

12VDC

20A

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Minleon Pro-Show Lights www.minleon.com

Indel: RGB NDB PLUS

fault IP 10.0.0.100 / 255.255.255.0

ss 2 Power and Data Dis

12VDC 20A PLUS

NETWORK DATA BOX+ USER GUIDE #1 RGB-NDB+

SETTING UP ARTNET & DDP

Presented by Minleon International

Your provider of leading edge LED lighting products

> Minleon USA.com June 2018



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NDB+ with MeanWell HRP power supply in a weatherproof box

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NDB+ USER GUIDE

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NDB+ USER GUIDE THE NDB SYSTEM



- 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.
- 2. DON'T DO YOUR OWN SEQUENCING?—ALSO WORKS WITH MINLEON'S NETWORK EFFECTS CONTROLLER (DDP PROTOCOL)—NO PC NEEDED
 - 23 BUILT-IN 2-D EFFECTS
 - LIGHT SHOW MODE
 - SD CARD DRIVE FILE PLAYER & AUDIO PLAYER
 - TRIGGER EFFECTS LIVE VIA DMX
- Used in Mega-Trees, Grids, Canopies, Chandeliers & Tunnels
- COMPLETELY SCALABLE AND FLEXIBLE (VIA THIRD PARTY NETWORK SWITCH)

An NDB+ has 16 RGB-LED output ports



NDB+ USER GUIDE FEATURES

In this basic sketch, Art-Net can be substituted for Minleon's NEC (power supply not shown)



DISTRIBUTES 12VDC POWER & SEQUENCING DATA (VIA ETHERNET) TO LIGHT STRINGS

RGB

PLUS

- CONNECT MULTIPLE NDB+'S (AND NDB'S) TO A NETWORK VIA THIRD PARTY NETWORK SWITCH
- 1530 MAXIMUM LIGHTS PER NDB WHEN USING ART-NET/ INDIVIDUALLY CONTROL 1600 VIA DDP (MINLEON NEC)*
- COMPATIBLE WITH MINLEON SMART-T'S, TO ADD MULTIPLE STRINGS TO A SINGLE OUTPUT (AND IN TURN SAVING CABLING)
- 16 LIGHT STRING OUTPUTS
- 40-AMP; 12-24vdc max power input (to date only RGB Domes run on 24 vdc in Plus Line)
 - 20-AMP MAX TO EACH SIDE OF NDB
 - POWER MUST BE BALANCED ON EACH SIDE IF RUNNING OVER 600 RGB'S
 - RECOMMENDED TO RUN AT 80-90% CAPACITY

* <u>Note</u>: These numbers are achieved with bulb spacing of 4-inches and power injections. It is recommended to run NDB's at no more than 90% this load with greater bulb spacings. Limit runs to about 125 lights or 100 feet from the NDB output to the final RGB.



NEW OPTION! 4-port NDB+ w/ power supply & dry box (same functionality as NDB+)



NDB+ USER GUIDE WHAT'S NEW IN 2017-18



- HOT-PLUG LIGHT STRINGS, WITH NDB+ POWERED
- 3-FUNCTION, EXTERNAL RESET SWITCH (MORE ON SLIDE 20)
- E1.31 SUPPORT (UNICAST ONLY)
- ARTNET4 SYNCH SUPPORT
- USER INTERFACE (UI) ACCESSIBLE AFTER LIGHT SHOW STOPS
- UPDATE FIRMWARE VIA UI
- REVERSE LIGHTS ON A STRING
- INPUT POWER 12-24 VDC
- INJECT POWER MID-RUN VIA POWER T+ & 5-AMP PSU (POWER T'S ARE NOT COMPATIBLE WITH LEGACY/GEN2 RGB NDB)
- 8-PORT MODE (INCREASE LIGHT COUNT PER PORT FROM 230 TO 460)
- NEW VERSION: 4-PORT NDB+ W/ POWER SUPPLY & DRY BOX (PICTURED AT LEFT)
- New RGB-Plus Line twist-and-lock connectors



NDB+ USER GUIDE SPECIFICATIONS



Control		Electrical & Safety	
Input	up to 16 universes	PSU Included	no
Outputs	16	Input Power	12-24 VDC
Max Lights across all Outputs	1600	Max current	20 Amps per side
Max Lights w/o power injections	approx. 1200	Fuse Type (per output)	5-Amp ATM
Max Lights per Output	460 in 8-port mode w/ inline power injections * (230 in 16-port mode)	*Inline power injection	via Minleon Power T+'s & RGB-5A, 12VDC PSU
Max Lights per Output w/o power iniection	approx. 125L or 100-feet, whichever comes first	Certifications	UL listed, IP 24
May Smart T's per Output	20	Dimensions	
External Interface	1 x RJ45 port	Box dimensions	4.0 x 5 .25 x 1.375 inches
Protocols	ArtNet, E1.31 (unicast), DDP	Output cable length	10.5 inches
Default IP Address	10.0.0.100	Weight	1.2 lb.
Hard Reset Button	yes, on top, 3-function	Housing	polycarbonate
Firmware Updates from Web Interface	yes, via ethernet	Mounting Option	yes, screw holes
Reverse Output Sequence	yes, optional	Operating Temperature	Neg -10 to +50 Cel. / Neg -14 to +122 Far.

Specifications as of March 2018 and are subject to change.









Powered by a 12vdc, 20-amp to 40-amp transformer, connected on both sides of NDB—we recommend MeanWell HRP 12vdc series

- CAT 5 NETWORK CABLE CONNECTS NDB DIRECTLY TO THE RJ45 NETWORK OUTPUT OF A COMPUTER, NEC OR ARTNET CONSOLE
- Spacers, Smart T's or Lights are connected beginning with pigtail output #1
- ADD STRINGS IN NUMERICAL ORDER



Left, side view

Computer, Minleon NEC or Art Net console



Lights

NDB+ USER GUIDE ADVANCED HARDWARE SET-UP



MULTIPLE NDB+'S CAN BE CONNECTED THROUGH A STANDARD 100MB NETWORK SWITCH*

RGB

PLUS

- EACH CONTROLLER MUST HAVE ITS OWN Individual IP address configured
- EACH NDB+ REQUIRES ITS OWN POWER SUPPLY

<u>*Pro Tip</u>: If RGB design is outdoors, a proper TEMPERATURE-RATED, THIRD PARTY CAT 5 CABLE & NETWORK SWITCH IS RECOMMENDED—AN EXAMPLE IS ETHERWAN #43008 (PICTURED BELOW).









NDB+ USER GUIDE INTEGRATING WITH THE NEC



- MINLEON'S NETWORK-EFFECTS CONTROLLER (NEC) CAN SEND DATA TO UP TO 8000 RGB'S*
- SEND DATA TO UP TO 16 NDB/NDB+'s*
- ONBOARD AUDIO WAV FILE PLAYER WITH OUTPUT JACK
- SD/HC CARD SLOT TO ACCESS USER-GENERATED (.BIN) LIGHTING DATA & (.WAV) AUDIO FILES
- NETWORK PORT TO SEND LIGHTING DATA TO NDB'S, NET SWITCHES, AND TO SYNCHRONIZE WITH OTHER NEC'S
- SINGLE DMX PORT (2 RJ45 JACKS) FOR SENDING DMX LIGHTING DATA OR RECEIVING DMX COMMANDS
- SHOW CONTROLLER (NEC-UI) ADD ON, ALLOWS WIRELESS, REMOTE ACCESS TO THE DDP EFFECTS PLAYER & INCLUDES A CALENDAR FORMAT SCHEDULER

* 8000 RGB's was achieved with bulb spacing of 4-inches. It is recommended to run NEC's at 80% this load with greater bulb spacings, esp. when using the .WAV audio player. In most cases, multiple NEC's can work together to reach the channel count you desire.

> For more details please reference the Network Effects Controller – Overview tutorial.



NDB+ USER GUIDE CONNECTING TO A NETWORK

MINLEON'S NEC CAN AUTO-CONFIGURE NDB+'S IN ITS UTILITY MODE*. CHOOSING THIS OPTION, ALL OUTPUTS ARE ASSIGNED THE SAME VALUES.

But in order to set custom values for each output, or to configure for Art-Net, we must first set up the IP4 network address on your computer's network interface to be on a similar IP range and subnet that the NDB+ CONTROLLER SHIPS WITH.

Must have similar IP Address & Subnet range

<u>*For more details on Auto-Configuration,</u> <u>please reference the</u> <u>NEC/NDB Network Configuration Guide tutorial.</u>

IP4 RECOMMENDED SETTINGS

- IP ADDRESS: 10.0.0.10
- SUBNET MASK: 255.255.255.0

RGB

PLUS

• DEFAULT GATEWAY: 10.0.0.1

NDB Controller Default Setting

- IP ADDRESS: 10.0.0.100
- SUBNET MASK: 255.255.255.0
- DEFAULT GATEWAY: 10.0.0.1



NDB+ USER GUIDE CONNECTING TO A NETWORK



11

USING WINDOWS

- 1. RIGHT CLICK ON THE 'LAN' CONNECTION AND SELECT 'OPEN NETWORK AND SHARING CENTER'.
- 2. SELECT THE 'NETWORK CONNECTION' WHERE THE NDB+ IS CONNECTED.
- 3. CLICK ON THE 'PROPERTIES' TAB.
- 4. DOUBLE CLICK ON 'INTERNET PROTOCOL VERSION 4 (TCP/IPv4)' TO BRING UP THE 'IP PROPERTIES BOX'.

5. MANUALLY SET:

- IP ADDRESS: 10.0.0.10
- SUBNET MASK: 255.255.255.0
- DEFAULT GATEWAY: 10.0.0.1

6. CLICK OK

<u>Note</u>: Your PC should now be able to access the 10.0.0.10 Network that the NDB Controller is on. Remember, you may not have internet access due to the IP address change.

Control Panel Home	View your basic net	work information and	set up connections		
Change adapter settings	A			See full map	
Change advanced sharing	FASTEDDY-17-PC	Network	Internet		
settings	(This computer)		anderhet		
	View your active networks		C	onnect or disconnect	
	Network		Access type: Internet		
	Home netw	ork	HomeGroup: Joined	Connection 2	Stop 2
			Connections a could Area c	connection 2	siep z
	Change your networking s	ettings			
	🕵 Set up a new con	nnection or network			
	Set up a wireless	, broadband, dial-up, ad hoc,	, or VPN connection; or set up a ro	outer or access point.	
	🐀 Connect to a ne	twork			
	Connect or reco	nnect to a wireless, wired, dia	al-up, or VPN network connection.		
	- Choose homeon	oup and sharing ontions			
	Access files and	printers located on other net	work computers, or change sharin	ng settings.	
		📮 Local Area Connection	2 Properties	Internet Protocol Version	4 (TCP/IPv4) Properties
ocal Area Connection 2 Status	X	Networking Sharing	· · · · · · · · · · · · · · · · · · ·		
neral		Connecturing		General	
Connection		Realtek PCIe GBF	Family Controller	You can get IP settings a this capability. Otherwise	assigned automatically if your network supports e, you need to ask your network administrator
IPv4 Connectivity:	Internet			for the appropriate IP se	ttings.
IPv6 Connectivity:	No network access	This second at the second state	Configure	Obtain an IP addres	ss automatically
	Enabled	Inis connection uses the f	rowwing items.		
Media State:	Lindbled	Client for Minman	ft Natuorka	 Use the following IP 	address:
Media State: Duration: Speed:	20 days 01:00:53	Client for Microso	ft Networks er driver	Ouse the following IP IP address:	address:
Media State: Duration: Speed:	20 days 01:00:53 100.0 Mbps	Client for Microso	ft Networks er driver eduler	 Use the following IP IP address: Subnet mask: 	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0
Media State: Duration: Speed: Details	20 days 01:00:53 100.0 Mbps	Client for Microso	ft Networks er driver eduler haning for Microsoft Networks Version 6 (TCP/IPv6)	O Use the following IP IP address: Subnet mask: Default gateway:	address:
Media State: Duration: Speed: Details	20 days 01:00:53 100.0 Mbps	Performation	ft Networks of driver eduler haring for Microsoft Networks Version 6 (TCP/IPv6) Version 4 (TCP/IPv4)	Use the following IP IP address: Subnet mask: Default gateway:	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0
Media State: Duration: Speed: Details	20 days 01:00:53 100.0 Mbps	Pient for Microso AVG network file AVG network file AOS Packet Sch Bile and Printer S	th Networks driver eduler Version 6 (TCP/IPv6) Version 4 (TCP/IPv6) Version 4 (TCP/IPv6) gg/ Discovery Mapper I/O Driver gg/ Discovery Responder	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server Obtain DNS server	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0
Media State: Duration: Speed: Details ctivity	20 days 01:00:53 100.0 Mbps	Client for Microso Client for Microso AltG network file Place Sch Place Sch Place And Printers Anternet Protocol Anternet	H Networks r driver eduler haring for Microsoft Networks Version 6 (TCP/IPv6) Version 1 (TCP/IPv6) Version 4 (TCP/IPv4) gy Discovery Mapper I/O Driver gy Discovery Responder Unproteint	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server O Use the following DI Preferred DNS server	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0 address automatically NS server addresses: Step !
Media State: Duration: Speed: Details ctivity Sent —	20 days 01:00:53 100.0 Mbps	Client for Microso Client for Microso Alta network file Alta network	H Networks r driver eduler Version 6 (TCP/IPv6) Version 4 (TCP/IPv6) Version 4 (TCP/IPv4) ogy Discovery Mapper I/O Driver ogy Discovery Responder Uninstall Properties	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server Use the following DNS Preferred DNS server: Alternate DNS server:	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0 address automatically NS server addresses: Step
Media State: Duration: Speed: Details ketivity Sent — Bytes: 1,262,453,718	20 days 01:00:53 100.0 Mbps — Received 3,092,970,221	Client for Microso Construction	Hetworks rdriver eduler rdriver eduler Version 6 (TCP/IPv6) Version 1 (TCP/IPv6) Version 4 (TCP/IPv4) orgy Discovery Mapper I/O Driver orgy Discovery Responder Lininstall Properties otocol/Internet Protocol. The default	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server: Use the following DN Preferred DNS server: Alternate DNS server:	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0 address automatically NS server addresses: Step !
Media State: Duration: Speed: Details Activity Sent — Bytes: 1,262,453,718	20 days 01:00:53 100.0 Mbps — Received 3,092,970,221	Client for Microso Client for Microso Alta network file Alta network and Alta network prote Alta network prot Alta network prot Alta network prote Alta network pro	Hetworks rdriver eduler rdriver eduler version 6 (TCP/IPv6) Version 6 (TCP/IPv6) Version 4 (TCP/IPv6) Version 4 (TCP/IPv6) version 4 (TCP/IPv4) ogy Discovery Responder Uninstall Properties totoci/Internet Protocol. The default cocd that provides communication nected networks.	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server: Obtain DNS server: Alternate DNS server: Validate settings u	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0 address automatically NS server addresses: Step
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Media State: Duration: Speed: Details Activity Sent Bytes: 1,262,453,718 Precrites @Disable Step	20 days 01:00:53 100.0 Mbps — Received 3,092,970,221 Diagnose 3	Client for Microso Client for Microso Client for Microso Client for Microso Client fortocol Client fort	th Networks driver eduler Version 6 (TCP/IPv6) Version 6 (TCP/IPv6) Version 4 (TCP/IPv6) Version 4 (TCP/IPv4) gry Discovery Mapper I/O Driver ogy Discovery Responder Uninstall Properties atocol/Internet Protocol. The default cool that provides communication nected networks.	Use the following IP IP address: Subnet mask: Default gateway: Obtain DNS server Use the following DN Preferred DNS server: Alternate DNS server: Validate settings up	address: 10 . 10 . 10 . 1 255 . 255 . 255 . 0



Changes above this line require a save and reboot to take effect.

Output	Smart-Ts	Lights/String	Reverse?	Starting Slot
1	0	10		1
2	0	10	2	31
3	0	10		61
4	0	10		91
5	0	10		121
6	0	10	8	151
7	0	10	8	181
8	0	10		211
9	0	10		241
10	0	10	8	271
11	0	10	8	301
12	0	10	G I	331
13	0	10		361
14	0	10		391
15	0	10	8	421
16	0	10	U	451

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero). Auto-Fill from Output 1 down

NDB+ USER GUIDE MANUAL CONFIGURATION



- TYPE 10.0.0.100 IN YOUR WEB BROWSER
- THE NDB+'S BLUE CONFIGURATION SCREEN SHOULD APPEAR (SEE GRAPHIC)
- BEGIN TO SET UP THE NETWORK CONFIGURATION, UNIVERSES & OUTPUTS
- You also have the ability to test the Lighting without the need for software

<u>Note</u>: The web configuration page is available after NDB power up or reset, and before the first ArtNet or DDP data packet arrives. The web server is shut down if data arrives, but will be re-enabled if NO data is received for 5 seconds.



NDB+ USER GUIDE



NDB-	- Config		×						
← (0 10	.0.0.1	00						
NDB+ v1	.48 (100N	l/Full)						
IP:	10		0		0	٦.	100	1	
NetMask:	255		255		255		0		
Gateway:	10		0		0	4	1		
Protocol:	DDP	•,	Art-Net	-	E1.31	(unic	ast)		
Changes a	bove this	lin	e require	e a	save an	id neb	boot to t	ake eff	ect.

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

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

*DDP is a proprietary protocol that runs Minleon's Network Effects Controller (NEC), built-in effects.



D ND	3+ Config	×				38		66666	3333B	63333	88	8888	333	88
÷	C () 10	.0.0.100				- 33		20000	22222	900000		6666	566	
NDB+ v	1.48 (100M	I/Full)						86666				333	383	388
IP:	10	. 0	. 0	٦.	100	- KS			999353				888	888
NetMask:	255	. 255	. 255		0			85566	200003			99992	9999	996
Gateway:	10	. 0	. 0		1			99999	55553	\$62996	88	8888	555	200
Protocol Changes	: DDP	• Art-Net	©E1.31 a save an	(unica d reb	ast) moot to	take e								
LED chip Load def TØH: 400 order:	settings: aults for:) ns, • RGB	RGB+ WS T1H: 850 RBG GRB	S2812B SI ns, Tbit: GBR	OI M	utputs: aximu	• 16 • 8 m Lights/O	3 Dutput: 230		-6510		1	1 Gender		
greyscal	e: 16 bits			St	ata fron arting a	n 16 contig at 16-bit ur	guous Art-Net U niverse number	0 0	of 510 byte	es) can be se	electe	d for the	outpu	its.
Outputs:	• 16 • 8	-	->	6	Jutnut	Smart-Ts	Lights/String	Reverse?	16-bit Ur	uv/Channel	Net	Subnet	Univ	Her
Maximu	m Lights/O	utput: 230			arbar					1/.		-	-	
Data from	n 16 contig	uous Art-Net U	Universes (1	-	<u>0</u>	25	<u> </u>	0	/1	0	0	0	0000
Starting	at 16-bit un	iverse number	0	2		0	25	0	0	/76	0	0	0	0000
Output	Smart-Ts	Lights/String	Reverse?	16-bi	it Univ/	Chann		65555						
1	0	25	0	0	/1			8333	33333			1	888	383
2	0	25	6	0	/76	6		6696266			1		333	
3	0	25	•	0	/15	51	6666666		20000					
4	0	25		0	/22	26	Fields	s with	ו Blu∈)				
5	0	25		0	/30	01	back	arou	nd a	re /				
6	0	25		0	/37	76	outo	mati						
7	0	25		0	/4	51	auto							
0	0	25		1	/16	3	calci	Jate	dby	the w	\overline{Ie}	$\overline{\mathbf{O}}$		

interface

NDB+ USER GUIDE LIGHT CONFIGURATION



OUTPUT ASSIGNMENTS

0000

4.

NOW WE WILL LINK THE UNIVERSE AND CHANNELS TO THE OUTPUT.

- OUTPUTS: 16- OR 8-PORT MODE (16 = 230 MAX L/OUTPUT; 1. 8-PORT = 460 MAX L/OUTPUT)
- ARTNET UNIVERSES: THIS IS THE UNIVERSE RANGE THAT THE 2. NDB+ CONTROLLER IS SET TO WORK WITH. SPECIFIES WHICH BLOCK OF 16 UNIVERSES WILL BE RECEIVED BY THE NDB.*
- OUTPUT: THE PHYSICAL OUTPUT (NDB+ PIGTAIL) THAT THE 3. LIGHTS ARE CONNECTED TO.
 - SMART T'S: THE NUMBER OF SMART T'S THAT ARE CONNECTED per output (if any, more on slide 18)
- 5. LIGHTS/STRING: THE AMOUNT OF LIGHTS CONNECTED PER STRING OR T.
- 6. REVERSE: MAKES THE LAST LIGHT ON THAT OUTPUT, THE FIRST, AND SO ON, UNTIL THE FIRST LIGHT IS LAST (ADDRESS)
- 16-BIT UNIV: SEE #2 ABOVE 7.
- 8. THE CHANNEL NUMBER IS THEN RELATIVE TO THE FIRST UNIVERSE YOU PICKED. SO IF YOU SET THE ARTNET UNIVERSE TO 30, IT RECEIVES UNIVERSE 30-35, AND THEN STARTING SLOT #1 WOULD BE UNIVERSE 30, CHANNEL 1.



D ND8+ Config × ← C ① 10.0.0.100 NDB+ v1.48 (100M/Full) Art-Net F1.31 (unicast hanges above this line require a save and reboat to take effect LED chip settings oad defaults for: RGB+ WS2812B SK6812 WS2811-low WS2811-high TM1803 TM1804-low TM1804-high TeH: 400 ns, TiH: 850 ns, Tbit: 1260 ns, Treset: 100 order: RGB RBG GRB GBR BRG prevscale: 16 bits Outputs: 16 8 Maximum Lights/Output: 230 Data from 16 contiguous Art-Net Universes (of 510 bytes) can be selected for the outputs. starting at 16-bit universe number 0 Output Smart-Ts Lights/String Reverse? 16-bit Univ/Channel Net Subnet Univ Hex 76 151 226 301 0000 376 451 25 16 15 001f 166 15 001f 25

 11
 0
 25
 31
 241
 0
 1
 15
 001f

 12
 0
 25
 3
 31
 316
 0
 1
 15
 001f

 13
 0
 25
 3
 31
 /316
 0
 1
 15
 001f

 14
 0
 25
 3
 31
 /466
 0
 1
 15
 001f

 15
 0
 25
 3
 32
 /31
 0
 2
 0
 0020

 16
 0
 25
 3
 32
 /106
 0
 2
 0
 020

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero Audu-FWI from Output 1 down Test Lights

Save

Upgrade NDB+ firmware: Choose File No file chosen

Upload BIN file (press once and wait!)

NDB+ USER GUIDE MANUAL CONFIGURATION (CONT.)



9. Auto-Fill: Will automatically fill all the outputs based on output 1 settings.

10. Test Lights: This enables a white test pattern that starts at the first configured output and finishes at the last configured output.

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

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero). Auto-Fill from Output 1 down

Test Lights

Save

Reboot

Upgrade NDB+ firmware: Choose File No file chosen



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NDB+ USER GUIDE STARTING SLOT – DDP MODE



THE STARTING SLOT NUMBER SPECIFIES WHICH PART OF THE INCOMING DATA STREAM GETS SENT TO THE LIGHTS ON EACH OUTPUT PORT.

- The starting slot begins at 1
 - WITH THE DDP PROTOCOL, THE NDB ACCEPTS UP TO 4800 (1600 LIGHTS TIMES 3 RGB BYTES PER LIGHT) BYTES OF DATA—EVERY 3 BYTES SPECIFIES A RED, GREEN AND BLUE COLOR VALUE FOR A LIGHT
 - STARTING SLOT 1 IS THE DATA FOR THE FIRST LIGHT, SLOT 4 FOR THE SECOND LIGHT, 7 FOR THE THIRD LIGHT, & <u>SO ON</u>

<u>Pro Tip</u>: Multiple outputs can have the same starting slot if you want to duplicate the same light data to the same outputs.

Sateway:	10	•	0	0 F1 31 (1 ast)	
changes at	ove this	lir	e require	 save and	ret	poot to take effect.	

100

LED chip settings:

NO8+ Config
 ← ⊂ ⊂ ⊙ 10.0.0.100
 NDB+ v1.48 (100M/Full)

10

 Load defaults for:
 RGB+
 WS2812B
 SK6812
 WS2811-low
 WS2811-ligh
 TM1803
 TM1804-low
 TM1804-low

 T0H:
 400
 ns, T1H:
 850
 ns, T5it:
 1260
 ns, Treset:
 100
 us

 order:
 RGB
 RBG
 GRB
 GRB
 BRG
 BGR

 greyscale:
 16 bits
 16 bits</t

Outputs: 🖲 16 🕓 8

Maximum Lights/Output: 230

Output	Smart-Ts	Lights/String	Reverse?	Starting Slo
1	0	25	e.	1
2	0	25	9	76
3	0	25	9	151
4	0	25	0	226
5	0	25	9	301
6	0	25	0	376
7	0	25	•	451
8	0	25		526
9	0	25	9	601
10	0	25	9	676
11	0	25	9	751
12	0	25	Ų.	826
13	0	25	0	901
14	0	25	9	976
15	0	25		1051
16	0	25		1126

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero). Auto-Fill from Output 1 down Test Lights Save

Upgrade NDB+ firmware: Choose File No file chosen

Reboot



×

Protocol: DOP Art-Net E1.31 (unicast)

Changes above this line require a save and reboot to take effect.

order: RGB RBG GRB GBR BRG GBR

NDB+ USER GUIDE STARTING SLOT – ART-NET



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.

greyscale: 16 bits Outputs: • 16 • 8

LED chip settings:

TØH: 400

ND8+ Config

NetMask: Gateway:

← C ③ 10.0.0.100

Maximum Lights/Output: 230

Data from 16 contiguous Art-Net Universes (of 510 bytes) can be selected for the outputs. Starting at 16-bit universe number 0

ns, T1H: 850 ns, Tbit: 1260 ns, Treset: 100

Load defaults for: RGB+ WS2812B SK6812 WS2811-low WS2811-high TM1803 TM1804-low TM1804-high

Output	Smart-Ts	Lights/String	Reverse?	16-bit I	iniv/Channel	Net	Subnet	Univ	Hex
1	0	25		0	1	0	0	0	0000
2	0	25	U.	0	/76	0	0	0	0000
3	0	25	0	0	/151	0	0	0	0000
4	0	25	0	0	226	0	0	0	0000
5	0	25	0	0	301	0	0	0	0000
6	0	25	0	0	376	0	0	0	0000
7	0	25		0	451	0	0	0	0000
8	0	25	8	1	/ 16	0	0	1	0001
9	0	25	8	31	/91	0	1	15	001f
10	0	25	0	31	/166	0	1	15	001f
11	0	25		31	/241	0	I	15	001f
12	0	25	D.	31	/316	0	1	15	001f
13	0	25		31	/391	0	1	15	001f
14	0	25	0	31	466	0	1	15	001f
15	0	25	9	32	/31	0	2	0	0020
16	0	25		32	106	0	2	0	0020

Set unused ports to zero Lights.

When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero). Auto-Fill from Output 1 down

Test Lights Save Reboot



100 lights off one NDB+ output are often divided amongst Smart T's & connected 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.

NDB+ USER GUIDE SMART T'S PER OUTPUT



SMART-T'S ARE EXCLUSIVE TO MINLEON NDB+, WI-FI CONTROLLER (WEC+) & NETWORK EFFECTS CONTROLLER (NEC) SYSTEMS.

- LIGHT STRINGS WILL RUN INDEPENDENT OF EACH OTHER—NOT IN PARALLEL
- REDUCES CABLING BY ADDING MULTIPLE STRINGS TO A SINGLE NDB OUTPUT
- This level of flexibility is becoming imperative in the Light design industry
- 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.)
- MAX SMART T'S PER OUTPUT IS 20

<u>Please Note</u>: 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 higher value. Harness' must also be equal value. If one is unequal, making it smaller & save it for last.



NDB+ USER GUIDE LIGHT CONFIGURATION





LIGHTS/STRING

This is the number of individual lights per Minleon RGB light string. Strings begin at the NDB+ Output or at each Smart T. If a string of lights has 25 lights on it then this should be set to 25.

<u>Remember</u>: The web configuration page is only available after NDB power up or reset, and before the first ArtNet or DDP data packet arrives. The web server is shut down if data arrives, but will be re-enabled if no data is received for 5 seconds.



NDB+ USER GUIDE RESTORING DEFAULT SETTINGS

RGB

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.



The Reset Switch is located in a small hole on the top side of the NDB. It has 3 modes of operation.

- PRESSING IT FOR LESS THAN 1 SECOND CAUSES AN NDB REBOOT (THIS COULD BE USED TO EXIT TEST LIGHTS MODE OR TO RESET LIGHT STRINGS AFTER ADDING OR REMOVING SOME).
- PRESSING IT FOR 1-5 SECONDS WILL RESET THE IP ADDRESS INFO TO THE FACTORY DEFAULT (USEFUL IF YOU FORGOT ITS ADDRESS) BUT WON'T CHANGE ANY SPECIFIC LIGHT OR PORT CONFIGURATIONS.
- Pressing it for more than 5 seconds will reset everything to the factory defaults.



D ND8+ Config * ← C ① 10.0.0.100 NDB+ v1.48 (100M/Full hanges shows this line require a save and reheat to take effect LED chip settings oad defaults for: RGB+ WS2812B SK6812 WS2811-low WS2811-high TM1803 TM1804-low TM1804-higi ns, TiH: 850 ns, Tbit: 1260 ns, Treset: 100 TeH: 400 endant # RGB _ RBG CBR BRG revicale: 16 bits Outputs: 16 8 Maximum Lights/Output: 230 Data from 16 contiguous Art-Net Universes (of 510 bytes) can be selected for the outputs. starting at 16-bit universe number 0 Output Smart-Ts Lights/String Reverse? 16-bit Univ/Channel Net Subnet Univ Hex 76 151 226 301 376 451 16 15 001f 15 001f 166 241 15 001f /316 15 001f 15 001f 391 466 15 001f 0020 106 0020

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (c Auto-Fill from Output1 down TsetLights

Save Reboot

Upgrade NDB+ firmware: Choose File No file chosen

Upl

NDB+ USER GUIDE FIRMWARE UPDATES



PERIODICALLY, MINLEON WILL RELEASE CODE UPDATES TO ADD FEATURES OR FIX BUGS WITH THE NDB+. THESE UPDATES ARE HOUSED AT <u>WWW.MINLEONUSA.COM</u>, ON THE NDB+ PRODUCT PAGE AS .BIN AND .HEX FILES. THE .BIN FILES CAN BE DOWNLOADED, SAVED AND UPLOADED TO THE NDB+ AT THE BOTTOM OF THE INTERFACE.

- 1. SELECT "CHOOSE FILE" FROM THE LOCATION YOU SAVED IT
- 2. SELECT "UPLOAD BIN FILE" ONCE, AND LET THE CONTROLLER RE-BOOT

THE .HEX FILE CAN BE USED IF YOU NEED TO UPDATE THE FIRMWARE DIRECT TO THE PCB WITH A PICKIT PROGRAMMER. CONTACT US FOR DETAILED INSTRUCTIONS, IF NEEDED.

Set unused ports to zero Lights. When using Smart-Ts, the number of Lights/String on all ports must be the same (or zero). Auto-Fill from Output 1 down Test Lights Save Reboot

Upgrade NDB+ firmware: Choose File No file chosen

Upload BIN file (press once and wait!)



NDB+ USE	R GUIDE
TROUBLESHOOTING	& BEST PRACTICES



	0 0 10	0.0 100							
	01010								
VDB+ v	1.48 (100N	(/Full)							
IP:	10	. 0	. 0	1.1	00				
NetMask:	255	. 255	. 255	. 0					
Gateway:	10	. 0	. 0	. 1					
rotocol	DOP	Art-Net	E1.31	(unicas	t)				
Changes	above this	line require	a save ar	d rebo	t to take eff	ect.			
ED chip	settings								
Load def	aults for:	RGB+ W	52812B SI	K6812	WS2811-low	WS:	2811-high		11803
OH: 400	PCP IIS,	RRG CRR	ns, Thit:	1200	ns, Trese	t: 10	0	15	
reyscal	e: 16 bits	i and	don	- DA	a ban				
Dutputs:	• 16 8	ŝ							
	-	L.		lana			1		-
Output	Smart-Is	Lights/String	Reverse?	16-bit	Univ/Channe	Net	Subnet	Univ	Hex
1	0	25	9	0	1	0	0	0	0000
2	0	25	0	0	76	0	0	0	0000
3	0	25	9	0	/151	0	0	0	0000
4	0	25	0	0	226	0	0	0	0000
5	0	25	9	0	/301	0	0	0	0000
6	0	25	Q.	0	/376	0	0	0	0000
7	0	25	9	0	451	0	0	0	0000
8	0	25	0	1	/16	0	0	1	0001
9	0	25		31	/91	0	1	15	001f
10	0	25	9	31	166	0	1	15	001f
11	0	25	1	31	241	0	1	15	001f
12	0	25	0	31	316	0	1	15	001f
13	0	25		31	/391	0	1	15	001f
14	0	25		31	466	0	1	15	001f
15	0	25		32	/31	0	2	0	0020
	0	DF.	-	100	1400	-	-	0	0020
	13	125		132	106	-0-	12	0	10020

Set unused ports to zero lights. When using Smart-Ts, the number of lights/String on all ports must be the same (or zero) Auto-Fillform Output 1 down

Test Lights Save

Reboot

Upgrade NDB+ firmware: Choose File No file chosen

The NDB+ System 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, capture a screen shot of the Network Configuration Page (at left). Print this out and keep in the weatherproof box with the NDB+. 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.

3. Use the "Test Lights" feature of each NDB+ 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: <u>http://www.3waylabs.com/triklits/ndbmax.html</u>. If using ArtNet, the lights are updated at a fixed 40fps, regardless of the incoming frame rate.



NDB+ USER GUIDE TROUBLESHOOTING & BEST PRACTICES (CONT.)

- 5. If a single NDB+ output will not work with any light string, check the face of the box for a RED LED shining through the black transparent case. If this light appears, 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 RGB Domes or the new 24 Vdc Pebbles or T5 Light Tubes, 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. This way we can re-cycle the power to the NDB's without cutting power to the NEC's.
- 10. Assign each Cluster of NDB's to it's 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.

PLUS



NDB+ USER GUIDE QUESTIONS & RESOURCES



PLEASE E-MAIL SUPPORT@MINLEONUSA.COM & REFERENCE THIS PRESENTATION. *****

WE ENCOURAGE YOU TO VIEW THESE RELATED TUTORIALS:

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

THANK YOU FOR YOUR INTEREST IN MINLEON RGB'S!



Videos on Facebook: Minleon USA





+

12VDC

CUL US

E469573 Low-voltage

Lighting System

Class 2 Power and Data Destruction tom Default IP 10.0.0 100 | 255 255 255

20A

25.4

Next Name along units.

PLEASE REMEMBER



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' MINLEONUSA.COM/NETWORK-DATA-BOX.HTML

FOR A THOROUGH UNDERSTANDING OF ITS OPERATION AND USE.



Minleon USA <u>MinleonUSA.com</u>

Minleon[™]

Mechanicsburg, PA



Minleon-Rainmin Illumination Rainmin.com

Dongguan City, China