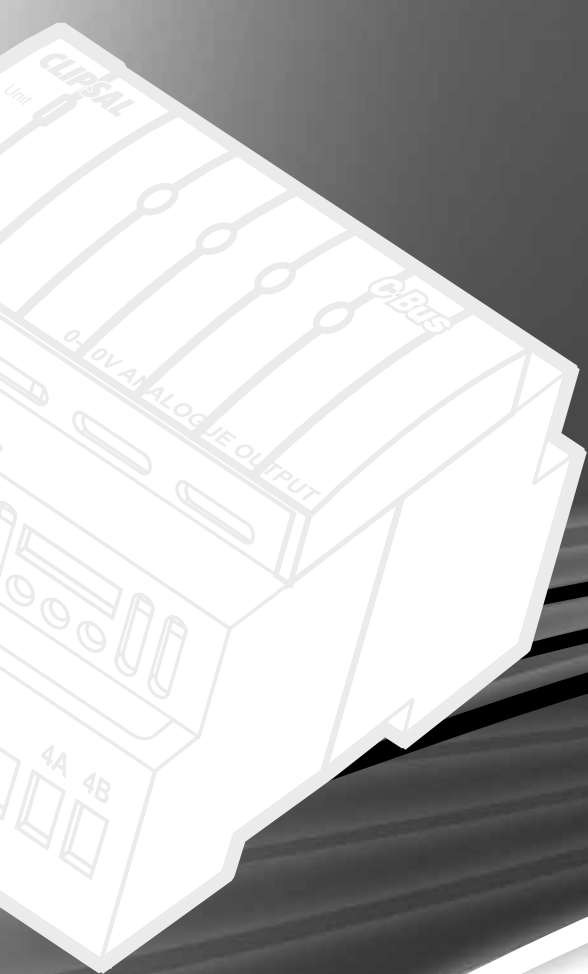




CLIPSAL[®]

by Schneider Electric



C-Bus[®]

**C-Bus 4-Channel
Analogue Output**

L5504AMP and LE5504TAMP



Installation Instructions

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1.0 Introduction

The DIN rail mounted C-Bus Analogue Output unit can either source or sink current and is used to drive most types of 0-10V electronic dimmable ballasts. The polarity of the signal may be selected so that 0V corresponds to maximum or minimum brightness. The C-Bus Analogue Output unit provides four independent channels. The unit is powered from mains and from the C-Bus network.

The output unit can also be used to control other types of peripheral equipment, such as pressure regulators and flow control valves. The unit is capable of sinking or sourcing current as appropriate for each connected load. Each channel is capable of driving multiple loads, depending on the load requirements. Refer to Specifications (Section 17.0) for output ratings. The 'A' terminal of each channel is connected to common Ground.

2.0 Safety and Product Handling

WARNING Electric Shock Hazard

Electric shock can cause death or serious injury. Turn off and lock out the circuit breaker serving the unit before installing or servicing the unit. Do not open the plastic case. There are no user serviceable parts inside the case.

- A qualified electrician must install the analogue output unit.
- Disconnect mains power before installing or changing wiring at the output channels.
- Using software not provided by Clipsal could result in erratic operation and could void the hardware warranty.
- The unit is for indoor use only.
- Do not attempt to make any adjustments or modifications to the unit without the assistance of Clipsal or Schneider Electric technical support.

3.0 Product Range

L5504AMP	4-Channel Analogue Output (220V to 240V, 50 or 60Hz)
LE5504TAMP	4-Channel Analogue Output (110V to 120V, 50 or 60Hz)

4.0 Important Note

The use of any software not provided by Clipsal, in conjunction with the installation of this product, may void any warranties applicable to the hardware.

5.0 Description

The L5504AMP and LE5504TAMP 4-channel Analogue Outputs provide a C-Bus controllable 0V to 10V d.c. variable output voltage. The unit is typically used to control electronically dimmable fluorescent lighting ballasts. It can also be used to control other types of peripheral equipment, such as electronic pressure regulators and flow control valves.

The unit is capable of sinking or sourcing current as appropriate for each connected load. Each channel is capable of driving multiple loads, depending on the load requirements. Refer to Specifications (Section 17.0) for output ratings. The 'A' terminal of each channel is internally connected to a common Ground.

6.0 Wiring Instructions

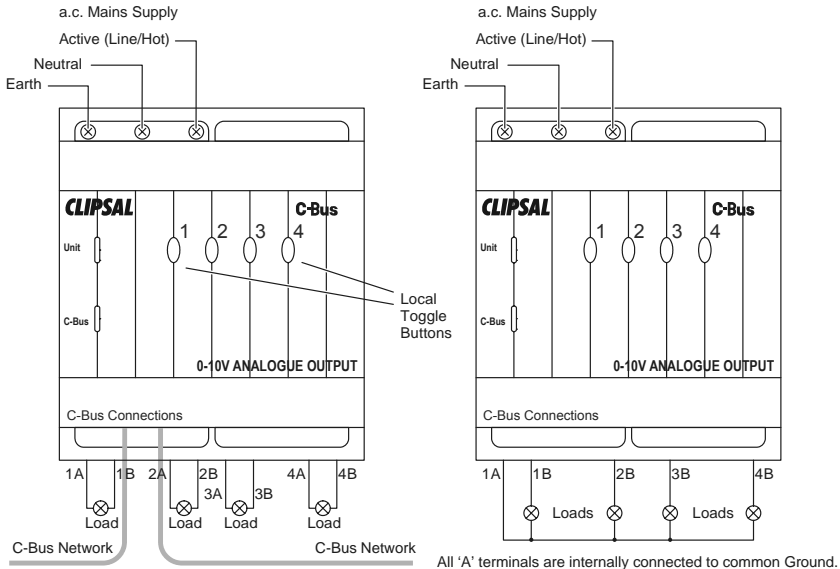


Figure 1 – L5504AMP and LE5504TAMP Wiring

IMPORTANT:

To prevent the possibility of electric shock, turn off and lock out the circuit breaker serving the analogue output unit before wiring the unit.

Wiring Instructions Guidelines:

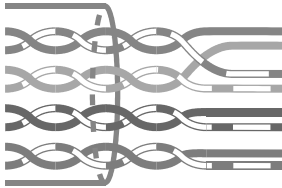
- The ballast control lines should be connected in one of the two ways shown in Figure 1. You can connect multiple ballasts to a control line so long as the channel rating is not exceeded. Refer to Specifications (Section 17.0).
- Keep the mains wiring and C-Bus network wiring segregated to avoid interference with C-Bus control signals. Place mains cables and network cables perpendicular to each other whenever possible.
- Make sure that connections are tight. Apply a maximum torque of 1.4Nm to the mains wiring terminals.
- Secure all cables with cable ties or trunking as required by local cabling rules.
- Use the supplied rubber plugs in any unused RJ45 sockets.

7.0 C-Bus Network Connection

Connection to the C-Bus network is made via one of the RJ45 sockets. Use Cat5 unshielded twisted pair (UTP) C-Bus cable and an appropriately wired RJ45 plug. Pin-outs and cable conductor assignments are provided below in Figure 2 and Table 1. The RJ45 sockets are internally connected.

There are now two types of pink Cat5e cable. The Clipsal catalogue numbers for C-Bus Cat5e UTP cable are 5005C305B (solid) and 5005C305BST (stranded).

A Clipsal patch cord (catalogue number RJ5CB300PL) is included with the unit.



C-Bus Positive: Blue + Orange

C-Bus Negative: Blue & White + Orange & White

Remote OFF: Brown + Brown & White

Remote ON: Green + Green & White

Figure 2 – C-Bus Cable Conductor Assignments

Pin	C-Bus Connection	Colour
1	Remote ON	Green & White
2	Remote ON	Green
3	C-Bus Negative (-)	Orange & White
4	C-Bus Positive (+)	Blue
5	C-Bus Negative (-)	Blue & White
6	C-Bus Positive (+)	Orange
7	Remote OFF	Brown & White
8	Remote OFF	Brown

Table 1 – RJ45 Sockets and C-Bus Pin-outs

A Clipsal RJ5CB300PL Cat5e UTP patch cord is included with the unit for easy interconnection.

Rubber bungs (x3) are supplied for unused RJ45 connectors, to stop foreign bodies from entering the unit. Always ensure these bungs are installed when the unit is mounted inside a mains rated enclosure.

7.1 Remote Override

Remote control of all channels on a unit can be achieved via the extra pairs of conductors on the C-Bus connector. Figure 3 illustrates how switches may be connected to these conductors. Green + Green & White conductors are used for the remote ON function. Brown + Brown & White are used for remote OFF. The remote override is triggered by connecting the relevant conductors to C-Bus negative. A Clipsal 30/1/2LM mechanism makes an ideal remote input switch.

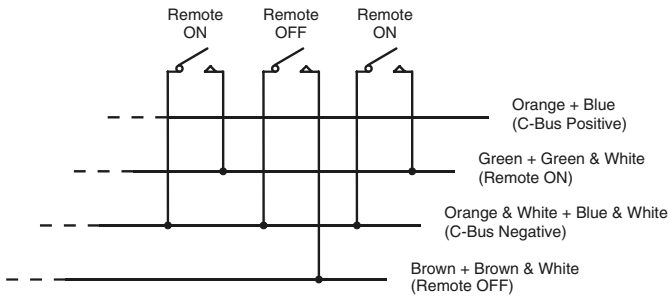


Figure 3 – Remote Override Connections

Note: C-Bus is a balanced network and therefore at any point where C-Bus negative (-) is taken, C-Bus positive (+) must also be present. For this reason both conductor pairs must be looped through all remote input switches on the network.

8.0 Local Override Switches

If the unit is in 'learn' mode you must exit this mode before using the buttons as local 'toggle' controls. The local 'toggle' buttons located on the front of the unit switch each channel on and off, providing local override capability. Each button illuminates when its respective channel is in the 'on' state. Local toggle buttons perform different functions depending on how they are pressed. This is summarised in Table 2.

Operation	Function
Quick press	A single quick press toggles the state of a channel.
Double quick press	Two quick presses in quick succession return the channel to the C-Bus network level.
Long press	Pressing any of the local toggle buttons for one second or more returns all channels to the C-Bus network level.

Table 2 – Local Toggle Button Functions

NOTE: Double quick press and long press operations only apply when the unit/channel is in local override mode. C-Bus commands received by the unit will (by default) override local toggle changes. In this case, only the channel associated with the received commands will revert to the current C-Bus network state. This option may be disabled in software. Refer to Section 9.0, Priority of Operating Modes.

9.0 Priority of Operating Modes

The state of an output channel can be changed by:

- pressing a button on a wall switch or other C-Bus input unit
- pressing a local override button (local toggle)
- using the remote override (remote ON/remote OFF for all 4 channels).

The output status of the L5504AMP and LE5504TAMP units can be changed by:

- pressing a C-Bus button
- activating any of the local toggle buttons (local override)
- using the remote override facility.

Table 3 shows the priority ranking of these control inputs.

Mode	Priority	Function
Thermal shutdown	1 (highest)	All channels off
Remote OFF	2	All channels off
Remote ON	3	All channels on
Local override	4*	Toggles the channel
C-Bus input unit (Neo, PIR, etc.)	5* (lowest)	Controls the channel

Table 3 – Control Input Priority Ranking

* Using local toggle buttons overrides the normal C-Bus commands, such as those issued by input units. By default, once a channel is in local override mode, further relevant C-Bus commands issued by input and control units will override the local override state. This feature can be disabled in software so that all relevant C-Bus commands are ignored by the unit when it is in local override mode.

Further information about programming C-Bus units is provided at the Clipsal website (www.clipsal.com/cis).

10.0 Status Indicators

10.1 C-Bus Indicator

The 'C-Bus' indicator shows the status of the C-Bus network at the unit. If sufficient network voltage and a valid C-Bus clock signal are present, the indicator illuminates as a continuous green light. If a network is connected, which has a higher current load than the power supplies support, the indicator flashes to show a marginal network voltage. If no C-Bus clock is present, or if the unit is powered by C-Bus only (for stand-alone programming), the indicator remains off.

Indicator Status	Meaning
On	Power is on and functional
Flashing	There is insufficient power to support the C-Bus network
Off	No C-Bus clock signal is present and/or mains power is not connected

Table 4 – The 'C-Bus' Indicator

Further debugging of possible network problems can be achieved using the Clipsal C-Bus Network Analyser Tool (5100NA).

10.2 Unit Indicator

The 'Unit' indicator shows the status of the individual unit. When mains power is supplied, the indicator illuminates as a continuous green light. If a local toggle button has been used to perform a local override, or if a remote override is active, the indicator flashes with a 90% duty cycle. The unit indicator does not function when the unit is powered by C-Bus only (for stand-alone programming).

Indicator Status	Meaning
On	Normal operation
Flashing	Unit is in override mode
Off	No mains power is connected

Table 5 – The 'Unit' Indicator

11.0 C-Bus System Clock

L5504AMP and LE5504TAMP 4-Channel Analogue Outputs incorporate a software selectable C-Bus system clock. The system clock is used to synchronize data communication over a C-Bus network. At least one active C-Bus system clock is required on each C-Bus network for successful communication. No more than three units on any C-Bus network should have clock circuitry enabled, so this option is normally disabled using the C-Bus Toolkit software.

If a system clock is required, it can be enabled from the unit's 'Global' tab in the C-Bus Toolkit software.

12.0 Power-up Load Status

C-Bus output units have on-board non-volatile memory, which is used to store the operating state of the unit in case of power loss. On restoration of power, L5504AMP and LE5504TAMP initiate a power-up diagnostic routine, which lasts approximately five seconds. Channels are then restored according to their previous states, and according to the unit's recovery settings.

13.0 C-Bus Power Requirements

The L5504AMP and LE5504TAMP 4-Channel Analogue Outputs draw 22mA from the C-Bus network. The unit does not supply power to the C-Bus network.

Adequate C-Bus power supply units must be installed to support connected devices. The network window of a C-Bus Toolkit project provides a summary of a C-Bus network, according to the units added to the database. This can be helpful in determining the power supply requirements of a particular network.

14.0 Power Surges

Each unit incorporates transient protection circuitry. Additional external power surge protection devices should be used to enhance system immunity to power surges. It is strongly recommended that overvoltage equipment, such as the Clipsal 970, be installed at the switchboard.

15.0 Megger Testing

Megger testing must never be performed on the C-Bus data cabling or terminals as it could degrade the performance of the network.

Megger testing of a mains electrical installation that has C-Bus units connected will not damage the units. Since C-Bus units contain electronic components, this should be taken into account when interpreting megger readings.

16.0 Programming

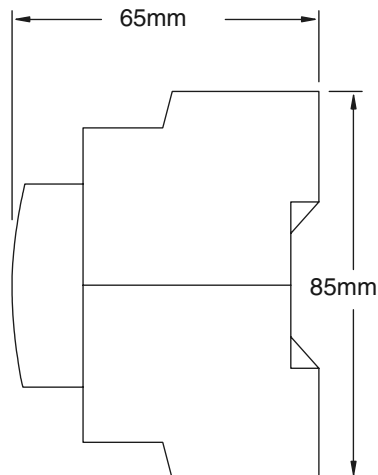
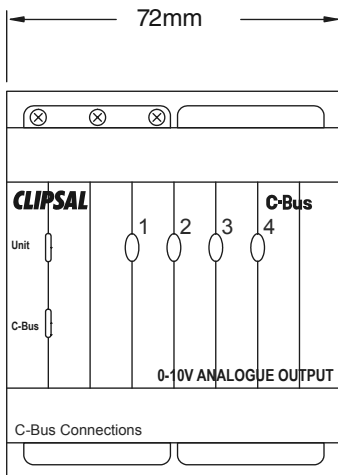
As with other C-Bus units, the L5504AMP and LE5504TAMP Analogue Outputs must be programmed before it will function as part of a C-Bus network. This can be accomplished using 'learn' mode. However, using the C-Bus Toolkit software provides a greater level of flexibility and customisation.

Units do not need a mains connection in order to be programmed via C-Bus Toolkit. They can be connected to any operational C-Bus network that is capable of supporting one or more extra C-Bus units (22mA current required). Units can then be configured using the C_Bus Toolkit software. Indicators and outputs will only function when a mains connection is established.

The C-Bus Toolkit software can be downloaded from the Clipsal website (www.clipsal.com/cis). Further information about programming C-Bus units is provided at this site.

17.0 Specifications

Parameter	Description
Mains voltage ranges	L5504AMP: 220V to 240V a.c. LE5504TAMP: 110V to 120V a.c.
Mains frequency ranges	47 to 53Hz or 57 to 63Hz
C-Bus voltage	15 to 36V d.c.
C-Bus current	22mA from the C-Bus network. The unit does not supply current to the network.
C-Bus a.c. impedance	50k Ω @ 1kHz
Electrical isolation	3.75kV between C-Bus and mains
Max units per network	50
Channel output voltage	0V to 10V d.c.
Channel current ratings	Source: 2.5mA maximum (4k Ω minimum load) Sink: 8mA at 10V d.c.
Mains terminal connector	Screw type, accommodates 2 x 1.5mm ² or 1 x 2.5mm ² wire
Warm-up time	5 seconds
Power-up delay	Programmable from 0 seconds to 33 minutes and 30 seconds.
Network clock	Software selectable
Operating temperature range	0 to 40°C (32 to 104°F)
Operating humidity range	10 to 95% RH, non condensing
Weight	250g



18.0 Standards Complied

DECLARATIONS OF CONFORMITY

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards

L5504AMP and LE5504TAMP Analogue Output units comply with the following:



Regulation	Standard	Title
EMC	CISPR 22	IT Equipment - RFI Emissions Standard
Electrical Safety	AS/NZS 3100	General Requirements for Electrical Equipment
	AS/NZS 61558-1, AS/NZS 61558-2-6	Safety of Power Supplies and Transformers

European Directives and Standards

L5504AMP and LE5504TAMP Analogue Output units comply with the following:



European Council Directive	Standard	Title
EMC Directive 89/336/EEC	EN 55022	IT Equipment – RFI Emissions Standard
	EN 55024	IT Equipment – RFI Immunity Standard
	EN 61000-4-2	Immunity to ESD
	EN 61000-4-3	Immunity to RFI
	EN 61000-4-4	Immunity to EFT
	EN 61000-4-5	Immunity to Surge Voltages
	EN 61000-4-6	Immunity to Conducted RF Currents
Low Voltage Directive 73/23/EEC	EN 61000-4-11	Immunity to Voltage Dips & Interruptions
	EN 61558-1, EN 61558-2-6	Safety of Power Supplies and Transformers

19.0 Two Year Warranty

The C-Bus 4-Channel Analogue Output Unit carries a two year warranty against manufacturing defects.

19.1 Warranty Statement

The benefits conferred herein are in addition to, and in no way shall be deemed to derogate; either expressly or by implication, any or all other rights and remedies in respect to Clipsal Australia Pty Ltd product, which the consumer has in the location where the product is sold.

The warrantor is Clipsal Australia Pty Ltd with registered offices worldwide.

This Clipsal Australia Pty Ltd product is guaranteed against faulty workmanship and materials for a period of two (2) years from the date of installation.

Clipsal Australia Pty Ltd reserves the right, at its discretion, to either repair free of parts and labour charges, replace or offer refund in respect to any article found to be faulty due to materials, parts or workmanship.

This warranty is expressly subject to the Clipsal Australia Pty Ltd product being installed, wired, tested, operated and used in accordance with the manufacturer's instructions.

All costs of a claim shall be met by Clipsal Australia Pty Ltd, however should the product that is the subject of the claim be found to be in good working order, all such costs shall be met by the claimant.

When making a claim, the consumer shall forward the product to the nearest office of Clipsal or Schneider Electric with adequate particulars of the defect within 28 days of the fault occurring. The product should be returned securely packed, complete with details of the date and place of purchase, description of load, and circumstances of malfunction.

For all warranty enquiries, contact your local Clipsal or Schneider Electric Sales Representative. The address and contact number of your nearest Clipsal or Schneider Electric office can be found at www.clipsal.com.

20.0 Technical Support and Troubleshooting

For further assistance in using this product, consult your nearest Clipsal Integrated Systems (CIS) Sales Representative or Technical Support Officer.

Technical Support Contact Numbers	
Australia	1300 722 247 (CIS Technical Support Hotline)
New Zealand	0800 888 219 (CIS Technical Support Hotline)
Northern Asia	852 2484 4157 (Clipsal Hong Kong)
South Africa	(011) 314 5200 (C-Bus Technical Support)
Southern Asia	603 7665 3555 Ext. 236 or 242 (CIS Malaysia)
United Kingdom	0870 608 8 608 (Schneider Electric Support)

Technical Support Email: cis.support@clipsal.com.au

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Contact us: clipsal.com/feedback

National Customer Care Enquiries:

Tel 1300 2025 25

Fax 1300 2025 56

clipsal.com

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