# DNA

## Distributed Network Advantage

# The Link to Providing a Healthy System

L S C Lighting Systems

## LSC

The Distributed Network Advantage (DNA) provides a modern day solution to a few "age-old" problems. Gone are the days of daisy chaining DMX512 data around a venue, where a fault could disable the entire network. Gone are the days of large cable patch bays where incoming data can be patched to a greater array of outgoing data streams. Losing the patch leads or finding an incorrectly patched lead can be rather costly as well as time consuming. A lot of misnomers about the DMX512 protocol and its limitations have made many in the lighting industry very apprehensive when using this digital protocol.

For this reason alone LSC Electronics embarked on designing a versatile system of DMX512 components that are cost effective, easy to use and easy to install. The DNA system consists of a number of " building-block" components that can be arranged in varying formats to suit a wide range of applications. Options such as installation-friendly " KRONE Termination Panels" and plug-in isolation/buffer circuits for the DMXchange round off this exciting new product group from LSC.

**ISOPORTS** - are wall mount, electrically isolated and buffered DMX512 outlets available in three models, providing up to 1536 channels of control at any point. Up to 32 Isoports can be connected per DMX512 spur and an inbuilt terminator can be set for the last ISOPORT on each spur. A sturdy wall mounting box has been designed to allow the ISOPORTS to connect directly into the building's DMX512 wiring without powering down. This is ideal in replacing faulty modules without disturbing the rest of the network.

Requiring a 24VDC supply to power the onboard electronics each ISOPORT has an integral 'Power' indicator and a 'Data' indicator for each output connector. It is recommended to run power cabling separate from the DMX512 cable as conductor size in the data cable would be inadequate to carry power in most situations.

**ISONODE** - is designed to utilise the same sturdy wall mount box as the ISOPORT. The ISONODE is an intelligent, electronically isolated input that can sense when a transmitting device has been connected into its front panel connector, thus disconnecting the upstream DMX512 data. If the device remains connected but stops transmitting, the ISONODE then reconnects the upstream data back onto the network. In the case where power to the ISONODE is interrupted, the main upstream DMX512 is always connected. Indicators on the front panel show that power is present to the ISONODE, that upstream DMX512 is available to the ISONODE and an indicator to show that a connected transmitting device is active.

**ISOPOWER** - specifically designed as a power source for the ISOPORT and ISONODE network modules, the ISOPOWER provides a 24VDC output for up to 32 output or inlet modules. The ISOPOWER provides the facility to connect three separate DMX512 inputs. It then buffers and isolates them, and provides three DMX512 outputs. When used as a stand alone unit the ISOPOWER provides the isolation between the inlet modules and the outlet modules. Outputs can then be fed through Multisplit data splitters.

Installing a distributed network of DMX512 inlet and outlet modules enhances security against equipment failure rendering the total system useless. However a distributed system will only be totally reliable if the power supply to the individual modules can be guaranteed. For this reason the ISOPOWER is short circuit proof and has the facility to be linked to a second ISOPOWER to provide full redundancy. An auto-fault detection circuitry detects a power failure in the first unit and automatically switches to the back-up ISOPOWER. A front panel button allows you to manually switch the ISOPOWER into either 'active' or 'standby' mode. Front panel indicators display essential information such as data present on any of the three incoming DMX512 streams; internal power supplies' status (including 'fault' indicator); cooling fan operating; and 'active' or 'standby' mode.

The ISOPOWER can be connected to the 'outside' world in a number of variations. The basic unit has the wiring for the three DMX512 inputs and the three DMX512 outputs on a computer style DB25 connector. The DC out is provided on a separate power connector. A rear panel switch allows the individual termination of each DMX512 input. The system wiring can then be wired directly to a mating DB25 connector or to an optional ISOPOWER KRONE termination panel.

**DMXchange** - As complex DMX512 Distributed Network systems are on the increase, the call for a central data crosspatch to route a large number of inputs to a greater number of outputs has become apparent. LSC Electronics introduces the revolutionary DMXchange, a data crosspatch unit that can be expanded to handle up to 24 DMX512 inputs and crosspatch to 48 DMX512 outputs. Two models are available - a 6 input to 12 output module that has a built-in LCD Display and function buttons, to allow the user to setup the crosspatching and electronically label the data paths. The second model is an extension unit of the 'master' unit and provides an additional 6 data inputs and 12 data outputs. Up to three 'slave' units can be connected to a 'master' unit. The setup and labelling of the 'slave' units is handled by the 'master' unit.

Both models have front panel indicators showing data activity on each of their six inputs. The 40 character by 2 line LCD and four function buttons on the 'master' unit, allows the operator to patch any incoming input to as many outputs as required, label the incoming and outgoing data paths (up to 15 characters per label) and to store and recall up to 32 preset states. Electronic labelling can easily be setup by using an IBM style keyboard connected to the Keyboard port on the front panel. No two inputs can be patched to the same output, however this can be achieved externally by utilising a DMiX merge unit. In the event of any of the inputs or outputs requiring isolation within the DMXchange, an optional plug-in module is available. Called the DMXiso, this circuit board is internally fitted and can be configured to either receive or transmit an isolated and buffered DMX512 signal.

The DNAnet port is a communications port allowing the DMXchange to talk to other DNA products such as a DMXchange Slave and DMiX merge units. As the hub of the data system, the DMXchange can send out preset information to these other products, automatically configuring them to a previously stored state.

All input and output wiring is present on DB25 computer style connectors on the rear panel and can be connected to the DMXchange via mating DB25 connectors or via the optional DMXchange KRONE termination panel. A rear panel dip switch allows the individual termination of each DMX512 input.

**DMiX** - essentially designed as a stand-alone 2 into 1 merge unit, the DMiX can easily be adapted into the DNA system, whereby the necessity of merging two inputs onto one DMX512 data streams is required.

The DMiX combines data from two separate transmitting devices (controllers, DMXchange etc.) on a Highest-Takes-Precedence (HTP) basis, thus allowing two controllers to control the same fixture. The second data stream can be offset using 'up' and 'down' buttons on the front panel and the offset address is displayed on a three digit display. Each incoming data stream has an 'error' indicator as well as 'data' present indicator. 'Loop thru' connectors are included on each DMX512 input located on the rear panel. A rear panel switch allows the individual termination of each DMX512 input. A computer style DB25 connector contains all the wiring for the two DMX512 inputs and the DMX512 output. The system wiring can then be wired directly to a mating DB25 connector or to an optional DMiX KRONE termination panel. A DNAnet port is located on the rear panel to allow remote connection to the DMXchange crosspatch unit.

# Typical Theatrical DMX512 Interconnection Diagram Using Distributed Network Advantage (DNA)

24V DC

24V DC

ISOPOWER POWER SUPPLY

**ISOPOWER**
INCOMING STREAMS

ISOPOWER POWER SUPPLY

**ISOPOWER**
INCOMING STREAMS

DMXchange CROSSPATCH MASTER UNIT

**DMXchange**

DMXchange CROSSPATCH SLAVE UNIT

**DMXchange**

DNA net

DMiX MERGE

**DMiX**
INCOMING STREAMS

DNA net

MULTISPLIT SPLITTER

Isolated and buffered DMX512 outputs

LINKLIGHT MULTIPLEXER

**LinkLight II**

LINKLIGHTS can also be used to feed existing analog signals into the DNA system

LINKLIGHT MULTIPLEXER

**LinkLight II**

ANALOG OUTPUTS

ISONODE
Control Room

**ISONODE**

ISONODE
Prompt Corner

**ISONODE**

ISONODE
Stalls Dip Trap

**ISONODE**

24V DC
ISOPORT-1

24V DC
ISOPORT-1

24V DC
ISOPORT-1

24V DC
ISOPORT-1*

24V DC

Front of House Bridge No 1

ISOPORT-2

ISOPORT-2

ISOPORT-2

ISOPORT-2*

Front of House Bridge No 2

ISOPORT-2

ISOPORT-2

ISOPORT-2*

Balcony

ISOPORT-3

ISOPORT-3

ISOPORT-3

ISOPORT-3

ISOPORT-3*

#1    #2    #3    #4    #5    Stage Bars

ISOPORT-2*
Prompt Boom Bar

ISOPORT-2*
Opposite Prompt Boom Bar

LSC recommends the use of good quality data cable suitable for DMX512 and RS485 applications. Terminators are essential at the end of each data run. These can be set internally on each of the ISOPORTS marked '*'.

ISOPORT-1    ISOPORT-1    ISOPORT-1    ISOPORT-1    ISOPORT-1

#1    #2    #3    #4    #5    Stage Dip Traps

# Technical Specifications

## ISOPORT



- Galvanically isolated and buffered DMX512 outlet(s) mounted in a rugged metal wall box.
- Can be used with other RS422 based protocols
- Power indicator to show power present to unit
- Data indicator(s) to show data present at the output(s)
- 12VDC to 30VDC (nominally 24VDC) Power input
- Able to be installed and removed from DMX512 stream without disturbing the main DMX512 data flow.
- Individually selectable 120 Ohm terminator resistor.
- **ISOPORT Series 1**
  - single 5 pin AXR type connector on front panel.
  - power consumption typically less than 2 watts
- **ISOPORT Series 2**
  - two 5 pin AXR type connectors on front panel that can be selected to provide two individual DMX512 outputs (max 1024 channels) or two DMX512 outputs in parallel from one DMX512 source.
  - power consumption typically less than 3 watts.
- **ISOPORT Series 3**
  - three 5 Pin AXR type connectors on front panel that can be selected to provide three individual DMX512 outputs (up to 1536 channels) or two DMX512 output in parallel plus a separate DMX512 output (up to 1024 channels) or three DMX512 outputs in parallel (up to 512 channels)
  - power consumption typically less than 4 watts.
- Fully conforms to CE and C Tick regulations
  Measures 120mm x 74mm x 60mm including wall box.
  Weighs approximately 300g.

## ISOPOWER



- Output voltage nominally at 24VDC @ 4 Amps max.
- Short circuit proof.
- Multiple units can be linked together via DB25 and Power connectors, to provide full redundancy.
- Auto-fault detection and back-up selection button
- Three input DMX512 streams and three output DMX512 streams all totally isolated and buffered.
- Thermally controlled cooling fan with indicator on front panel and rear panel test button.
- Indicator for internal power supply failure.
- Standby/Active indicators to show ISOPOWER status
- Optional KRONE block termination panel.
- Fully conforms to CE and C Tick regulations
- 19" Rack Mount metal chassis, 2 rack units high.
- Input voltage switchable 100-120/220-240 VAC 50/60Hz 160 Watts max.
- Dimensions: 480mm Wide x 89mm High x 225mm Deep
- Weight: 10 kgs.
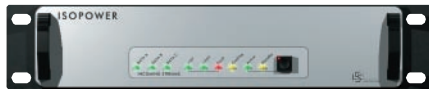
## ISONODE



- Front panel 5 pin AXR input connector providing full galvanic isolation onto the main DMX512 stream.
- Can be used with other RS422 based products.
- Automatic detection of incoming DMX512 through front panel connector to disconnect upstream DMX512 from main data network. Note that the ISONODE actually detects data, not just the connector presence.
- Led Indicator shows power is present to the ISONODE.
- Led Indicator shows the presence of upstream data.
- Led Indicator shows that a transmitting device has activated the ISONODE.
- 12VDC to 30VDC (nominally 24VDC) power input
- Power consumption less than 2 watts.
- Fully conforms to CE and C Tick regulations.
- Measures 120mm x 74mm x 60mm (includes mounting box)
- Weighs approximately 300g

## DMXchange



- Up to six DMX512 inputs and up to twelve DMX512 outputs per unit.
- Can be used with other RS422 based products.
- E2PROM memory retention in case of power failure.
- Master unit with LCD and function buttons.
- Slave unit as a plug-in extension unit for Master.
- Any output can be electronically patched to any input via the function buttons.
- Optional plug-in isolation and buffered modules for any input or output.
- Electronic labelling of any input or any output.
- Store and recall functions for 32 internal presets
- Indicators for incoming data activity.
- Optional KRONE termination panel
- Fully conforms to CE and C Tick regulations
- 19" Rack Mount metal chassis, 1 rack unit high.
- Input voltage switchable 100-120/220-240 VAC 50/60Hz 30 Watts max.
- Dimensions: 480mm Wide x 45mm High x 225mm Deep
- Weight: 3.5 kgs

## DMiX



- Two DMX512 inputs to one DMX512 output merge facility, with signals merged on HTP basis.
- Fixed offset on DMX512 stream A with variable offset on DMX512 stream B.
- Remotely change variable offset via DNAnet port when connected with DMXchange DMX512 Crosspatch.
- Fully isolated and buffered inputs and outputs, with loop thru AXR connectors on inputs.
- Optional KRONE termination panel
- Fully conforms to CE & C Tick regulations.
- 19" Rack Mount metal chassis, 1 rack unit high.
- Input voltage switchable 100-120/220-240 VAC 50/60Hz 30 Watts max.
- Dimensions: 480mm Wide x 45mm High x 225mm Deep.
- Weight: 3.5kgs

# Ordering Information

All components of the DNA system can be ordered separately, however as they are equally important within the data network, we encourage specifiers, consultants, venue managers, operators etc. to contact LSC with their specific requirements, whereby our Sales Engineers can tailor the optimum system for each application.

| CODE | DESCRIPTION |
|------|-------------|
| ISOP-1 | ISOPORT Single optically isolated and buffered DMX512 outlet wall mount box. |
| ISOP-2 | ISOPORT 2 way optically isolated and buffered DMX512 outlet wall mount box. |
| ISOP-3 | ISOPORT 3 way optically isolated and buffered DMX512 outlet wall mount box. |
| ISONODE | ISONODE Intelligent DMX512 inlet wall mount box. |
| ISOPOWER | ISOPOWER 19" Rackmount power supply unit |
| POWERKR | ISOPOWER 19" Rackmount KRONE Termination Panel |
| | |
| DMXchange | 6 input, 12 output 19" Rackmount DMX512 crosspatch unit Master. |
| DMXchangeS | 6 input, 12 output 19" Rackmount DMX512 crosspatch unit Slave. |
| DMXiso | Plug in isolation/buffer module for any input or output inside a DMXchange. |
| DMXCHKR | DMXchange 19" Rackmount KRONE Termination Panel. |
| | |
| DMiX | DMiX 19" Rackmount 2 in, 1 out DMX512 Merge unit. |
| DMiXKR | DMiX 19" Rackmount KRONE Termination Panel. |

The DNA system has now fulfilled specifiers wishes in providing a cost effective, functional solution for distributing DMX512 data safely and efficiently. Many prestigious venues have now taken the "Distributed Network Advantage" and below is a sample of some typical end users.

- Sydney Opera House, Australia
- Melbourne Concert Hall, Australia
- Crown Casino, Melbourne, Australia
- Victorian State Theatre, Melbourne, Australia
- Playhouse Theatre, Melbourne, Australia
- Lyric Theatre, Queensland Performing Arts Centre, Australia
- Superbowl Stadium, South Africa

LSC Electronics has forged a world wide reputation for designing and manufacturing innovative world class DMX512 products. The range is now one of the most extensive available and caters from the small system operator to the very large theatres, television studios, theme parks, function centres, cruise ships and the like.

## Other DMX512 products from LSC



### MULTISPLIT

Offering complete electrical isolation between all inputs and outputs, the Multisplit range of DMX512 splitter/amplifiers is available in 5, 10, 15 and 20 way output arrangements. Now regarded worldwide as the device for distributing DMX512.

### LINKLIGHT

The Linklight offers 48 channels of Multiplexing/demultiplexing of positive or negative analog voltage, inbuilt test facilities, external switching for polarity and transmit/receive mode and switchable power supply.

### SOFTLINK

The Softlink is a very powerful patching tool offering multiple DMX512 inputs patched to multiple DMX512 outputs with pile on and merge facilities. Available with Disk Drive backup and a Fader module, the Softlink is unsurpassed in its value as a large system DMX512 patch for concert, studio and theatre applications.

CE  ✓ XXXX