

# **C-Bus Application Messages & Behaviour**

## **Chapter 0 – Introduction**

Document Number: CBUS-APP/00

Issue: 16

Date: 4 December 2008

**Comments on this document should be addressed to:**

**Engineering Manager  
Clipsal Integrated Systems  
PO Box 103 Hindmarsh  
South Australia 5007**

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## C-Bus Application Messages & Behaviour

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### CHANGE HISTORY

Date	Change Reference	Comments
14 Dec 2001	Issue 1	Original
9 Jan 2002	Issue 2	Added Chapter 24, Telephony Status & Control; renumbered subsequent chapters.
10 May 2002	Issue 3	Changed C-Bus Inside references to C-Bus Enabled. Changed Chapter 28 Level Measurement to Measurement and allocated application number.
11 Dec 2002	Issue 4	Added pool, spa, pond & fountain control. Changed ventilation to be more specific, for fan and damper control. Allocated application address. Change Watering control to irrigation control. Added application address.
14 Jan 2004	Issue 5	Reserved application \$FD for use by installation software.
1 Oct 2004	Issue 6	Update QA Logo
19 Jan 2005	Issue 7	Reserved application \$F0
25 Mar 2005	Issue 8	Add Error Reporting Application
13 Sep 2006	Issue 9	Add Scene Management Application \$C9
13 Feb 2007	Issue 10	Change legal Identity
1 Mar 2007	Issue 11	Added HVAC Actuator
28 Nov 2007	Issue 12	Added text messaging and media transport control
28 May 2008	Issue 13	Text Message Service -> Short Text Messages
20 Nov 2008	Issue 14	Minor typographical improvements, remove QA logo, add lighting colour control, remove some applications that will never come to pass.
22 Nov 2008	Issue 15	Tidy up naming for Chapter 14.
4 Dec 2008	Issue 16	Short Text Messages -> Short Information Messages

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## C-Bus Application Messages & Behaviour

### 0 C-BUS APPLICATION MESSAGES AND BEHAVIOUR

This document and its subsidiary chapters specify the message traffic and application behaviour requirements for devices attached to C-Bus networks.

#### 0.1 C-Bus Enabled

“C-Bus Enabled” is an approach used by Clipsal Integrated Systems Pty Ltd to specify, test and certify that devices attached to a C-Bus network:

- Comply with the network protocols;
- Avoid excessive bus traffic; and
- Have acceptable interoperability with other C-Bus devices.

The above objectives are achieved by specifying the interface requirements for C-Bus devices, and by specifying, for each application, the message traffic that may be sent over C-Bus. Finally, guidance is provided for the use of the C-Bus PC interface.

The documents and their relationships are shown in Figure 0-1.

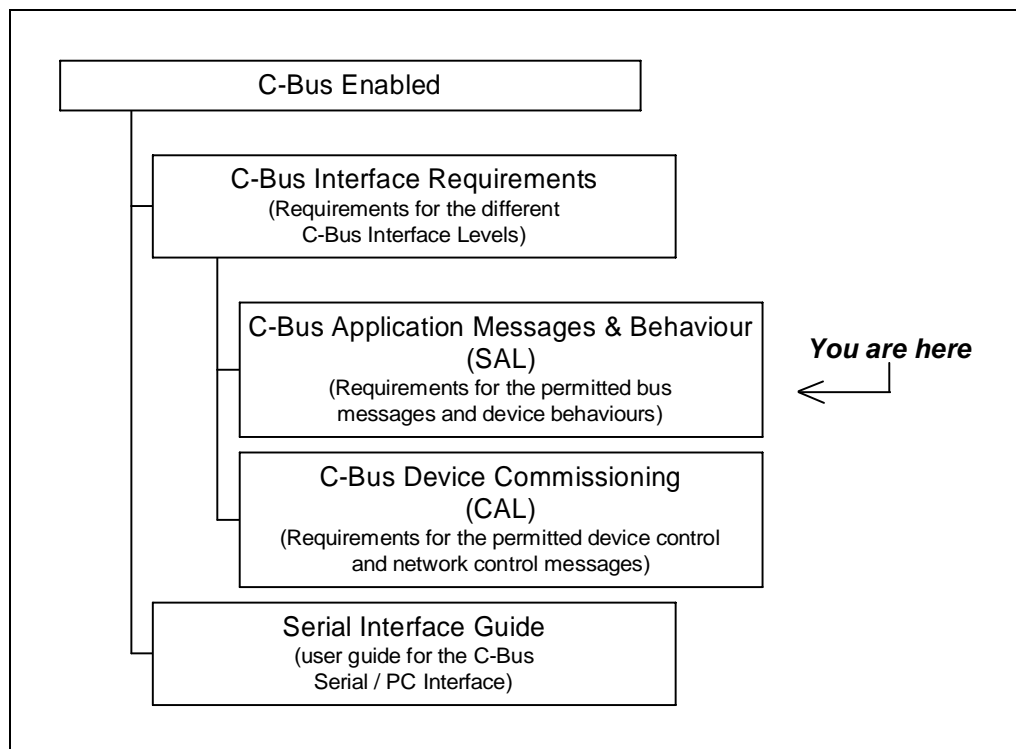


Figure 0-1 C-Bus Enabled Documents and Relationships

#### 0.2 C-Bus Application Messages

C-Bus point to multipoint messages are addressed to an “Application” rather than a specific device.

Such messages are broadcast to all devices, and filtered so that only those devices with a matching Application can further receive and process the message.

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Different Applications need to transfer different information. This document and its separate chapters document the C-Bus Applications, their messages, and Application Behaviour.

### 0.3 Scope

In the ISO 7-layer model, as applied to C-Bus, the Application Messages described in this document form the “Data” payload portion of information transmitted over C-Bus, as shown in Figure 2. All other information used in other protocol layers forms part of the C-Bus protocol, and is documented elsewhere.

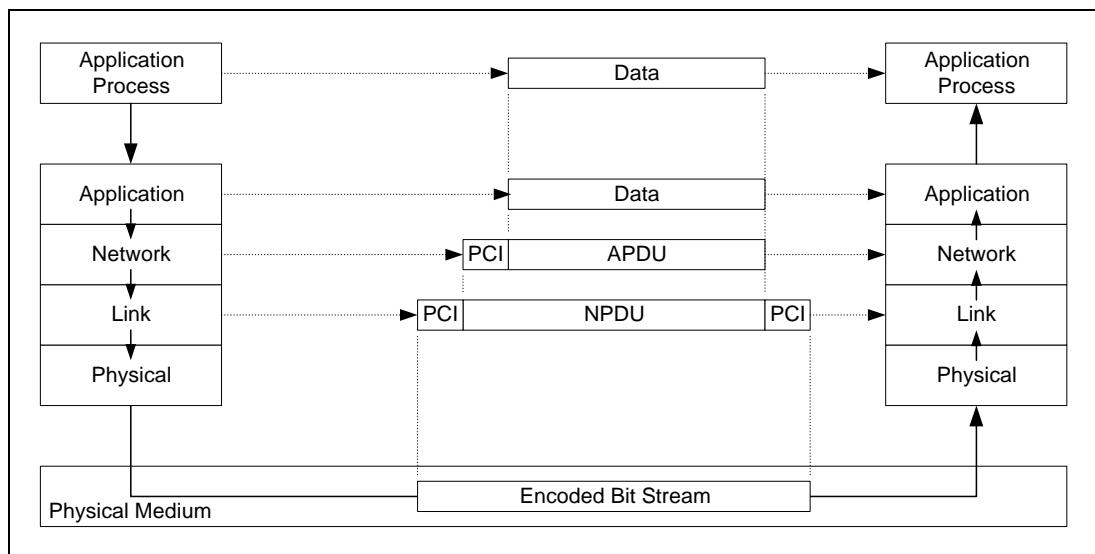


Figure 2 C-Bus Protocol Layers and Interactions

### 0.4 Document Conventions

Numbers are shown in decimal (base ten) with no other special prefixes or indications.

Binary numbers (base 2) are shown with the prefix %, and Hexadecimal numbers (base 16) are shown with the prefix \$.

Example: 157 = %10011101 = \$9D

### 0.5 Compatibility

C-Bus has historically grown from a basis of lighting control. Most C-Bus installations are based on lighting and lighting control.

An objective in defining Messages for other C-Bus Applications is to preserve some degree of compatibility with Lighting Application messages. Each chapter describes the degree of compatibility.

### 0.6 IMPORTANT NOTICE: PC Interface Limitations

The C-Bus Serial Interface (also the PCI Development Kit) contains a buffer used to construct information for transmission onto the bus.

This buffer will hold 21 bytes (21 character pairs). However, this buffer includes the inter-network routing information (the Network PCI). Therefore, the buffer space

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available for the C-Bus commands depends on the number of bytes used for the Network PCI.

The Network PCI has a length of between one byte, in case of a message intended for the local network, and up to eight bytes in case when message is intended for a network separated by six network bridges.

Therefore the space available for the commands will vary between 20 bytes in case of the local network down to 14 bytes in case of a the furthest sub-network.

No Application has commands greater than 14 bytes long. When transmitting Concatenated Commands, Applications must pack as many commands as possible into the available buffer space.

### 0.7 Application ID Number Requirements

C-Bus application numbers are used to segregate different uses (applications) of the bus. Within an application, all devices must use an identical formatting of the data payload transmitted over the bus. This permits those devices to inter-operate.

Different application need not format the data payload the same way (though they can if that seems appropriate). When different data formatting rules are applied, the **only** means available for devices to work out how to interpret the data they receive is by the application number.

Consequently:

***Only those Application ID numbers allocated by Clipsal Integrated Systems shall be used.***

The following rules apply to Application ID numbers:

#### **RESERVED**

Application ID numbers **\$00** and **\$FE** are reserved and shall not be used. Application ID number **\$FD** is reserved by use by C-Bus installation software. Application ID number **\$F0** is reserved for Clipsal network testing.

#### **FREE USE**

Application ID numbers **\$01** to **\$0F** are available for free use by other parties manufacturing C-Bus devices. However, use of these Application ID numbers is discouraged. Future C-Bus network device compatibility cannot be assured if these Application ID numbers are used.

#### **LIGHTING & ELECTRICAL LOAD CONTROL**

Clipsal Lighting units default to application **\$38**, but can be re-programmed if needed. Historically, they could be allocated to any application address.

For future compatibility, lighting is restricted to the range **\$30** to **\$5F**.

#### **RESERVED FOR SPECIFIC PURPOSE**

For future installations, non-lighting device application numbers are limited to the range **\$01** to **\$2F** and **\$80** to **\$EF**. Applications **\$F0** to **\$FF** should be avoided because these are used for Clipsal testing and other purposes.

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### **RESERVED FOR FUTURE EXPANSION**

Most of Applications **\$60 - \$7F** are unallocated, but are reserved for future expansion.

### **0.8 Chapters**

Each Application is described in its own chapter. The Applications and chapters are shown in Table 1.

**Table 1 C-Bus Applications**

<b>Chapter</b>	<b>Application</b>	<b>Application ID</b>
1	C-Bus Network Management and Control	\$FF
2	Lighting & Electrical Load Control	\$38 (\$30 - \$5F)
3	Heating (Clipsal 5 Star)	\$88
4	Room Control System (Clipsal 5 Star)	\$26
5	Security	\$D0
6	Metering (gas, water, electricity, oil, etc)	\$D1
7	Trigger Control (Scene Trigger)	\$CA
8	Enable Control	\$CB
9	Temperature Broadcast	\$19
10	Ventilation (dampers and fans)	\$70
11	Access Control (including card reading)	\$D5
12	Closed Circuit Television Control	-- TBA --
13	Smoke, Fire & Humidity Alarm	-- TBA --
14	Multi-Room Audio Control ( <i>In Development</i> )	\$CD
15	Position Feedback for Motorised Blinds	-- TBA --
16	Lighting Colour Control	-- TBA --
17	N/A	-- TBA --
18	Programmable Logic Controllers	-- TBA --
19	Generator Sets	-- TBA --
20	Emergency Lighting	-- TBA --
21	Media Transport Control ( <i>In Development</i> )	\$C0
22	Short Information Messages ( <i>In Development</i> )	\$AD
23	Clock and Timekeeping	\$DF
24	Telephony Status & Control	\$E0
25	Heating, Venting and Air Conditioning	\$AC
26	Irrigation Control	\$71
27	Remote counting (of sensed events)	-- TBA --
28	Measurement (light, liquid, temperature, etc)	\$E4
29	Remote display	-- TBA --
30	Elevator control	-- TBA --
31	Pool, spa, pond and fountain control	\$72
32	N/A	-- TBA --
33	Clipsal Testing	\$F0, \$FA
34	Error Reporting	\$CE
35	Scene Management ( <i>In Development</i> )	\$C9
36	HVAC Actuator Control	\$73, \$74

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### **0.9 Examples**

Each chapter provides a limited number of examples of different message types, assuming use of the C-Bus PC (serial) interface as the means for transmitting and receiving C-Bus messages.

When using the PC Interface, C-Bus messages are constructed from a series of fields. These fields are used in lower level parts of the C-Bus protocol to construct a message to be transmitted over the bus. Consequently, some of the information present in the examples is not directly relevant to the Application messages.