



C-Bus DIN Rail Four Channel Dimmer Installation Instructions

5504D2A Series

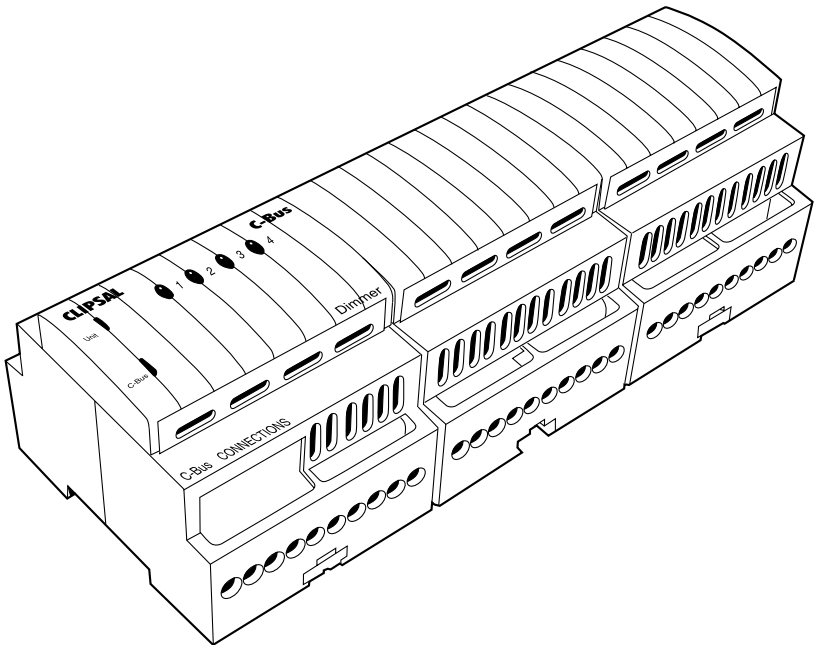


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1. Product Range

5504D2A	C-Bus DIN Rail Four Channel Dimmer with C-Bus Power Supply (220-240V, 50-60Hz, 2A)
E5504TD2A	C-Bus DIN Rail Four Channel Dimmer with C-Bus Power Supply (110-120V, 50-60Hz, 2A)
5504D2AP	C-Bus DIN Rail Four Channel Dimmer (220-240V, 50-60Hz, 2A)
E5504TD2AP	C-Bus DIN Rail Four Channel Dimmer (110-120V, 50-60Hz, 2A)

2. Description

The 5504D2A series products are C-Bus output devices designed to be used in distribution applications. For ease of installation they are DIN mounted, measuring 12M (1M=17.5 +0.5/-0.0 mm) wide. Four leading edge phase controlled dimming channels are provided for general load control applications.

3. Capabilities

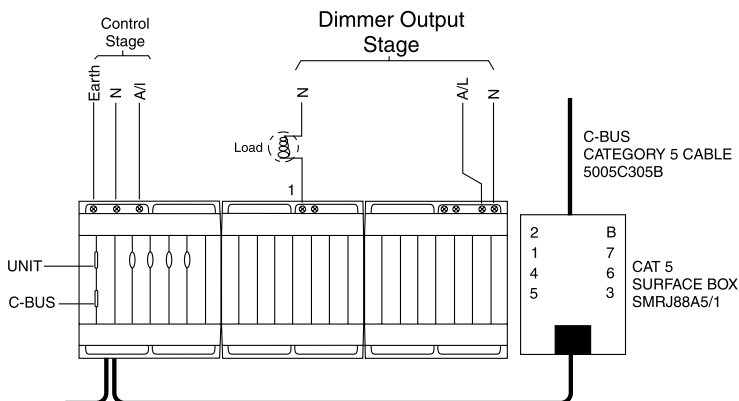
This C-Bus unit can form the heart of a simple C-Bus network. C-Bus connection is conveniently achieved through the use of RJ45 connectors, allowing similar units to be quickly looped together. 5504D2A products have an internal C-Bus power supply capable of supporting a number of other C-Bus units (200mA capacity). All units with suffix "P" have no C-Bus power supply and consume no current from the C-Bus network during normal operation. C-Bus clock signal may be generated by these products, providing all the support necessary for a simple C-Bus network. Local toggle buttons have been included to allow individual channels to be toggled at each unit as well as via the C-Bus commands. Remote ON and OFF input facilities are available, permitting all channels to be turned On or Off without C-Bus network communications. These units isolate the mains power from the safe extra low voltage C-Bus network.

4. Compatible Loads

Suitable loads for these products include incandescent and inductive varieties. Low voltage lighting can be controlled provided iron core transformers or electronic transformers specially suited to leading edge phase control are used. Small motors can be controlled, such as those used in ceiling fans, however motor noise may be audible in some instances.

5. Wiring Instructions

The DIN Rail Dimmer Unit is capable of handling up to four channels of 2A dimmed loads. The installer should make adequate consideration for the total current consumption when selecting power feed cables. It is recommended allowance be made for multiple feed cables. The load supply should be protected by an 8A circuit breaker.



Notes:

1. A maximum of 10 C-Bus DIN Rail units (with 200mA power supply) can be connected to a single C-Bus network. A maximum of 100 "P" suffix units may be interconnected.
2. The installer must fix mains cabling in the distribution board using cable ties or trunking as required by local cabling rules. Care must be taken not to allow copper strands to enter DIN unit apertures. To stop copper strands from entering RJ45 sockets, fit rubber bungs to unused sockets, (3 rubber bungs are supplied).
3. Mains supply to the Control and Switching Stages are NOT internally connected. Both must be wired from the SAME VOLTAGE PHASE. DO NOT CROSS NEUTRAL CONNECTIONS.

6. C-Bus DIN Rail Series Dimmer Features

6.1 Local Override Buttons

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

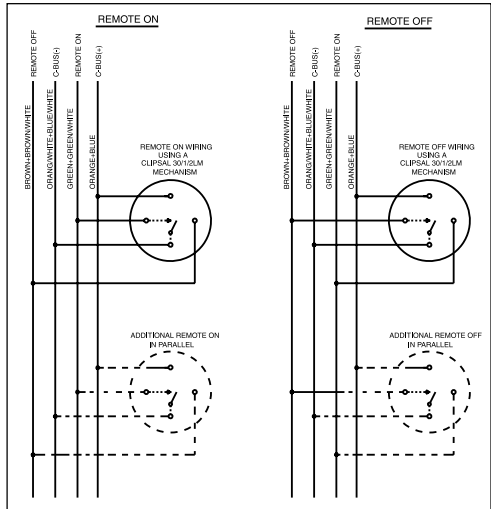
Operation	Function
Short Press	Toggle
Double Click (two short presses within 2 seconds)	Returns this channel only to the C-Bus network level
Long Press (a press longer than 2 seconds on any local override button)	Returns ALL channels to C-Bus network level

Note: Double Click and Long Press operations will only occur if the unit/channel is already in override mode.

By default, C-Bus commands received by the unit will override local toggle changes. In this case only the channels associated with the received commands will revert to the current C-Bus network state. This option may be disabled via installation software. Please refer to Section 7, 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. C-Bus is a balanced network, 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. This diagram shows that switches may be connected in parallel on any one network, using the green and green/white conductors for a 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 state. A Clipsal 30/1/2LM mechanism makes an ideal remote input switch.



6.3 Network Burden

The C-Bus DIN Rail Series Dimmer unit incorporates a software selectable Network Burden. This Burden may or may not be required in order to ensure correct operation of the C-Bus Network. To enable the on-board Burden, set the Unit Address to 001.

Important Note: Always disable all PC Interface Network Burdens before installing C-Bus DIN range products that include a power supply (non “P” suffix versions). If a burden is required use the built-in Burden on the DIN Rail unit only!

6.4 Zero Crossing Filter

The incoming mains frequency is tracked and harmonics of the fundamental frequency are attenuated via a filter. A special algorithm ensures that lights do not flicker due to signal injections on the mains from the power authorities.

6.5 Thermal Shut Down

The C-Bus DIN Rail Dimmer Series products incorporates a temperature sensing device to monitor its own temperature. When the internal operating temperature of the unit exceeds approximately 70°C, all channels of the dimmer will shut down. Dimmer levels are automatically restored once the over-temperature condition has been resolved and the unit has cooled.

6.6 Linearised Brightness Control

In conventional phase control dimmers, as the light is being dimmed, the rate of change of power delivered to the load is not linear. As a result, the change in brightness is more apparent when the light is at a lower brightness setting. The imbedded micro-controller in the C-Bus DIN Rail Dimmer uses an algorithm to ensure that this change in brightness is uniform throughout the control range.

6.7 Soft Turn On

Unlike conventional devices, where abrupt changes in brightness occur whenever a channel is switched ON or OFF, the micro-controller incorporated in the C-Bus DIN Rail Dimmer controls the rate of brightness change. This results in a soft brightness change, and is referred to as “Soft Turn On” and “Soft Turn Off”. This feature also helps to prolong the life of incandescent light fittings.

7. Priority of Operating Modes

The output status of the C-Bus DIN Rail Dimmer 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
Thermal Shutdown	1 (Highest)	Turns all channels OFF
Remote OFF	2	Turns all channels OFF
Remote ON	3	Turns all channels On
Local Override	4 *	Toggles the channel
C-Bus Input Unit (key, PIR etc.)	5 * (Lowest)	Controls the channel

* Local Override has priority over normal C-Bus commands received on the bus (such as those generated by pressing a C-Bus Key). By default, if any channel is in Local Override mode and a C-Bus command is received for that channel then the C-Bus command state will be imposed (“Enable C-Bus Priority” option). This feature can be disabled in software such that all relevant C-Bus commands will be ignored by the unit whilst in Local Override Mode. Please refer to the C-Bus Manual (or C-Bus Manual Addendum V211A: C-Bus DIN and PRO Series) for further information relating to the programming of DIN Rail Dimmer units.

8. Indicators

8.1 C-Bus Indicators

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 the “OK” signal will be displayed (continuous green light). If a network is connected which demands more current than the power supplies can support, this indicator will flash showing marginal network voltage. If there is no C-Bus clock present the indicator will not light. When the unit is powered from C-Bus only for stand-alone programming this indicator will not function.

Indicator Status	Meaning
On	C-Bus network operational
Flashing	Insufficient power to support network
Off	No C-Bus clock present; No mains connection

Note: 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. A continuous green light (OK) indicates the mains power is connected. If the indicator is flashing it means that any one of the four channels has been toggled (using the override facility) into a state different to the C-Bus network. This applies to either Local or Remote Override inputs. This indicator will not function when the unit is powered from C-Bus only for stand-alone programming.

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

9. 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 mains power loss. On restoration of power the DIN Rail Dimmer unit initiates a short power-up diagnostic routine which runs for approximately 5 seconds. User programmable options then allow the dimmer relay status to be set as desired. Please refer to the C-Bus Manual (or the C-Bus Manual Addendum V211A: C-Bus DIN and PRO Series) for further information relating to the programming of the DIN Rail Dimmer Units.

10. C-Bus Power Requirements

The C-Bus DIN Rail Dimmer Unit draws 18mA from the C-Bus Network when it is not connected to the mains supply. With mains voltage connected, the unit supplies up to 200mA to the network, which can provide power for up to 10 C-Bus Input Units connected to the same network.

The DIN Rail Dimmer unit is available in four different configurations. "P" suffix variants (such as the 5504D2AP) do not include a 200mA C-Bus power supply.

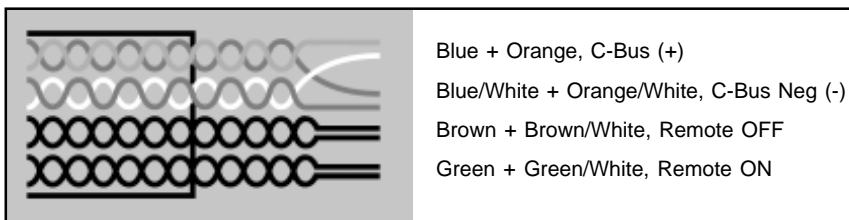
11. Stand-Alone Programming

A 5504D2A series product can be programmed without a mains power connection, by connecting the unit to an operational C-Bus network capable of supporting at least one additional C-Bus device (18mA of current required). Once the unit is connected to a network, it can be configured using C-Bus Installation software. Indicators will not function until mains connection is made.

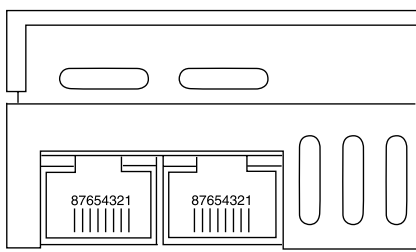
12. C-Bus Network Connection

It is recommended that Category 5 data cable be used, Clipsal catalogue number 5005C305B. Installation of the 5504D2A products requires connection to the unshielded twisted pair C-Bus Network Cable. This connection is polarity sensitive and clearly shown in the diagram below.

A Clipsal 5504D2A Cat 5 UTP patch cord is included with the unit for easy interconnection. No more than 10 x 5504D2A Series products should be connected to one physical C-Bus network. This may be extended to 100 products for "P" suffix units.



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



13. Programming Requirements

As with other C-Bus units, the Dimmer Units must be programmed to set their unique identification and the mode of operation on the C-Bus Network. The C-Bus Installation Software can be used to configure all operational parameters including the specification of control sources, and power up options. Please refer to the C-Bus Manual (or the C-Bus Manual Addendum V211A: C-Bus DIN and PRO Series) for further information relating to the programming of the DIN Rail Dimmer Units.

14. Power Surge 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 and additional external power surge protection devices can be used to enhance system immunity to power surges. It is strongly recommended that over-voltage equipment such as the Clipsal 970 Series is installed at the switchboard.

15. Megger Testing

Megger testing 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.

16. Important Warning

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

17. Standards Complied

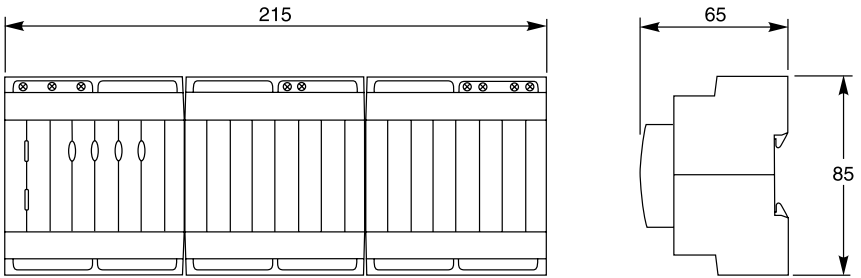
The units have been designed to meet Australian and European standards for EMC Compliance and Safety.

AS/NZS 3100:1997	General Requirements for Electrical Equipment
AS/NZS 3108:1994, IEC 742:1983	Requirements for Safety Extra Low Voltage
97/32C/EE	Low Voltage Directives
AS/NZS 1044:1995, IEC/CISPR 14:1993, BS/EN 55014:1994	RFI Emissions Standard
AS/NZS 4051:1998, IEC/CISPR 15:1996, BS/EN 55015:1994	RFI Emissions Standard
IEC669-2-2, BS/EN 60669-2-2	Particular Requirements for Remote Control Switching Devices
BS/EN 61000-4-2	Immunity to Electrostatic Discharge
BS/EN 61000-4-3	Immunity to Radio Frequency Interference
BS/EN 61000-4-4	Immunity to Electrical Fast Transients
BS/EN 61000-4-5	Immunity to Surge Voltages
BS/EN 61000-4-11	Immunity to Voltage Dips and Interruptions
EN 61558	Safety of Power Supplies and Transformers
89/336/EEC	Electromagnetic Compatibility Directive

18. Product Specifications

Cat. No.	5504D2A	5504D2AP	E5504TD2A	E5504TD2AP
Nominal Supply Voltage	220 – 240V~		110-120V~	
Frequency Range(s)	47 – 53Hz and 57 – 63Hz			
C-Bus Supply Voltage	15-36VDC @ 18mA required for programming when mains power is not connected. Sources 200mA to the C-Bus network with mains power connected.	15-36VDC @ 18mA required for programming when mains power is not connected. 15-36VDC @ 0mA required for programming when mains power is connected. Does not source current to the C-Bus network.	15-36VDC @ 18mA required for programming when mains power is not connected. Sources 200mA to the C-Bus network with mains power connected.	15-36VDC @ 18mA required for programming when mains power is not connected. 15-36VDC @ 0mA required for programming when mains power is connected. Does not source current to the C-Bus Network.
AC Input Impedance	50kΩ @ 1kHz	100kΩ @ 1kHz	50kΩ @ 1kHz	100kΩ @ 1kHz
Electrical Isolation	3.75kV RMS from C-Bus to Mains			
Status Indicators	C-Bus Status Voltage ≥ 20V DC Voltage < 20V DC Voltage < 15V DC Unit Status On Flashing Off Load Indicators (4) Load indicator is On when dimmer output is On at C-Bus determined dimming level.	Clock Present On Flashing Off Mains Power Present Present Fail	No Clock Present Off Off Off Conditions Normal Operation At least one channel in local or remote override mode Mains power not available	
Maximum Number of Units on a single C-Bus Network	10	100	10	100
Load Rating	2A	2A	2A	2A
Dimmer Type	Leading edge phase control			
Compatible Loads	Suitable for incandescent, low voltage lighting and ceiling sweep fans (contact manufacturer). Suitable for electronic transformers compatible with leading edge dimmers.			
Quiescent Power	10 Watts			
Warm Up Time	5 seconds			
Power-up Delay	0 seconds – 33 minutes and 30 seconds, software selectable			
Network Clock	Software selectable			
Network Burden	Software selectable (Unit address 01 only)			
Dimensions	215 x 85 x 65mm			
Remote Override Input	Remote switch input can be daisy chained to a maximum of 10 units and a maximum of 1000m of cable.	Remote switch input can be daisy chained to a maximum of 100 units and a maximum of 1000m of cable.	Remote switch input can be daisy chained to a maximum of 10 units and a maximum of 1000m of cable.	Remote switch input can be daisy chained to a maximum of 100 units and a maximum of 1000m of cable.
Mains Terminals	Accommodates 2 x 1.5mm ² or 1 x 2.5mm ²			
Weight	647g			
C-Bus Connection	RJ45 socket			
Remote Override Connection	RJ45 socket			
Operating Temperature Range	0 – 45°C			
Operating Humidity Range	10 – 95% RH			

19. Mechanical Specifications



All dimensions in millimetres.
No user serviceable parts inside.

Technical Support and Troubleshooting

For further assistance in using C-Bus, please consult your nearest Clipsal Integrated Systems Sales Representative or Technical Support Officer.

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Clipsal Integrated Systems Website

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Please visit the Clipsal Integrated Systems Website for information on new product developments, online software registration, software upgrades, plus much more.

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