

Issue 1.0

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LL422u

PRODUCT LL422  
RS422 to FIBRE Interface.  
USER MANUAL  
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USER MANUAL

TABLE OF CONTENTS

<b>1. PRODUCT DESCRIPTION .....</b>	<b>3</b>
1.1 GENERAL.....	3
1.1.1 INDICATIONS.....	3
<b>2. CONFIGURATION.....</b>	<b>4</b>
2.1 PRODUCT STOCK CODES.....	4
2.2 VERSION HISTORY .....	4
<b>3. PREPARATION FOR USE .....</b>	<b>4</b>
3.1 UNPACKING.....	4
3.2 INSTALLATION.....	4
3.2.1 Configuration of the links .....	4
3.3 COMMISSIONING .....	6
<b>4. OPERATORS INSTRUCTIONS.....</b>	<b>6</b>
<b>5. MAINTENANCE INSTRUCTIONS.....</b>	<b>6</b>
5.1 INSTRUMENTS AND TOOLS REQUIRED .....	6
5.2 FIRST LINE MAINTENANCE.....	6
<b>6. PHYSICAL AND ELECTRICAL SPECIFICATION.....</b>	<b>6</b>

## 1. PRODUCT DESCRIPTION

### 1.1 GENERAL

The LL422 is a RS422 or RS485 low speed data communication interface suitable to operate over fibre. It is compatible with LL232 which is a RS232 to fibre interface and can also communicate over fibre with LL705T and LL705R which are interfaces used in the video systems.

The unit is packaged in a small plastic container and requires a 9-12V external DC power supply.

The unit has a fully duplex operation in RS422 mode and requires a transmit and a receive fibre. In the RS485 mode the unit will operate in half duplex mode and use a time out circuit to do turn around of the data signals.

The unit can be used in a feed through or party line fashion where data is sent to several units in a ring network then allowing any unit in the ring to answer.

Further the unit can be coupled directly to a LL232 which is a RS232 interface making a very versatile system allowing the master controller to communicate at RS232 level and the peripheral equipment to communicate at RS485 level.

### SPECIAL FEATURES

- Repeats data without interference.
- Compact.
- Economical RS485 operation.

### Uses

- Ideally suited for Pan tilt zoom systems in video applications.
- Access control.

#### 1.1.1 INDICATIONS

##### INDICATORS:

Power	- Indicates Power to the PCB
Traffic in	- Data being Transmitted to optics.
Traffic out	- Data being Received from optics.

## 2. CONFIGURATION

### 2.1 PRODUCT STOCK CODES.

**LL422AB** Single Channel RS422 /RS485 Transmitter with 850nm optics and ST optic connector.

### 2.2 VERSION HISTORY

- Version 'A' The original version is strapped for RS422 operation only.
- Version 'B' Has intelligence built in and can operate in a RS485 mode.

## 3. PREPARATION FOR USE

### 3.1 UNPACKING

Check for physical damage caused during transportation. Return any damaged equipment.

### 3.2 INSTALLATION

Ensure that the link loss over the fibre cable is within the power budget of the equipment. See the model number and optic option.

#### 3.2.1 Configuration of the links.

##### 3.2.1.1 Dip switch settings

Dip Switch	Off	On
SW 1	Termination on TX off.	Termination on TX on.
SW 2	Termination on RX off.	Termination on RX on.
SW 3	Party Line Off	Party Line On
SW 4	RS485 - 2 wire operation	RS422 - 4 wire operation.

##### 3.2.1.2 Using the unit in RS422 mode.

Dip switch 4 on.

RS422 usually has a 4 wire connection. 2 wires are used for receive and two wires are used for transmit. The data driver to the equipment is usually permanently in a 'driver on' condition. This connection is usually used in an point to point connection.

##### 3.2.1.3 Using the unit in RS485 mode.

Dip switch 4 off.

RS485 normally operates on a 2 wire mode thus only connections 1 and 2 are used. Data now has to flow in two directions on these two wires, thus the receive and transmit data is separated, and only one is active at any moment. The unit is usually in a receive condition. When data is received on the optic side the unit will go into a transmit condition and drive the RS485 bus. After the data stops the unit will time out and switch the driver off and revert back to receive condition. It is now ready to send an answer back. This time out period is usually referred to as the turn around time and could vary in length depending on the pattern of the data sent. Normally this period adds up to approximately 8 bit lengths. Should the peripheral equipment try to answer the master in less than this period then a data clash will occur. Software in the peripheral equipment must be modified not to violate this period.

#### 3.2.1.4 Party line operation.

Dip switch 3 on.

With this switch in the on position the data received by the unit will be echoed back to the Fibre transmitter. This will enable several units to be connected in a ring network. The data sent from the master will be echoed to all units in the ring and will return back to the master which must not be set for party line otherwise the message will go around the ring again. Any unit which now answers the message will send its message along the ring and then return to the master. This is a simple data ring network and is used in access control etc.

#### 3.2.1.5 Terminations

Dip switch 1 and 2.

When RS422 or RS485 data is sent on a copper pair one can always expect some data reflections from the cable ends. To eliminate this problem and to reduce the capacitive effect of the copper cable, one needs to put terminating resistors on each end of the copper link - even if the link is very short. The LL422 has built in terminating resistors which can be selected by dip switch 1 and 2. Further the input circuitry has bias resistors which pre biases the copper line to ensure that the data in the non active condition would be zero. If a problem occurs then it is possible that the equipment used has an opposite bias condition. This can be rectified by swapping the data wires at both the controller and the master.

#### 3.2.1.6 Connecting to RS232.

#### 3.2.1.7 Connecting to Copper cable.

Connect the + Positive wire to the Right hand pin of the connector and the negative wire to the second pin. Connection detail is illustrated on the unit. A screen wire or an earth can be connected to pin 5.

#### 3.2.1.8 Fibre Connection.

Carefully remove the optic connector covers and connect the fibre cables to the transmit and receive connections as illustrated on the unit.

### 3.3 COMMISSIONING

Observe the data indicator LED's too see if data is received and returned. If the link is correctly connected then the data led will flash when data is sent.

## 4. OPERATORS INSTRUCTIONS

The unit needs no operator intervention to function. If a fault arises, it is necessary to observe the alarm indications and to perform such procedures as first line maintenance as described in the proceeding chapter.

## 5. MAINTENANCE INSTRUCTIONS

No routine maintenance is required on this equipment.

### 5.1 INSTRUMENTS AND TOOLS REQUIRED

Optic power meter  
Multimeter.

### 5.2 FIRST LINE MAINTENANCE

When arriving at a suspect link it is always necessary to ensure that the unit has been correctly coupled and to note the alarm conditions of the equipment.

First observe the power indicator. If the power indicator is off then check if the supply voltage is correct for that particular unit. Replace a faulty fuses with those of the correct value only.

Next observe the data indications. Should this be in order then the fault is further down the link and most likely a broken fibre link is to blame. Optic power could be measured from the unit but this is only possible when sending constant data. A Level of approximately - 20dB could be expected.

## 6. PHYSICAL AND ELECTRICAL SPECIFICATION

### Copper side

Number: 1 Channel  
Type: RS422 or RS485.  
Connector: Phoenix 5 pin connector.

### Optic Interfaces

Optic: 850 OR 1300nm  
Connector: SMA or ST  
Fibre: Multi mode depending on option chosen.

**Power requirement**

Voltages: 9V to 12 Vdc @ 100mA  $\pm$ 5 %

**Dimensions**  
Height 20mm  
Width 50mm  
Length 70mm  
Weight 50g

**Ordering Information:**

Stock Code:

eg. LL422AB Single channel RS422 / RS485 Interface with 850nm short range optics with ST connector. See explanation below for optic selection.

<b>Optic option</b>	Wavelength	Range	Budget distance	Connector
AB	850nm	Short range	3.5km	ST or SMA
BB	1300nm	Medium range	12km	ST or SMA