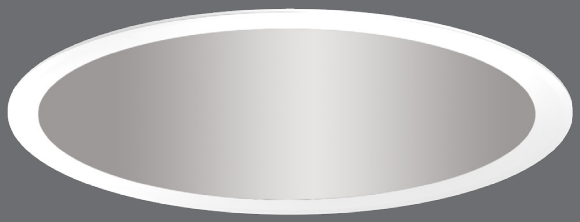
MAXILUME ARCHITECTURAL LIGHTING
By Elite Lighting

RGB+Tunable White **HHJ10-LED** 10”
10” Architectural High Lumen LED Downlight - Retrofit

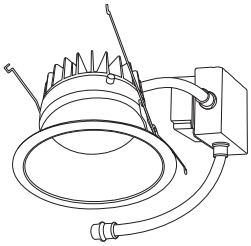


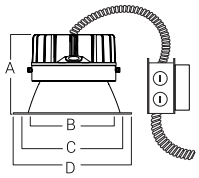
HH10-1501
Flanged Downlight

HH10-1507
Flanged Wall Wash

HH10-1577
Flanged Double Wall Wash

REFLECTOR/ TRIM COLOR





A: Height = 9-1/8”
B: Trim Aperture = 9-5/8”
C: Cut-Out = 10-5/8”
D: Trim Outside Dia = 11-5/32”

NOMINAL	LED ENGIN
2000	29 W
1100	15 W

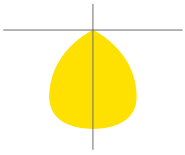
Based on 1650K-8000K, 90CRI with semi-specular chrome reflector. Actual wattage may vary +/-5%.

DYNAMIC PLATFORM

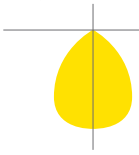
RGB + White technology has a white color tuning range from 65K to 18K. RGB color range derived from the primary colors red, green and blue is used to create infinite color options in the RGB palette, adding colors together in varying amounts to create new ones. RGB Tunable White technology enables users to adjust the color temperature, adding gradients of saturated colors. No longer restricted to white light LEDs, lighting designers and architects can manipulate a space with desired hues and shades, altering the color temperature of the room, creating the perfect environment. The use of RGB Tunable White technology in healthcare and assisted living stimulates circadian rhythm, accelerating the healing process. Available in LED Engin component, maintains a constant CRI of 90+.

LUMENS	LED Engin Platform: 1100 & 2000
RGBW PLATFORMS	Elite: RGBW-ELT-65K-18K
CRI	90+ Standard
COLOR QUALITY	2 Step MacAdam Ellipse
DISTRIBUTIONS	VWD, WD, MWD, MD, ND, SPD, NSPD, 45º-50º visual cutoff
TRIM OPTIONS	Downlight, Wall Wash, Double Wall Wash, Wet Location
REFLECTOR COLORS	CL (Semi-Specular Chrome), SHZ (Low Iridescent Satin Haze), WT (Wheat), WH (White), MB (Black)
FLANGE COLORS	Self-Flanged MB (Black), SCH (Semi-Specular Chrome), SHZ (Low Iridescent Satin Haze), WH (White), WT (Wheat)
DIMMING	ELDODMX.1-RJ45, ELDODMX.1-XLR ELDODMX.1-HR
EMERGENCY	PELI-S-20, PELI-S-100, PELI-S-250, PELI-S-400
LIFETIME	L70 at 50,000 Hours
PHOTOMETRIC TESTS	In Accordance with IES LM79-08, LM80 and TM-30, TM-21

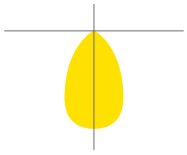
VWD: Very Wide Candlepower Distribution Curve



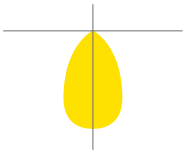
WD:Wide Candlepower Distribution Curve



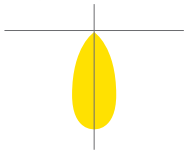
MWD:Medium Wide Candlepower Distribution Curve



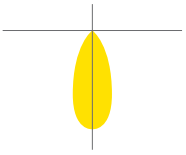
MD:Medium Candlepower Distribution Curve



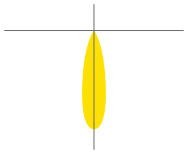
ND: Narrow Candlepower Distribution Curve



SPD:Spot Candlepower Distribution Curve



NSPD:Narrow Spot Candlepower Distribution Curve



Reference IES files for additional distribution curve information.

c UL us LISTED
PROUDLY ASSEMBLED in AMERICA
SAMEDAY SHIPPING Consult with Factory
5 YEARS LIMITED WARRANTY

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AS210316

FEATURES

A highly sustainable and ultra-efficient architectural LED downlight that provides even, glare-free illumination. Available in a range of finishes, distributions, and lumen packages, it is ideally suited for use in corporate office space, hospitality, healthcare, commercial, academic, churches and retail.

OPTICS AND REFLECTOR

The reflector has a 45 ° visual cutoff, and is shipped standard with a Solite lens in a smooth frosted finish. It is spun from 0.05" thick aluminum, has a 1-step anodized finish, and is available in different colors or custom RAL finishes. Reflector trim options include self-flanged and white painted flange. Various distribution options are available, and all optics are field changeable.

THERMAL MANAGEMENT SYSTEM

Passive cooling Diecast Aluminum Heat Sink, LED light engine and driv er are replaceable, upgradeable, and can be accessed from below the ceiling. The consistency in the quality of light is delivered with precision performance by the use of a unique locking mechanism that aligns the reflector with the light engine.

MOUNTING FRAME & BRACKET

Designed for easy installation into an existing incandescent or CFL downlight mounting frame, converting the luminaire into an energy efficient LED downlight. Flex is designed to attach into the existing junction box, with additional brackets available for up to a 2-1/2" ceiling thickness.

DRIVER ELECTRICAL INFORMATION

The LED driver is rated for 50 to 60 Hz at 120V-277V input, produces less than 20%THD, has a power factor between 90% and 100%, and is thermally protected for additional safety. Junction box and Driver can be accessed from below the ceiling and above the ceiling. Junction Bo x is Listed for through branch circuit wiring.

DIMMING & DRIVER INFORMATION

Elite RGB+W platform produces a full spectrum of brilliant colors with tuning range of 6500K to 1800K (RGBW-ELT-65K-18K).

WARRANTY

Five-year warranty for parts and components. (Labor not included)

LISTINGS

c-UL-us - Listed for Wet Location if used with HH10-1501 Trim.
c-UL-us - Listed for Feed Through Wiring.
All LED luminaires are rated and tested to LM-79 and LM-80 standards by an! independent laboratory.

Example: **HHJ10-LED-RGBW-ELT-65K-18K-1100L-DMX-512/RDM-120-MD-90-HH10-1501-CL-WH**

SERIES	LUMENS	DRIVER	VOLTAGE	EMERGENCY	TRIM TYPE	REFLECTOR/TRIM- FINISH
HHJ10-LED-RGBW-ELT-65K-18K	❑ 1100L ❑ 2000L	❑ ELDODMX.1- RJ45 ❑ ELDODMX.1- XLR ❑ ELDODMX.1-HR	❑ 120 ❑ 277 ❑ MVOLT	❑ PELI-S-20 ❑ PELI-S-100 ❑ PELI-S-250 ❑ PELI-S-400	❑ HH10-1501 Flanged Downlight ❑ HH10-1507 Flanged Wall Wash ❑ HH10-1577 Flanged Double Wall Wash	❑ CL-WH ❑ CL-SCH ❑ SHZ-WH ❑ SHZ-SHZ ❑ WT-WH ❑ WH-WH ❑ MB-WH ❑ CL-MB

OPTICS	CRI
❑ VWD 70º ❑ WD 60º ❑ MWD 52º ❑ MD 36º ❑ ND 30º ❑ SPD 24º ❑ NSPD 15º	❑ 90+

* For Details Consult Factory

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1.1 DMX512-A Protocol Specifications

DMX512-A is an acronym for Digital Multiplex, a communication protocol used to remotely control lighting dimmers and intelligent fixtures. It is designed to provide a common communications standard between these lighting devices regardless of the manufacturer. The 512-A after the DMX refers to the number of control channels used on one network segment (often called a ‘universe’) of devices.

DMX512A Specifications:

- DMX 512-A (Controller).
- A universe is 512 Channels.
- DMX value is between 0 and 255, where 0 is off and 255 is full on.
- The maximum number of devices in a daisy-chain wire run is 32, which include the controller and opto-splitter.
- The maximum network wire run is a distance of up to 1600 feet for non-RDM systems and up to 1000 feet for RDM systems.
- One device functions as the master (DMX controller) on a network, while the rest function as slaves (mergers, splitters, intelligent fixtures, etc.).
- Only the controller (master) transmits over the network, and all fixtures receive the same data.
- The final device in the daisy-chain must be terminated with a 120 ohm resistor between DMX+ and DMX- pins.
- It is recommended that the terminator for the final device be located in the control panel, if it falls within the recommended wiring distance.
- All wiring must be in a continuous run and daisy-chained.
- Star wiring is only allowed in conjunction with an opto-splitter.
- Do not run DMX control cable in close proximity to AC power lines. EM spikes from switching of high-current devices such as HVAC equipment or generators will induce noise into the DMX cable.
- The shield must be carried through between modules and properly grounded at one point only.
- Connections to DMX512-A-RDM accessory board: wire size to be 24AWG, and solid or stranded cables may be used. Stranded wire used must be tinned or installed with ferule connector.

RDM

DMX512-A control protocol that enables Remote Device Management for two-way communications for confi guration, monitoring and system setup. Allows two way communication between lighting controller and the fi xtures. Allows for remote setting of DMX start addressing. RDM signals are sent back the other way, but not constantly. Controller can ask one or more devices for query feedback. RDM packets are inserted in-between the existing DMX data packets being used to control the lighting. The DMX Control Console will broadcast up to 512 channels over one DMX cable (max. run of 1000 feet for RDM). Some of these channels may not be used, but will still be transmitted, as required by the protocol. It must be set to a desired channel (001, 002. 003. 004, etc.) to control the connected light fi xture. This is usually accomplished using RDM. This desired ‘channel’ is commonly known as the DMX address. When addressing fi xtures, it is not recommended to skip addresses.

The DMX512-A interface follows the ANSI E1.11-2008 (R21013) standard. Four address slots are allocated to each interface board and control the Dim level, CCT, Saturation and Hue of the araya[5] modules connected to the board.

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1.2 DMX512-A Electrical Specifications

Parameter	Range	Remarks
ESD Protection	±15KV (air), ±8KV (conducted)	Per IEC 61000-4-2
Termination	Recommended	The DMX512 bus termination rules apply
Directionality	Receive only	
Frequency stability	±20ppm	
Load per port	1/256	1/8 of Nominal RS-485
Isolation	$3KV_{rms}$	

DMX512-A Control Systems (recommended list)

Choreo
Cognito
Crestron Greenlight System
Entec
ETC Mosaic
ETC Paradigm
Fresco
Interactive Technologies
Lutron HomeWorks QS
Lutron Quantum
Nicolaudie
Pathway Connectivity
Pharos
Traxon Ecue
Vantage Controls

DMX512-A Recommended Internal / Field Wiring

TMB Cable ProPlex DMX

PC224T: 2-pair DMX512 cable, overall foil and braid shielding with drain wire. UV and fungus resistant. Fully rated for installations, yet easy handling for light duty portable applications. **PC224TW:** Same as above, with white jacket.

For use as DMX in/out under one jacket:

PC244T: Two individually shielded pairs and drain wires. UV resistant. Color coded foil shielding for easy reference.

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DMX512-A PROTOCOL

1.3 DMX512-A Recommended Field Wiring

Liberty 24-2P-485 (Non-Plenum), 24 AWG, 2 pair dual 120 ohm, 11.2 pf/ft low capacitance (Wago, XLR and PHX connectors)
Liberty 24-2P-P485 (Plenum), 24 AWG, 2 pair dual 120 ohm, 11.2 pf/ft low capacitance (XLR and PHX connectors)
Belden #9842 (Non-Plenum), 24 AWG, 2 pair dual shielded 120 ohm, 12.8 pf/ft low capacitance (XLR and PHX connectors)
Belden #89842 (Plenum), 24 AWG, 2 pair dual shielded 120 ohm, 12.8 pf/ft low capacitance (XLR and PHX connectors)

Please refer to wire manufacturer’s lighting catalog for and/equals as required by code.

Category Wire or Equal

The Entertainment Services and Technology Association (ESTA) does not define a maximum run length for DMX over Cat5 since many factors will affect the maximum run length, such as number of devices, number of splices in the cable, the strength of the DMX transmitter(s), if Remote Device Management (RDM) is being used, and sources of interference. ESTA does state (again, in ANSI E1.21-2):

“A properly selected and installed DMX512 cable should provide acceptable signal strength for runs of 300m (1000ft). Please note that the technical requirements, such as run-length and topology for other networking technologies, such as Ethernet, should be considered if using the installed cable for another networking technology in the future is anticipated.”

Cat5 or equivalent is not preferred as a portable cable since it is not as rugged as other DMX cables. Male RJ45 connectors are especially prone to breakage over repeated re-connections.

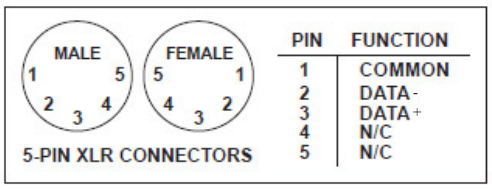
DMX512-A Recommended Field Connectors (or Equal)

WAGO 221
PHOENIX CONTACT
XLR NEUTRIK
CRESTRON
RJ45 DM -8G-CONN
RJ45 IDC DM-CONN

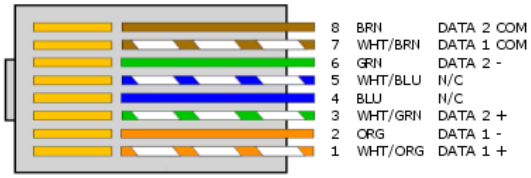
DMX512-A Wiring Connections

Signal	Description	Pin Colors (4-Pair Cable)	Pin Colors (2-Pair Cable)	3-pin XLR connector	5-Pin XLR connector	5-Pin PHX connector
Signal Common		White/Brown and Brown	White/Blue and Blue	1	1	1
Data (-)	Primary Data Link	Orange	Orange	2	2	2
Data (+)	Primary Data Link	White/Orange	White/Orange	3	3	3
Data2 (-), or not used	Optional Secondary Data Link				4	4
Data2 (+), or not used	Optional Secondary Data Link				5	5

XLR Connectors (5-Pin)



RJ-45 Connector Pin-Out (T568B)



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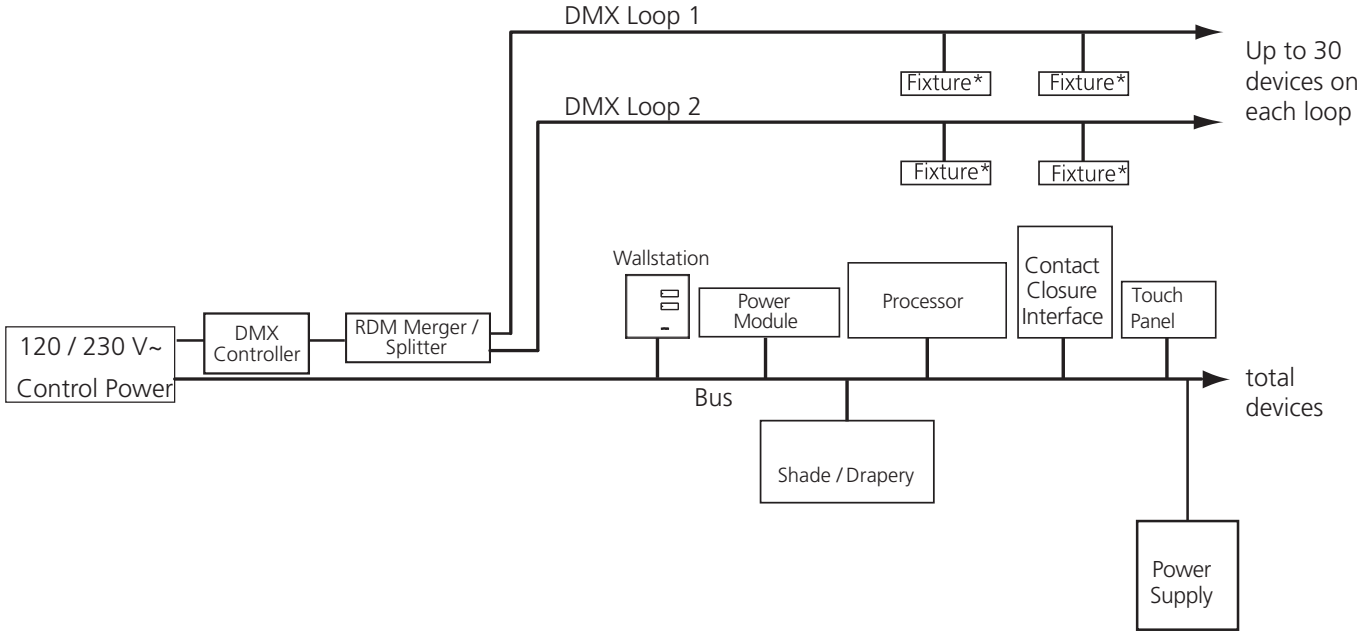
DMX512-A PROTOCOL

1.4 DMX512-A Controller Example

DMX512A Example



DMX512-A Drain Wire Connections

Drain wire connections are required as follows.

Shielding

To add another level of protection from electromagnetic noise, a grounded shield is added over the twisted pair wires. When this is enclosed in a protective jacket, to avoid ground loops and electromagnetic contamination of the ground system, all control ground wiring, including cable shields and drain wires, should be treated like sensitive current-carrying conductors. All control ground wires should be insulated (not bare) and the same wiring practices should be observed with ground wires as with other sensitive signals. Care must also be taken when designing control wiring to ensure that each shield is connected to only a single ground point. You should establish this point at a central location, like a control panel or cabinet, and avoid all connection to grounds in the field. A control ground is sometimes referred to as an isolated ground (an oxymoron) for this reason, but the term single-point ground is more accurate.

Method-1

A typical two-pair shielded cable can be prepared for termination to the terminals with the drain wire cut off. This is usually done at the field end of the cable where no shield grounding is desired. You will then use insulating tape or heat-shrink tubing to protect the cable from contamination and to prevent accidental grounding of the shield or drain wire. An accidental ground at this point would almost certainly create an undesirable ground loop.

Method-2

A typical two-pair shielded cable can be prepared for termination to the terminals with the drain wire cut off. The drain wire, which is an uninsulated conductor, is sleeved with a insulating tubing to prevent accidental grounding. The crimp-on lug is valuable in this instance to retain the tubing. Insulating tape or heat-shrink tubing is again used to protect the cable from contamination and to prevent accidental grounding, since any accidental connection between the drain wire and a chassis, frame, or enclosure would almost certainly create a ground loop.

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- **LED ENGIN ELDO DMX Protocol and Wiring Description**

How to wire DMX/RDM lighting systems

DMX/RDM is a robust and reliable system for lighting control. However, if not implemented correctly, problems can arise such as random flashing of lights, erratic operation and delays in responding to commands. This document explains the best practices in DMX wiring.

Below, a typical DMX universe is shown. The DMX controller sends signals over the DMX cable to the drivers. At the last driver, the cable has to be terminated with a 120Ω resistor to prevent reflections of the signal.

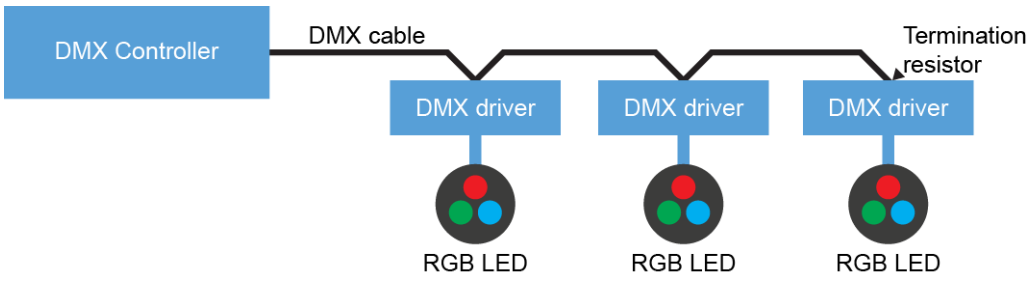

Figure 1 – Typical DMX universe

Important things to consider are:

- DMX is a three-wire system. Use all three!
- DMX is based on the EIA-485/RS-485 standard.
- Always use cable specifically designed for DMX / RS-485. These cables have an impedance of 120Ω and a low capacitance. For instance: Belden 9841 or 3105a.

Figure 2 – Belden 9841 cable

- DMX must be terminated with a 120Ω resistor to prevent reflections.
- A daisy chain topology should be used.
- After 32 unit loads a repeater/booster should be used.
- Keep cabling below 300 metres between the controller and the last driver.
- It is generally considered good practice to provide separate DMX in and DMX out/DMX thru connections to your fixture to aid in installation. This can be in the form of pigtails, RJ-45 connectors or 5-pin XLR-connectors.

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Connecting the cable on eldoLED drivers with ‘DMX in’ terminals only

Drivers with only one set of DMX terminals (DMX in +, DMX in -, and DMX in shield) use a standard DMX bus topology (daisy chain). At the last driver, a 120Ω resistor must be connected between the DMX in + and DMX in - pins of the driver as termination. This method is compatible with RDM.

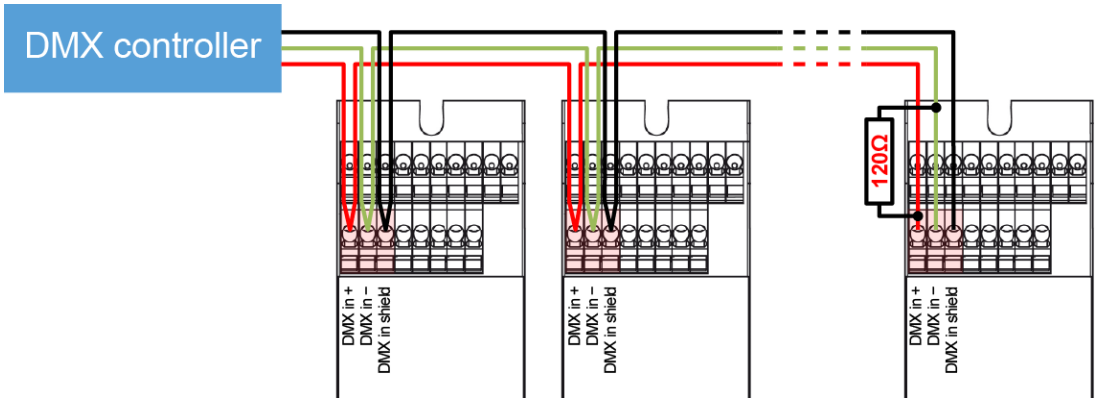

Figure 3 – Daisy chain topology with ‘DMX in’ only

Connecting the cable on eldoLED drivers with ‘DMX in’ and ‘DMX thru’ terminals

Some eldoLED drivers have an extra set of DMX terminals (DMX thru +, DMX thru - and DMX thru shield) in addition to the ‘DMX in’ terminals to make installation easier. Internally, these ‘thru’ terminals are electrically connected to the ‘DMX in’ terminals. These drivers also use standard DMX bus topology (daisy chain). The ‘DMX thru’ connections are compatible with RDM.

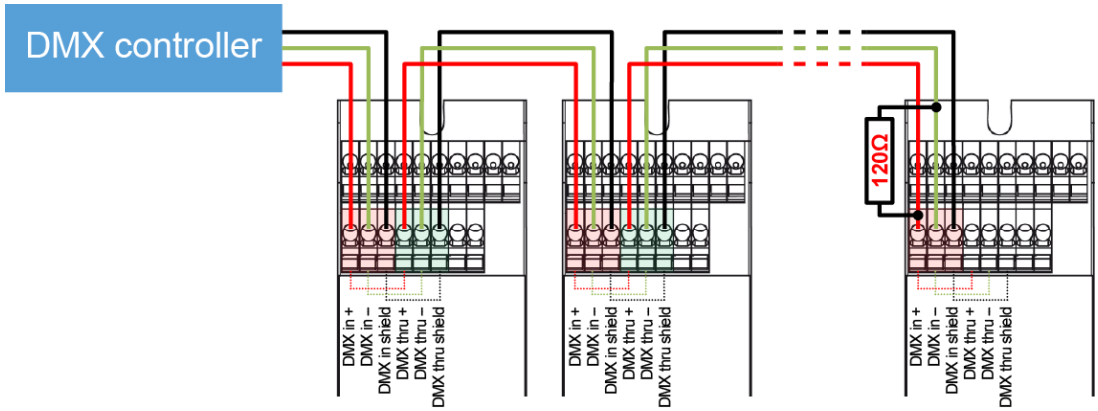

Figure 4 – Daisy chain topology with ‘DMX in’ and ‘DMX thru’

Connecting the cable on eldoLED drivers with ‘DMX in’ and ‘DMX out’ terminals

Drivers with ‘DMX out’ terminals (DMX out +, DMX out - and DMX out shield) in addition to the ‘DMX in’ terminals provide a buffered DMX out signal. These drivers offer additional functionality on top of standard DMX. On some products ‘DMX out’ is called LEDsync.

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- DMX out acts as a built-in booster or repeater, so no additional repeaters or boosters are necessary after 32 drivers.
- DMX out provides automatic driver addressing possibilities.
- With DMX out, it is possible to have mixed topologies instead of daisy chain only.
- Only the first driver on the ‘DMX out’-chain (master) is visible on RDM – slaves behind are not visible. If RDM is required, use the ‘DMX in’ terminals instead of ‘DMX out’.
- Each DMX out adds a delay of approximately 300µs. After 75 drivers, this delay will be visible.
- The maximum available DMX address is 480; DMX addresses 481 – 512 are reserved for ‘DMX out’-features.
- If one driver in the chain fails, devices behind the failing driver will stop receiving DMX signals.
- Drivers without ‘DMX out’-terminals or third party drivers should be first in the DMX chain, they cannot be connected behind drivers with ‘DMX out’.

Termination with DMX out

With drivers that have DMX out terminals extra care should be taken with termination, depending of the configuration. In short: termination is necessary after each cable run, but not at any T/Y-connections. Some examples:

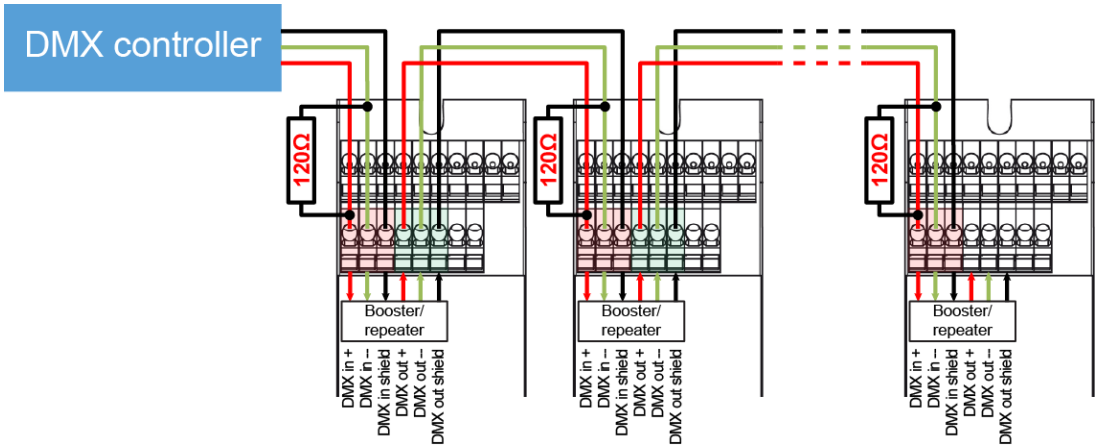

Figure 5 – Termination on each cable run

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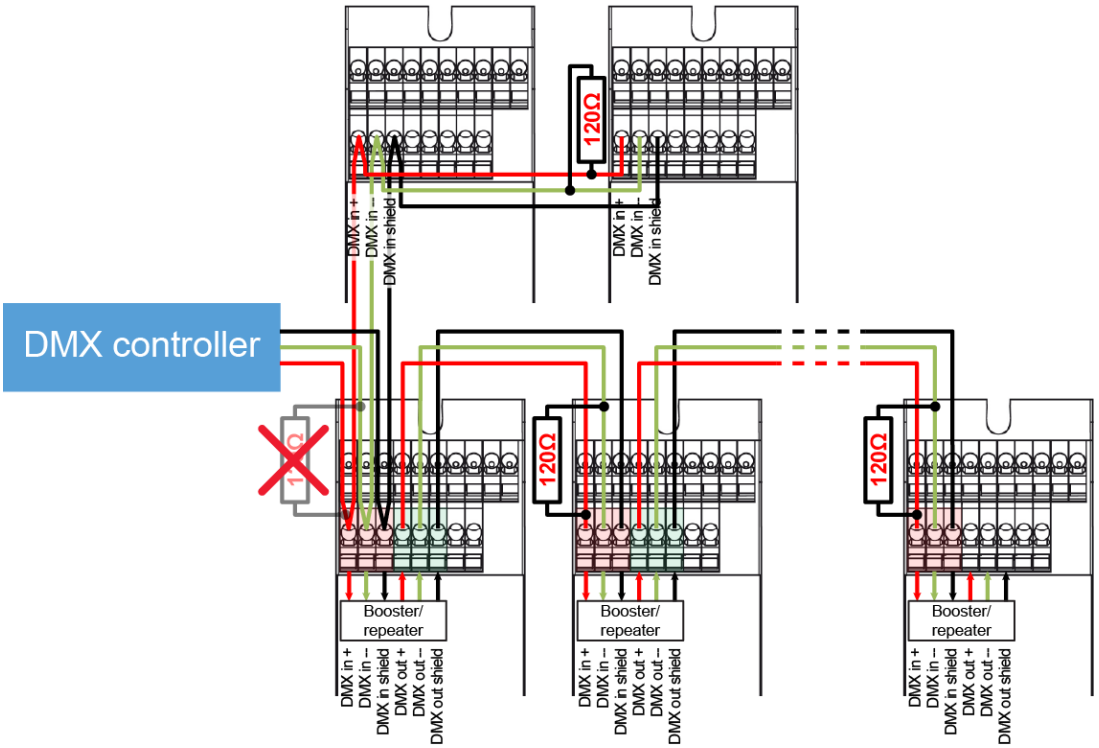

Figure 6 Mixed topology with daisy chain and DMX out

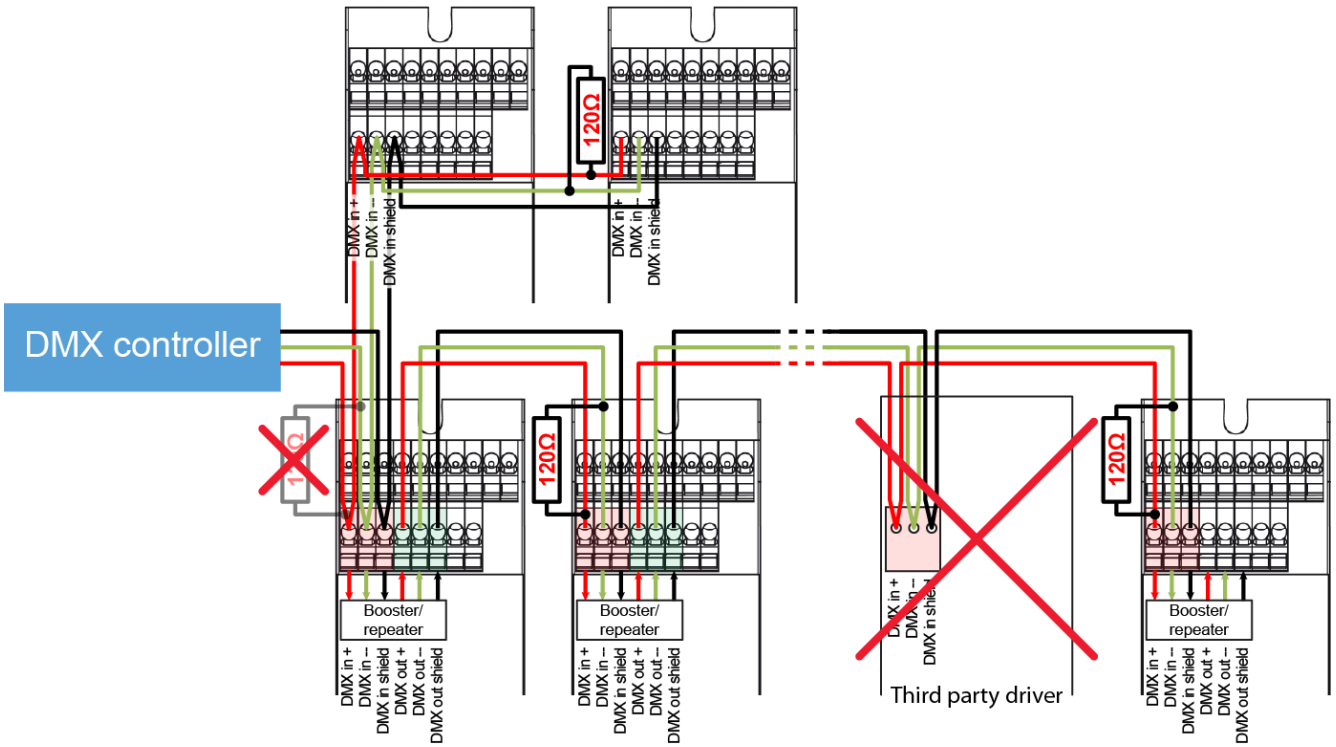

Figure 7 – It is not possible to have third party drivers in the DMX out-chain

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