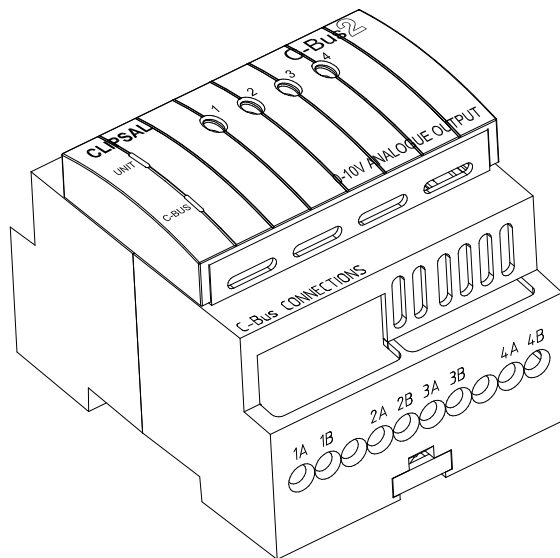




C-Bus Four Channel Analogue Output Unit Installation Instructions

5504AMP Series



REGISTERED PATENT



Table of Contents

Section	Page
1.0 Product Range	3
2.0 Description	3
3.0 Capabilities	3
4.0 Wiring Instructions	4
5.0 Connection to the C-Bus Network	4
6.0 C-Bus DIN Rail Series Analogue Output Features	5
6.1 Local Override Buttons	5
6.2 Remote Override Facility	6
7.0 Priority of Operating Modes	6
8.0 Status Indicators	7
8.1 C-Bus Indicator	7
8.2 Unit Indicator	7
9.0 C-Bus System Clock	7
10.0 Power-Up Load Status	8
11.0 C-Bus Power Requirements	8
12.0 Stand-Alone Programming	8
13.0 Power Surges and Short Circuit Conditions	8
14.0 Megger Testing	8
15.0 Standards Complied	9
16.0 Programming Requirements	10
17.0 Important Warning	10
18.0 Mechanical Specifications	10
19.0 Electrical Specifications	11

Copyright Notice

© Copyright 2003 Clipsal Integrated Systems Pty Ltd. All rights reserved.

Trademarks

- Clipsal is a registered trademark of Gerard Industries Pty Ltd.
 - C-Bus and C-Bus2 are registered trademarks of Clipsal Integrated Systems Pty Ltd.
 - Intelligent Building Series is a registered trademark of Clipsal Integrated Systems Pty Ltd.
- All other logos and trademarks are the property of their respective owners.

Disclaimer

Clipsal Integrated Systems reserves the right to change specifications or designs described in this manual without notice and without obligation.

1.0 Product Range

L5504AMP	Four Channel Analogue Output Unit (220-240V, 50-60 Hz)
LE5504TAMP	Four Channel Analogue Output Unit (110-120V, 50-60 Hz)

2.0 Description

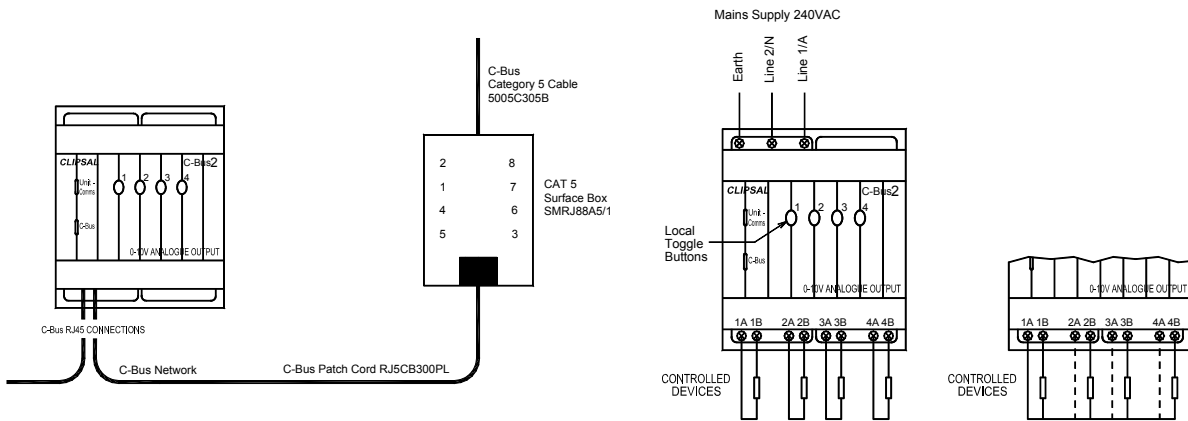
The 5504AMP Series Analogue Output unit provides analogue output voltages in the range 0-10V, which can be used as the control signals for various peripheral devices including electronically dimmable fluorescent lighting ballasts. For ease of installation they are DIN rail mounted, measuring 4M wide (1M = 17.5 +0.5/-0.0 mm). C-Bus connection is conveniently achieved through the use of RJ45 connectors, allowing similar units to be quickly looped together.

3.0 Capabilities

The 5504AMP Series Analogue Output unit comprises of 0-10VDC output controlled by instructions from the C-Bus Network. The unit is capable of sinking or sourcing current as appropriate for the connected load (Refer to *Section 19.0, Electrical Specifications* for output ratings). Each channel may drive multiple loads, depending on the load current requirements. The unit isolates the mains power from the safe extra low voltage C-Bus Network.

Output Channels of the Unit are not isolated from each other, and can be commoned to reduce cabling requirements. The connection is polarity sensitive (Refer to *Section 4.0, Wiring Instructions*).

4.0 Wiring Instructions

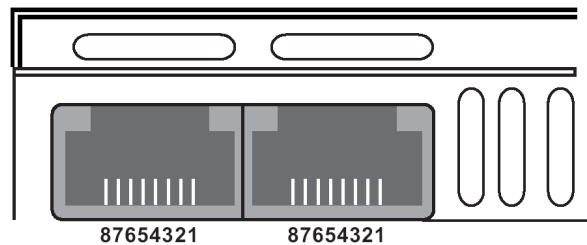


NOTE:

- A maximum of 50 x 5504AMP Series units may be interconnected.
- The installer must fix mains cables in the distribution board using cable ties or trunking as required by local wiring rules. Care must be taken not to allow copper strands to enter the DIN unit’s apertures.
- Rubber bungs are supplied (3 off) for unused RJ45 connectors, to stop foreign bodies from entering the unit. Always ensure these bungs are installed when the Unit is to be mounted inside a mains rated enclosure.

5.0 Connection to the C-Bus Network

Installation requires connection to the unshielded twisted pair C-Bus Network Cable. This illustration shows the recommended technique for cable termination giving the best electrical performance. It is required that Category 5 data cable is used, Clipsal catalogue number 5005C305B.



RJ Pin	C-Bus Connection	Colour
1	Remote ON	Green/White
2	Remote ON	Green
3	C-Bus Neg (-)	Orange/White
4	C-Bus Pos (+)	Blue
5	C-Bus Neg (-)	Blue/White
6	C-Bus Pos (+)	Orange
7	Remote OFF	Brown/White
8	Remote OFF	Brown

NOTE:

- It is recommended that the Remote Override (On/Off) connections be maintained for correct operation of these services across the C-Bus Network, even if they are not intended to be used. Remote Override services may be disabled in software if necessary.

6.0 C-Bus DIN Rail Series Analogue Output Features**6.1 Local Override Buttons**

The buttons located on the front of the unit provide a means to toggle each channel locally (at the unit). Each button is illuminated when the respective channel is in the On state.

Operation	Function
Short Press	One short press will toggle the state of this channel only
Double Click	Two short presses within 2 seconds will return this channel only to the C-Bus Network level
Long Press	Pressing any of the Local Override buttons for longer than 2 seconds will return all channels to the C-Bus Network level

Note double-click and long press operations will only occur if the unit/channel is already in override mode.

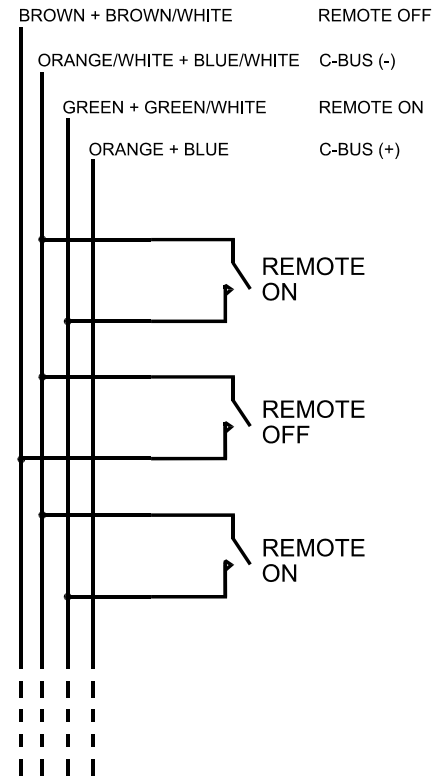
C-Bus commands received by the unit will (by default) override local toggle changes. In this case, only the channel associated with the received commands will revert to the current C-Bus Network state. This option may be disabled in software. Please refer to *Section 7.0, Priority of Operating Modes*.

6.2 Remote Override Facility

Remote control of all channels on a unit can be achieved via the extra pairs of conductors on the C-Bus connector. This diagram shows that switches may be connected in parallel on any one Network, using green and green/white conductors for the remote ON function. Brown and Brown/White may be wired in the same fashion for remote OFF, with these conductors being connected to C-Bus negative via the switch to action this state. A Clipsal 30/1/2LM mechanism makes an ideal remote input switch.

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. Hence both network conductors must be looped through all remote input switches on the Network.



7.0 Priority of Operating Modes

The output status of the 5504AMP Series C-Bus Four Channel Analogue Output Unit can be changed by:

- Pressing a C-Bus Key,
- By activating any of the Local Override buttons or
- By using the Remote Override facilities.

The table below shows the priority ranking of these control inputs,

Mode	Priority	Function
Remote OFF	1 (Highest)	Turns all channels OFF
Remote ON	2	Turns all channels ON
Local Override	3*	Toggle channel
C-Bus Input Unit (Key, PIR etc)	4* (Lowest)	Control the channel

For further information about the programming this and other C-Bus units, please refer to the C-Bus Technical Manual (5000S/2, 5000M/2).

8.0 Status Indicators

8.1 C-Bus Indicator

This indicator shows the status of the C-Bus Network at this unit. If sufficient network voltage and a valid C-Bus Clock signal are present then the 'OK' signal will be displayed (continuous green light). If a Network is connected which has more current load than the power supplies can support, then this indicator will flash to show a marginal Network voltage. If there is no C-Bus Clock present then this indicator will not light.

Indicator Status	Meaning
On	Power on and functional
Flashing	Insufficient power to support Network
Off	No C-Bus connected No C-Bus Clock Signal present

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

8.2 Unit Indicator

This indicator shows the status of the individual unit. When C-Bus is supplied to the unit, 'OK' will be displayed (continuous green light). If any of the four channels have been toggled (using Override facilities) into a state other than is present on the C-Bus network, this indicator will flash with a 90% ON duty cycle. This applies to either Local or Remote Override inputs.

Indicator Status	Meaning
On	Normal operation
Flashing	Unit in override mode
Off	No C-Bus connected

9.0 C-Bus System Clock

The 5504AMP Series C-Bus Four Channel Analogue Output Unit incorporates a software selectable C-Bus System Clock. The System Clock is used to synchronise data communications waveforms on a C-Bus Network. At least one active C-Bus System Clock is required on each C-Bus Network for successful communications. No more than three units on any C-Bus Network should have Clock circuitry enabled, so this option should normally be disabled using the C-Bus Installation Software.

If a System Clock is required, it can be enabled from the 'Global Tab' on the Graphical User Interface (GUI) for the unit.

10.0 Power-Up Load Status

All C-Bus units have onboard non-volatile memory, which is used to store the operating state of the unit in case of power loss. On restoration of power the DIN Rail unit initiates a short power-up diagnostic routine, which lasts for approximately 5 seconds. User programmable options will then allow the analogue output status to be set as desired.

For further information about the programming this and other C-Bus units, please refer to the C-Bus Technical Manual (5000S/2, 5000M/2).

11.0 C-Bus Power Requirements

The 5504AMP Series C-Bus Four Channel Analogue Output Unit is available in 'P' variants only, which draw 22mA from the C-Bus Network regardless if connected to the mains supply. The 5504AMP Series products do not source current to the C-Bus Network.

Adequate C-Bus Power Supply Units must be installed to support the connected devices. If in doubt, consult the C-Bus Calculator (Network Design Verification Software Utility) before proceeding with the hardware installation.

12.0 Stand-Alone Programming

The 5504AMP Series C-Bus Four Channel Analogue Output Unit can be programmed without a mains connection. The unit can be connected to any operational C-Bus Network that is capable of supporting one or more extra C-Bus units (22mA current required). The unit can then be configured using the C-Bus Installation Software. The analogue output will only function when a mains connection is made.

13.0 Power Surges and Short Circuit Conditions

The mains voltage must be limited to the range specified for any unit which is mains powered. 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.

14.0 Megger Testing

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

Megger testing of mains wiring of an electrical installation that has C-Bus Units connected will not cause any damage to C-Bus Units. Since C-Bus Units contain electronic components, the installer should interpret megger readings with due regard to the nature of the circuit connection.

15.0 Standards Complied

DECLARATIONS OF CONFORMITY

European Directives and Standards

Models L5504AMP & LE5504TAMP comply with the following:



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

Australian/New Zealand EMC & Electrical Safety Frameworks and Standards

Model L5504AMP complies with the following:



RCM Framework	Standards	Title
EMC	AS/NZS CISPR22 EN 55024 BS/EN 61000-4-2 BS/EN 61000-4-3 BS/EN 61000-4-4 BS/EN 61000-4-5 BS/EN 61000-4-6 BS/EN 61000-4-11	IT Equipment - RFI Emissions Standard IT Equipment - RFI Immunity Standard Immunity to ESD Immunity to RFI Immunity to EFT Immunity to Surge Voltages Immunity to Conducted RF Currents Immunity to Voltage Dips & Interruptions
Electrical Safety	AS/NZS 3100 AS/NZS 61558-1 AS/NZS 61558-2-6	General Requirements for Electrical Equipment Safety of Power Transformers – General Requirements Safety of Power Transformers – Particular Requirements

16.0 Programming Requirements

The 5504AMP Series C-Bus Four Channel Analogue Output Unit must be programmed to set a unique identification (Unit Address) and mode of operation on the C-Bus Network. C-Bus Installation Software v2.2.0 (or higher) can be used to configure the:

- Project Name
- Part Name
- Unit Address
- Clock (Enable/Disable)
- Analogue Output Relationships
- Other Advanced Operating Parameters (e.g. Logic Relationships, Turn-On Thresholds, Power Fail Options etc).

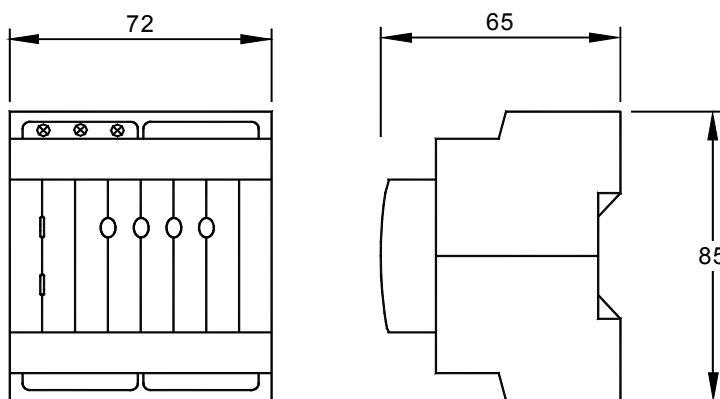
The latest C-Bus Installation Software can be downloaded from the Clipsal Integrated Systems Web Site (www.clipsal.com/cis).

For further information about programming this and other C-Bus units, please refer to the C-Bus Technical Manual (5000S/2, 5000M/2).

17.0 Important Warning

The use of any non-approved software in conjunction with the hardware installation without the written consent of Clipsal Integrated Systems may void any warranties applicable to the hardware.

18.0 Mechanical Specifications



All dimensions are in millimeters.
No user serviceable parts inside.

19.0 Electrical Specifications

Catalogue No.	L5504AMP	LE5504TAMP	
Nominal Supply Voltage	220-240V~	110-120V~	
Frequency Range(s)	47-53Hz and 57-63Hz		
C-Bus Supply Voltage	15-36V DC @ 22mA required for programming. Does not source current to the C-Bus Network.		
AC Input Impedance	50k Ω @1kHz A maximum of 50 units may be connected on a single C-Bus Network		
Electrical Isolation	3.75kV RMS from C-Bus to Mains		
Status Indicators	C-Bus Indicator Voltage \geq 20V DC Voltage < 20V DC Voltage < 15V DC Unit Status Indicator On Flashing Off Load Indicators (4) Load indicator is On when analogue output is on	Clock Present On Flashing Off C-Bus Power Present Present Fail	No Clock Present Off Off Off Conditions Normal Operations At least one channel in Local or Remote Override mode C-Bus power not available
Maximum Number of Units on a Single C-Bus Network	50		
Output Voltage Range	0 (\pm 0.5) to 10 (\pm 0.5) VDC		
Output Rating - Sourcing	2.5mA (i.e. minimum of 4k Ω)		
Output Rating - Sinking	15mA at Vout = 0V 8mA at Vout = 10V i.e. I = 15-(0.7*Vout)mA		
Quiescent Power	10 Watts		
Warm Up Time	5 seconds		
Restart Delay	0 seconds to 42 minutes and 30 seconds		
Network Clock	Software selectable		
Dimensions	72 x 85 x 65 mm		
Remote Override	Remote switch input can be daisy chained to a maximum of 50 units and a maximum of 1000m of cable		
Mains Terminals	Accommodates 2 x 1.5mm ² or 1 x 2.5mm ²		
Weight	245g		
C-Bus Connections	2 x RJ45 sockets		
Operating Temperature Range	0-45 ^o C		
Operating Humidity Range	10 – 95% RH		

Further Information

For further information about configuring this product and other C-Bus devices, please consult the documentation supplied. Further assistance can be obtained as follows:

- **C-Bus Manuals**
The 5000M/2 C-Bus Technical Manual provides a comprehensive and definitive guide to Clipsal C-Bus. Includes hardware and software specifications, product datasheets, system design and installation guides, and software overview with fully worked programming examples.
- **C-Bus Installation Software**
The 5000S/2 C-Bus Installation Software (includes 5000M/2 C-Bus Technical Manual) may be used to unlock the power and flexibility of Clipsal C-Bus. Unit operation may be completely customised to suit user requirements. Advanced control functions may be programmed.
- **C-Bus Installer Training Courses**
Contact your nearest Clipsal Integrated Systems Sales or Technical Support Officer and enquire about Clipsal C-Bus Installer Training and Certification Programs today !!
- **Technical Support and Troubleshooting**
For further assistance, please consult your nearest Clipsal Integrated Systems Sales Representative or Technical Support Officer.

Technical Support Hotline	1 300 722 247 (Cost 25¢ per call, Australia Only)
Technical Support Email	techsupport.cis@clipsal.com.au
Sales Support Email	sales.cis@clipsal.com.au
Clipsal Integrated Systems Website	clipsal.com/cis

Products of Clipsal Integrated Systems Pty Ltd

ABN 15 089 444 931

Head Office

12 Park Terrace, Bowden
South Australia 5007

International Phone +61 8 8269 0560

International Fax +61 8 8346 0845

Internet clipsal.com/cis

E-Mail cis@clipsal.com.au

1036469