of the color values can, for example, comprise a fully automatic process, or it can be made dependent on user input or user confirmation. The extracted color values can,

continuing the example, be presented to a user in a user interface, for example, alongside the image from which they are extracted.

The order in which colors are rendered by a lighting device or presented in a user interface can be determined such that there is minimal perceptual difference between subsequent colors. This produces a visually pleasant palette or gradient. If the perceptual difference between individual colors is defined as a cost, then an algorithm for sorting the palette is searching for a palette order such that total cost is minimum over the complete set of colors. For a linear gradient presented through a user interface or for rendering colors in sequence by a lighting device, the cost function can be defined as: Difference[1-2] + Difference [2-3] +…+ Difference [N-1 – N]. Wherein each number (1, 2, ..., N) is a color from the set of colors. When presenting a gradient in a user interface not in a linear fashion but radially, the cost function is: Difference [1-2] + Difference [2-3] +…+ Difference [N-1 – N] + Difference [N – 1]. For linear visualization, the difference between first and the last color in the palette is not relevant, while it has to be taken into account for radial palettes. As such, the most distant colors will most likely occur at the ends of the linear palette.

The perceptual difference between individual colors, as used in these cost functions, can be calculated with standard 'dE' functions (i.e. International Commission on Illumination's delta Empfindung metric) of various color spaces. The best results can be obtained with perceptually linear color spaces like CIELAB, CIELUV or CIECAM02. Optional further steps can be executed for linear ordering of the colors. For example, more dominant and more frequently occurring colors can be shown first (e.g. on the left in a horizontal gradient in a user interface).

The (ordered) colors can be turned into a gradient using standard gradient functions. For example, a function provided by the operating system of a smart phone on which the method is executed. If no gradient function is supported, as a further example, linear interpolation can be used.

When there are multiple lighting devices, colors can be assigned to individual lighting devices or each lighting device can render the same color(s). When lighting devices render different colors, the following is an example to illustrate how colors can be assigned to lighting devices. A first color for the first lighting device is picked (e.g. randomly or based on the ordered colors). The picked color can then be excluded from the color set and for the next lighting device a new color can be picked from the color set. This process can be repeated until all lighting devices (or light sources in a luminaire) have a color assigned. Alternatively, instead of randomly picking colors for the additional light sources, the adjacent colors of the

color palette can be picked. This could have the advantage of creating a smooth color gradient in a space or on a luminaire with multiple light sources. Examples of other rules that can be applied to assign a color to a lighting device are: choosing a complementary color, choosing an opposite color, etc. Assigning colors to lighting devices can be applied to a group of lighting devices instead of a single lighting device or luminaire, e.g. multiple lighting devices in close proximity can be grouped together. As a further example, the calculated weight of dominant colors can be mapped to lighting devices according to the prominence of the light effect generated by each lighting device. For instance, for each lighting device an effect contribution factor may be determined based on the lighting device's position, type, number of lighting nodes, typical lumen output, etc. Colors that are more dominant in the palette, in the set of colors or in the (first area or sub-area) in the image can be assigned to lighting devices that have a large contribution factor.

While the invention has been illustrated and described in detail in the drawings and foregoing description, such illustration and description are to be considered illustrative or exemplary and not restrictive; the invention is not limited to the disclosed embodiments. Other variations to the disclosed embodiments can be understood and effected by those skilled in the art in practicing the claimed invention, from a study of the drawings, the disclosure, and the appended claims. In the claims, the word "comprising" does not exclude other elements or steps, and the indefinite article "a" or "an" does not exclude a plurality. The mere fact that certain measures are recited in mutually different dependent claims does not indicate that a combination of these measures cannot be used to advantage. Any reference signs in the claims should not be construed as limiting the scope.

CLAIMS:

1. A method of controlling a lighting device to generate a dynamic light effect, the method comprising:
- receiving an image,
- selecting a first area in the received image based on first selection criteria,
- selecting a sequence of sub-areas in the first area based on second selection criteria,
- extracting a set of color values, each color value extracted from a sub-area in the sequence of sub-areas; and
- controlling the lighting device based on the extracted set of color values to render a dynamic light effect,
wherein selecting the first area in the received image based on the first selection criteria comprises:
- detecting a focal point in the received image; and
- selecting as the first area an area in the received image comprising the detected focal point.

2. The method according to claim 1, wherein selecting the first area in the received image based on the first selection criteria comprises:
- determining a color homogeneity of each of a plurality of areas in the received image; and
- selecting one of the plurality of areas as the first area based on the determined color homogeneity of the one of the plurality of areas.

3. The method according to claim 1, wherein selecting the first area in the received image based on the first selection criteria comprises:
- detecting an object in the received image; and
- selecting as the first area an area comprising the detected object.

4. The method according to claim 3, wherein the detected object is one of a set of natural phenomena, the set of natural phenomena comprising: a fire, a cloud, a body of water, a waterfall, and a heavenly body.

5. The method according to any one of the preceding claims, wherein receiving the image comprises a user selecting the image from a set of images.

6. The method according to any one of the preceding claims, wherein selecting the sequence of sub-areas in the first area based on the second selection criteria comprises:

- determining a path in the first area in the received image; and
- selecting the sequence of sub-areas in the first area along the determined path.

7. The method according to claim 6, wherein the determined path runs parallel to an axis of the received image.

8. The method according to claim 6, wherein determining the path in the first area of the received image comprises:

- detecting one or more objects in the first area of the received image, and

wherein the path crosses at least one of the one or more detected objects.

9. The method according to claim 6, wherein the path in the first area of the received image is selected by a user.

10. The method according to any one of the preceding claims, wherein the sub-areas in the sequence of sub-areas in the first area are of different sizes.

11. The method according to claim 10, wherein the sub-areas in the sequence of sub-areas are of an increasingly smaller size.

12. The method according to any one of the preceding claims, wherein extracting a color value from a sub-area in the sequence of sub-areas comprises:

- extracting a dominant color value of the sub-area.

13. The method according to any one of the preceding claims, the method further comprising:

- determining a particular order of the extracted color values based on at least one of: hue, saturation and brightness of the extracted color values, such that the one or more lighting devices are controlled based on the determined order of extracted color values.

14. A computer program product arranged for performing the method according to any one of the preceding claims when run on a computer device.

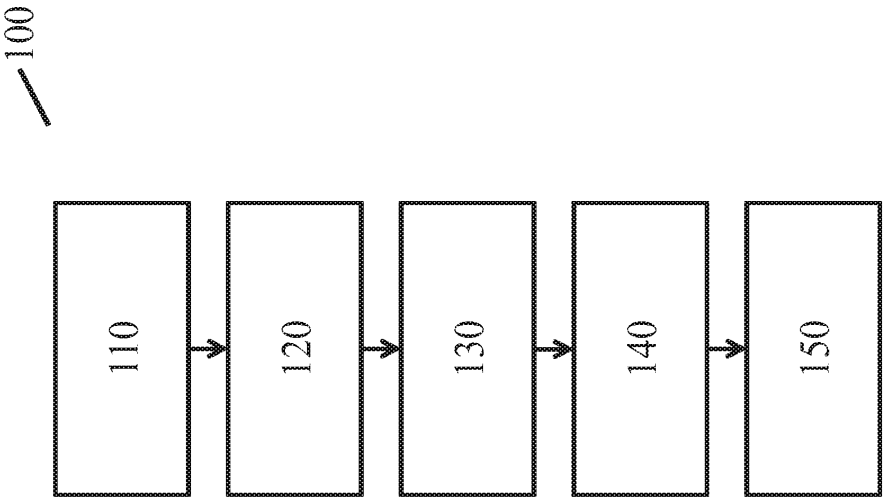


Fig. 1

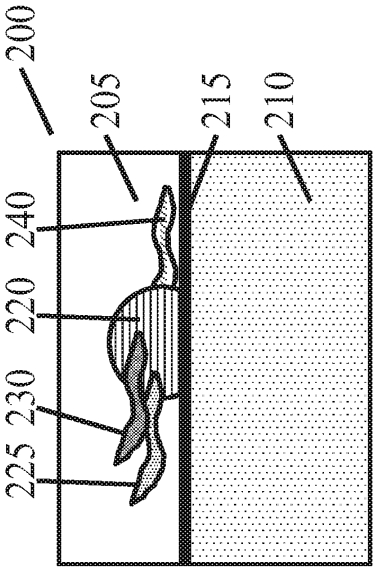


Fig. 2a

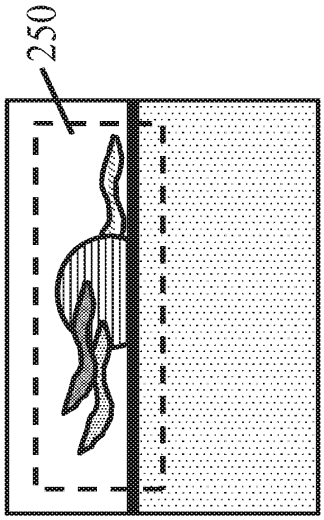


Fig. 2b

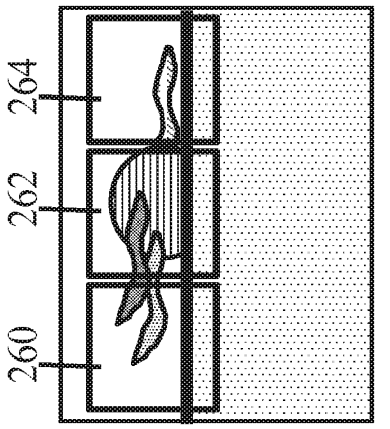


Fig. 2c

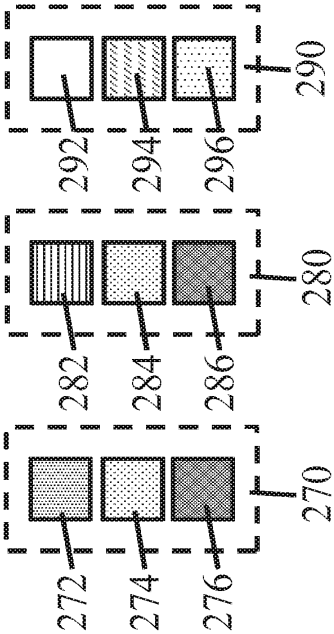
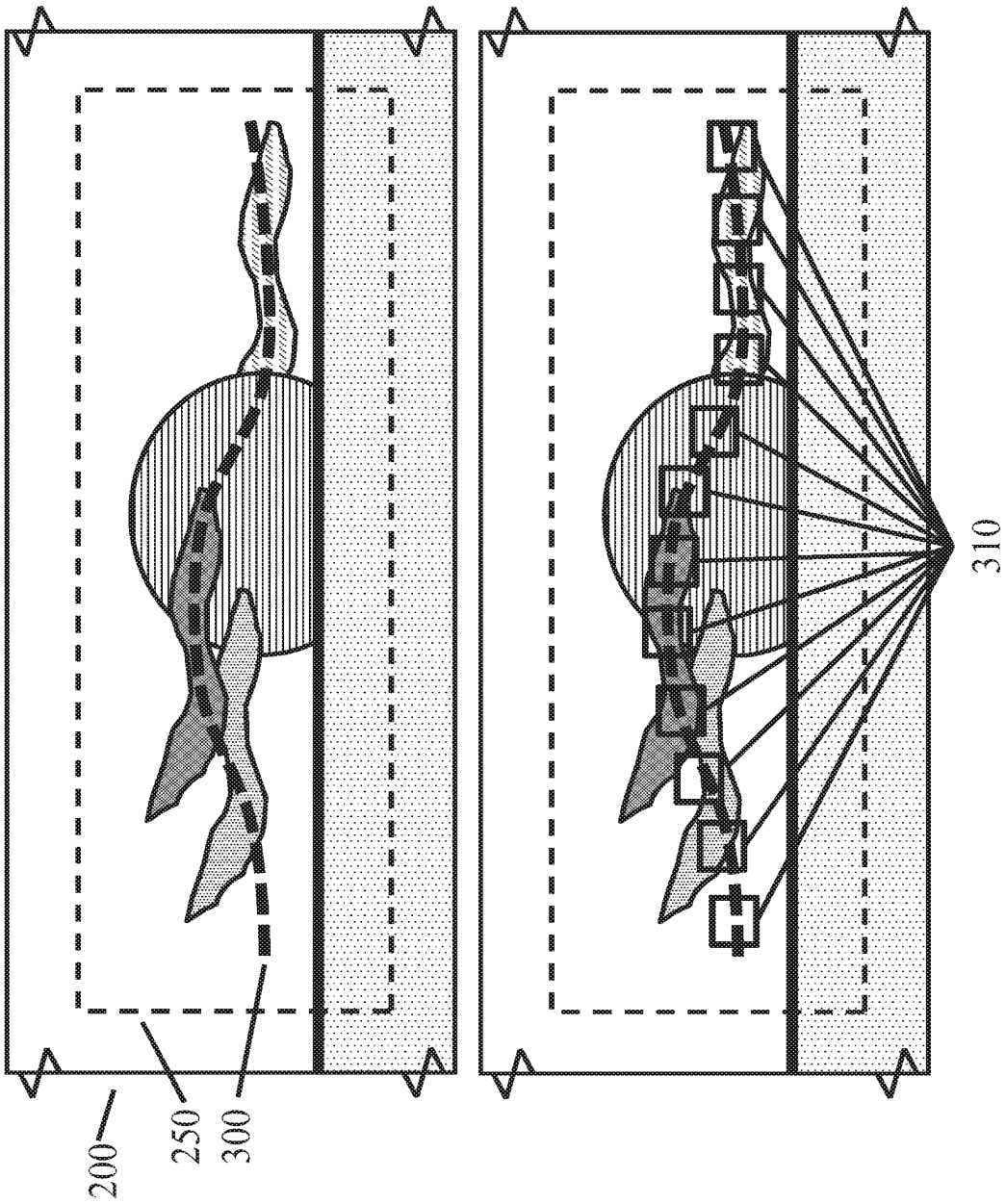


Fig. 2d

Fig. 3a

Fig. 3b



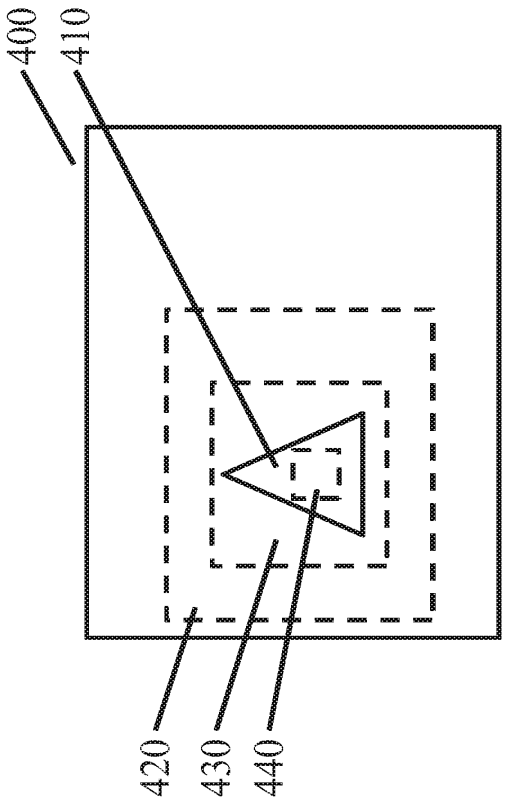


Fig. 4

INTERNATIONAL SEARCH REPORT

International application No
PCT/EP2016/079847

A. CLASSIFICATION OF SUBJECT MATTER
INV. H05B37/02 H05B33/08
ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
H05B

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
EPO-Internal, WPI Data

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 2 120 512 A1 (KONINKL PHILIPS ELECTRONICS NV [NL]) 18 November 2009 (2009-11-18)	1,3-5, 7-14
Y	the whole document	2,6
X	WO 2011/124933 A1 (NATUREN KFT [HU]; BERKES BALAZS [HU]; FERENCZ ANDRAS [HU]) 13 October 2011 (2011-10-13)	1,14
Y	the whole document page 10, line 20 - line 26	2,6

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier application or patent but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
21 February 2017	28/02/2017

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Fax: (+31-70) 340-3016	Burchielli, M

1

Form PCT/ISA/210 (second sheet) (April 2005)

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/EP2016/079847

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP 2120512 A1	18-11-2009	CN 102027806 A	20-04-2011
		EP 2120512 A1	18-11-2009
		EP 2274959 A1	19-01-2011
		JP 5592878 B2	17-09-2014
		JP 2011521412 A	21-07-2011
		KR 20110013471 A	09-02-2011
		RU 2010150817 A	20-06-2012
		TW 201001115 A	01-01-2010
		US 2011057582 A1	10-03-2011
		WO 2009138935 A1	19-11-2009
WO 2011124933 A1	13-10-2011	NONE	

Form PCT/ISA/210 (patent family annex) (April 2005)

Electronic Patent Application Fee Transmittal	
Application Number:	15820469
Filing Date:	22-Nov-2017
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Filer:	Martin Dennis Moynihan/Benjamin Frohlinger
Attorney Docket Number:	70945

Filed as Small Entity

Filing Fees for Utility under 35 USC 111(a)

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
SUBMISSION- INFORMATION DISCLOSURE STMT	2806	1	120	120
		Total in USD ($)		**120**

Electronic Acknowledgement Receipt	
EFS ID:	33312068
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan/Benjamin Frohlinger
Filer Authorized By:	Martin Dennis Moynihan
Attorney Docket Number:	70945
Receipt Date:	30-JUL-2018
Filing Date:	22-NOV-2017
Time Stamp:	08:25:42
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$120
RAM confirmation Number	073018INTEFSW00007874501407
Deposit Account	
Authorized User	
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows:	

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	_USPTOltr.pdf	24124 1ea30b002aa3070b04218ce1e3f455af32c9fe1a	no	3
Warnings:					
Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	_form1449.pdf	45124 b65cb89359f24274efa5270650c9131a891d8306	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Foreign Reference	7-298091.pdf	1654556 3ab7f78fd7265f22836d923ba471c0a1456a4291	no	21
Warnings:					
Information:					
4	Foreign Reference	8-298092.pdf	875610 2ecd72f9e30695bb59c600f7de303b5f1013a44c	no	15
Warnings:					
Information:					
5	Foreign Reference	9-298093.pdf	781271 9becafa5cb2e7cca5e84809465f8381f00ecab68	no	18
Warnings:					
Information:					
6	Foreign Reference	10-298097.pdf	647881 cc57c2d0fda8fa0996f46315f496e85e3030a9e0	no	12
Warnings:					

Information:					
7	Foreign Reference	11-298094.pdf	448652 b27fd079819c708b99fa992d69fd54f735a5a67b	no	14
Warnings:					
Information:					
8	Foreign Reference	12-298095.pdf	314892 f878b34666c6b867d51598967a2af2c2044b01a2	no	13
Warnings:					
Information:					
9	Foreign Reference	13-298101.pdf	2031944 7822a75e3c6383193da7e376afab8ed6df3c421e	no	20
Warnings:					
Information:					
10	Non Patent Literature	14-287950.pdf	839392 61d9465e9fb1da874f5ea3e835c489407a3eed71	no	9
Warnings:					
Information:					
11	Non Patent Literature	15-289117.pdf	1995319 2a7599ff18a906fa31fbddb09fd57c113f16d783	no	14
Warnings:					
Information:					
12	Non Patent Literature	16-289561.pdf	2255802 97c0bff0567268a753b2f850561be9e3158a3b5a	no	17
Warnings:					
Information:					
13	Non Patent Literature	17-298096.pdf	14905749 70cd16f8b95babc669cf30c431b9bb661aa15edb	no	36
Warnings:					
Information:					

14	Fee Worksheet (SB06)	fee-info.pdf	30372 93a5b7af0790eff653021a9f08f9113d7a839745	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	26850688		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:		§	
		§	
	GAMMONS Roderick Allen et al	§	
		§	Confirmation No.: 5873
Serial No.:	15/820,469	§	
		§	
Filed:	November 22, 2017	§	Group Art Unit: 2844
		§	
For:	LIGHTING SYSTEM AND CONTROL THEREOF [CineSFX]	§	
		§	Attorney Docket: 70945
Examiner:	PHAM Thai N.	§	

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. The Examiner is requested to make these citations of official record in this application.

The undersigned states:

A. NO CERTIFICATION OR FEE DUE

☐ This Information disclosure Statement is being filed within three months of filing a national application or entry of a national phase of an international application; or before the mailing date of a first Office action on the merits of the above-identified application. Accordingly, no fee or Certification is believed due. However, if a fee is due, authorization to deduct such fee from the Deposit Account 501407 of the undersigned is hereby provided.

B. CERTIFICATION

☐ That each item of information contained in the information disclosure statement was first cited in any communication from a foreign patent office in a counterpart foreign application not more than three months prior to the filing of the information disclosure statement; or

That no item of information contained in the information disclosure statement was cited in a communication from a foreign patent office in a counterpart foreign application, and, to the knowledge of the person signing the certification after making reasonable inquiry, no item of information contained in the information disclosure statement was known to any individual designated in 37 CFR 1.56(c) more than three months prior to the filing of the information disclosure statement.

C. FEE

☒ Please charge the fee of $120 (Small Entity Status) set forth in 37 CFR 1.17(p) to Deposit Account 501407. Appropriate fee attached.

This Information Disclosure Statement under 37 CFR 1.56 is not to be construed as a representation that a search has been made, that additional matter which is material to the examination of this application does not exist, or that any one or more of the citations listed constitutes prior art as defined by 35 U.S.C. 102.

It is respectfully requested that the Examiner consider the cited information, along with any other information, in reaching a determination concerning the patentability of the present claims, and sign the enclosed form PTO-1449 to evidence that the cited information has been fully considered by the Patent and Trademark Office during the examination of this application. Notwithstanding any statements by the Applicant, the Examiner is urged to form his/her own conclusion regarding the relevance of the cited information.

FOR PATENT TERM ADJUSTMENT CALCULATION PURPOSES ONLY:

Unless indicated otherwise, to the best of our knowledge and procedures, each item of information contained in the information disclosure statement was first known no more than thirty days prior to the filing of the information disclosure statement, either by the inventor named in the application, Attorney or agent who prepares or prosecutes the application, and every other person who is substantively involved in the preparation or prosecution of the application and who is associated with the inventor, the applicant, an assignee, or anyone to whom there is an obligation to assign the application.

Respectfully submitted,

/ Martin D. Moynihan /

Martin D. Moynihan
Registration No. 40338
Telephone: (703)859-9634

Date: 27 July 2018

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

NOTICE OF ALLOWANCE AND FEE(S) DUE

67801 7590 09/26/2018

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES OF AMERICA

EXAMINER
PHAM, THAI N

ART UNIT	PAPER NUMBER
2844	

DATE MAILED: 09/26/2018

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	11/22/2017	Roderick Allen Gammons	70945	5873

TITLE OF INVENTION: LIGHTING SYSTEM AND CONTROL THEREOF

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	12/26/2018

THE APPLICATION IDENTIFIED ABOVE HAS BEEN EXAMINED AND IS ALLOWED FOR ISSUANCE AS A PATENT. PROSECUTION ON THE MERITS IS CLOSED. THIS NOTICE OF ALLOWANCE IS NOT A GRANT OF PATENT RIGHTS. THIS APPLICATION IS SUBJECT TO WITHDRAWAL FROM ISSUE AT THE INITIATIVE OF THE OFFICE OR UPON PETITION BY THE APPLICANT. SEE 37 CFR 1.313 AND MPEP 1308.

THE ISSUE FEE AND PUBLICATION FEE (IF REQUIRED) MUST BE PAID WITHIN THREE MONTHS FROM THE MAILING DATE OF THIS NOTICE OR THIS APPLICATION SHALL BE REGARDED AS ABANDONED. THIS STATUTORY PERIOD CANNOT BE EXTENDED. SEE 35 U.S.C. 151. THE ISSUE FEE DUE INDICATED ABOVE DOES NOT REFLECT A CREDIT FOR ANY PREVIOUSLY PAID ISSUE FEE IN THIS APPLICATION. IF AN ISSUE FEE HAS PREVIOUSLY BEEN PAID IN THIS APPLICATION (AS SHOWN ABOVE), THE RETURN OF PART B OF THIS FORM WILL BE CONSIDERED A REQUEST TO REAPPLY THE PREVIOUSLY PAID ISSUE FEE TOWARD THE ISSUE FEE NOW DUE.

HOW TO REPLY TO THIS NOTICE:

I. Review the ENTITY STATUS shown above. If the ENTITY STATUS is shown as SMALL or MICRO, verify whether entitlement to that entity status still applies.

If the ENTITY STATUS is the same as shown above, pay the TOTAL FEE(S) DUE shown above.

If the ENTITY STATUS is changed from that shown above, on PART B - FEE(S) TRANSMITTAL, complete section number 5 titled "Change in Entity Status (from status indicated above)".

For purposes of this notice, small entity fees are 1/2 the amount of undiscounted fees, and micro entity fees are 1/2 the amount of small entity fees.

II. PART B - FEE(S) TRANSMITTAL, or its equivalent, must be completed and returned to the United States Patent and Trademark Office (USPTO) with your ISSUE FEE and PUBLICATION FEE (if required). If you are charging the fee(s) to your deposit account, section "4b" of Part B - Fee(s) Transmittal should be completed and an extra copy of the form should be submitted. If an equivalent of Part B is filed, a request to reapply a previously paid issue fee must be clearly made, and delays in processing may occur due to the difficulty in recognizing the paper as an equivalent of Part B.

III. All communications regarding this application must give the application number. Please direct all communications prior to issuance to Mail Stop ISSUE FEE unless advised to the contrary.

IMPORTANT REMINDER: Maintenance fees are due in utility patents issuing on applications filed on or after Dec. 12, 1980. It is patentee's responsibility to ensure timely payment of maintenance fees when due. More information is available at www.uspto.gov/PatentMaintenanceFees.

PTOL-85 (Rev. 02/11)

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

CURRENT CORRESPONDENCE ADDRESS (Note: Use Block 1 for any change of address)

67801 7590 09/26/2018
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES OF AMERICA

Note: A certificate of mailing can only be used for domestic mailings of the Fee(s) Transmittal. This certificate cannot be used for any other accompanying papers. Each additional paper, such as an assignment or formal drawing, must have its own certificate of mailing or transmission.

Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	11/22/2017	Roderick Allen Gammons	70945	5873

TITLE OF INVENTION: LIGHTING SYSTEM AND CONTROL THEREOF

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	12/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHAM, THAI N	2844	315-297000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ❑ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ❑ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE (B) RESIDENCE: (CITY and STATE OR COUNTRY)

Please check the appropriate assignee category or categories (will not be printed on the patent) : ❑ Individual ❑ Corporation or other private group entity ❑ Government

4a. The following fee(s) are submitted:
- ❑ Issue Fee
- ❑ Publication Fee (No small entity discount permitted)
- ❑ Advance Order - # of Copies _____

4b. Payment of Fee(s): **(Please first reapply any previously paid issue fee shown above)**
- ❑ A check is enclosed.
- ❑ Payment by credit card. Form PTO-2038 is attached.
- ❑ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number _____ (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ❑ Applicant certifying micro entity status. See 37 CFR 1.29 — NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ❑ Applicant asserting small entity status. See 37 CFR 1.27 — NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ❑ Applicant changing to regular undiscounted fee status. — NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature _____ Date _____

Typed or printed name _____ Registration No. _____

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Offic COMMERCE

Videndum Production Solutions, Inc. Ex. 1002
Page 602 of 657

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
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Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	11/22/2017	Roderick Allen Gammons	70945	5873

67801 7590 09/26/2018

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES OF AMERICA

EXAMINER	
PHAM, THAI N	
ART UNIT	**PAPER NUMBER**
2844	

DATE MAILED: 09/26/2018

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(Applications filed on or after May 29, 2000)

The Office has discontinued providing a Patent Term Adjustment (PTA) calculation with the Notice of Allowance.

Section 1(h)(2) of the AIA Technical Corrections Act amended 35 U.S.C. 154(b)(3)(B)(i) to eliminate the requirement that the Office provide a patent term adjustment determination with the notice of allowance. See Revisions to Patent Term Adjustment, 78 Fed. Reg. 19416, 19417 (Apr. 1, 2013). Therefore, the Office is no longer providing an initial patent term adjustment determination with the notice of allowance. The Office will continue to provide a patent term adjustment determination with the Issue Notification Letter that is mailed to applicant approximately three weeks prior to the issue date of the patent, and will include the patent term adjustment on the patent. Any request for reconsideration of the patent term adjustment determination (or reinstatement of patent term adjustment) should follow the process outlined in 37 CFR 1.705.

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Customer Service Center of the Office of Patent Publication at 1-(888)-786-0101 or (571)-272-4200.

OMB Clearance and PRA Burden Statement for PTOL-85 Part B

The Paperwork Reduction Act (PRA) of 1995 requires Federal agencies to obtain Office of Management and Budget approval before requesting most types of information from the public. When OMB approves an agency request to collect information from the public, OMB (i) provides a valid OMB Control Number and expiration date for the agency to display on the instrument that will be used to collect the information and (ii) requires the agency to inform the public about the OMB Control Number's legal significance in accordance with 5 CFR 1320.5(b).

The information collected by PTOL-85 Part B is required by 37 CFR 1.311. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, Virginia 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, Virginia 22313-1450. Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number.

Privacy Act Statement

The Privacy Act of 1974 (P.L. 93-579) requires that you be given certain information in connection with your submission of the attached form related to a patent application or patent. Accordingly, pursuant to the requirements of the Act, please be advised that: (1) the general authority for the collection of this information is 35 U.S.C. 2(b)(2); (2) furnishing of the information solicited is voluntary; and (3) the principal purpose for which the information is used by the U.S. Patent and Trademark Office is to process and/or examine your submission related to a patent application or patent. If you do not furnish the requested information, the U.S. Patent and Trademark Office may not be able to process and/or examine your submission, which may result in termination of proceedings or abandonment of the application or expiration of the patent.

The information provided by you in this form will be subject to the following routine uses:

1. The information on this form will be treated confidentially to the extent allowed under the Freedom of Information Act (5 U.S.C. 552) and the Privacy Act (5 U.S.C 552a). Records from this system of records may be disclosed to the Department of Justice to determine whether disclosure of these records is required by the Freedom of Information Act.
2. A record from this system of records may be disclosed, as a routine use, in the course of presenting evidence to a court, magistrate, or administrative tribunal, including disclosures to opposing counsel in the course of settlement negotiations.
3. A record in this system of records may be disclosed, as a routine use, to a Member of Congress submitting a request involving an individual, to whom the record pertains, when the individual has requested assistance from the Member with respect to the subject matter of the record.
4. A record in this system of records may be disclosed, as a routine use, to a contractor of the Agency having need for the information in order to perform a contract. Recipients of information shall be required to comply with the requirements of the Privacy Act of 1974, as amended, pursuant to 5 U.S.C. 552a(m).
5. A record related to an International Application filed under the Patent Cooperation Treaty in this system of records may be disclosed, as a routine use, to the International Bureau of the World Intellectual Property Organization, pursuant to the Patent Cooperation Treaty.
6. A record in this system of records may be disclosed, as a routine use, to another federal agency for purposes of National Security review (35 U.S.C. 181) and for review pursuant to the Atomic Energy Act (42 U.S.C. 218(c)).
7. A record from this system of records may be disclosed, as a routine use, to the Administrator, General Services, or his/her designee, during an inspection of records conducted by GSA as part of that agency's responsibility to recommend improvements in records management practices and programs, under authority of 44 U.S.C. 2904 and 2906. Such disclosure shall be made in accordance with the GSA regulations governing inspection of records for this purpose, and any other relevant (i.e., GSA or Commerce) directive. Such disclosure shall not be used to make determinations about individuals.
8. A record from this system of records may be disclosed, as a routine use, to the public after either publication of the application pursuant to 35 U.S.C. 122(b) or issuance of a patent pursuant to 35 U.S.C. 151. Further, a record may be disclosed, subject to the limitations of 37 CFR 1.14, as a routine use, to the public if the record was filed in an application which became abandoned or in which the proceedings were terminated and which application is referenced by either a published application, an application open to public inspection or an issued patent.
9. A record from this system of records may be disclosed, as a routine use, to a Federal, State, or local law enforcement agency, if the USPTO becomes aware of a violation or potential violation of law or regulation.

Notice of Allowability	Application No. 15/820,469	Applicant(s) GAMMONS ET AL.	
	Examiner THAI PHAM	Art Unit 2844	AIA (First Inventor to File) Status Yes

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *amendment submitted on 07/10/2018*.
   ☐ A declaration(s)/affidavit(s) under **37 CFR 1.130(b)** was/were filed on_____.
2. ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on _____; the restriction requirement and election have been incorporated into this action.
3. ☒ The allowed claim(s) is/are *1-21*. As a result of the allowed claim(s), you may be eligible to benefit from the **Patent Prosecution Highway** program at a participating intellectual property office for the corresponding application. For more information, please see http://www.uspto.gov/patents/init_events/pph/index.jsp or send an inquiry to PPHfeedback@uspto.gov.
4. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

   Certified copies:

   a) ☒ All b) ☐ Some *c) ☐ None of the:
   1. ☒ Certified copies of the priority documents have been received.
   2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
   3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☒ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date 07/30/2018
3. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
4. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
5. ☐ Examiner's Amendment/Comment
6. ☒ Examiner's Statement of Reasons for Allowance
7. ☐ Other _____.

/THAI PHAM/
Primary Examiner, Art Unit 2844

The present application, filed on or after March 16, 2013, is being examined under the first inventor to file provisions of the AIA.

DETAILED ACTION

This Office Action is responsive to the applicant's amendment submitted on 06/28/2018. Claims 1-20 have been amended. Claim 21 is newly added. The specification has amended to fix some minor informalities. The drawings have been amended to clarify the claim languages. Thus, claims 1-21 are currently pending in the instant application.

Information Disclosure Statement

1. The information disclosure statements (IDSs) submitted on 07/30/2018 is in compliance with the provisions of 37 CFR 1.97. Accordingly, the information disclosure statements have been considered by the examiner.

Allowable Subject Matter

2. Claims 1-21 are allowed.

3. The following is an examiner's statement of reasons for allowance. The prior art fails to teach or fairly suggest combination of elements recited in independent claims 1, 15 and 20 including:

"an effect simulator adapted to calculate a time varying lighting value based on at least one simulation parameter; wherein said at least one simulation parameter characterises a user customisable lighting effect selected from a range of different user customisable lighting effects for at least one of: videography, broadcasting, cinematography, studio filming, and location filming; wherein the at least one simulation

parameter is at least one of: a random brightness, a random duration; and a random interval; said simulation parameter depending on the user customisable lighting effect being simulated; and wherein an output of the effect simulator is adapted to control a lighting device according to the calculated variation of lighting over time."

Comparing to the prior art of the record, because none of the prior art references of the record, either stand alone or in combination, has taught or suggest the above mentioned features in combination with other limitations recited in the claims above. Therefore, the claims seemed patentable over the prior of record.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to THAI PHAM whose telephone number is (571)270-5518. The examiner can normally be reached on 5/4/9 M-F 9:00 AM - 6:30PM.

Examiner interviews are available via telephone, in-person, and video conferencing using a USPTO supplied web-based collaboration tool. To schedule an interview, applicant is encouraged to use the USPTO Automated Interview Request (AIR) at http://www.uspto.gov/interviewpractice.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglas Owens can be reached on (571)272-1662. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/THAI PHAM/
Primary Examiner, Art Unit 2844
09/17/2018

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	**Art Unit**
	THAI PHAM	2844

CPC							
Symbol						**Type**	**Version**
F21V		23	/	003		F	2013-01-01
H05B		37	/	029		I	2013-01-01
H05B		37	/	0272		I	2013-01-01
H05B		37	/	0254		I	2013-01-01
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CPC Combination Sets							
Symbol					**Type**	**Set**	**Ranking**	**Version**
			/					
			/					

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	21	
/THAI PHAM/ Primary Examiner.Art Unit 2844	09/17/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	**Art Unit**
	THAI PHAM	2844

US ORIGINAL CLASSIFICATION		INTERNATIONAL CLASSIFICATION										
CLASS	SUBCLASS	CLAIMED					NON-CLAIMED					
		F	2	1	V	23 / 00 (2015.01.01)						
CROSS REFERENCE(S)		H	0	5	B	37 / 02 (2006.01.01)						
CLASS	SUBCLASS (ONE SUBCLASS PER BLOCK)											

NONE		Total Claims Allowed:	
(Assistant Examiner)	(Date)	21	
/THAI PHAM/ Primary Examiner.Art Unit 2844	09/17/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Issue Classification	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	**Art Unit**
	THAI PHAM	2844

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original	Final	Original
1	1	17	17												
2	2	18	18												
3	3	19	19												
4	4	20	20												
5	5	21	21												
6	6														
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9	9														
10	10														
11	11														
12	12														
13	13														
14	14														
15	15														
16	16														

NONE		**Total Claims Allowed:**	
(Assistant Examiner)	(Date)	21	
/THAI PHAM/ Primary Examiner.Art Unit 2844	09/17/2018	O.G. Print Claim(s)	O.G. Print Figure
(Primary Examiner)	(Date)	1	2

Search Notes	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	Art Unit
	THAI PHAM	2844

CPC- SEARCHED		
Symbol	Date	Examiner
H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003	3/3/2018	TP
Same as above	9/17/2018	TP

CPC COMBINATION SETS - SEARCHED		
Symbol	Date	Examiner

US CLASSIFICATION SEARCHED			
Class	Subclass	Date	Examiner

* See search history printout included with this form or the SEARCH NOTES box below to determine the scope of the search.

SEARCH NOTES		
Search Notes	Date	Examiner
CPC search, Text search, Inventor name search, Assignment data search, backward and forward search	3/3/2018	TP
Looked at IDS	3/3/2018	TP
Looked at PCT and ISA search report	3/3/2018	TP
Updated East search	9/17/2018	TP
Looked at IDS	9/17/2018	TP
Did the interference search	9/17/2018	TP

INTERFERENCE SEARCH			
US Class/ CPC Symbol	US Subclass / CPC Group	Date	Examiner

INTERFERENCE SEARCH			
US Class/ CPC Symbol	**US Subclass / CPC Group**	**Date**	**Examiner**
H05B	37/02, 37/0272, 37/029, 37/0281, 33/08, 33/0842	9/17/2018	TP
F21V	23/00, 23/003	9/17/2018	TP

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BIB DATA SHEET

CONFIRMATION NO. 5873

SERIAL NUMBER	FILING or 371(c) DATE RULE	CLASS	GROUP ART UNIT	ATTORNEY DOCKET NO.
15/820,469	11/22/2017	315	2844	70945

APPLICANTS
Rotolight Limited, London, UNITED KINGDOM;

INVENTORS
Roderick Allen Gammons, Staines Upon Thames, UNITED KINGDOM;
Andrew Francis, Witham, UNITED KINGDOM;
Roderick Aaron Gammons, Winkfield, UNITED KINGDOM;

**** CONTINUING DATA **************************
This application is a CON of 15/481,460 04/07/2017
which claims benefit of 62/319,809 04/08/2016

**** FOREIGN APPLICATIONS **************************
UNITED KINGDOM 1606907.2 04/20/2016

**** IF REQUIRED, FOREIGN FILING LICENSE GRANTED **** ** SMALL ENTITY **
12/27/2017

Foreign Priority claimed ☑ Yes ☐ No 35 USC 119(a-d) conditions met ☑ Yes ☐ No Verified and Acknowledged /THAI N PHAM/ Examiner's Signature	☐ Met after Allowance Initials	STATE OR COUNTRY	SHEETS DRAWINGS	TOTAL CLAIMS	INDEPENDENT CLAIMS
		UNITED KINGDOM	5	21	3

ADDRESS
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES OF AMERICA

TITLE
LIGHTING SYSTEM AND CONTROL THEREOF

FILING FEE RECEIVED	FEES: Authority has been given in Paper	☐ All Fees
780	No._____ to charge/credit DEPOSIT ACCOUNT	☐ 1.16 Fees (Filing)
	No._____ for following:	☐ 1.17 Fees (Processing Ext. of time)
		☐ 1.18 Fees (Issue)
		☐ Other _____
		☐ Credit

BIB (Rev. 05/07).

PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
U.S.Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet 1 of 2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Document Number Number-Kind Code [2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
	1	2004/0257007	23-Dec-2004	Lys et al.	
	2	2014/0139130	22-May-2014	Upton	
	3	2018/0112862	26-Apr-2018	Gammons et al.	
	4	2018/0135842	17-May-2018	Gammons et al.	
	5	7,777,427	17-Aug-2010	Stalker III	
	6	8,253,666	28-Aug-2012	Shteynberg et al.	

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Documents Country Code [3] Number [4] Kind Code [5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]
	7	CN 103090238	08-May-2013	Zheng et al.		
	8	CN 103313457	18-Sep-2013	Xing et al.		
	9	CN 103313458	18-Sep-2013	Xing et al.		
	10	CN 202841602	27-Mar-2013	Lv		
	11	EP 2120512	18-Nov-2009	Koninklijke Philips Electronics		
	12	EP 3002995	06-Apr-2016	Van de Sluis et al.		
	13	WO 2017/097741	15-Jun-2017	Van de Sluis et al.		

Examiner Signature	/Thai Pham/	Date Considered	09/17/2018

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

[6] Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGE

PTO/SB/08a (08-03)
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Group Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet	2	Of	2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	14	Official Action Dated 09 March 2018 From the US Patent and Trademark Office Re. Application No. 15/481,460. (9 pages)	
	15	Official Action Dated 22 March 2018 From the US Patent and Trademark Office Re. Application No. 15/849,793. (14 pages)	
	16	Official Action Dated 28 March 2018 From the US Patent and Trademark Office Re. Application No. 15/849,819. (17 pages)	
	17	Philips "Controlling LED Lighting: Transform Environments, Provide Confort and Security, Save Energy", Philips Color Kinetics, Product Catalog, P.1-36, 2011.	

Examiner Signature	/Thai Pham/	Date Considered	09/17/2018

[*] EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

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If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

ALL REFERENCES CONSIDERED EXCEPT WHERE LINED THROUGE

EAST Search History

EAST Search History (Prior Art)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S1	1	"15481460"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:32
S2	4	(("GAMMONS") near3 ("Roderick") near3 ("Allen")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:33
S3	378	(("FRANCIS") near3 ("Andrew")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:34
S4	3	(("GAMMONS") near3 ("Roderick") near3 ("Aaron")).INV.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:34
S5	3	S2 and S3 and S4	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:34
S6	1	(("ROTOLIGHT") near3 ("LIMITED")).AANM.	USPAT	OR	ON	2018/02/20 11:35
S8	22	("20070159347" | "20080129226" | "5307295" | "5921659" | "5924784" | "7038399" | "7353071").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:44
S9	3	("3787752").PN. OR ("7365649").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2018/02/20 11:46
S10	26	"2424525"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 11:48
S11	48723	(H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 12:23

S12	4	"20080129226"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 12:24
S13	1	"15820469"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/02/20 15:21
S14	5	"2005052751"	EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/01 18:49
S15	9	light$4 with control$4 with simulat$4 with (calculat$4 or comput$4) with random	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:39
S16	574	light$4 with control$4 with (calculat$4 or comput$4) with random	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S17	48822	(H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003).CPC.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S18	37	S17 and S16	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:41
S19	181	light$4 same control$4 same simulat$4 same (calculat$4 or comput$4) same random same (wire$1less or wifi or zigbee) same user	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/02 17:50
S21	2	"15849793"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/14 15:59
S22	12	("20070159347" | "20080129226" | "5924784" | "7038399").PN.	US-PGPUB; USPAT;	OR	ON	2018/03/15 15:42

			USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB			
S23	22	("20070159347" | "20080129226" | "5307295" | "5921659" | "5924784" | "7038399" | "7353071").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/15 15:45
S24	3	light$4 with control$4 with (calculat$4 or comput$4) with simulat$4 with (camera or piture$1) with frequen$3	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/15 15:46
S25	6	"20140139130"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/03/15 15:53
S26	5	("20070296354" | "20120069176" | "7667740" | "8218068" | "8362712").PN. OR ("9060404").URPN.	US-PGPUB; USPAT; USOCR	OR	ON	2018/03/15 15:53
S27	4	"15849793"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/17 10:54
S28	15	("20070159347" | "20080129226" | "20140139130" | "5924784" | "7038399").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/17 11:16
S29	700	("20010033488" | "20010045803" | "20020038157" | "20020044066" | "20020047569" | "20020047624" | "20020048169" | "20020057061" | "20020070688" | "20020074559" | "20020078221" | "20020101197" | "20020130627" | "20020145394" | "20020145869" | "20020152045" | "20020153851" | "20020158583" | "20020163316" | "20020171365" | "20020171377" | "20020171378" | "20020176259" | "20020195975" | "20030011538" | "20030028260" | "20030057884" | "20030057886" | "20030057887" | "20030057890" | "20030076281" | "20030100837" | "20030133292" | "20030137258" | "20030189412" | "2909097" | "3318185" | "3561719" | "3586936" | "3601621" |	US-PGPUB; USPAT; USOCR	OR	OFF	2018/09/17 11:53

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Page 620 of 657

		"6031343" | "6068383" | "6069597" | "6072280" | "6092915" | "6095661" | "6097352").PN. OR ("6127783" | "6132072" | "6135604" | "6149283" | "6150774" | "6166496" | "6175201" | "6175220" | "6181126" | "6183086" | "6183104" | "6184628" | "6196471" | "6211626" | "6215409" | "6250774" | "6252358" | "6273338" | "6292901" | "6310590" | "6323832" | "6340868" | "6369525" | "6379022" | "6445139" | "6448550" | "6459919" | "6495964" | "6528954" | "6548967" | "6577080" | "6586890" | "6596977" | "6608453" | "6624597" | "6636003" | "6683419" | "6744223" | "RE36030").PN. OR ("7038399").URPN.				
S30	11	("8218068" | "20120069176" | "7667740" | "20070296354" | "8362712").PN.	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/17 11:57
S39	3	"15849819"	US-PGPUB; USPAT; USOCR; FPRS; EPO; JPO; DERWENT; IBM_TDB	OR	ON	2018/09/17 12:31

EAST Search History (Interference)

Ref #	Hits	Search Query	DBs	Default Operator	Plurals	Time Stamp
S31	16007	(H05B37/02 OR H05B37/0272 OR H05B37/029 OR H05B37/0281 OR H05B33/08 OR H05B33/0842 OR F21V23/00 OR F21V23/003).CPC.	US-PGPUB; USPAT	OR	ON	2018/09/17 11:54
S32	1	light$4 with control$4 with (calculat$4 or comput$4) with simulat$4 with (camera or piture$1) with frequen$3 with user with shutter$4	US-PGPUB; USPAT	OR	ON	2018/09/17 11:59
S33	6	light$4 same control$4 same (calculat$4 or comput$4) same simulat$4 same (camera or piture$1) same frequen$3 same user same shutter$4	US-PGPUB; USPAT	OR	ON	2018/09/17 12:01
S36	2	(light$4 and control$4 and (calculat$4 or comput$4) and simulat$4 and (camera or piture$1) and frequen$3 and user and shutter$4 and frame and rate$1).clm.	US-PGPUB; USPAT	OR	ON	2018/09/17 12:07
S38	1	S31 and S33	US-PGPUB; USPAT	OR	ON	2018/09/17 12:09
S41	17	(light$4 and control$4 and (calculat$4 or comput$4) and simulat$4 and input$4 and output$4 and user and interface$1 and select$4 and tim$4 and (vary$4 or adjust$4 or tun$4) and effect).clm.	US-PGPUB; USPAT	OR	ON	2018/09/17 12:52

9/17/2018 1:31:55 PM
C:\Users\tpham3\Documents\EAST\Workspaces\15849819_1.wsp

Index of Claims	Application/Control No.	Applicant(s)/Patent Under Reexamination
	15820469	GAMMONS ET AL.
	Examiner	Art Unit
	THAI PHAM	2844

✓	Rejected	-	Cancelled	N	Non-Elected	A	Appeal
=	Allowed	÷	Restricted	I	Interference	O	Objected

☐ Claims renumbered in the same order as presented by applicant ☐ CPA ☐ T.D. ☐ R.1.47

CLAIM		DATE								
Final	Original	03/03/2018	09/17/2018							
	1	✓	=							
	2	✓	=							
	3	✓	=							
	4	✓	=							
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	17	✓	=							
	18	✓	=							
	19	✓	=							
	20	✓	=							
	21		=							

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of.:			
	Roderick Allen GAMMONS et al.	Confirmation No.:	5873
Serial No.:	15/820,469	Art Unit:	2844
Filed:	November 22, 2017		
For:	LIGHTING SYSTEM AND CONTROL THEREOF	Attorney Docket:	**70945**
Examiner:	Thai N. PHAM		

Mail Stop Petition
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

PETITION TO ADD INVENTORS UNDER 37 C.F.R. §1.48(c)

Sir:

This is a Petition to Add Inventor, for which a fee of $300.00 is due. Please charge my Deposit Account 50-1407 for this fee, as well as any additional fees due.

The above-identified patent application as originally filed included three (3) inventors, namely Roderick Allen GAMMONS, Andrew FRANCIS and Roderick Aaron GAMMONS. By error, without deceptive intent, the name of one (1) additional inventor, namely **Stefan LANGE** was left out.

An executed Declaration and Statement under 37 CFR 3.73(c) are attached herewith, along with a Supplemental Application Data Sheet (ADS).

Consequently, please add **Stefan LANGE** as the 4th inventor to the above-identified patent application.

Respectfully submitted,

/Martin D. Moynihan/

Martin D. Moynihan
Registration No. 40338
Telephone: (703) 859-9634

Date: November 9, 2018

Doc Code: Oath
Document Description: Oath or declaration filed

PTO/AIA/08 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION FOR UTILITY OR DESIGN PATENT APPLICATION (37 CFR 1.63)

☒ Declaration Submitted With Initial Filing

☐ Declaration Submitted After initial Filing (surcharge (37 CFR 1.16(f)) required

Attorney Docket Number	70945
First Named Inventor	Roderick Allen GAMMONS
COMPLETE IF KNOWN	
Application Number	15/820,469
Filing Date	November 22, 2017
Art Unit	2844
Examiners Name	Thai N. PHAM

LIGHTING SYSTEM AND CONTROL THEREOF

(Title of the Invention)

As below named inventor, I hereby declare that:

This declaration is directed to:

☐ The attached application,
OR

☒ United States Application or PCT Number 15/820,469
Filed On November 22, 2017

The above-identified application was made or authorized to be made by me.

I believe I am the original inventor or an original joint inventor of a claimed invention in the application.

I hereby acknowledge that any willful false statement made in this declaration is punishable under 18 U.S.C. 1001 by fine or imprisonment of not more than five (5) years, or both.

Authorization To Permit Access To Application by Participating Office

☑ If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the above-identified patent application is filed access to the above-identified patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the above-identified patent application is filed to have access to the above-identified patent application.

In accordance with 37 CFR 1.14(h)(3), access will be provided to a copy of the above-identified patent application with respect to: 1) the above-identified patent application-as-filed; 2) any foreign application to which the above-identified patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the above-identified patent application; and 3) any U.S. application-as-filed from which benefit is sought in the above-identified patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing the Authorization to Permit Access to Application by Participating Offices.

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

Attorney Docket Number: 70945

PTO/AIA/08 (06-12)
Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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DECLARATION — Utility or Design Patent Application

Direct all Correspondence to: ☒	The address associated with Customer Number:	67801	OR ☐	Correspondence address below

Name		
Address		
City	State	Zip
Country	Telephone	Email

I have reviewed and understand the contents of the above identified application.

I acknowledge the duty to disclose information material to the patentability of the claims, as defined by 37 CFR 1.56.

LEGAL NAME OF SOLE OR FIRST INVENTOR:

(*E.g.*, Given Name (first and middle (if any)) and Family Name or Surname)

Roderick Allen GAMMONS

Inventor's Signature 	Date (Optional)

Residence: City	State	Country
Staines Upon Thames	Surrey	Great Britain

Mailing Address

135 Chertsey Lane

City	State	Zip	Country
Staines Upon Thames	Surrey	TW18 3LR	Great Britain

☒ Additional inventors are being named on the 1 supplemental sheet(s) PTO/AIA/10 attached hereto

Attorney Docket Number: 70945

PTO/AIA/10 (06-12)

Approved for use through 01/31/2014. OMB 0651-0032
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SUPPLEMENTAL SHEET FOR DECLARATION — **ADDITIONAL INVENTOR(S) Supplemental Sheet (for PTO/AIA/08,09)**

Page 1 of 1

Legal Name of Additional Joint Inventor, if any:

(*E.g.*, Given Name (first and middle (if any)) and Family Name or Surname)
Andrew FRANCIS

Inventor's Signature		Date (Optional)
Witham Residence: City	**Essex** State	**Great Britain** Country
4 Wickham Bishops Mailing Address		
Witham City	**Essex** State	**CM8 3NU** Zip / **Great Britain** Country

Legal Name of Additional Joint Inventor, if any:

(*E.g.*, Given Name (first and middle (if any)) and Family Name or Surname)
Roderick Aaron GAMMONS

Inventor's Signature		Date (Optional)
Winkfield Residence: City	**Windsor** State	**Great Britain** Country
Vetch Cottage, Lovel Road, Mailing Address		
Winkfield City	**Windsor** State	**SL4 2EU** Zip / **Great Britain** Country

Legal Name of Additional Joint Inventor, if any:

(*E.g.*, Given Name (first and middle (if any)) and Family Name or Surname)
Stefan LANGE

Inventor's Signature		Date (Optional) 25/10/2018
Shepperton Residence: City	**Middlesex** State	**Great Britain** Country
Cedar Lodge, Towpath Mailing Address		
Shepperton City	**Middlesex** State	**TW17 9LL** Zip / **Great Britain** Country

This collection of information is required by 35 U.S.C. 115 and 37 CFR 1.63. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 21 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 (1-800-786-9199) and select option 2.

ASSIGNMENT

For good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged, the undersigned (hereinafter called the "Assignor"):

Stefan LANGE
Cedar Lodge Towpath, Shepperton
TW17 9LL Middlesex
Great Britain

hereby sell(s), assign(s) and transfer(s) to:

Rotolight Limited
c/o London Law, The White House, 57-63 Church Road, Wimbledon Village
SW19 5SB London
Great Britain

(hereinafter called the "Assignee"), its successors, assigns, nominees or other legal representatives, the undersigned's entire rights, title and interest in and to the invention titled:

LIGHTING SYSTEM AND CONTROL THEREOF

described and claimed in the following Patent Application:

US Patent Application No. 15/820,469,
filed on November 22, 2017,
and identified as Attorney Docket No. 70945

and in and to said Patent Application, and all original and reissued Patents granted therefore, and all divisions and continuations thereof, any corresponding PCT Patent Application and the National Phases thereof, including the right to apply and obtain Patents in all other countries, the right to claim priority under International Conventions, and the Letters Patent which may be granted thereon:

covenant that the undersigned have (has) the full right to convey the entire interest therein assigned;

authorize(s) and request(s) the Registrar of Patents, and any Official of any country whose duty it is to issue Patents on applications as aforesaid, to issue the said Letters Patent to the said Assignee;

and agree(s) to sign all lawful papers, make all rightful oaths, do all lawful acts requisite for such Patent Applications, and do everything possible to aid said Assignee to apply for, obtain and enforce Patent protection for said invention.

ASSIGNOR

Stefan Lange

Stefan LANGE

Date: 25th October '18

Approved for use through 01/31/2013. OMB 0651-0031
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
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STATEMENT UNDER 37 CFR 3.73(c)

Applicant/Patent Owner: Roderick Allen GAMMONS (et al)

Application No./Patent No.: 15/820,469 Filed/Issue Date: November 22, 2017

Titled: LIGHTING SYSTEM AND CONTROL THEREOF

Rotolight Limited, (Name of Assignee) a Corporation (Type of Assignee, e.g., corporation, partnership, university, government agency, etc.)

states that, for the patent application/patent identified above, it is (choose **one** of options 1, 2, 3 or 4 below):

1. ☑ The assignee of the entire right, title, and interest.
2. ☐ An assignee of less than the entire right, title, and interest (check applicable box):
   - ☐ The extent (by percentage) of its ownership interest is ___%. Additional Statement(s) by the owners holding the balance of the interest must be submitted to account for 100% of the ownership interest.
   - ☐ There are unspecified percentages of ownership. The other parties, including inventors, who together own the entire right, title and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.
3. ☐ The assignee of an undivided interest in the entirety (a complete assignment from one of the joint inventors was made). The other parties, including inventors, who together own the entire right, title, and interest are:

   Additional Statement(s) by the owner(s) holding the balance of the interest must be submitted to account for the entire right, title, and interest.
4. ☐ The recipient, via a court proceeding or the like (e.g., bankruptcy, probate), of an undivided interest in the entirety (a complete transfer of ownership interest was made). The certified document(s) showing the transfer is attached.

The interest identified in option 1, 2 or 3 above (not option 4) is evidenced by either (choose **one** of options A or B below):

A. ☐ An assignment from the inventor(s) of the patent application/patent identified above. The assignment was recorded in the United States Patent and Trademark Office at Reel _____, Frame _____, or for which a copy thereof is attached.

B. ☑ A chain of title from the inventor(s), of the patent application/patent identified above, to the current assignee as follows:

1. From: Inventors Roderick Allen GAMMONS, Andrew FRANCIS and Roderick Aaron GAMMONS To: Rotolight Limited
   The document was recorded in the United States Patent and Trademark Office at
   Reel 044553, Frame 0881, or for which a copy thereof is attached.
2. From: Inventor Stefan LANGE To: Rotolight Limited
   The document was recorded in the United States Patent and Trademark Office at
   Reel ___, Frame _____, or for which a copy thereof is attached.

This collection of information is required by 37 CFR 3.73(b). The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.11 and 1.14. This collection is estimated to take 12 minutes to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

If you need assistance in completing the form, call 1-800-PTO-9199 and select option 2.

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE
Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it displays a valid OMB control number

STATEMENT UNDER 37 CFR 3.73(c)

3. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

4. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel ___, Frame _____, or for which a copy thereof is attached.

5. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel _____, Frame _____, or for which a copy thereof is attached.

6. From: _____ To: _____
The document was recorded in the United States Patent and Trademark Office at
Reel ___, Frame _____, or for which a copy thereof is attached.

☐ Additional documents in the chain of title are listed on a supplemental sheet(s).

☐ As required by 37 CFR 3.73(c)(1)(i), the documentary evidence of the chain of title from the original owner to the assignee was, or concurrently is being, submitted for recordation pursuant to 37 CFR 3.11.

[NOTE: A separate copy (i.e., a true copy of the original assignment document(s)) must be submitted to Assignment Division in accordance with 37 CFR Part 3, to record the assignment in the records of the USPTO. See MPEP 302.08]

The undersigned (whose title is supplied below) is authorized to act on behalf of the assignee.

/Martin D. Moynihan/	November 9, 2018
Signature	Date
Martin D. Moynihan	40338
Printed or typed Name	Title or Registration Number

Supplemental ADS

PTO/AIA/14 (OB-12)

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U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70945
	Application Number	**15/820,469**
Title of Invention	LIGHTING SYSTEM AND CONTROL THEREOF	

The application data sheet is part of the provisional or nonprovisional application for which it is being submitted. The following form contains the bibliographic data arranged in a format specified by the United states Patent and Trademark Office as outlined in 37 CFR 1.76.

This document may be completed electronically and submitted to the Office in electronic format using the Electronic Filing System (EFS) or the document may be printed and included in a paper filed application.

Secrecy Order 37 CFR 5.2

☐ Portions or all of the application associated with this Application Data Sheet may fall under a Secrecy Order pursuant to 37 CFR 5.2 (Paper filers only. Applications that fall under Secrecy Order may not be filed electronically.)

Inventor Information:

Inventor 1

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Roderick Allen		GAMMONS	

Residence Information (Select One) ○ **US Residency** ◉ **Non US Residency** ○ **Active US Military Service**

City	Staines Upon Thames	State/Province	Surrey	Country	GB

Mailing Address of Inventor:

Address 1	135 Chertsey Lane		
Address 2			
City	Staines Upon Thames	**State/Province**	Surrey
Postal Code	TW18 3LR	**Country**	GB

Inventor 2

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Andrew		FRANCIS	

Residence Information (Select One) ○ **US Residency** ◉ **Non US Residency** ○ **Active US Military Service**

City	Witham	State/Province	Essex	Country	GB

Mailing Address of Inventor:

Address 1	4 Wickham Bishops		
Address 2			
City	Witham	**State/Province**	Essex
Postal Code	CM8 3NU	**Country**	GB

Supplemental ADS

PTO/AIA/14 (OB-12)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70945
	Application Number	15/820,469
Title of Invention	LIGHTING SYSTEM AND CONTROL THEREOF	

Inventor 3

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Roderick Aaron		GAMMONS	

Residence Information (Select One) ○ **US Residency** ◉ **Non US Residency** ○ **Active US Military Service**

City	Winkfield	State/Province	Windsor	Country	GB

Mailing Address of Inventor:

Address 1	Vetch Cottage, Lovel Road		
Address 2			
City	Winkfield	**State/Province**	Windsor
Postal Code	SL4 2EU	**Country**	GB

Inventor 4

Legal Name

Prefix	Given Name	Middle Name	Family Name	Suffix
	Stefan		LANGE	

Residence Information (Select One) ○ **US Residency** ◉ **Non US Residency** ○ **Active US Military Service**

City	Shepperton	State/Province	Middlesex	Country	GB

Mailing Address of Inventor:

Address 1	Cedar Lodge, Towpath		
Address 2			
City	Shepperton	**State/Province**	Middlesex
Postal Code	TW17 9LL	**Country**	GB

Supplemental ADS

PTO/AIA/14 (OB-12)

Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70945
	Application Number	**15/820,469**
Title of Invention	LIGHTING SYSTEM AND CONTROL THEREOF	

Correspondence Information:

Enter either Customer Number or complete the Correspondence Information section below.
For further information see 37 CFR 1.33(a).

☐ An Address is being provided for the correspondence Information of this application.

Customer Number	**67801**
Email Address	martin@ipatent.co.il

Application Information:

Title of the Invention	LIGHTING SYSTEM AND CONTROL THEREOF		
Attorney Docket Number	70945	**Small Entity Status Claimed ☒**	
Application Type	Non Provisional		
Subject Matter	Utility		
Suggested Class (If any)		**Sub Class (If any)**	
Suggested Technology Center (if any)			
Total Number of Drawing Sheets (if any)	5	**Suggested Figure for Publication (if any)**	

Publication Information:

☐ Request Early Publication (Fee required at time of Request 37 CFR 1.219)

☐ **Request Not to Publish.** I hereby request that the attached application not be published under 35 U.S.C. 122(b) and certify that the invention disclosed in the attached application **has not and will not** be the subject of an application filed in another country, or under a multilateral international agreement, that requires publication at eighteen months after filing.

Representative Information:

Representative information should be provided for all practitioners having a power of attorney in the application. Providing this information in the Application Data Sheet does not constitute a power of attorney in the application (see 37 CFR 1.32). Either enter Customer Number or complete the Representative Name section below. If both sections are completed the customer Number will be used for the Representative Information during processing.

Please Select One:	⊙Customer Number	○US Patent Practitioner	○ Limited Recognition (37 CFR 11.9)
Customer Number	67801		

Domestic Benefit/National Stage Information:

This section allows for the applicant to either claim benefit under 35 U.S.C. 119(e), 120, 121, or 365(c) or indicate National Stage entry from a PCT application. Providing this information in the application data sheet constitutes the specific reference required by 35 U.S.C. 119(e) or 120, and 37 CFR 1.78.

Prior Application Status	**Pending**		
Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Continuation Of	15/481,460	2017-04-07
Prior Application Status	**Expired**		

Supplemental ADS

PTO/AIA/14 (OB-12)

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Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70945
	Application Number	**15/820,469**
Title of Invention	LIGHTING SYSTEM AND CONTROL THEREOF	

Application Number	Continuity Type	Prior Application Number	Filing Date (YYYY-MM-DD)
	Claims Benefit Of Provisional	62/319,809	2016-04-08

Foreign Priority Information:

This section allows for the applicant to claim benefit of foreign priority and to identify any prior foreign application for which priority is not claimed. Providing this information in the application data sheet constitutes the claim for priority as required by 35 U.S.C. 119(b) and 37 CFR 1.55(a).

Application Number	Country	Filing Date (YYYY-MM-DD)	Priority Claimed
1606907.2	**GB**	**2016-04-20**	⊙ Yes O No

Authorization to Permit Access:

☒ Authorization to Permit Access to the Instant Application by the Participating Offices

If checked, the undersigned hereby grants the USPTO authority to provide the European Patent Office (EPO), the Japan Patent Office (JPO), the Korean Intellectual Property Office (KIPO), the World Intellectual Property Office (WIPO), and any other intellectual property offices in which a foreign application claiming priority to the instant patent application is filed access to the instant patent application. See 37 CFR 1.14(c) and (h). This box should not be checked if the applicant does not wish the EPO, JPO, KIPO, WIPO, or other intellectual property office in which a foreign application claiming priority to the instant patent application is filed to have access to the instant patent application.

In accordance with 37 CFR 1.14(h) (3), access will be provided to a copy of the instant patent application with respect to: 1) the instant patent application-as-filed; 2) any foreign application to which the instant patent application claims priority under 35 U.S.C. 119(a)-(d) if a copy of the foreign application that satisfies the certified copy requirement of 37 CFR 1.55 has been filed in the instant patent application; and 3) any U.S. application-as-filed from which benefit is sought in the instant patent application.

In accordance with 37 CFR 1.14(c), access may be provided to information concerning the date of filing this Authorization.

Applicant Information:

Providing assignment information in this section does not substitute for compliance with any requirement of part 3 of Title 37 of CFR to have an assignment recorded by the Office.

Applicant 1

If the applicant is the inventor (or the remaining joint inventor or inventors under 37 CFR 1.45), this section should not be completed. The information to be provided in this section is the name and address of the legal representative who is the applicant under 37 CFR 1.43; or the name and address of the assignee, person to whom the inventor is under an obligation to assign the invention, or person who otherwise shows sufficient proprietary interest in the matter who is the applicant under 37 CFR 1.46. If the applicant is an applicant under 37 CFR 1.46 (assignee, person to whom the inventor is obligated to assign, or person who otherwise shows sufficient proprietary interest) together with one or more joint inventors, then the joint inventor or inventors who are also the applicant should be identified in this section.

⊙ Assignee	O Legal representative under 35 U.S.C 117
O Person to whom the inventor is obligated to assign.	O Person who shows sufficient propriety interest

If applicant is the legal representative, indicate the authority to file the patent application, the inventor is:

Supplemental ADS

PTO/AIA/14 (OB-12)

Approved for use through 01/31/2014. OMB 0651-0032
U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Under the Paperwork Reduction Act of 1995, no persons are required to respond to a collection of information unless it contains a valid OMB control number.

Application Data Sheet 37 CFR 1.76	Attorney Docket Number	70945
	Application Number	**15/820,469**
Title of Invention	LIGHTING SYSTEM AND CONTROL THEREOF	

Name of the Deceased or Legally Incapacitated Inventor :			
If the Assignee is an Organization check here. ☒			
Organization Name	Rotolight Limited		
Mailing Address Information:			
Address 1	c/o London Law, The White House, 57-63 Church Road, Wimbledon Village		
Address 2			
City	London	**State/Province**	
Country GB		Postal Code	SW19 5SB
Phone Number		Fax Number	
Email Address			

Signature:

NOTE: This form must be signed in accordance with 37 CFR 1.33. See 37 CFR 1.4 for signature requirements and certifications					
Signature	**/Martin D. Moynihan/**			Date (YYYY-MM-DD)	2018-11-09
First Name	Martin	Last Name	Moynihan	Registration Number	40338

This collection of information is required by 37 CFR 1.76. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. This collection is estimated to take 23 minutes to complete, including gathering, preparing, and submitting the completed application data sheet form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of Commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. **SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450.**

Electronic Patent Application Fee Transmittal	
Application Number:	15820469
Filing Date:	22-Nov-2017
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Filer:	Martin Dennis Moynihan
Attorney Docket Number:	70945
Filed as Small Entity	
Filing Fees for **Utility under 35 USC 111(a)**	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
Extension-of-Time:				

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Miscellaneous:				
CORRECTION OF INVENTORSHIP ON MERITS	2819	1	300	300
		Total in USD ($)		**300**

Electronic Acknowledgement Receipt	
EFS ID:	34258395
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan
Filer Authorized By:	
Attorney Docket Number:	70945
Receipt Date:	09-NOV-2018
Filing Date:	22-NOV-2017
Time Stamp:	08:09:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$300
RAM confirmation Number	110918INTEFSW00007140501407
Deposit Account	501407
Authorized User	Martin Moynihan
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Petition for review by the Office of Petitions	70945PetitiontoAddInventorStefanLANGE.pdf	35819 bf41c7c8376790ab3a5f03ae0db4f92d90f2a706	no	1
Warnings:					
Information:					
2	Oath or Declaration filed	70945ExecutedDeclarationStefanLANGE.pdf	581678 3439932001ac7cc77c91833e2d15449cba883954	no	3
Warnings:					
Information:					
3	Assignee showing of ownership per 37 CFR 3.73	70945ExecutedAssignmentStefanLANGESecondSTATEMENT.pdf	317114 1b2323a5f8fe1789d38e275cff591e103674116d	no	3
Warnings:					
Information:					
4	Application Data Sheet	70945SupplementalApplicationDataSheet.pdf	80379 ea4a8bb434e743684b60f1d1a9f7602b7caa6825	no	5
Warnings:					
Information:					
This is not an USPTO supplied ADS fillable form					
5	Fee Worksheet (SB06)	fee-info.pdf	30099 7fbee2a63ebeb2775b913c430fbcbbd8a0962132	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	1045089		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111

If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.

National Stage of an International Application under 35 U.S.C. 371

If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.

New International Application Filed with the USPTO as a Receiving Office

If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

Document code: WFEE

United States Patent and Trademark Office
Sales Receipt for Accounting Date: 11/14/2018

VVAN11 SALE #00000017 Mailroom Dt: 11/09/2018 501407 15820469
01 FC : 2830 70.00 DA

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
15/820,469	11/22/2017	Roderick Allen Gammons	70945

CONFIRMATION NO. 5873

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

37 CFR 1.48 ACKNOWLEDGEMENT LETTER

OC000000103814946

Date Mailed: 11/16/2018

NOTICE OF ACCEPTANCE OF REQUEST UNDER 37 CFR 1.48(a)

This is in response to the applicant's request under 37 CFR 1.48(a) submitted on 11/09/2018.

The request under 37 CFR 1.48(a) to correct the inventorship, to correct or update the name of an inventor, or to correct the order of names of joint inventors is accepted.

Questions about the contents of this notice and the requirements it sets forth should be directed to the Office of Data Management, Application Assistance Unit, at **(571) 272-4000** or **(571) 272-4200** or **1-888-786-0101**.

/byemane/

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING or 371(c) DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	TOT CLAIMS	IND CLAIMS
15/820,469	11/22/2017	2844	780	70945	20	3

CONFIRMATION NO. 5873

UPDATED FILING RECEIPT

67801
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

OC000000103814945

Date Mailed: 11/16/2018

Receipt is acknowledged of this non-provisional patent application. The application will be taken up for examination in due course. Applicant will be notified as to the results of the examination. Any correspondence concerning the application must include the following identification information: the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please submit a written request for a Filing Receipt Correction. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the USPTO processes the reply to the Notice, the USPTO will generate another Filing Receipt incorporating the requested corrections**

Inventor(s)

Roderick Allen Gammons, Staines Upon Thames, UNITED KINGDOM;
Andrew Francis, Witham, UNITED KINGDOM;
Roderick Aaron Gammons, Winkfield, UNITED KINGDOM;
Stefan Lange, Shepperton, UNITED KINGDOM;

Applicant(s)

Rotolight Limited, London, UNITED KINGDOM;

Power of Attorney: The patent practitioners associated with Customer Number 67801

Domestic Priority data as claimed by applicant

This application is a CON of 15/481,460 04/07/2017
which claims benefit of 62/319,809 04/08/2016

Foreign Applications (You may be eligible to benefit from the **Patent Prosecution Highway** program at the USPTO. Please see http://www.uspto.gov for more information.)
UNITED KINGDOM 1606907.2 04/20/2016 Access Code Provided

Permission to Access Application via Priority Document Exchange: Yes

Permission to Access Search Results: No

Applicant may provide or rescind an authorization for access using Form PTO/SB/39 or Form PTO/SB/69 as appropriate.

Projected Publication Date: Not Applicable

Non-Publication Request: No

Early Publication Request: No
**** SMALL ENTITY ****
Title

LIGHTING SYSTEM AND CONTROL THEREOF

Preliminary Class

315

Statement under 37 CFR 1.55 or 1.78 for AIA (First Inventor to File) Transition Applications: No

PROTECTING YOUR INVENTION OUTSIDE THE UNITED STATES

Since the rights granted by a U.S. patent extend only throughout the territory of the United States and have no effect in a foreign country, an inventor who wishes patent protection in another country must apply for a patent in a specific country or in regional patent offices. Applicants may wish to consider the filing of an international application under the Patent Cooperation Treaty (PCT). An international (PCT) application generally has the same effect as a regular national patent application in each PCT-member country. The PCT process **simplifies** the filing of patent applications on the same invention in member countries, but **does not result** in a grant of "an international patent" and does not eliminate the need of applicants to file additional documents and fees in countries where patent protection is desired.

Almost every country has its own patent law, and a person desiring a patent in a particular country must make an application for patent in that country in accordance with its particular laws. Since the laws of many countries differ in various respects from the patent law of the United States, applicants are advised to seek guidance from specific foreign countries to ensure that patent rights are not lost prematurely.

Applicants also are advised that in the case of inventions made in the United States, the Director of the USPTO must issue a license before applicants can apply for a patent in a foreign country. The filing of a U.S. patent application serves as a request for a foreign filing license. The application's filing receipt contains further information and guidance as to the status of applicant's license for foreign filing.

Applicants may wish to consult the USPTO booklet, "General Information Concerning Patents" (specifically, the section entitled "Treaties and Foreign Patents") for more information on timeframes and deadlines for filing foreign patent applications. The guide is available either by contacting the USPTO Contact Center at 800-786-9199, or it can be viewed on the USPTO website at http://www.uspto.gov/web/offices/pac/doc/general/index.html.

For information on preventing theft of your intellectual property (patents, trademarks and copyrights), you may wish to consult the U.S. Government website, http://www.stopfakes.gov. Part of a Department of Commerce initiative, this website includes self-help "toolkits" giving innovators guidance on how to protect intellectual property in specific countries such as China, Korea and Mexico. For questions regarding patent enforcement issues, applicants may call the U.S. Government hotline at 1-866-999-HALT (1-866-999-4258).

LICENSE FOR FOREIGN FILING UNDER

Title 35, United States Code, Section 184

Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CFR 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 37 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Bureau of Industry and Security, Department of Commerce (15 CFR parts 730-774); the Office of Foreign AssetsControl, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15(b).

SelectUSA

The United States represents the largest, most dynamic marketplace in the world and is an unparalleled location for business investment, innovation, and commercialization of new technologies. The U.S. offers tremendous resources and advantages for those who invest and manufacture goods here. Through SelectUSA, our nation works to promote and facilitate business investment. SelectUSA provides information assistance to the international investor community; serves as an ombudsman for existing and potential investors; advocates on behalf of U.S. cities, states, and regions competing for global investment; and counsels U.S. economic development organizations on investment attraction best practices. To learn more about why the United States is the best country in the world to develop technology, manufacture products, deliver services, and grow your business, visit http://www.SelectUSA.gov or call +1-202-482-6800.

PART B - FEE(S) TRANSMITTAL

Complete and send this form, together with applicable fee(s), to: Mail **Mail Stop ISSUE FEE**
Commissioner for Patents
P.O. Box 1450
Alexandria, Virginia 22313-1450
or Fax (571)-273-2885

INSTRUCTIONS: This form should be used for transmitting the ISSUE FEE and PUBLICATION FEE (if required). Blocks 1 through 5 should be completed where appropriate. All further correspondence including the Patent, advance orders and notification of maintenance fees will be mailed to the current correspondence address as indicated unless corrected below or directed otherwise in Block 1, by (a) specifying a new correspondence address; and/or (b) indicating a separate "FEE ADDRESS" for maintenance fee notifications.

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67801 7590 09/26/2018
MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215
UNITED STATES OF AMERICA

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Certificate of Mailing or Transmission
I hereby certify that this Fee(s) Transmittal is being deposited with the United States Postal Service with sufficient postage for first class mail in an envelope addressed to the Mail Stop ISSUE FEE address above, or being facsimile transmitted to the USPTO (571) 273-2885, on the date indicated below.

(Depositor's name)
(Signature)
(Date)

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	11/22/2017	Roderick Allen Gammons	70945	5873

TITLE OF INVENTION: LIGHTING SYSTEM AND CONTROL THEREOF

APPLN. TYPE	ENTITY STATUS	ISSUE FEE DUE	PUBLICATION FEE DUE	PREV. PAID ISSUE FEE	TOTAL FEE(S) DUE	DATE DUE
nonprovisional	SMALL	$500	$0	$0	$500	12/26/2018

EXAMINER	ART UNIT	CLASS-SUBCLASS
PHAM, THAI N	2844	315-297000

1. Change of correspondence address or indication of "Fee Address" (37 CFR 1.363).
- ☐ Change of correspondence address (or Change of Correspondence Address form PTO/SB/122) attached.
- ☐ "Fee Address" indication (or "Fee Address" Indication form PTO/SB/47; Rev 03-02 or more recent) attached. **Use of a Customer Number is required.**

2. For printing on the patent front page, list
(1) The names of up to 3 registered patent attorneys or agents OR, alternatively,
(2) The name of a single firm (having as a member a registered attorney or agent) and the names of up to 2 registered patent attorneys or agents. If no name is listed, no name will be printed.
1 _____
2 _____
3 _____

3. ASSIGNEE NAME AND RESIDENCE DATA TO BE PRINTED ON THE PATENT (print or type)

PLEASE NOTE: Unless an assignee is identified below, no assignee data will appear on the patent. If an assignee is identified below, the document has been filed for recordation as set forth in 37 CFR 3.11. Completion of this form is NOT a substitute for filing an assignment.

(A) NAME OF ASSIGNEE: **Rotolight Limited**

(B) RESIDENCE: (CITY and STATE OR COUNTRY): **London, Great Britain**

Please check the appropriate assignee category or categories (will not be printed on the patent) : ☐ Individual ☒ Corporation or other private group entity ☐ Government

4a. The following fee(s) are submitted:
- ☒ Issue Fee
- ☐ Publication Fee (No small entity discount permitted)
- ☐ Advance Order - # of Copies _____

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- ☐ Payment by credit card. Form PTO-2038 is attached.
- ☒ The director is hereby authorized to charge the required fee(s), any deficiency, or credits any overpayment, to Deposit Account Number **50-1407** (enclose an extra copy of this form).

5. **Change in Entity Status** (from status indicated above)
- ☐ Applicant certifying micro entity status. See 37 CFR 1.29
  NOTE: Absent a valid certification of Micro Entity Status (see forms PTO/SB/15A and 15B), issue fee payment in the micro entity amount will not be accepted at the risk of application abandonment.
- ☐ Applicant asserting small entity status. See 37 CFR 1.27
  NOTE: If the application was previously under micro entity status, checking this box will be taken to be a notification of loss of entitlement to micro entity status.
- ☐ Applicant changing to regular undiscounted fee status.
  NOTE: Checking this box will be taken to be a notification of loss of entitlement to small or micro entity status, as applicable.

NOTE: This form must be signed in accordance with 37 CFR 1.31 and 1.33. See 37 CFR 1.4 for signature requirements and certifications.

Authorized Signature **/Martin D. Moynihan/** Date **December 24, 2018**

Typed or printed name **Martin D. Moynihan** Registration No. **40338**

PTOL-85 Part B (10-13) Approved for use through 10/31/2013. OMB 0651-0033 U.S. Patent and Trademark Office; U.S. DEPARTMENT OF COMMERCE

Electronic Patent Application Fee Transmittal	
Application Number:	15820469
Filing Date:	22-Nov-2017
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Filer:	Martin Dennis Moynihan
Attorney Docket Number:	70945
Filed as Small Entity	
Filing Fees for **Utility under 35 USC 111(a)**	

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Basic Filing:				
Pages:				
Claims:				
Miscellaneous-Filing:				
Petition:				
Patent-Appeals-and-Interference:				
Post-Allowance-and-Post-Issuance:				
UTILITY APPL ISSUE FEE	2501	1	500	500

Description	Fee Code	Quantity	Amount	Sub-Total in USD($)
Extension-of-Time:				
Miscellaneous:				
			Total in USD ($)	**500**

Electronic Acknowledgement Receipt	
EFS ID:	34684858
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan
Filer Authorized By:	
Attorney Docket Number:	70945
Receipt Date:	24-DEC-2018
Filing Date:	22-NOV-2017
Time Stamp:	04:35:55
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	yes
Payment Type	DA
Payment was successfully received in RAM	$500
RAM confirmation Number	122618INTEFSW00015522501407
Deposit Account	501407
Authorized User	Martin Moynihan
The Director of the USPTO is hereby authorized to charge indicated fees and credit any overpayment as follows: 37 CFR 1.16 (National application filing, search, and examination fees) 37 CFR 1.17 (Patent application and reexamination processing fees)	

37 CFR 1.19 (Document supply fees)

37 CFR 1.20 (Post Issuance fees)

37 CFR 1.21 (Miscellaneous fees and charges)

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Issue Fee Payment (PTO-85B)	70945IssueFeeTransmittalSheetfromNoticeofAllowancedated26Sep2018.pdf	230396 f5784c439962da4ab4356bee50af57193e9ff37c	no	1
Warnings:					
Information:					
2	Fee Worksheet (SB06)	fee-info.pdf	29993 a5f623782b18491f295e3dd15e1034434a3a1fd0	no	2
Warnings:					
Information:					
		Total Files Size (in bytes):	260389		

This Acknowledgement Receipt evidences receipt on the noted date by the USPTO of the indicated documents, characterized by the applicant, and including page counts, where applicable. It serves as evidence of receipt similar to a Post Card, as described in MPEP 503.

New Applications Under 35 U.S.C. 111
If a new application is being filed and the application includes the necessary components for a filing date (see 37 CFR 1.53(b)-(d) and MPEP 506), a Filing Receipt (37 CFR 1.54) will be issued in due course and the date shown on this Acknowledgement Receipt will establish the filing date of the application.
National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
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Change(s) applied to document, /M.P./ 10/2/2018

In the Specification:

page 7

Please amend the Paragraph beginning at ~~Page 8, line 2,~~ as follows:

Figure 3a is a flow diagram of a method for adjusting a lighting device;

Figure 3b is a more detailed version of Figure 3a;

Please amend the Paragraph beginning at Page 8, line 23, as follows:

Figure 2 schematically shows an example where a lighting effect simulator 100 and the light 102 are integrated in a single studio lamp device 120. In one example, the light 102~~amp device~~ is an array of LEDs, preferably of differing colours. This arrangement does not require the DMX distribution hub 302, power elements 304, 306 as described above, and is more flexible in producing effects as will be described in more detail below. A microcontroller or other computing unit is integrated in the lamp device 120 for performing calculations.

Please amend the Paragraph beginning at Page 8, line 30, as follows:

An input interface 105 including a ~~A~~ control panel is provided at a back panel of the lamp device~~ight~~ 120. The control panel can include for example buttons, rotary knobs, sliders, and/or a display/input panel for user input of parameters for simulating an effect. In a variant a simple digital interface is provided on the light itself for user input of simulation parameters to control the lighting effect. In another variant the lamp device~~ight~~ 120 is adapted for communication with a wireless user device and receives user-selectable simulation parameters to control the lighting effect from the user device. The user device may for example be a tablet or smart phone with suitable hardware / software (e.g. an app) for receiving user input of simulation parameters and transmitting that data to the light 102~~0~~.The system of Figure 2 is simpler to set up and less expensive than that of Figure 1 as there are fewer pieces of hardware. Furthermore the energy inefficiency of 'hot light' systems (i.e. a 1K hot light consumes 1000 watt/hour, vs 38 watt per hour of current generation LED system), Systems such as that described in Figure 1 using a flicker box and typically 'hot lights' also suffer from the significant disadvantage that a hot light is a fixed colour of light, either daylight 5600K or most commonly tungsten 3200K. When recreating an effect such a lightning this effect would appear at the blue end of the colour spectrum i.e. 7000K+ so utilising a 3200K light for this would require an operator to climb up a ladder to apply one or more CTB (Colour temperature blue) filter(s) to the light in order to achieve the desired colour temperature.

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APPLICATION NO.	ISSUE DATE	PATENT NO.	ATTORNEY DOCKET NO.	CONFIRMATION NO.
15/820,469	02/05/2019	10197257	70945	5873

67801 7590 01/16/2019

MARTIN D. MOYNIHAN d/b/a PRTSI, INC.
P.O. BOX 16446
ARLINGTON, VA 22215

ISSUE NOTIFICATION

The projected patent number and issue date are specified above.

Determination of Patent Term Adjustment under 35 U.S.C. 154 (b)
(application filed on or after May 29, 2000)

The Patent Term Adjustment is 0 day(s). Any patent to issue from the above-identified application will include an indication of the adjustment on the front page.

If a Continued Prosecution Application (CPA) was filed in the above-identified application, the filing date that determines Patent Term Adjustment is the filing date of the most recent CPA.

Applicant will be able to obtain more detailed information by accessing the Patent Application Information Retrieval (PAIR) WEB site (http://pair.uspto.gov).

Any questions regarding the Patent Term Extension or Adjustment determination should be directed to the Office of Patent Legal Administration at (571)-272-7702. Questions relating to issue and publication fee payments should be directed to the Application Assistance Unit (AAU) of the Office of Data Management (ODM) at (571)-272-4200.

APPLICANT(s) (Please see PAIR WEB site http://pair.uspto.gov for additional applicants):

Roderick Allen Gammons, Staines Upon Thames, UNITED KINGDOM;
Rotolight Limited, London, UNITED KINGDOM;
Andrew Francis, Witham, UNITED KINGDOM;
Roderick Aaron Gammons, Winkfield, UNITED KINGDOM;
Stefan Lange, Shepperton, UNITED KINGDOM;

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PTO/SB/08a (08-03)
Approved for use through 07/31/2006. OMB 0651-0031
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Substitute for form 1449A/PTO

INFORMATION DISCLOSURE STATEMENT BY APPLICANT

(*use as many sheets as necessary*)

Complete if Known	
Application Number	15/820,469
Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet 1 of 2

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Document Number Number-Kind Code [2] (if known)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No. [1]	Foreign Patent Documents Country Code [3] Number [4] Kind Code [5] (*if known*)	Publication Date DD-MMM-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear	T [6]

Examiner Signature		Date Considered	

* EXAMINER: Initial if reference considered, whether or not citation is in conformance with MPEP 609. Draw line through citation if not in conformance and not considered. Include copy of copy of this form with next communication to applicant.

[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[3] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

[4] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.

[5] Kind of document by the appropriate symbols as indicated on the document under WIPO Standard ST. 16 if possible.

[6] Applicant is to place a check mark here if English language translation is attached.

This collection of information is required by 37 CFR 1.97 and 1.98. The information is required to obtain or retain a benefit by the public which is to file (and by the USPTO to process) an application. Confidentiality is governed by 35 U.S.C. 122 and 37 CFR 1.14. this collection is estimated to take 2 hours to complete, including gathering, preparing, and submitting the completed application form to the USPTO. Time will vary depending upon the individual case. Any comments on the amount of time you require to complete this form and/or suggestions for reducing this burden, should be sent to the Chief Information Officer, U.S. Patent and Trademark Office, U.S. Department of commerce, P.O. Box 1450, Alexandria, VA 22313-1450. DO NOT SEND FEES OR COMPLETED FORMS TO THIS ADDRESS. SEND TO: Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450

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(*use as many sheets as necessary*)

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Filing Date	November 22, 2017
First Named Inventor	GAMMONS Roderick Allen et al
Group Art Unit	2844
Examiner Name	PHAM Thai N.
Attorney Docket Number	70945

Sheet	2	Of	2

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS

Examiner Initials	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial symposium, catalog, etc.) date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
	1	Official Action Dated 31 December 2019 From the US Patent and Trademark Office Re. Application No. 15/481,460. (16 pages)	

Examiner Signature		Date Considered	

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[1] Applicant's unique citation designation number (optional).

[2] See Kinds Codes of USPTO Patent Documents at www.uspto.gov or MPEP 901.04. 3 Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).

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Electronic Acknowledgement Receipt	
EFS ID:	34943097
Application Number:	15820469
International Application Number:	
Confirmation Number:	5873
Title of Invention:	LIGHTING SYSTEM AND CONTROL THEREOF
First Named Inventor/Applicant Name:	Roderick Allen Gammons
Customer Number:	67801
Filer:	Martin Dennis Moynihan
Filer Authorized By:	
Attorney Docket Number:	70945
Receipt Date:	24-JAN-2019
Filing Date:	22-NOV-2017
Time Stamp:	03:08:26
Application Type:	Utility under 35 USC 111(a)

Payment information:

Submitted with Payment	no

File Listing:

Document Number	Document Description	File Name	File Size(Bytes)/ Message Digest	Multi Part /.zip	Pages (if appl.)
1	Transmittal Letter	_USPTOltr.pdf	16929 694a057e8d9ccffc833e04177f808f161e89177f	no	1
Warnings:					

Information:					
2	Information Disclosure Statement (IDS) Form (SB08)	_form1449.pdf	43636 4cb4006b2d998b991021c3e79cfbfd4cb2bedd9e	no	2
Warnings:					
Information:					
This is not an USPTO supplied IDS fillable form					
3	Non Patent Literature	1-310424.pdf	1909807 cfa4e057350e837db03ec6adf2096ed451b2f0eb	no	16
Warnings:					
Information:					
		Total Files Size (in bytes):	1970372		

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New Applications Under 35 U.S.C. 111
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National Stage of an International Application under 35 U.S.C. 371
If a timely submission to enter the national stage of an international application is compliant with the conditions of 35 U.S.C. 371 and other applicable requirements a Form PCT/DO/EO/903 indicating acceptance of the application as a national stage submission under 35 U.S.C. 371 will be issued in addition to the Filing Receipt, in due course.
New International Application Filed with the USPTO as a Receiving Office
If a new international application is being filed and the international application includes the necessary components for an international filing date (see PCT Article 11 and MPEP 1810), a Notification of the International Application Number and of the International Filing Date (Form PCT/RO/105) will be issued in due course, subject to prescriptions concerning national security, and the date shown on this Acknowledgement Receipt will establish the international filing date of the application.

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:			
	GAMMONS Roderick Allen et al		
		Confirmation No.:	5873
Serial No.:	15/820,469		
Filed:	November 22, 2017	Group Art Unit:	2844
For:	LIGHTING SYSTEM AND CONTROL THEREOF		
		Attorney Docket:	70945
Examiner:	PHAM Thai N.		

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUPPLEMENTAL INFORMATION DISCLOSURE STATEMENT

Sir:

☐ Enclosed is a PTO Form 1449 which lists citations which may be material to the patentability and examination of the above identified application. Also enclosed are copies of the references cited, other than U.S. Patents and U.S. patent applications. These are submitted in compliance with the duty of disclosure defined in 37 CFR 1.56, 37 CFR 1.97 and 37 CFR 1.98. This Information Disclosure Statement is being filed after the payment of issue fee. Applicant requests that it be placed in the application file.

Respectfully submitted,

/ Martin D. Moynihan /

Martin D. Moynihan
Registration No. 40338
Telephone: (703)859-9634

Date: 18 January 2019