RGB+NDB-PRO

NETWORK DATA BOX+

WIRELESS PROCESSING & CONTROL

Presented by
Minleon (USA) International

Your manufacturer of leading-edge LED lighting products

Minleon USA.com
Aug 2023

NDB+ USER GUIDE
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- REAL TIME POWER, DATA SWITCH & OUTPUT FUSE READINGS FOR TROUBLESHOOTING

- 8 LIGHT STRING OUTPUTS

- DAISY-CHAIN MULTIPLE NDB-PRO'S TO A NETWORK VIA THIRD PARTY NETWORK SWITCH

- 32-AMP; 12-24VDC MAX POWER INPUT

An NDB+ can have 16, 8 or 4 RGB-LED output ports

NDB-Pro maintains previous model features.

Only the 4-port comes with on-board power

1. SIMILARLY, DISTRIBUTES 12-24VDC POWER & SEQUENCING DATA (VIA ETHERNET) TO LIGHT STRINGS

2. ALSO, RUNS FULLY SEQUENCED RGB LIGHT SHOWS & INSTALLATIONS VIA PC OR CUSTOM LIGHT DESK USING INDUSTRY STANDARD SACN/E1.31 & **ART-NET** SEQUENCING SOFTWARE: SUCH AS **MADRIX, RESOLUME, X-LIGHTS, MOSAIC, LIMBIC MEDIA'S AURORA,** AMONG MANY OTHERS.

3. SAME CHIPSET SETTINGS A PREVIOUS MODELS, BUT PRO ADDS SUPPORT FOR GEN1 MINLEON RGB (LEGACY LINE)

4. 16 & 4-PORTS HAVE NO ON-BOARD EFFECTS, BUT PAIR WITH MINLEON'S **NETWORK EFFECTS CONTROLLER (DDP** PROTOCOL), IF NEEDED:

   - 23 BUILT-IN 2-D EFFECTS

   - LIGHT SHOW MODE

   - SD CARD DRIVE RUNS **X-LIGHTS FILES & .WAV AUDIO**

   - TRIGGER EFFECTS LIVE VIA DMX

5. BOTH WORK WITH SMART-T'S, TO ADD MULTIPLE STRINGS TO A SINGLE OUTPUT (AND IN TURN SAVE CABLING)

6. COMPLETELY SCALABLE AND FLEXIBLE (VIA THIRD PARTY NETWORK SWITCH)

7. 40-AMP MAX POWER ON INPUTS; NDB-PRO LIMITED TO 32AMPS

8. UL LISTED

9. USED IN MEGA-TREES, LIGHT WALLS & CURTAINS, CANOPIES, CHANDELIERS & TUNNELS

Pro Tip: Like all models, per UL standards, the NDB-Pro ships with internal 5-Amp fuses on each output port. Be sure not to load more than 5A of lights per port. If so, the tripped fuse with need replaced.

NDB+PRO
NDB-PRO HOME PAGE

1. GO TO YOUR SMART DEVICE OR LAPTOP'S WI-FI SETTINGS

2. LOOK FOR A WI-FI NETWORK NAMED NDB-XXXX & CONNECT

3. OPEN A WEB BROWSER LIKE GOOGLE CHROME, AND GO TO WEB PAGE 192.168.2.2

4. **ALTERNATIVELY, IF CONNECTING AN ETHERNET CABLE TO YOUR LAPTOP OR LIGHT DESK** & TYPE 10.0.0.100 IN YOUR WEB BROWSER

3. THE NDB-PRO'S BLUE CONFIGURATION SCREEN WILL APPEAR (SEE GRAPHIC)

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| NDBPRO | OUTPUTS | NETWORK |
| COLORS | EFFECTS | SHOWS |

LED chip settings:

Load defaults for: [RGB+ ⌄]

Timing: T0H: [400] ns, T1H: [850] ns, Tbit: [1260] ns, Treset:

Conversion: [RGB=>RGB(16bit) ⌄]

Protocol: ⦿DDP ◯Art-Net ◯E1.31 (unicast)

Maximum Lights/Output: 460

Output	Smart-Ts	Lights/String	Reverse?	Starting Slot
1	2	50	☐	1
2	2	50	☐	76
3	2	50	☐	151
4	2	50	☐	226
5	2	50	☐	301
6	0	0	☐	376
7	0	0	☐	451
8	0	0	☐	526

[Auto-Fill from Output 1 down]

[Save and Reboot]

Generate effects for [10] Strings of [50] Lights

[Update]

Network Effects: ◯Master ◯Slave ⦿None

OUTPUT ASSIGNMENTS

HERE WE TELL THE NDB-PRO WHAT WE INTEND TO PLUG INTO THE CONTROLLER, SO IT FUNCTIONS PROPERLY:

1. **LED CHIP SETTINGS:** RGB+, RGBW+, AND RGB+2 (4-WIRE/DOUBLE-DATA) ARE THE PRIMARY MINLEON-RAINMIN CHIPSETS. ALSO SUPPORT WS2811 & OTHERS.

2. **TIMING**: MOST OF THE TIME WE KEEP THESE DEFAULT VALUES

3. **CONVERSION:** CHANGE THE ORDER OF R-G-B (NOT NECESSARY WITH RGB+PLUS LINE PIXEL & STOCK CONTROL. MIGHT USE IF DRIVING RGBW+ PIXELS WITH 3RD PARTY RGBW SOFTWARE, FOR EXAMPLE.)

4. **PROTOCOL**: CHOOSE BETWEEN ART-NET, E1.31 (UNICAST) OR DDP

   DDP IS A PROPRIETARY PROTOCOL THAT RUNS MINLEON'S NETWORK EFFECTS CONTROLLER (NEC), AND NDB-PRO BUILT-IN EFFECTS.

5. **OUTPUT:** THE PHYSICAL OUTPUT (NDB+ PIGTAIL) THAT THE LIGHTS ARE CONNECTED TO.

6. **SMART T'S:** A WAY TO ADD STRINGS PER OUTPUT. ENTER THE NUMBER OF SMART T'S THAT ARE CONNECTED PER OUTPUT, IF ANY – MUST BE THE SAME FOR ALL OUTPUTS USED (MORE ON P16)

7. **LIGHTS/STRING:** THE AMOUNT OF LIGHTS CONNECTED PER STRING OR SMART T. IF DIFFERENT LENGTHS, ENTER THE LONGEST LIGHT COUNT.

8. **REVERSE:** MAKES THE LAST LIGHT ON THAT OUTPUT TO BE FIRST, AND SO ON, UNTIL THE FIRST LIGHT IS LAST

9. **STARTING SLOT:** THIS DATA SHOULD AUTO-FILL FOR US. 1 IS THE DATA FOR THE FIRST RGB LIGHT, SLOT 4 FOR THE SECOND LIGHT, 7 FOR THE THIRD LIGHT, & SO ON.

- WITH THE **DDP PROTOCOL**, THE NDB-PRO ACCEPTS UP TO 2400 (800 RGB LIGHTS TIMES 3 RGB BYTES PER LIGHT) BYTES OF DATA—EVERY 3 BYTES SPECIFIES A RED, GREEN AND BLUE COLOR VALUE FOR A LIGHT

PRO TIP: MULTIPLE OUTPUTS CAN HAVE THE SAME STARTING SLOT IF YOU WANT TO DUPLICATE THE SAME LIGHT DATA TO THE SAME OUTPUTS.

10. **AUTO-FILL:** WILL AUTOMATICALLY FILL ALL THE OUTPUTS BASED ON OUTPUT 1 SETTINGS.

11. **SAVE AND REBOOT:** WHEN YOU HAVE COMPLETED YOUR CONFIGURATION YOU MUST "SAVE AND REBOOT" THE CONTROLLER FOR THE SETTINGS TO REGISTER.

12. SUMMARIZE THE NUMBER OF STRINGS & NUMBER OF LIGHTS

13. **NETWORK EFFECTS:** IF YOU ARE GROUPING MULTIPLE NDB-PRO'S VIA WI-FI. IF GROUPING VIA WI-FI, CLIENT/SLAVE CONTROLLERS WILL ACT AS CLONES, OR COPIES OF THE MASTER NDB-PRO.

NDB+PRO
ART-NET CONFIGURATION

Configuring for **ArtNet**:

- Only the first 510 bytes of each universe are used (for 170 lights)—the last 2 bytes are ignored

- Up to 9 consecutive universes of 510 bytes of ArtNet data are appended together into an internal buffer—the Starting Slot specifies the position within that buffer

For Example, specifying a *Starting Slot* of 511 would mean the first light data from the second universe,

- Slot 514 the second light of the second universe,

- Slot 1021 would be the first light of universe 3, etc.

In this way, data for a particular NDB output can span more than a single ArtNet universe.

NDB+PRO
E1.31 / sACN CONFIGURATION

<u>Configuring for **E1.31 Protocol**:</u>

- Only the first 510 bytes of each universe are used (for 170 lights)—the last 2 bytes are ignored

- Up to 9 consecutive universes of 510 bytes of E1.31 data are appended together into an internal buffer—the Starting Slot specifies the position within that buffer

<u>For Example</u>, specifying a *Starting Slot* of 511 would mean the first light data from the second universe,

- Slot 514 the second light of the second universe,

- Slot 1021 would be the first light of universe 3, etc.

In this way, data for a particular NDB output can span more than a single E1.31 universe.

ETHERNET SETTINGS – WE ONLY NEED TO ENTER THESE DETAILS, IF USING THIRD-PARTY CONTROL. IF USING BUILT-IN EFFECTS OR MINLEON NEC, THIS SECTION CAN BE LEFT ALONE.

1. **IP:** SET THE DESIRED IP ADDRESS FOR THE NDB+ CONTROLLER. REMEMBER, EACH CONTROLLER SHOULD HAVE A UNIQUE IP ADDRESS.

2. **NETMASK:** THIS MUST BE THE SAME AS WHAT YOUR COMPUTER 'SUBNET MASK' IS SET TO.

3. **GATEWAY:** SET TO BE THE SAME AS THE 'DEFAULT GATEWAY' THAT IS USED IN YOUR COMPUTER'S NETWORK CONFIGURATION.

Pro Tip: Write the IP address you choose for each NDB directly on its face.

Ethernet Settings

IP:	10	.	0	.	1	.	101
NetMask:	255	.	255	.	255	.	0
Gateway:	10	.	0	.	1	.	1

Wifi Settings

Mode: ●Direct (AP) ○Network (AP Client) ○Off

SSID: NDB-PRO DOTS

Security: ●Open ○WEP ○WPA/WPA2

Key:

Address: ○Fixed ●DHCP
Always uses Fixed settings below if in Direct (AP) mode

IP:	192	.	168	.	2	.	2
NetMask:	255	.	255	.	255	.	0
Gateway:	192	.	168	.	2	.	1

Save and Reboot

Reset Switch: press 1-4 seconds to reset wifi, 4-8 seconds for ethernet, >8 seconds for everything.

Reset Switch: Refers to the physical button on the NDB-Pro to the right of the power input.

WI-FI SETTINGS – SAME-STYLE INTERFACE, AND PROCEDURE AS MINLEON WEC+2 & WEC-BOSS CONTROLLERS

1. MODE:
   - SELECT "DIRECT/ACCESS POINT" IF THIS IS YOUR MASTER (OR ONLY) NDB-PRO & YOU ARE NOT USING A THIRD-PARTY ROUTER;
   - SELECT "NETWORK" IF THIS IS YOUR MASTER NDB ON A THIRD-PARTY ROUTER/NETWORK OR THIS IS A CLIENT/SLAVE NDB;
   - SELECT "OFF" IF YOU ARE NOT GROUPING NDB-PRO'S VIA WI-FI

2. SSID: THIS NAME WILL APPEAR IN YOUR SMART DEVICE OR PC'S WIRELESS NETWORK SETTINGS. DEFAULT IS "NDB-XXXX".

3. SECURITY: IF YOU CHOOSE TO PASSWORD PROTECT YOUR NDB. KEY = YOUR CHOSEN PASSWORD

4. ADDRESS:
   - SELECT FIXED IF IN DIRECT (ACCESS POINT) MODE, OR IF A MASTER ON THIRD-PARTY NETWORK/ROUTER, OR IF THIS IS CLIENT/SLAVE NDB THAT YOU DESIRE TO LOG BACK INTO
   - SELECT DHCP IF THIS IS A CLIENT/SLAVE NDB-PRO, AND YOU WILL NOT NEED TO LOG BACK INTO
   - WHEN DHCP IS SELECTED, IP, NETMASK & GATEWAY VALUES ARE BYPASSED/IGNORED

5. SAVE AND REBOOT: CLICK THIS BUTTON FOR YOUR CHANGES TO TAKE EFFECT.

Pro Tip: Use a third-party IP Scanner App on your network to discover the IP addresses of NDB's set to DHCP (random IP assignment).

NDB+PRO
COLORS MENU

SELECT 5 CUSTOM COLORS, & A 6TH BACKGROUND COLOR – FROM 3 DIFFERENT PALLETS.

TAP THE BLACK BOXES TO OPEN PALLET OPTIONS:

1. **GRID:** CHOOSE FROM A 120-COLOR GRID

2. **SPECTRUM:** SCROLL OR MOUSE ALONG PALLET

3. **SLIDERS:** INPUT RGB NUMERIC VALUES

- NOTICE QUICK LINKS TO WARM WHITE & COOL WHITE, AND TO DELETE A COLOR.

- DARK BULB OPTION BY CHOOSING THE BLACK CIRCLE.

Pro Tip: Save your favorite or holiday color pallets as Fixed Effects in the Shows Menu for quick reference.

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NDB+PRO
EFFECTS MENU

14 Built-In Animations – adjust the colors, speed, distance, and other parameters, to customize your light show.

- **Two Show Modes:** Show1 & Show2 pull from SHOWS Menu settings

- **Test Mode:** runs thru each diode: red, green, blue, white, then a purple chase (so we can see if our strings are wired in proper order)

- **Off effect**

- **Power on default option**

Screenshot UI:

11:48 AM Wed Feb 2 — 73%

NDBPRO — http://192.168.2.2/pshows.html?p=13&t=100

| NDBPRO | OUTPUTS | NETWORK | COLORS | EFFECTS | SHOWS |

Show 1:

Recall	Effect	Intensity%	Color 1	Color 2	Color 3	Color 4	Color 5	Background	ShowTime	Set
Recall	Glow	100							30	Set
Recall	Color Wave	100							30	Set
Recall	Color Wave	100							30	Set
Recall	Color Wave	100							30	Set
Recall	Off	0							0	Set
Recall	Off	0							0	Set
Recall	Off	0							0	Set
Recall	Off	0							0	Set
Recall	Off	0							0	Set
Recall	Off	0							0	Set

Show 2:

Recall	Effect	Intensity%	Color 1	Color 2	Color 3	Color 4	Color 5	Background	ShowTime	Set
Recall	Fixed Colors	100							100	Set
Recall	Color Wave	100							100	Set
Recall	Pulsate	100							100	Set
Recall	Fixed Colors	45							100	Set
Recall	Color Wave	0							0	Set

CREATE A LIGHT SHOW & BOOKMARK FAVORITES – DISPLAY YOUR DESIRED EFFECTS ON THE LIGHT STRINGS, THEN GO TO THE SHOWS MENU, LAST MAIN MENU OPTION AT THE TOP LEFT OF THE UI.

1. **TAP "SET":** SET THE DESIRED IP ADDRESS FOR THE NDB+ CONTROLLER. REMEMBER, EACH CONTROLLER SHOULD HAVE A UNIQUE IP ADDRESS.

2. **ENTER SHOWTIME:** THIS VALUE IS SECONDS. 180 WOULD MEAN 3 MINUTES. 0 LEAVES OUT OF SHOW. EFFECTS WILL PLAY ON A LOOP.

3. **"RECALL" FAVORITES:** IF YOU WANT A SINGLE EFFECT TO PLAY OUTSIDE OF THE "SHOW".

Pro Tip: Save your favorite Holiday Color Pallets in Show 2, for quick reference in animations.

IF YOU DO NOT KNOW AN **NDB**'S **IP** ADDRESS, OR IF IT BECOMES UNRESPONSIVE, IT IS POSSIBLE TO RESET THE **NDB** TO FACTORY DEFAULT SETTINGS.
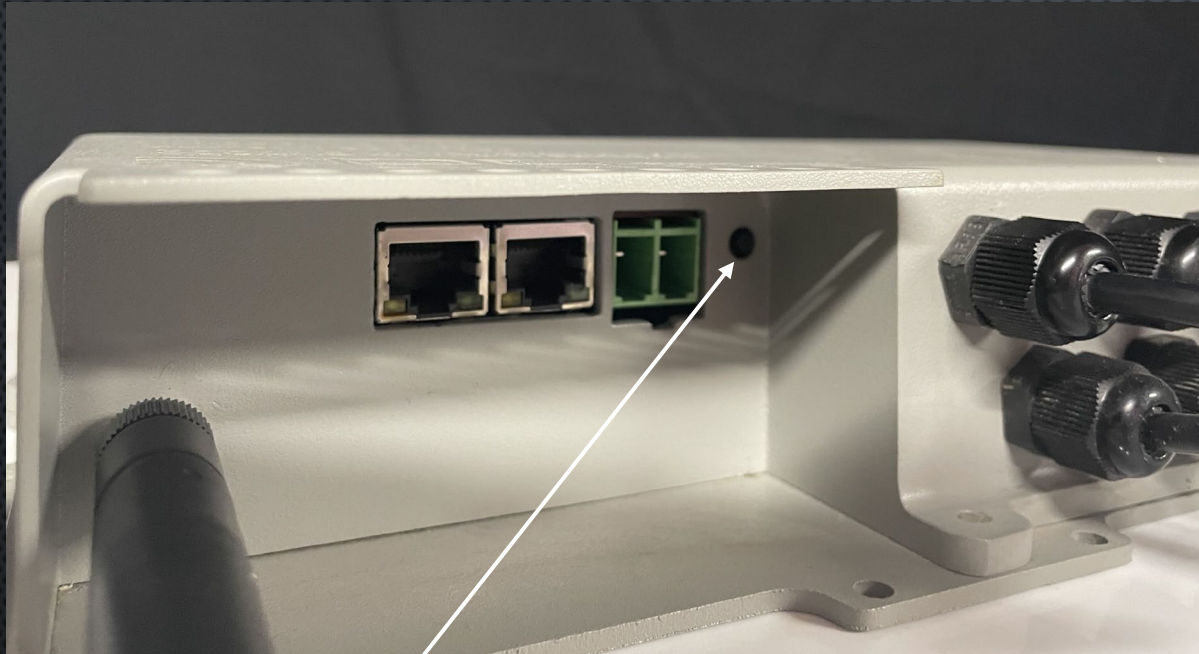
Re-set button

THE RESET BUTTON IS LOCATED ON THE NDB-PRO TO THE RIGHT OF THE POWER INPUT. IT HAS 3 MODES OF OPERATION.

1. PRESSING IT FOR **1-4** SECONDS WILL **RESET THE WI-FI SETTINGS**

2. PRESSING IT FOR **5-8** SECONDS WILL **RESET THE WI-FI & ETHERNET SETTINGS**. IP ADDRESS INFO WILL BE FACTORY DEFAULT (USEFUL IF YOU FORGOT ITS ADDRESS) BUT WON'T CHANGE ANY SPECIFIC LIGHT OR PORT CONFIGURATIONS.

3. PRESSING IT FOR MORE THAN **8** SECONDS WILL **RESET EVERYTHING TO THE FACTORY DEFAULTS.**

100 x 12Vdc pixels (or 200 x 24V) from one NDB+ output are often divided into multiple strings (i.e. 4 x 25L) on one output, by connecting Smart T's as a harness in this fashion.

This is common in RGB grids & chandeliers.

Smart T+'s will only output lights via the BOTTOM of the T, not the side.

SMART-T'S ARE EXCLUSIVE TO RAINMIN NDB+, WI-FI CONTROLLER (WEC+). LIGHT STRINGS WILL RUN _INDEPENDENT OF EACH OTHER_—NOT IN PARALLEL

- **MAX** SMART T'S PER NDB-PRO **OUTPUT** IS **32** (MUST BE LESS THAN 5-AMPS, OR POWER INJECTION WILL BE NEEDED.)

- REDUCES CABLING BY ADDING MULTIPLE STRINGS TO A SINGLE NDB OUTPUT—IN SOME INSTALLS SMART T'S CAN REDUCE THE NUMBER OF NDB'S

- SET THE NUMBER OF "**T'S PER OUTPUT**" ON THE NDB CONFIGURATION PAGE (_IF YOU WERE USING 6 SMART T'S PER OUTPUT THEN YOU WOULD SET THIS TO 6._)

PLEASE NOTE: WHEN USING SMART T+'S, THE NUMBER OF LIGHTS/STRING ON ALL PORTS MUST BE SET TO THE SAME VALUE (OR ZERO). IF SOME RUNS ARE SHORTER, USE THE HIGHEST VALUE. T'S PER OUTPUT MUST BE EQUAL VALUE. IF ONE IS UNEQUAL, MAKE IT A LOWER VALUE ON THE FINAL NDB OUTPUT.

Periodically, Minleon will release software updates to add features or fix bugs with the NDB-Pro.

These updates are housed at **WWW.MINLEONUSA.COM**, on the NDB-Pro product page as **.BIN FILES**, or can be emailed on request from **SUPPORT@MINLEONUSA.COM**.

1. Go to NBDPRO page & scroll to very bottom

2. Next to "**Upgrade NDB software**", Select "**Choose File**" from the location you saved it

3. Select "**Upload BIN file**" once, and let the controller re-boot

We can also download configurations for customers to upload into their own NDB-PRO's.

Screenshot content:

11:40 AM   Wed Feb 2   74%

NDBPRO

http://192.168.2.2/psys.html

| NDBPRO | OUTPUTS | NETWORK | COLORS | EFFECTS | SHOWS |

NDBPRO v0.6 - p1.2

Name: ndbpro   [Update]

Up 0 days, 00:09:58

Fuses

Output	1	2	3	4	5	6	7	8
Fuse	OK	OK	OK	OK	OK	OK	OK	OK

Power

Item	Last	Low	High	Unit
3.3V Supply	3.35	3.26	3.47	V
5.0V Supply	5.02	4.90	5.17	V
Input Voltage	11.98	11.98	12.01	V
Supply Current	7.43	3.62	7.48	A
Power	88	43	89	W

Switch

Link	Status	Speed	Duplex	Rx Unicast	Tx Unicast	Rx Broadcast	Tx Broadcast	Rx Multicast	Tx Multicast
1 jack	down	-	-	0	0	0	0	0	0
2 jack	down	-	-	0	0	0	0	0	0
3 NDB	up	100M	full	0	0	10	0	0	0

Check NDBs [10] . [0] . [0] . [101] to [105]   [Check]

Download Configuration or [Choose File] no file selected   and

[Upload Configuration]

Upgrade NDB software: [Choose File] no file selected   [Upload NDB BIN file]

(press once and wait 30 seconds)

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1. When using third party control, the NDB-Pro works best when Uni-casting the data, rather than Broadcasting. The NDB+ will respond to ArtNet Polling packets, but will only show support for the first 4 universes, due to ArtNet protocol limitations. However, you can still manually configure your lighting software to send up to 9 universes to the NDB. ArtNet 3 protocol can support up to 32767 universes.

2. When employing multiple NDB's and the Minleon NEC, capture a screen shot of the Output & Network Pages. Save these files in the event that one NDB needs a hard re-set to factory defaults or replaced, we can then manually configure this NDB, rather than re-AutoConfiguring the entire network via NEC.

3. Use the "**Test**" Effect of each NDB-Pro before installing in tough-to-access places to ensure functionality. This can be done with a single string attached to a single, configured NDB output. (See button at bottom left of the graphic.) If the lights work then the issue will be in the software configuration used to control the lights.

4. To figure the **Maximum DDP Frame Rate** possible, use the calculator here: http://www.3waylabs.com/triklits/ndbmax.html. If using ArtNet, the lights are updated at a fixed 40fps, regardless of the incoming frame rate.

5. If a single NDB+ output will not work with any light string, check the NDB's HomePage in the UI to see if a fuse has blown. If an Output's fuse reads OFF, then the fuse for this output has blown and will need replaced. Unscrew the NDB and remove the blown 5A vampire fuse with plyers. Replace with a new 5A fuse from your local electrical or automotive store. If running a 24Vdc power supply to power 24V light strings or fixtures, UL requires a 4Amp fuse.

6. Ensure there is data being sent to the NDB controller. Notice by looking at the RJ45 socket (ethernet jack)on the NDB controller. This light should be flickering when receiving a data stream, if not, check that the software used to control the lights has the output "on" and is configured properly.

7. Label all NDB's, spacer cables & Network/Ethernet Cables on both ends. If a cable needs replaced, this will make it easier to identify.

8. Do not cable tie Data or Network Cables with Main Voltage/Power cables. This could distort the Data Signal.

9. Power all NDB's from the same power strip(s), isolated from NEC's on the network (if any). This way we can re-cycle the power to the NDB's without cutting power to the NEC's.

10. In multiple NDB installs, assign each Cluster of NDB's to its own power breaker.

11. To prevent a 20Amp breaker from tripping, limit 5 NDB's (approx. 1000 RGB's each) per breaker. This keeps each breaker running at about 75%, with 25% headroom for potential power spikes.
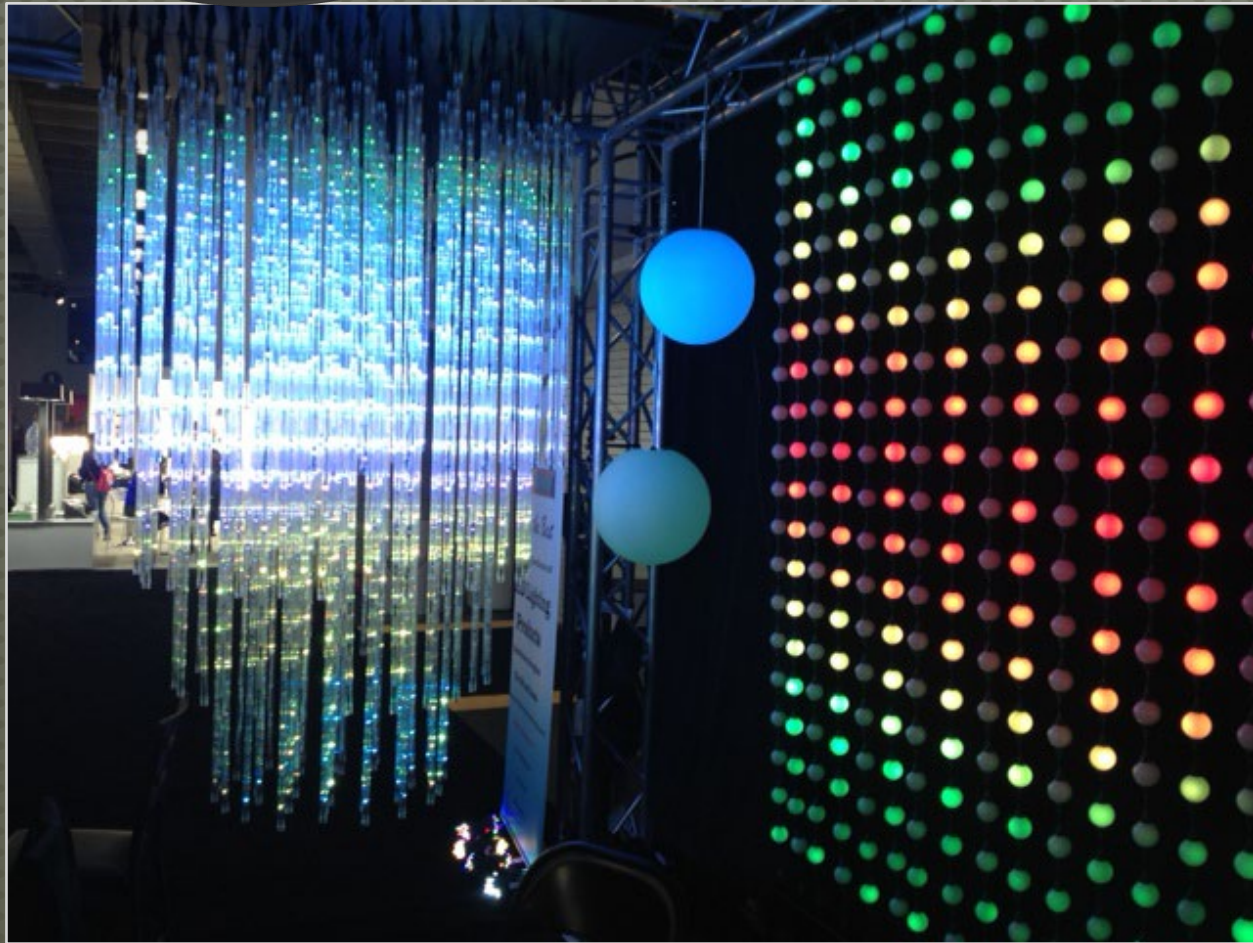
QUESTIONS & RESOURCES

PLEASE E-MAIL

Support@MinleonUSA.com

& REFERENCE THIS PRESENTATION.

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WE ENCOURAGE YOU TO VIEW THESE RELATED TUTORIALS:

- **POWER & DATA MANAGEMENT**
- **NEC/NDB NETWORK CONFIGURATION GUIDE**
- **NETWORK EFFECTS CONTROLLER (NEC) – OVERVIEW**

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THANK YOU FOR YOUR INTEREST IN

MINLEON RGB's!

Videos on Facebook: Minleon USA

THIS IS A SUMMARIZED PRESENTATION ON THE OPERATION AND USE OF THE RGB PLUS LINE NETWORK DATA BOX (NDB+).

BEFORE OPERATING, PLEASE READ THE 'NDB+ USER MANUAL'

HTTPS://MINLEONUSA.COM/SUPPORT/?RAINMIN RGB

FOR A THOROUGH UNDERSTANDING OF ITS OPERATION AND USE.

Minleon USA

Stateside Support & Sales

MinleonUSA.com

Mechanicsburg, PA

Rainmin Illumination

Commercial Manufacturing

Rainmin.com

Dongguan City, China

Soundtrack credit: Bensound.com