



C-Gate Server Application

Command Interface

5000 CG Series



Table of Contents

Section	Page
1.0 Product Range	3
2.0 Introduction	3
2.1 About this Document	3
2.2 This Version	3
2.3 About C-Gate	3
2.4 Trademarks	5
3.0 Background	5
3.1 Terminology	5
3.2 Interface Environment	6
3.3 Object Approach in the C-Gate Server	6
3.4 Addressing Controlled Components and Objects	7
3.5 Legacy 1.0-style Addressing	10
4.0 Command Interface	11
4.1 Socket Interface	11
4.2 Commands and Replies	12
4.3 Commands in Detail	16
4.4 Detailed Responses	39
5.0 Event Interface	43
5.1 Network Connection	43
5.2 Structure of Individual Events	43
5.3 Detail of Events Issued	45
5.4 Setting the Event Level	54
6.0 Change Port Interfaces	56
6.1 Load Change Port	56
6.2 Configuration Change Port	56
7.0 C-Gate Object Overview	56
7.1 Supported by all Objects	57
7.2 The cgate Object	58
7.3 C-Bus Network Manager	65
7.4 C-Bus Networks	65
7.5 C-Bus Units	69
7.6 C-Bus Output Units (C-Bus Relay and Dimmer Units)	70
7.7 C-Bus Output Terminal	70
7.8 C-Bus DIN Rail / Professional Series Relay, Dimmer	72
7.9 C-Bus DIN Rail / Professional Series Terminals	72
7.10 C-Bus PE Cell / Light Level Sensor	74
7.11 C-Bus Temperature Sensor	76
7.12 C-Bus Application	77
7.13 C-Bus Group	78
7.14 C-Groups	79

Copyright 2002 Clipsal Integrated Systems Pty Ltd. All rights reserved

Clipsal Integrated Systems reserves the right to change specifications or designs described in this manual without notice and without obligation. See Section 2.4 for Trademarks

1.0 Product Range

The C-Gate server product is available in five basic variants distinguished by the number of licensed networks that can be operated concurrently.

5000CG	C-Gate licensed to operate one network
5000CG5	C-Gate licensed to operate five networks
5000CG10	C-Gate licensed to operate 10 networks
5000CG50	C-Gate licensed to operate 50 networks
5000CGUNL	C-Gate licensed to operate an unlimited number of networks

2.0 Introduction

This section deals with the current version of C-Gate, general discussion of the purpose of C-Gate and a summary of the purpose of this document.

2.1 *About this Document*

This document describes the Command and Event interfaces of the C-Gate server. The C-Gate server is a software package that provides a high-level interface to one or more Clipsal C-Bus networks, as well as providing auxiliary management functions for connected C-Bus networks.

Refer to the C-Gate User's Guide for background information on C-Gate.

2.2 *This Version*

This version of C-Gate, **1.5**, adds a range of new features. Refer to the Readme.rtf file for an overview of the changes from C-Gate version 1.0.

2.3 *About C-Gate*

The C-Gate server is a server software component that integrates and manages a number of Clipsal C-Bus networks into one control and event interface.

2.3.1 **Physical Implementation**

The C-Gate server software is supported on a PC or server platform. Version 1.5 of C-Gate is supported on Microsoft Windows 95B, 98 and Windows NT, Windows Me, Windows 2000, and various Linux implementations.

It supports interfaces to one or more C-Bus PC Interface or C-Bus Network interface modules. These modules can be connected to the C-Gate by:

- local serial connection in the case of a PC interface, which uses a PC COM port on the PC or server that the C-Gate server is executing on,
- via a TCP/IP socket interface to a C-Bus Network Interface (CNI) which provides a TCP/IP network connection direct to a C-Bus network without the need for a separate PC Interface.
- via a TCP/IP socket interface, which could be provided by a terminal server or other TCP/IP socket to serial interface converter.
- Controlling systems interface to the C-Gate server software by connecting via TCP/IP socket protocols to a TCP/IP socket to the command interface described in this document.

2.4 Trademarks

Clipsal is a registered trademark of Gerard Industries Pty Ltd.

C-Bus is a registered trademark of Clipsal Integrated Systems Pty Ltd.

C-Gate is a registered trademark of Clipsal Integrated Systems Pty Ltd.

Intelligent Building Series is a registered trademark of Clipsal Integrated Systems Pty Ltd. All other trademarks are the property of their respective owners.

3.0 Background

This section provides a background to the approach of C-Gate and its interfaces.

3.1 Terminology

The unambiguous reference to groups, units and other aspects of a C-Bus network demands a systematic approach to nomenclature. The notation used is described below.

3.1.1 Augmented BNF

This specification uses an augmented Backus-Naur Form to describe the grammar of commands, responses and events. Reference should be made to

<http://www.w3.org/Protocols/rfc2616/rfc2616-sec2.html#sec2.1>

This document contains certain useful definitions such as the following concerning the use of:

“*”

- The character “*” preceding an element indicates repetition. The full form is “<n>* <m>element” indicating at least <n> and at most <m> occurrences of element. Default values are 0 and infinity so that “*(element)” allows any number, including zero; “1*element” requires at least one; and “1*2element” allows one or two.

rule1 | rule2

- Elements separated by a bar (“|”) are alternatives, e.g., “yes | no” will accept yes or no

[rule]

- Square brackets enclose optional elements; “[foo bar]” is equivalent to “*1(foo bar)”

DIGIT

- DIGIT = <any US-ASCII digit "0".."9">

ALPHA

- ALPHA = UPALPHA | LOALPHA

UPALPHA

- UPALPHA = <any US-ASCII uppercase letter "A".."Z">

LOALPHA

- LOALPHA = <any US-ASCII lowercase letter "a".."z">

In addition to these we have defined our own useful additions which are particularly appropriate for use with C-Bus networks:

HEX_DIGIT

- HEX_DIGIT = <DIGIT and "A".."F">

NAME

- NAME = ALPHA [*<CHAR except CTRL, white space, "\$", "/", "~", "-", " ", ".", or ">"]

3.2 *Interface Environment*

The interface defined in this specification is between the C-Gate server and a controlling building management system. The building management system and the C-Gate Server are connected by a TCP/IP network.

There are four interfaces between the building management system and the C-Gate Server:

- A **Command** Interface, that allows a building management system or other control system or person to execute commands in the C-Gate server to control and monitor the controlled C-Bus networks.
- An **Event** Interface that allows a building management system or other control system or person to receive in real time status and alarm information relating to the C-Gate server and the controlled C-Bus networks.
- A **Configuration Change** port which provides a description of changes to unit programming as they occur
- A **Load Change** port which reports changes to loads, such as on, off or ramp events.

All four of these interfaces are described in this document.

3.3 *Object Approach in the C-Gate Server*

The C-Gate server adopts an object-oriented approach to controlled devices. All controlled devices and many internal components of the C-Gate server are exposed to the command and event interfaces as objects that can be accessed with commands.

In general, every object has:

- An object identifier that allows the object to be referred to. Object identifiers may be network addresses, symbolic names, or reserved system names.

- Parameters that may be set or viewed, using the SET and SHOW (or GET) commands
- Methods which may be executed with the DO command

Objects are either created by the system on startup, created as a C-Bus network is scanned, or are created with the NEW command. System objects provide parameters and methods to allow configuration and operation of the C-Gate server itself. Key system objects include the `cgate` object and defined C-Group objects. Parameters for these objects are described in section 7.2.

3.4 Addressing Controlled Components and Objects

Both commands and events reference the components and objects in networks attached to the C-Gate and contained within it. This section defines the format of addresses for network devices used in the gateway and for object identifiers that can reference addressed components on networks, but can also reference local system objects.

As of C-Gate 1.5, addressing syntax has been changed to support the use of C-Bus applications and apply URI-compatible addressing. While the 1.0-compatible addressing can still be used, new applications communicating with C-Gate should move to this addressing system as soon as possible.

3.4.1 Addresses

Addresses are constructed from one or more address parts separated by the “/” (slash) character. Address parts get more specific to the right hand side of an address. Address parts except for network names, are all expressed as positive decimal integers, in the range from 0 to 32767 or as hexadecimal integers preceded by the ‘\$’ character in the range (0 to 7FFF).

3.4.2 Object identifiers

An object identifier can contain:

- An address, as described above, or
- an object name that is known to C-Gate and is part of a flat namespace typically used for system objects and CGroups.

3.4.3 C-Bus address components

The table describes the components of a C-Bus address that would be used to control and monitor C-Bus networks connected to C-Gate.

Address type	Description
C-Bus Network name	<p>This is a name or number describing a C-Bus network controlled by the C-Gate server.</p> <p><i>Important notes: Network names are case-sensitive. Network A42 and network a42 are different networks.</i></p> <p><i>When using C-Gate with Clipsal C-Lution, you must use numbers for the C-Bus network name, and the numbers must be in the range 1 through 255.</i></p> <p><i>Network name 0 is reserved for system use.</i></p>
C-Bus Unit number	<p>Identifies a single physical C-Bus unit on a C-Bus network. Unit numbers are unique on a C-Bus network.</p> <p>C-Bus unit numbers range from 0 to 255. Unit 255 is the initialisation address for new C-Bus units that have not been allocated a device address, but otherwise operates as a normal unit address.</p>
C-Bus terminal number	<p>This is the number of a unique relay terminal, dimmer circuit, or key switch pushbutton on a C-Bus unit. C-Bus relays and dimmers typically have from 1 to 12 terminals or circuits and this part of an address allows them to be individually addressed.</p> <p>There is no terminal 0 (zero) on any C-Bus unit.</p>
C-Bus Application Number	<p>This is the number of a C-Bus application. Various C-Bus applications have been defined for specific purposes like lighting, heating and security. Each application has a different message format and C-Gate currently only supports the lighting format messages. The acceptable application numbers for a C-Gate V1.5 project are 48 to 79 or \$30 to \$4F hexadecimal. This includes the default 56, \$38 lighting application.</p>
C-Bus Group or Area number	<p>C-Bus Group and area numbers are used in sending commands and monitoring commands sent to the C-Bus network. In the programming of a C-Bus network, C-Bus Units are programmed to send or act upon commands that specify a Group or an Area for a specific application.</p> <p>C-Bus Group and Area numbers range from 0 to 255 in any C-Bus network. Groups share the numbering space with Area numbers.</p>

3.4.4 Representing Addresses

The augmented BNF forms below show how addresses are represented. There are two main types of addressing:

- physical addressing by network components or physical devices, and
- group and application addressing which addresses the network by C-Bus applications and C-Bus groups (used in C-Bus for command and status information).

Physical addresses are indicated by the addition of the “p/” path element to the beginning of the address.

A wildcard (match all objects) address can be indicated by using a “*” symbol in the last part of an address.

Note that in this document the “|” symbol denotes an “or”.

numeric-address = 1*DIGIT | “\$” 1*HEX_DIGIT | “*”

terminal-number = numeric-address

unit-number = numeric-address

network-name = 1*DIGIT | NAME

application-number = numeric-address | “~”(defaults to lighting)

group-number = numeric-address

physical-address = [“/”] “p” “/” network-name “/” unit-number [“/” terminal-number]

application-address = [“/”] network-name ((“/” application-number) | “/”)

group-address = application-address “/” group-number

network-address = [“/”] network-name

system-address = NAME

3.4.5 Representing Object Identifiers

The augmented BNF below shows the form of an object identifier. Note that an object identifier fully encompasses the representation of an address.

object-identifier = NAME | network-address | physical-address | application-address | group-address

3.4.6 Addressing Examples

Some example addresses are shown below:

To address network 5, the address would be:

5

To address physical C-Bus unit 15 on network 57 the address would be constructed as:

p/57/15

To address all the units on network 57 the address would be constructed as:

p/57/*

To address terminal 2 on the same unit:

p/57/15/2

To address C-Bus group 12 on C-Bus network 2 on application 56, the address would be:

2/56/12

To address group 5 in the default application of network 11

11//5

or

11/~ /5

3.5 Legacy 1.0-style Addressing

C-Gate 1.5 supports the new addressing system described above. However, the addressing used in previous versions of C-Gate is still supported **but should not be used by new applications**.

Note that 1.0 addressing does not support multiple applications or wildcards in addresses.

The augmented BNF forms below show how 1.0 addresses are represented. There are two main types of addressing:

- physical addressing by network components or physical devices, and
- group addressing which addresses the network by C-Bus groups (used in C-Bus for command and status information).

Physical addresses are indicated by the addition of the “#” character to the beginning of the address.

numeric-address = 1*DIGIT

terminal-number = numeric-address

unit-number = 1*DIGIT

network-name = 1*DIGIT | NAME

application-number = 1*DIGIT

group-number = 1*DIGIT

area-number = 1*DIGIT

unit-address = unit-number [“.” sub-unit-number]

physical-address = “#” network-name “.” unit-number [“.” terminal-number]

group-address = network-name “.” group-number

network-address = network-name

3.5.1 Representing Object Identifiers

The augmented BNF below shows the form of an object identifier. Note that an object identifier fully encompasses the representation of an address.

NAME = ALPHA [*<CHAR except CTRL, whitespace, or ".">]

object-identifier = NAME | physical-address | group-address

3.5.2 Addressing Examples

Some example addresses are shown below:

To address physical C-Bus unit 15 on network 57 the address would be constructed as:

#57.15

To address C-Bus group 12 on C-Bus network 2 the address would be:

2.12

4.0 Command Interface

To allow external systems to send commands to and receive command from the C-Gate server, a command interface is supported. This interface is described in this section.

4.1 Socket Interface

The command interface for the C-Gate server is accessed as a TCP/IP socket interface using a series of text commands and responses to allow both human and automated use¹. The command interface may be opened using the C-Gate manager which ships with the C-Gate software or via a simple telnet session. To access the C-Gate server using telnet, type the following commands and observe the results:

1. Start the telnet program
2. Connect to the hostname or IP address of the C-Gate server, using port 20023, or the port number set in the C-Gate system parameter `command-port`.
3. The C-Gate server will respond with the 201 Service Ready response if the connection is established successfully.

Automatic systems wishing to access the C-Gate server should open a TCP/IP socket to the IP address of the C-Gate server; port

¹ The style of this interface is derived from J. Postel's RFC 821, defining Internet SMTP Simple Mail Transfer Protocol. Refer to the RFC for further background to this interface <http://www.sendmail.org/rfc/0821.html>. *Note: if the C-Gate server's cgate parameter accept-connections-from is set to a list of IP addresses, then connections will only be accepted from hosts with those IP addresses. See section 6.0 for further details of this parameter.*

20023. The 201 Service Ready message should be received in response to the connection.

8 bit bytes are supported over the socket interface. All command and response data is 7 bit USASCII characters. The high-order bit is ignored in commands, and it cleared in response and event messages.

4.2 *Commands and Replies*

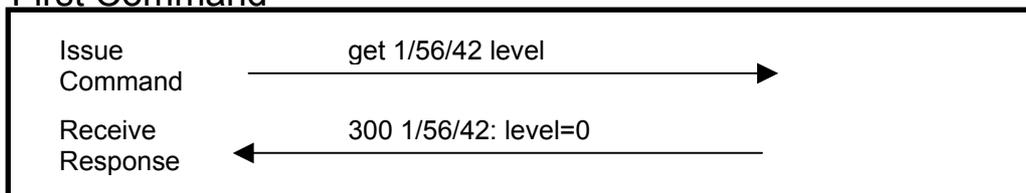
The command interface is based on a dialogue involving a command being issued and a response being returned following the execution of the command by the C-Gate server. All commands are one line only, terminated by a CRLF pair. Most responses are one line long.

The figure shows the opening of a connection to the C-Gate server and the ongoing conversation. Once the controlling system opens the connection, the C-Gate server responds with a 201 Service Ready message. This response is to the connection being opened and tells the controlling system that C-Gate is ready to receive commands.

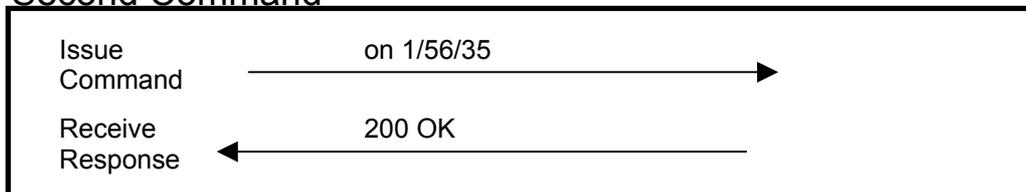
When the controlling system issues the NOOP command, C-Gate responds with a 200 OK message, a single response message for this command.

When the controlling system sends a GET command, a reply is sent.

First Command



Second Command



4.2.1 **Commands**

A command is a line of ASCII text terminated by a CRLF pair. Each command line begins with an action verb and contains one or more parameters following the action verb described in section 4.3 below. White spaces (ASCII space and tab characters depicted as SP) are used to separate commands and parameters.

command = action-verb SP parameters [CRLF]

where action-verb is selected from the list of commands in section 4.3 below.

4.2.2 Responses

Every command results in a response. Responses can be one or more lines of text. Each response line is terminated with a CRLF pair.

response = response-code (optional continuation-mark)
text [CRLF]

Responses to commands are structured to be both machine and human readable.

response-code = 3*DIGIT;

continuation-mark = "-" ; this indicates another line follows in the case of multi-line responses

text can be a text string of any type appropriate

The digits in the response code are coded provide a compact description of the general meaning of the response. The table explains the use of the three digit response codes. Note that the 7xx, 8xx and 9xx responses are used to define events in the event interface.

First DIGIT of response-code	General meaning	Use
0xx	Not used	Not used.
1yz Informational	Informational response only, to indicate useful information	Generally for human users, help and suggestions. Generally ignored by automatic systems.
2yz Successful	Operation successful and complete	Usual in response to successful SET commands.

First DIGIT of	General	Use
3yz Object Status	Returns status of objects or other requested information. May be one or more response lines of object information which need to be decoded.	Generally 3xx codes are issued in response to a SHOW/GET commands.
4yz Client Error	Incorrect or malformed command, address, object id or other client-side problem has caused the problem to fail	Example: 400 Syntax Error
5yz Server Error	Failure of the command due to some failure in the connected controlled devices or in C-Gate itself.	
6yz Continuation	Issued when a following command is required to complete the specified operation	For example, a restart command requires another confirming command. 6xx is issued to ask for confirmation before performing a restart.
7yz	Reserved for events	
8yz	Reserved for events	
9yz	Reserved for events	

The second and third digits provide fine shades of meaning to the error codes. Refer to the full response code table for details of these codes.

4.3 Commands in Detail

This section details commands and responses from the commands. Refer to the response guide (section 4.3.14) for details of how to handle response codes.

4.3.1 NOOP command

The NOOP command is designed to allow simple verification that the interface is operating correctly. Issuing the NOOP command simply results in a 200 OK reply message with no additional details if the interface is working. A 500 Internal error can only occur when the server has a serious internal error. If no response is received to a NOOP command, then the current command session is not responding. This may be due to the fact that this command interface is still processing an existing command.

Command	NOOP
Syntax	"NOOP"
Example	NOOP
Successful Response	200 OK
Failure response	500 Internal error [or no response in the case of a broken connection or other condition]
Access Level	connect

4.3.2 Comment command

This is used to insert a comment into the command stream. Comments ignored by the command processor.

Command	Comment
Syntax	("//" [any-text]) ("#" [any-text])
Example	// this is a test comment # turn on these lights
Successful Response	[no response]
Failure response	[no response]
Access Level	monitor

4.3.3 ON command

Turn on the specified C-Bus Group. This command results in a C-Bus group ON command being sent to the specified network.

Command	ON
Syntax	"ON" SP object-identifier
Examples	ON L57/56/1
Successful Response	200 OK
Failure responses	400, 401, 402, 405, 408, 420
Access Level	operate
See also	OFF, RAMP, DO

4.3.4 OFF command

Turn on the specified group. This command sends a C-Bus group OFF command to the appropriate network.

Command	OFF
Syntax	"OFF" SP object-identifier
Examples	OFF L57/56/1
Successful Response	200 OK
Failure responses	400, 401, 402, 405, 408, 420
Access Level	operate
See also	ON, RAMP, DO

4.3.5 RAMP command

Ramps the specified group or area to the percentage level using the specified ramp time. Note that the ramp time is the time taken to ramp from off to on, so a ramp of a smaller range will happen correspondingly more quickly.

Ramp Level Parameter

The ramp level can be given in an absolute (0..255) or percentage (0%-100%) range.

Ramp Time Parameter

Supported ramp times are between 0 seconds and 17 minutes. This command sends the C-Bus Group RAMP command to the specified network.

If there is no symbol following the ramp time, the time is assumed to be in seconds. If followed by an 's', then seconds

are used. Following the time by 'm' means the time is assumed to be in minutes.

The ramp time parameter is optional. If not given, then the ramp time is set to 0 seconds and the ramp is immediate.

The breakdown of the command follows:

Command	RAMP
Syntax	ramp-level = 1*3DIGIT ["%"]; in the range 0 to 255, or 0 through 100 if "%" is used ramp-time = 1*2DIGIT ["s" "m"]; s for seconds, m for minutes "RAMP" SP object-identifier SP ramp-level [SP ramp-time]
Examples	RAMP 57/\$38/15 0 4s RAMP Lobby/\$38/12 253 5m ramp 57/56/1 255 0 ramp 1/56/1 100%
Successful Response	200 OK
Failure responses	400, 401, 402, 405, 408, 420
Access Level	operate
See also	ON, OFF, DO

4.3.6 SET object command

The SET command allows the setting of parameters in objects. Objects may be part of connected controlled networks, or may be internal to the C-Gate server. Object parameters are described in detail in the guide for the particular object.

Command	SET
Syntax	parameter = token parameter-value = token "SET" SP object-identifier SP parameter SP parameter-value
Example	set level42//1 name lobby
Successful Response	200 OK
Failure response	400, 401, 402, 405, 408, 420
Access Level	operate [depends on Access Level of the parameter also]
See also	SHOW object

Many parameters can be set with the set command. Major general parameters for most or all objects are described here. Specific detail parameters for objects are dealt with in the specific guides for the relevant objects.

4.3.7 GET or SHOW object command

The GET or SHOW command allows the retrieval and viewing of the values of objects. Object parameters may be viewed by naming them in the command.

The special parameter '?' returns a list of all parameters supported by this object.

Command	GET object or SHOW object
Syntax	parameter = token ("SHOW" "GET") SP object-identifier [SP (parameter "?")]
Examples	show cbus networks get level57 units get level57/\$38/1 level get p/level57/2/1 power get p/level57/2 type get p/level57/2 ?
Successful Response	One or more lines of the following 3xx series responses: response-code [-] object-identifier ":" SP parameter-name=parameter-value For example: 300 level57/56/1: level=200
Failure response	400, 401, 402, 408, 420
Access Level	monitor
See also	SET object

4.3.8 DO object METHOD command

The `DO object` command allows the methods of an object to be called. As different objects support different methods, please consult the appropriate table in section 7.0 for the supported methods.

A 202 Done response is returned in response to a successful execution of a command.

The method may return one or more lines of 120 response that are information relating to this method.

Note that the `ON`, `OFF` and `RAMP` commands are shorthand versions of `DO` commands with the methods `on` `off` and `ramp`.

Command	DO object METHOD
Syntax	method-parameter = token "DO" SP object-identifier SP method-name *(SP method-parameter)
Examples	DO 57//1 on DO 2 sync
Successful Response	"202 Done:" SP object-identifier Also may include one or more lines of 120 responses giving additional method information.
Failure response	400, 401, 402, 405, 408, 420
Access Level	operate
See also	SHOW object SET object ON OFF RAMP

4.3.9 NEW command

The `NEW` command creates a new object. This new object is created in state **new**.

Command	NEW
Syntax	; Defining a group "NEW" SP "GROUP" SP object-reference [SP ("AREA" "PHANTOM")] ;Defining a unit "NEW" SP "UNIT" SP object-reference SP unit-type SP unit-version ;Defining an application "NEW" SP "APPLICATION"

Examples	NEW unit p/1/\$34 DIMMER4 1 NEW group 42/56/1 area NEW group 42/56/2 phantom NEW group 42/56/3 NEW application
Successful Response	200 OK.
Failure response	400, 401, 402, 406, 420
Access Level	Operate
See also	SHOW object SET object

4.3.10 QUIT command

Closes the connection to the C-Gate server command interface after sending a final response. Note that this command does not stop the C-Gate server operations or stop operation of the event interface.

Command	QUIT
Syntax	"QUIT" "EXIT"
Examples	QUIT EXIT
Successful Response	204 Closing Connection
Failure response	[none]
Access Level	Connect

4.3.11 RUN command

The run command allows execution of a macro file containing a series of commands. A filename specified. Specifying QUIET on the command line shows no output or response events unless an error occurs.

Command	RUN
Syntax	Filename "RUN" SP filename [SP "QUIET"]
Examples	RUN all-lights-off-slowly
Successful Response	203 Run complete.
Failure response	4xx syntax and client errors 410 Macro command error 411 Enable command not allowed in macros 412 Macro loop detected
See also	C-Gate parameter macro-path

4.3.12 HELP command

Gives brief command-line help by issuing the “HELP” or “?” command.

Command	HELP
Syntax	("HELP" "?") [SP command-or-topic]
Examples	HELP SET HELP HELP
Successful Response	101 <help information>
Failure response	4xx syntax and client errors

4.3.13 SHUTDOWN command

The shutdown command causes the C-Gate server to cease operation. It requires confirmation to execute the command.

Command	SHUTDOWN
Syntax	"SHUTDOWN"
Examples	SHUTDOWN
Successful Response	600 Critical operation. Type CONFIRM to continue. CONFIRM 206 Shutdown confirmed.
Failure response	420 Access Denied.
Access Level	admin
See also	CONFIRM

4.3.14 CONFIRM command

This command is used with a 600 message is received to confirm the execution of a shutdown before it proceeds.

Command	CONFIRM
Syntax	"CONFIRM"
Examples	CONFIRM
Successful Response	206 Shutdown confirmed.
Failure response	400, 420
Access Level	admin

4.3.15 GETSTATE command

This command causes a series of **events** to be sent to the event stream, that gives the status of a connected network. Events are returned for all devices in the network. Events are returned giving:

- status information for all units and groups
- level information for all groups and terminals

This command is an easy way for an application to get the current state of the network as a starting point for a model or for subsequent event tracking or polling.

Command	GETSTATE
Syntax	"GETSTATE" SP (network-name cgroup-name)
Examples	GETSTATE 57
Successful Response	200 OK
Failure response	400, 401, 420
Access Level	monitor
See also	GET, TREE

4.3.16 TREE or REPORT command

The tree command returns a listing of all the units and groups in the specified network in a human-readable form.

Command	TREE or REPORT
Syntax	("TREE" "REPORT") SP network-name
Examples	TREE 1
Successful Response	More than one response lines starting with 320 that give human-readable information about the network
Failure response	400, 401, 402, 420
Access Level	monitor
See also	GETSTATE, GET

4.3.17 EVENT command

The event commands enable or disable sending events to this command session. If the commands EVENT ON or EVENTS ON are set, then all C-Gate events will then be send to this command interface. This can be turned off using the EVENT OFF or EVENTS OFF command.

Command	EVENT or EVENTS
Syntax	("EVENT" "EVENTS") SP ("ON" "OFF")
Examples	EVENT ON EVENTS OFF
Successful Response	200 OK.
Access Level	monitor

4.3.18 RECALL command

The RECALL command allows parameters to be recalled from C-Bus units and displayed. These parameters are the internal memory locations contained inside the C-Bus units. Up to 8 locations can be displayed from one request. If the `count` parameter is not given, a `count` of 1 is used to retrieve only one parameter.

The parameter address can be given as hex digits if preceded by the \$ character.

Command	RECALL
Syntax	"RECALL" SP unit-address SP parameter-address SP count parameter-address = (\$ hex-digits) DIGIT
Examples	RECALL p/2/1 \$20 RECALL p/2/1 \$50 4
Successful Response	300 p/2/1: recall=\$1(1) 300 p/2/1: recall=\$13(19), \$9(9), \$13(19), \$13(19)
Failure response	400, 401, 405, 420, 522
Access Level	program
See also	STORE, GETSTATUS

4.3.19 GETSTATUS command

The GETSTATUS command allow status parameters to be recalled from C-Bus units and displayed. These parameters are the internal memory locations contained inside the C-Bus units. Up to 8 locations can be displayed from one request. If the `count` parameter is not given, a `count` of 1 is used to retrieve only one parameter.

The parameter address can be given as hex digits if preceded by the `$` character.

Command	GETSTATUS
Syntax	<pre>"GETSTATUS" SP unit-address SP parameter- address SP count parameter-address = (\$ hex-digits) DIGIT</pre>
Examples	<pre>GETSTATUS p/2/1 \$20 GETSTATUS p/2/1 \$50 3</pre>
Successful Response	<pre>300 p/2/1: getstatus=\$1(1) 300 p/2/1: getstatus=\$13(19), \$9(9), \$13(19)</pre>
Failure response	<pre>400, 401, 405, 420, 522</pre>
Access Level	<pre>program</pre>
See also	<pre>STORE, RECALL</pre>

4.3.20 STORE command

The STORE command allows parameters to be stored to C-Bus unit memory locations. These parameters are the internal memory locations contained inside the C-Bus units.

The parameter address and the value can be given as hex digits if preceded by the `$` character.

This command is only available if the `allow-recall-write` system parameter is set to `yes`.

Command	STORE

Syntax	<pre>"STORE" SP unit-address SP parameter- address SP value [SP count] parameter-address = (\$ hex-digits) DIGIT* value = (\$ hex-digits) DIGIT*</pre>
Examples	STORE p/2/1 \$50 \$ff
Successful Response	200 Ok.
Failure response	400,401, 405, 420, 522
Access Level	program
See also	RECALL, GETSTATUS

4.3.21 LOGIN command

This command is used to change the current access level of this command session, by providing a username and a password.

If no username and password are given, the command returns the current access level.

Usernames and passwords are case-sensitive.

Command	LOGIN
Syntax	<pre>"LOGIN" [SP username SP password] username = name password = name</pre>
Examples	LOGIN fred yabbadabbadoo
Successful Response	210 Access level: level 211 Access level set to: level
Failure response	400, 422
Access Level	connect

4.3.22 LOCK command

The LOCK command sets an advisory lock on an object. This lock is typically used to cooperating applications that want exclusive access to a device or object for programming of configuration. A lock survives until unlocked with the UNLOCK command or the command session ends.

Note that the locking is advisory only. Applications must cooperate to make a locking system work.

Command	LOCK
----------------	-------------

Syntax	"LOCK" SP object-identifier
Examples	LOCK p/1/11
Successful Response	225 <object-identifier>: Locked
Failure response	400, 401, 420, 425
Access Level	operate
See also	UNLOCK

4.3.23 UNLOCK command

Use this command to remove a lock taken with the LOCK command.

Command	UNLOCK
Syntax	"UNLOCK" SP object-identifier
Examples	UNLOCK p/1/11
Successful Response	226 <object-identifier>: Unlocked.
Failure response	400, 401, 405, 420, 426
Access Level	operate
See also	RECALL, GETSTATUS

4.3.24 SEND command

For debugging purposes only. Use of this command may invalidate C-Bus warranty.

The SEND command sends a raw string of bytes to a C-Bus network and attempts to return a valid response to the command.

Command	SEND
Syntax	"SEND" SP network-address SP string string = *ALPHA
Examples	SEND 1 00aabbcc
Successful Response	300 Response=abcdef
Failure response	400, 401, 420, 524
Access Level	debug

4.3.25 IDENTIFY or ID command

This command returns identify information from C-Bus units.

Command	IDENTIFY
Syntax	("IDENTIFY" "ID") SP unit-address SP identify-type identify-type = ("manufacturer" "man" "0" "type" "version" "summary")
Examples	IDENTIFY p/1/11 type
Successful Response	300 <unit-address> <identify-type>=<result>
Failure response	400,401, 420, 521
Access Level	program

See also	RECALL, GETSTATUS
----------	-------------------

4.3.26 SCENE command

This command performs functions for scenes created with the Scene Module – see the section on the Scene Module in the C-Gate User's Guide. Use this command to record or play a scene from the command line.

Command	SCENE
Syntax	<pre>"SCENE" SP command SP scene-set SP scene command = ("PLAY" "RECORD") scene-set = NAME scene = NAME</pre>
Examples	SCENE play conf1 allon
Successful Response	200 Ok.
Failure response	401, 402, 407, 420
Access Level	operate

4.3.27 CI command

The CI command allows control of cgate and connected C-Bus networks using a PLC-like addressing model to allow easy integration into SCADA systems.

CI GET commands are used to read values, CI SET is used to set values.

Command	CI
Syntax	<pre>"CI" SP request-id SP "GET" SP request- type SP network-or-application-name SP address SP count "CI" SP request-id SP "SET" SP request- type SP network-or-application-name SP address SP count value</pre>
Examples	<pre>CI 1 GET 2 1 0 16 CI 1 SET 2/56 1 1 255</pre>
Successful Response	310 request-id result-code [result-code]
Failure response	311 request-id result-code
Access Level	operate
See also	GET, SET

The CI series of commands are somewhat user-hostile. They are designed to minimise parsing for other drivers and systems

that interface to cgate, while adding efficiency for multiple read/write requests.

An explanation of the parameters and their use follows:

request-id

To allow a driver to issue multiple requests and keep synchronism, each CI command contains a request id field. This field is echoed in the response to that request, allowing the response to be easily matched to the request and preventing and subsequent loss of synchronisation of requests and responses. Typically, request ids are numbers that incremented after each command. C-Gate does **no** checking of the request id, merely echoing it back in the response to that request.

“GET” or “SET”

A “GET” command returns the value requested in request-type for the identified network and application & group/unit/terminal. A “SET” command sets the value for the request-type for the identified network and application & group/unit/terminal.

request-type

The request type is a numeric field that indicates the type of request this is. Refer to the table for information about request types, appropriate parameters and ranges.

request-type	Description	Addressing (value of address parameter)	Possible values	Notes
1	Network Alarm	network number (if network number is 0, refers to C-Gate server alarms rather than alarms for a particular network).	returns 0 for normal operation of this C-Bus network Other values represent alarms on the specified C-Bus network	Read only. Alarms are queued as they occur, and each read of this location retrieves the next alarm from the queue and returns it.

request-type	Description	Addressing (value of address)	Possible values	Notes
2	Group level	C-Bus group number for this network or application (0-254)	0 – 255 normal group levels -1 returned when group level not available or no such group -2 returned when terminal in error or unknown state.	Use this to set and get C-Bus group levels.
3	Terminal level	(C-Bus unit number * 4) + terminal number. Terminals are numbered 0,1,2,3. ²	0 – 255 normal terminal output levels -1 returned when terminal not available or does not exist -2 returned when terminal in error or unknown state.	Read only. Get the current output level of a C-Bus relay or dimmer
4	Digital Group Level	C-Bus group number for this network or application (0-254)	0 or 1 0 represents OFF or group not available 1 represents ON	When writing, will set the group level to 0 for off, or 255 for on.
5	Network Unit Count	0	0 - 255 representing the number of units	Read only.
6	Network Group Count	0	0 - 255 representing the number of groups on the network	Read only.

² If a unit with more than 4 terminals is referenced, only the first four terminal values are available

request-type	Description	Addressing (value of address)	Possible values	Notes
7	Pro Terminal Level	(C-Bus unit number * 4) + terminal number. Terminals are numbered 0 through 15	0 – 255 normal terminal output levels -1 returned when terminal does not exist -2 returned when terminal in error or unknown state.	This is used for accessing the terminal levels of 12 or more terminal output devices.
8	Get-Status Parameter	(C-Bus unit number * 256) + Parameter number (range 0-255)	0 – 255 normal return values. -1 returned when unit or parameter does not exist. -2 returned when unit in error or unknown state.	This is used to read a Get-Status parameter directly from a C-Bus unit. This read from the device is performed in real time.
9	Recall Parameter	(C-Bus unit number * 256) + Parameter number (range 0-255)	0 – 255 normal return values. -1 returned when unit or parameter does not exist. -2 returned when terminal in error or unknown state.	This is used to read a Recall parameter directly from a C-Bus unit. By default writing is disabled. To enable writing, set the <code>cgate</code> object parameter <code>allow-recall-write</code> to <code>yes</code> . This read or write is performed direct to the network in real time.

request-type	Description	Addressing (value of address)	Possible values	Notes
10	Current Sense	(C-Bus unit number * 4) + terminal number. Terminals are numbered 0 through 15	0 – 255 normal current levels -1 returned when terminal does not exist -2 returned when terminal in error or unknown state.	Current sense values are scaled to the maximum current range of the unit the terminal is a part of.
11	Network Voltage	C-Bus unit number	The raw voltage of the C-Bus network for this unit at this moment. Actual voltage in Volts = (raw voltage/6.375) -1 returned when unit does not exist or when this unit can not measure voltage. -2 returned when voltage unknown.	Read only
12	Light Level	C-Bus unit number	Current light level (lux) if this unit is a light level sensor. -1 returned when the unit does not exist or is not a light level sensor -2 returned when light level is unknown.	Read only

request-type	Description	Addressing (value of address)	Possible values	Notes
13	Temperature	C-Bus unit number	<p>Current temperature, if this unit is a temperature sensor. Temperature is expressed in 256ths of degrees Celsius.</p> <p>-1 returned when the unit does not exist.</p> <p>-2 returned when temperature is unknown.</p>	Read only
14	Unit State	C-Bus unit number	<p>Current state of this unit:</p> <p>-1 returned when unit does not exist</p> <p>0 returned when unit is in state ok (normal operation).</p> <p>1 returned when unit is in sync state.</p> <p>2 returned when unit is in error or other state.</p>	
15	Psync	C-Bus unit number	When written to, runs the psync method for this object.	Write only. Always returns 0.

request-type	Description	Addressing (value of address)	Possible values	Notes
16	Stored Ramp Time	C-Bus group number	0 - 32767 Default value is 0 -1 if it doesn't exist	Stores a number of seconds to use for a ramp when a group level command is used. This allows a ramp time to be set for any group change that occurs from the CI command.

network-or-application-name

This is either a network name, or an application name (as an address eg 1/56). If the operation is request type 2 (Group Level) or 4 (Digital Group Level) then an application name can be used to access the groups in that application. If, for these types, a network name only is used, then the **default** application is used.

For all other requests, the network part of the application name will be used if an application name is given.

If no network name is required, or if the network name is not relevant, use '0' as the network name.

address

See the details of the address required in the table of request types above.

count

This parameter is the number of items to be read in a get command or written in a set command. **Note: the CI SET command does not support a count of more than 1.**

The following sections cover alarm codes for the network alarm and C-Gate alarm parameters for the CI command.

Network alarms

These alarm codes are defined for a C-Bus network and equipment associated with that network.

Alarm value	Meaning	Notes
0	No alarm registered	Normal operation
820	Network not available	The C-Bus network is not available. This may be the result of a networking or hardware failure
826	C-Bus receive error	An error was encountered receiving from this network
827	C-Bus send error	An error resulted from sending to this network
828	Checksum error	"receive checksum error"
840	PCI not responding	The PCI is not responding for this network. This may indicate a PCI or cabling failure.
841	Network port not available	The port connecting to the PCI for this network is not available.

Alarm value	Meaning	Notes
842	Terminal adapter not available	The terminal adapter, providing RS232 connections to C-Bus PCs, is not available.

C-Gate Alarms

These alarm codes are defined for the C-Gate server software itself. These alarms are returned where the network number in the CI get command equals 0.

Alarm value	Meaning	Notes
0	No alarm registered	Normal operation
900	Internal error	C-Gate has registered an internal error. C-Gate's event log should be consulted for details.
910	Can't open event interface	
912	Can't open command interface	
913	Can't start event server socket	
914	Unable to open event file	Can't write event file
930	Startup file error	There is an error in a C-Gate startup file. Refer to the C-Gate event log for further details.

4.4 Detailed Responses

The table gives detail of the event codes that are issued, their meaning, and the syntax of additional information.

Response code	Meaning	Syntax of response
10x	Help information	
101	Help information	(typically multiple lines such as: 101-help-text 101-help-text 101 help-text
110	Starting macro file	"Starting macro file:" SP filename
111	Ending macro file	"Ending macro file:" SP filename
112	Indicating a macro command from an executing macro file	"Macro command:" SP command-line
120	Additional information from executing method	method-name ":" SP information
19x	Pre-release debugging information	
191	Pre-release debugging information	unstructured information (not for automatic use)
20x	Successful completion	
200	Completed successfully	"OK"
201	Service ready	Service ready: SP cgate-name=NAME SP Version:=VERSION STRING
202	Method successfully executed	"Done:" SP object-id

Response code	Meaning	Syntax of response
203	Macro complete.	"Macro:" SP filename SP "complete."
204	Closing connection.	"Closing connection."
205	Restart Confirmed.	"Restart confirmed."
206	Shutdown confirmed.	"Shutdown confirmed."
21x and 22x	Security	
210	Indicating the current access level	"Access level" SP access-level-name
211	Indicating the new access level	"Access level set to" SP access-level-name
225	Indicating a successful lock operation	object-identifier ":" SP "Locked."
226	Indicating a successful unlock operation	object-identifier ":" SP "Unlocked."
30x	Object information	
300	Object information	parameter-name = token parameter-value = token *DIGIT quoted-string one or more lines of: object-identifier ":" *(SP parameter-name "=" parameter-value) For example: 300 57//1: level=200
320	Tree information. Returned from the <code>tree</code> command.	
40x	Client side command error	
400	Syntax error	"Syntax error."

Response code	Meaning	Syntax of response
401	Bad object or device ID	bad-object-id = object-identifier "Bad object or device ID"
402	Not supported by this object	"Operation not supported by:" SP object-identifier
403	Unsupported ramp level	"Unsupported Ramp Level:" SP ramp-level
404	Unsupported ramp time	"Unsupported Ramp Time:" SP ramp-time
405	Parameter out of range	bad-parameter = parameter-name "Parameter out of range:" SP bad-parameter
406	Error creating object	"NEW command error:" SP details
407	Error processing scene. A scene record or play could not be executed due to an error.	"Error processing scene"
408	Indicates that a set, get or method failed executing for an object. May include a text reason.	"Operation failed:" SP details
41x	Macro errors	
410	Macro command error	line-number = 1*DIGIT "Macro command error at:" SP filename SP line-number
411	Enable command not allowed in macro	"Enable not allowed in macro at:" SP filename SP line-number
412	Macro loop detected	"Macro loop detected at:" SP filename SP line-number
413	Macro file not found.	"Macro file not found: SP filename"

Response code	Meaning	Syntax of response
42x	Access control errors	
420	Access denied	"Access denied."
421	Connection refused. A command interface connection was refused.	"Connection refused."
422	Bad username and password in login command	"Username and Password do not match"
425	Can not perform lock command	"Already locked by:" SP session-name
426	Can not perform unlock command	"Unlock failed."
43x	Method failures	
430	Parameter sync failed	"Parameter sync failed."
50x	Internal errors	
500	Internal Error	debug-information = text "Internal Error." SP debug-information
52x	Network errors	
520	Network unavailable	"Network" SP object-identifier SP "unavailable"
521	Unit unavailable	"Unit" SP object-identifier SP "unavailable"
522	Unit error	unit-error-information = text "Unit error:" SP unit-error-information
523	Interface error.	interface-name = NAME "Interface error on:" SP interface-name

Response code	Meaning	Syntax of response
524	Error sending command to network	"Command send error"
60x	Continuation confirmation	
600	Confirm by typing confirm	"Critical operation. Type CONFIRM to continue."

5.0 Event Interface

The event interface is intended primarily for the passive monitoring of C-Bus activity and provides information for monitoring and for programs that perform statistical tracking of power usage for ongoing energy audits.

5.1 Network Connection

The event interface operates on a similar basis to that of the command interface. However, the event interface uses a separate TCP/IP connection to provide event information.

Upon startup of the C-Gate server, a TCP/IP connection is opened to the host IP address and port number specified in the sys-event object parameters. Once this connection is established, the C-Gate server will send events to this interface on a line-by-line basis, one event per line. The level and type of events that are delivered is controlled by the parameters of the sys-event object. The parameters involved can be shown and set via the command interface and stored in the system configuration file for startup.

5.2 Structure of Individual Events

The structure of an event line is shown in the augmented BNF form below:

```
event-response = event-time SP event-code SP object-
identifier SP event-info [CRLF]
```

```
event-time      = YYYYMMDD-HHMMSS [".mmm] where
  YYYY          = 4 digit year code
  MM            = 2 digit month code (01-12)
  DD            = 2 digit day code (01-31)
  HH            = 2 digit hour (00-23)
  MM            = 2 digit minute code (00-59)
  SS            = 2 digit second code (00-59)
```

mmm = 3 digit millisecond code (00-999) optional

event-code = ("7" | "8" | "9") + 2 digits ; three digit event code
7 series for status reports
8 series for medium priority
9 series for alarms (high priority)

event-info = <see event table for details of event information>

Millisecond timing can be added to events by setting the config parameter `event-millis` to `yes`. This adds a dot and a three digit millisecond count to the event time. It is disabled by default in the Windows version of C-Gate.

The event-time is based on the internal clock used by the C-Gate server. It is set to the system time at startup.

5.3 Detail of Events Issued

The table gives detail of the event codes that are issued, their meaning, and the syntax of additional information.

Event code	Event level	Meaning	Syntax of event-info
70x		Information	
700	5	Heartbeat to indicate C-Gate server is operating.	"Heartbeat"
701	3	Object parameter information. This is an event that does nothing but report the state of a pre-defined object. These events can be triggered by the GETSTATE command.	parameter-name "=" value
72x		Energy-related	
720	3	Power usage report An event indicating that the calculated power usage for the loads connected to the object (and sub-objects) has changed. This calculation requires that individual sub-unit definitions for wattage of loads are set. These are set on the load-power parameter for each unit and sub-unit.	power-usage = *DIGIT "power=" power-usage "W"
73x		Command events	
730	7	New level advice for group	New level= *DIGIT SP sourceunit= *DIGIT SP ramptime= *DIGIT
731	8	Unit advice	"unit type:" SP type SP "version:" SP version
732	8	Group advice	"group at" SP *DIGIT
733	8	Unit type advice	"unit type:" SP TOKEN

Event code	Event level	Meaning	Syntax of event-
734	9	Response line:	"response:" SP STRING
735	9	Command send advice	"send cmd" [SP "(fastpci)"]:" SP command-string
736	8	Application advice	"applications:" application-number "," application-number
737	8	Area advice	"area: " SP *DIGIT
74x		Network Information	
740	5	Opened C-Bus network	"Opened cbus network:" SP network-name
741	5	Closed C-Bus network	"Closed cbus network:" SP network-name
761	9	Command detail	"Command: " + command-line
762	6	Network synchronisation has succeeded	"Network sync ok"
763	6	Version 3 or later PCI detected (allowing fast communications)	"C-Bus PCI V3 detected at unit:" SP unit-address
765	8	Indication of confirm packet for sent command (with V3 PCI)	"got packet confirm:" SP CHAR CHAR
770	6	Scene playing notification	"Playing scene:" SP scene-name
771	6	Scene recording notification	"Recording scene:" SP scene-name
772	6	Reloading scene notification	"Reloading scene:" SP scene-name
775	8	Licence check	"Checking license"
78x		Unit configuration warnings (non-critical)	

Event code	Event level	Meaning	Syntax of event-
781	8	The expected count of terminals for this output unit was not found in the unit	"Terminal count does not match for unit:" SP unit-number
782	8	The expected count of minimum values for this output unit was not found	"Min level terminal count does not match for unit:" SP unit-number
783	8	The expected count of group values was not found for this unit	"Group Value count does not match for unit:" SP unit-number
784	8	The expected set of current sensors does not match for this unit	"Current sense does not match for unit:" SP unit-number
785	8	The extendo-dignostic summary for this unit is missing or bad.	"Bad extendo-diagnostic summary for unit:" SP unit-number
79x	9	Debugging Information	
80x		Command related	
800	5	Startup	"C-Gate started"
801	3	Shutdown	"C-Gate shutdown"
802	3	Restart	"C-Gate will restart"
803	5	Command interface opened	"Host: " ip-address SP "opened command interface from port: " SP port-number
804	5	Command interface closed	"Host: " ip-address SP "closed command interface from port: " SP port-number

Event code	Event level	Meaning	Syntax of event-
805	5	Command connection refused	"Host:" SP ip-address SP "command connection refused."
806	5	Connection refused by access control	"Access control refused" SP [connection-type SP] "connection from" SP STRING
807		Reserved for future audit commands	
808		Reserved for future audit commands	
81x		Security related	
810	5	Enable succeeded	"Command interface:" interface-no SP "user:" username SP enabled.
811	5	Enable failed	"Command interface:" interface-no SP "user:" username SP failed enable.
812	5	End enable	"Command interface:" interface-no SP "user:" un-enabled.
82x		Non-critical network errors	
820	2	Network unavailable	"Network" SP object-identifier SP "unavailable"
821	2	Unit unavailable	"Unit unavailable:" SP additional-details
822	2	Unit error	"Unit error:" SP unit-error information
823	4	PCI busy	"PCI busy indication"

Event code	Event level	Meaning	Syntax of event-
824	2	Unknown C-Bus response	"unknown cbus response:" SP STRING
825	2	Response for unknown group	"response for unknown group:" SP STRING
826	4	C-Bus receive error	"cbus receive exception:" SP additional-information
827	2	C-Bus send error	"cbus send error" ["(fast pci)"] ":" SP additional-information
828	2	Checksum error	"receive checksum error"
829	3	New C-Bus unit not defined for this network	"newcbus unit: address=" unit-address SP "type=" unit-type SP "version=" version SP "not defined for this network."
830	3	New C-Bus group found on this application	"new group: address=" group-address SP "not defined for this application."
831	3	Error creating a unit as a C-Gate object	"error creating cbus unit: address="unit-address SP "type=" unit-type SP "version=" version
832	4	Response for unknown application	"Response for unknown application address=" application-address
833	3	New C-Bus area not defined for this application	"new cbus area: address=" unit-address SP "not defined for this application."

Event code	Event level	Meaning	Syntax of event-
834	2	The transmitter thread has been restarted after being paused and not restarted due to communication issues	"Restarting stuck transmitter"
835	2	Failed to send command to C-Bus – timeout after retries	"C-Bus Send Error: command timed out, failed"
840	2	PCI not responding	"PCI not responding"
841	2	Network port not available	"Network port not available"
842	2	The terminal adapter, providing RS232 connections to C-Bus PCs, is not available.	"Terminal adapter not available"
843	3	Synchronisation of groups on this application has failed.	"Group sync failed"
844	3	Synchronisation of units on this network has failed.	"Unit sync failed"
845	2	Network synchronisation has failed	"Network sync failed"
850		Can't execute scene action	"Can't execute scene action for scene:" SP scene-name SP "address:" SP address
90x		Critical Alarms	
900	1	Internal error	"Internal error: " SP debug-information
902	1	The unit specification file could not be found, so unit types can not be established	"Missing unit specification file" SP file-name
91x		Connected network and interface alarms	

Event code	Event level	Meaning	Syntax of event-
910	2	Can't open event interface	"Can't open event interface at:" ip-address SP "port:" port-number
911	2	Can't open C-Bus network interface	"Can't open:" SP debugging-information
912	2	Can't open command interface	"Can't open command interface on port:" SP *DIGIT
913	2	Can't start event server socket	"Can't start event server socket on port:" SP *DIGIT
914	2	Unable to open event file	"Unable to open event file:" SP file-name
915	2	Can't start config change port	"Can't start config change port socket on port:" SP *DIGIT
916	1	Unable to open event printer	"Unable to open event printer:" SP file-name
917	2	Can't start load change port	"Can't start load change port socket on port:" SP *DIGIT
92x		Interface errors	
920	1	A checksum error was noted in a received message	"receive checksum error:" SP additional-details
921	1	Bad or unknown interface type.	"Unknown/unimplemented C-Bus interface type" SP interface-type
922	1	Unable to open C-Bus Network	debugging-information
93x		File errors	
931	1	Can't open networks file	"Can't open networks file:" SP file-name

Event code	Event level	Meaning	Syntax of event-
932	1	Bad token in networks file	"bad token in networks file: " SP additional-detail
933	1	Can't open CGroup file	"Can't open Cgroups file:" SP file-name
934	1	Syntax error in cgroups file line	"Bad token in networks file line:" SP line-name
935	1	Syntax error in configuration parameter	"Syntax error:" SP additional-details
936	1	C-Gate could not start the given class as a network interface	"Unable to start network class:" SP class "(" additional-details ")"
937	1	Unknown object in cgroup	"Unknown object " object "
94x		Licensing errors	
940	1	Hardware key not found	"Protection key not found" SP error-details
941	1	Network count exceeded	"Network license exceeded: (" *DIGIT SP "in use," SP *DIGIT SP "licensed.)"
942	1	Shutdown due to exceeded licence	"Cgate Shutdown - licence exceeded"
95x		Unit Specification Errors	
950	1	Bad class in Unit Specification file	"Bad class in unit specification: Type:" SP type SP "Class:" SP class-name SP "not found" SP "(" additional-information ")"

Event code	Event level	Meaning	Syntax of event-
951	1	Unable to load the class indicated in the class specification file due to a error in the constructor	"Error in constructor for Type:" SP type SP "Class:" SP class-name SP "(" additional-information ")"
952	1	Error reading unit specification:	"Error reading unit specification:" SP file-name
953	1	Syntax error in unit specification file	"Syntax error in unit specification file:" SP name SP "after type:" SP details
954	1	Unable to start class to represent unit	"Unable to start unit class" SP "(" additional-detail ")"
955	1	No specification available for unit	"No specification for unit address:" SP unit-number SP "type:" type SP "version:" version SP "-- using base CBusUnit"
96x		Scene Errors	
961	1	Unknown notify from scene control group	"Unknown notify from scene control group. Scene" SP scene-name SP "group" SP group-number)
962	1	Missing scene file	"Missing scene file" SP file-name
963	1	Error reading scene file	"Error reading scene file" SP file-name
964	1	Syntax error in scene file	"Syntax error in scene file:" SP file-name SP "last token:" SP TOKEN

Event code	Event level	Meaning	Syntax of event-
965	1	Bad address in scene	"Bad address" SP group-address SP "in scene:" SP scene-name
966	1	Error writing scene	"Error writing recorded scene:" SP scene-name SP "error:" SP additional- information
967	1	Scene directory not found	"Scene directory not found:" SP directory-name
97x		Access Control	
970	1	Missing access control file	"Missing access control file" SP file-name
971	1	Error reading access control file	"Error reading access control file:" SP filename
972	1	Syntax error in access control file	"Syntax error in access control file:" SP file- name SP "after word:" SP TOKEN
974	1	Can't resolve address in access control file	"Can not resolve address: " SP address SP "on line" sp TOKEN sp "in access control file:" SP file-name
975	1	Bad access level in access control file	"Bad AccessLevel in access control file, setting to None"

5.4 *Setting the Event Level*

As a guide to setting the correct event level, the following table gives an overview of the levels and the types of events that occur at that level. As an example, setting the event level to 5 means that all events with a lower or equal event level will be sent to the event outputs.

Event level	Events at this level
1	Critical errors, such as syntax errors in c-gateconfig , cgroups , networks files. Internal errors in cgate Operational failure messages
2	Network errors Interface errors Discovery of unknown devices
3	Startup and shutdown advice messages Network sync failures Object information (from 701, GETSTATE command) Power usage (720)
4	Recoverable C-Bus communication errors: checksum failures, PCI busy errors
5	Heartbeat events (700) Network open/close advice Command interface open/close advice, Enable on/off advice
6	Network synchronisation messages
7	Reserved
8	Network device information (73x) Device configuration Reports from sync operations
9	Individual send/receive commands for each interface

In typical operation, event level 5 provides a reasonable level of event reporting. At a minimum, event level 3 allows the receipt of object information and critical errors. Event level 9 is principally used for diagnostic purposes and generates an enormous amount of event related information.

The **global-event-level** parameter of the **cgate** system object sets the event-level used by all new objects when they are created. Setting this parameter to the desired level at startup, via the **cgate** config file, will ensure that all objects report at the appropriate level. In addition, every object has a **event-level** parameter of its own, and this can be set from the command interface or in one of the other startup files to allow more detailed monitoring of a particular aspect of system operation.

6.0 Change Port Interfaces

In addition to the command interface and event interface there are two other interfaces which can be interrogated by users of the C-Gate server. These are the load change port and the configuration change port.

6.1 *Load Change Port*

The changes to load configuration such as on, off or ramp events are reported in the load change port. As in the other ports the actual port number is configurable and is accessed in the CgateConfig.txt file. A terminal session on the load change port simply displays changes to load on all networks served by the C-Gate server.

6.2 *Configuration Change Port*

The C-Gate server has limited programming capability and any changes to actual programming of units on networks controlled by the instance of C-Gate server are reflected in the configuration change port. This would happen in the case of the unravel function, where unit addresses are changed.

7.0 C-Gate Object Overview

This section gives an overview of the parameters and methods of C-Gate objects, including C-Bus objects that represent networks and devices in connected and controlled C-Bus networks.

In general, all object parameters can be retrieved from the command interface using the GET or SHOW command. Some parameters can be set with the SET command. Parameters of the C-Gate system object can be set in the cgate config file.

Methods given here can be invoked from the command interface using the DO command.

7.1 Supported by all Objects

Certain parameters are supported by all units and represent a level of baseline functionality for C-Gate objects. This section describes the parameters and their methods.

7.1.1 Object Parameters

The object parameters determine the settable attributes of these objects and influence the behaviour of the relevant object.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Event Level*	Values range from 0 (no events) to 9 (all events).	The event level is set from the startup file.	monitor	operate
State†	New, sync, ok, error, deleted, unknown	The state is determined when the object is acquired		

* Describes the level of reporting for objects within the C-Gate model of the C-Bus network:

- **Level:** Events that are at a level lower to or equal to the value of **event-level** will be sent..
- **Value:** The value of the cgate global event-level parameter at the time this object is created. This is the parameter that is provided in the startup file. It may not contain valid data in this state

† Represents the state of an object in C-Gate. The following states are possible:

- **new:** This is a new object that is not synchronized with a real device. This state occurs when an object has been created with the NEW command but is yet to synchronize with a real device. A new object is created in state **new**.
- **sync:** This object is in the process of synchronizing with a real device. It may not contain valid data in this state
- **ok:** Object in state of normal operation, synchronized to external controlled objects.

- **error**: This object is in an error state and its data may not reflect actual status.
- **deleted**: This object has been deleted.
- **unknown**: The state of this object is not known.

7.1.2 Object Methods:

In addition to the parameters, certain methods are available as part of the definition of the objects.

Method name	Access Level	Parameters	Description
Gc	operate	None	Performs a manual global garbage collection for C-Gate. This operation is provided for debugging purposes only.

7.2 The cgate Object

The system object **cgate** represents major parameters for the cgate itself.

At C-Gate startup, the C-Gate server reads a cgate configuration file that file that allows these parameters to be set before the C-Gate server commences operation.

7.2.1 Object parameters:

Parameter	Values and impact	Default value	Can be set in cgate configuration file	Can be set by SET command
cgate-name	Name of this C-Gate server – delivered in the 201 service ready message. If this is not set, the hostname of the cgate will be used in place of this.	NULL	Yes	Yes
command-port	TCP/IP port to wait for a connection on for the command interface	20023	Yes	No
accept-connection-s-from	A list of IP addresses or hostnames (each entry separated by a space) that command connections will be accepted from.	all	Yes	No

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
config-path	Path to the directory containing configuration files. This can be relative to the base directory for C-Gate.	"config"	Yes	No
macro-path	Path to directory containing macros to be executed with the RUN command.	macros	Yes	No
enable-password	Password to enable critical features.	NULL	Yes	No
report-new-objects	If set to yes, will send events for all new objects detected on C-Bus networks.	yes	Yes	No
cbus-application	Sets the default application supported by C-Bus network interfaces. The default application can be addressed using 1.0 addressing syntax or by using the special value '~' in place of the application number. This value can be set for an individual network in a network startup file or from a set command directed at the C-Bus network.	56 (hex 38) C-Bus lighting	Yes	No
event-mode	"socket" causes events to be delivered to the event-port at the event-host via a TCP/IP socket. "server" open a socket on the cgate that remote software can connect to in order to retrieve events.	server	Yes	No
event-port	port number to wait for a connection on or to establish a connection on, depending on mode	20024	Yes	No
event-host	host IP address where event socket is to be opened	NULL	Yes	No

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
heartbeat-time	Time in seconds between heartbeat events. 0 indicates do not send heartbeat	0	Yes	Yes
event-filename	Local filename to store events in.	event.log	Yes	No
event-printer	Local printer ID to print events to. NULL means do not print to printer.	NULL	Yes	No
global-event-level	The level of events that will be produced for all new objects created after startup. This parameter is used to set the event-level parameter of any new object	5 (Normal level of events)	Yes	Yes
use-cgroups	yes: loads and supports cgroups. no: does not support cgroups.	No	Yes	No
cgroups-file	A filename that is the name of the file holding CGroup information.	Cgroups.txt	Yes	No
response-delay	Time in milliseconds to wait for a response to a command issued to a C-Bus network	10000 (10 seconds)	Yes	No
cbus-tx-delay	Delay in milliseconds between commands <i>sent</i> to a C-Bus network when a V2 or earlier C-Bus PC Interface is used. Setting this delay smaller than 250 ms may result in the loss of data to and from C-Bus networks.	250 (250 milliseconds)	Yes	No
allow-recall-write	If set to "yes", allows cgate commands to perform recall write operations. This must be used with care and must be left disabled for an operating environment to prevent rogue programming.	yes	Yes	No

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
memory-report	If set to "yes", gives an event detailing the memory usage of the C-Gate server at time intervals based on the heartbeat-time setting. Use this option for debugging only.	no	yes	no
sync-time	Default sync-time for all C-Bus networks. See sync-time under C-Bus Network.	300 seconds or 5 minutes	yes	no
scan-time	Default scan-time for all C-Bus networks. See scan-time under C-Bus Network.	60 seconds	yes	no
psync-time	Default time between psync operations for C-Bus Units. See psync-time under the C-Bus Unit object.	300 seconds or 5 minutes.	yes	no
report-new-objects	If set to yes, issues an event for every new C-Bus unit detected on a network	yes	yes	no
pci-flow-control	If set to yes, uses XON/XOFF flow control for information transmitted to the PCI, if supported by the PCI. Set this parameter to no if flow control problems are suspected.	yes	yes	no
allow-v3-pci	If set to yes, allows higher performance and command verification options if a version 3 PCI is detected.	yes	yes	no
networks-file	The name of the file containing the information about the C-Gate networks to be connected to.	Networks.txt	yes	no
use-event-file	Sends events to a file.	no	yes	no

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
use-scenes	If set to yes, enables the processing of scenes. See the C-Gate User's Guide for details of scene operation	no	yes	no
use-load-change-port	If set to yes, enables the load change port, which provides a connection that delivers a list of ON, OFF and RAMP commands as events are recorded from C-Bus networks.	no	yes	no
load-change-port	The socket or port number that the load change port accepts connections on.	20025	yes	no
use-config-change-port	If set to yes, enables the configuration change port, which provides a connection that delivers a list of network and unit ids that have had their configuration (programming) or addressing changed.	no	yes	no
config-change-port	The socket or port number that the configuration change port accepts connections on.	20026	yes	no
sweep-timeout	The timeout in milliseconds between runs of the queue sweeper thread.	2000	yes	no
auto-reopen	Experimental feature, use with care. If set to yes, will attempt to automatically re-open closed C-Bus networks. Not recommended for normal use.	no	yes	no
speed-write	When set to yes, enables cached writes to C-Bus networks to accelerate the transmission of commands to the network	no	yes	no

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
use-flow-control	When set to 'yes' (the default) enables flow control where supported by the a network's PCI. This improves network performance significantly.	yes	yes	no
local-flow-control	When set to 'yes', uses C-Gate's XON/XOFF implementation rather than the flow control provided by the operating system. Use local flow control when the operating system has flow control problems. You should generally use the flow control built into the operating system.	no	yes	no
sync-fast-pci	If set to yes, runs version 3 PCIs in a synchronous mode – making sure that no messages are sent before the confirmation of the previous message has been received.	yes for Windows ME, 98, 95, 2000. no for Windows NT and other platforms.	yes	no
comms-debug	If set to yes, writes all sent and received bytes to a debugging log called comm-debug-<network name>. There is one file created per network. This produces large files. Do not leave enabled. Use for debugging purposes only.	no	yes	no
use-queue-sweeper	If set to yes, enables the queue sweeping function to clear network's transmit and received queues and check for a stuck transmitter	yes	yes	no

Parameter	Values and impact	Default value	Can be set in cgate configuration	Can be set by SET command
command-local-address	If an IP address is given here, then C-Gate will bind it's command interface to this interface only, thus preventing access from all interfaces, which is the default if this parameter is not defined.	no default	yes	no
access-control-file	The name of the access control file.	access.txt	yes	no
use-1.0-addressing	If set to yes, C-Gate will output 1.0-compatible address syntax in event and command streams.	no	yes	no
event-millis	If set to yes, include millisecond timing in event output, added as a '.' and 3 digits of milliseconds onto the end of the event date-time string	no	yes	no

7.3 C-Bus Network Manager

The C-Bus network manager, system object **cbus**, controls the definition, opening and operation of attached C-Bus networks.

7.3.1 Object parameters

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Networks	A list of the current know C-Bus networks, comma separated.	empty if no networks are defined	monitor	none

7.4 C-Bus Networks

C-Bus networks are objects named by their network names specified in the **networks** file.

7.4.1 Object parameters

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Applications	Returns a comma-separated list of the C-Bus application numbers in use on this network	empty if no applications are defined	monitor	none
Type	The type of C-Bus network interface this is. Possible values are: serial : local serial port interface to C-Bus PCI socket : TCP/IP socket interface to C-Bus PCI cni : Clipsal C-Bus Network Interface (provides direct TCP/IP connection to C-Bus). etherlite : Interface to C-Bus PCI via Etherlite module.	No default, defined at interface startup time in networks file.	monitor	none

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Interface	A string that defines the interface address and port name. For serial type, the string is a COM port identifier, for socket and etherlite or cni types, the string is in the form: ip-address:port-number, such as: 10.1.1.66:2001	No default	monitor	none
Interface State	A string that defines the current state of this interface to the C-Bus network. Possible values and their meanings are: closed: The interface has not been opened or has closed. opened: The interface has been opened (but is not yet fully operating). running: The interface is operating normally. closing: The interface is in the process of closing. streamsclosed: The interface is in the process of closing.	closed	monitor	none
Name	The name of this interface. This is equivalent to the network name specified when the C-Bus network is defined.	No default	monitor	none
Units	A list of the C-Bus unit numbers that are known on this network.	No default	monitor	none
Groups	A comma-separated list of the C-Bus group numbers for the default application of this network.	No default	monitor	none
TxQ	[For debugging only] A list of commands that are queued in the transmit queue waiting to be sent	No default	debug	none

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
RxQ	[For debugging only] A list of the commands that have been sent and are waiting for a response or confirmation.	No default	debug	none
Stats	[For debugging only] Basic statistics for this C-Bus interface	No default	debug	none
FreeUnit	Returns the unit address of the next free unit address.	No default	monitor	none
FreeApplication	Returns the application address of the next free application address	No default	monitor	none
SyncTime	Time (in seconds) between synchronising the local objects and the actual C-Bus networks. (NB the check for sync-time is only performed at the interval of scan-time .)	300	monitor	operate
ScanTime	Time (in seconds) between checks of psync and sync times. Every scan-time checks are made if the sync-time has been exceeded, if so, a sync is performed for this network. Also, the psync-time is checked for each unit in this network and psyncs are performed on those objects if required.	30	monitor	operate
LSP	Returns the count of lost sync packets. That is, the number of responses that are returned that are not matched to a sent command waiting for a response.	No default	monitor	none
DefaultApplication	The default application number for this network. The default application can be addresses with shorthand and version 1.0 addressing.	56, or \$38 (The generic lighting application)	monitor	operate

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
TxEnable	Returns 'yes' if the transmitter is currently enabled for this network. This is generally used for testing purposes only.	no	monitor	none

7.4.2 Object methods

Method name	Access Level	Parameters	Description
Sync	admin	None	Perform a network synchronisation immediately. This pre-empts the usual background synchronisation operation that performs sync operations every sync-time .
Open	admin	None	Opens the network interface if it is not already open.
Close	admin	None	Close this network interface.
AllOn	operate	None	Sets the state of all unprotected groups in the default application to on .
AllOff	operate	None	Sets the state of all unprotected groups in the default application to off .
AllRamp	operate	ramp-level SP ramp-time (see the RAMP command for the definition of ramp-level and ramp-time)	Ramp all of the unprotected groups in the default application to the specified level in the specified ramp time. See the RAMP command for additional details.
Unravel	program	None	Scan, detect and re-address any C-Bus units that have duplicate unit addresses. Progress is reported as a series of 120 responses.

7.5 C-Bus Units

The C-Bus unit is a definition of a physical C-Bus device connected to a C-Bus network.

7.5.1 Object parameters

The parameters detailed in section 7.1.1 are supported by this object, as well as the parameters in the table below.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Name	The name of this object. (This is not the same as the address and may be set independently of the address)	"unknown"	monitor	operate
Address	The numeric address of this unit. Setting this value will change the C-Bus Unit's address on the network. Use this with care.	No default	monitor	program
Application	The numeric value of the primary application for this C-Bus unit.	255 (The value indicating the application is unassigned)	monitor	none
Application2	The numeric value of the secondary application for this C-Bus unit.	255 (The value indicating the application is unassigned)	monitor	none
Type	The C-Bus unit device type string	No default	monitor	none
Version	The version string for this C-Bus unit.	No default	monitor	none
ClassName	The name of the java class that is used by C-Gate to model this unit.	com.clipsal.cgate.cb us.CBusUnit	debug	none
PsyncTime	The time between parameter sync operations for this unit. This is measured in seconds. (Note, parameter syncs can not occur more often than the <code>scan-time</code> global parameter unless invoked by the <code>psync</code> method (see below))	The default value is set by the <code>cgate global parameter default-psync-time</code> when the unit is created.	monitor	operate

7.5.2 Object methods

The methods detailed in section 7.1.2 are supported by this object, as well as the methods in the table below.

Method name	Access Level	Parameters	Description
Sync	admin	None	Perform a unit synchronisation immediately. This pre-empts the usual background synchronisation operation that performs sync operations.
PSync	admin	None	Perform an immediate parameter synchronisation for this unit.

7.6 C-Bus Output Units (C-Bus Relay and Dimmer Units)

These are the output units in a C-Bus Network and share the following parameters and methods.

7.6.1 Object parameters

The following parameters are available for C-Bus output units in addition to those provided by the C-Bus Unit shown in section 7.5.1.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Area	The C-Bus Area address that is set for this unit.	255 (this is the unassigned value)	monitor	none
Groups	A comma-separated list of C-Bus groups used by this unit.	No default	monitor	none
Terminals	The comma-separated list of terminals supported by this unit	No default	monitor	none
TerminalCount	The number of terminals supported by this unit	0	monitor	none

7.6.2 Object methods

The methods detailed in section 7.5.2 are supported by this object.

7.7 C-Bus Output Terminal

This object represents an individual output terminal on a C-Bus output unit. Individual terminals represent an individual dimmer or relay contact set.

7.7.1 Object parameters

The following parameters are available for C-Bus output terminals.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Level	The current level of this terminal – in the range 0 through 255.	0	monitor	none
Power	The current output power calculated for this terminal based on the value of the Level and the Load parameters. Note: this is not an accurate power measurement nor is it based upon actual current flowing.	0	monitor	none
Load	The load power of this terminal. This value defaults to 0 and must be set in order for the Power parameter to give any value other than 0.	0	monitor	operate
Groups	A comma-separated list of C-Bus groups used by this terminal	No default	monitor	none
Logic	The type of logic used on the groups supported by this terminal. Values are: greater: The greater of the C-Bus groups will be used to set the output level. lesser: The lesser of the C-Bus groups will be used to set the output level.	No default	monitor	none
Name	The name of this terminal	No default	monitor	operate

7.7.2 Object methods

No additional methods are supported by this object.

7.8 C-Bus DIN Rail / Professional Series Relay and Dimmer Units

C-Bus DIN Rail and Professional Series relays have enhanced features over the standard Relay and Dimmer output devices.

7.8.1 Object parameters

The following parameters are available for C-Bus output units in addition to those provided by the C-Bus Output Unit shown in section 7.6.1.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
NetVoltage	The C-Bus network voltage at this unit. This parameter is read when parameter sync (psync) is performed. Execute the psync method on this object to update this value.	No default	monitor	none
Serial	The unique serial number of this device	No default	monitor	none

7.8.2 Object methods

No additional methods are supported by this object.

7.9 C-Bus DIN Rail / Professional Series Terminals

C-Bus DIN Rail and Professional Series relays and dimmer terminals offer parameters in addition to those offered by the C-Bus Terminal object.

7.9.1 Object parameters

The following parameters are available for C-Bus output units in addition to those provided by the C-Bus Terminal shown in section 7.7.1.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Current	<p>The measured current for this terminal. -1 is returned if no current sense information is available, otherwise, a value is returned from 0 through 255, representing current as a fraction of the terminal's maximum current rating.</p> <p>This parameter is read from the device using the parameter sync (PSync) operation. Execute the PSync method on the unit this terminal is attached to in order to update current ratings.</p>	No default	monitor	none

7.9.2 Object methods

No additional methods are supported by this object.

7.10 C-Bus PE Cell / Light Level Sensor

The parameters specific to these units are sufficiently different as to require a new object definition.

7.10.1 Object parameters

In addition to the C-Bus Unit parameters in section 7.5.1, the following parameters are supported by the PE Cell/Light Level Sensor. For details of this sensor's operation, refer to the C-Bus Installation software help about this unit.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
LightLevel	The light level recorded by this sensor when the last parameter sync (psync) was performed. The light level is given in lux and has an approximate range of between 0 and 1600.	No default	monitor	none
Target	The target value for this unit. This value is given in lux. Setting this parameter will change the target value set in the unit. Range: 0 – 1600	No default	monitor	operate
Margin	The margin value for this unit. Setting this parameter will change the margin value stored in the unit. Range 0 – 1600	No default	monitor	operate

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
RawTarget	The raw, unscaled value of the Target parameter	No default	monitor	none
RawMargin	The raw, unscaled value of the Margin parameter.	No default	monitor	none

7.10.2 Object methods

No additional methods are supported by this object.

7.11 C-Bus Temperature Sensor

Similarly to the light level sensors, a new object type is defined for temperature sensors.

7.11.1 Object parameters

In addition to the C-Bus Unit parameters, the following parameters are supported by the C-Bus Temperature Sensor. For details of this sensor's operation, refer to the C-Bus Installation software help about this unit.

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Temperature	The temperature recorded by this sensor when the last parameter sync (PSync) operation was performed. The temperature is given in degrees Celsius to 2 decimal places. A typical value might be 20.44.	No default	monitor	none
Target	The target temperature value for this unit. This value is given in whole degrees Celsius . Setting this parameter will change the target value set in the unit.	No default	monitor	operate
Margin	The margin value for this unit in whole degrees Celsius. Setting this parameter will change the margin value stored in the unit.	No default	monitor	operate
Offset	The offset value for this unit in whole degrees. Setting this parameter will change the offset value stored in the unit.	No default	monitor	operate
Mode	The heating or cooling mode for this unit. Valid values are heating or cooling . Setting this value will change the value stored in the unit.	No default	monitor	operate
High	The high-side offset for this sensor	No default	monitor	none

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Low	The low-side offset for this sensor	No default	monitor	none

7.11.2 Object methods

No additional methods are supported by this object.

7.12 C-Bus Application

One or more C-Bus Applications are defined for each C-Bus network. The application contains some parameters for operating groups within the Application.

7.12.1 Object parameters

The following parameters are supported:

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Name	The name of this object. (This is not the same as the address and may be set independently of the address)	"unknown"	monitor	operate
Address	The numeric address of this application.	No default	monitor	none
Groups	A comma-separated list of the C-Bus group numbers for this application.	No default	monitor	none
FreeGroup	The address of the first unassigned group address in this application.	No default	monitor	none

7.12.2 Object methods

Method name	Access Level	Parameters	Description
AllOn	operate	None	Sets the state of all unprotected groups in this application to on .
AllOff	operate	None	Sets the state of all unprotected groups in this application to off .
AllRamp	operate	ramp-level SP ramp-time (see the RAMP command for the definition of ramp-level and ramp-time)	Ramp all of the unprotected groups in this application to the specified level in the specified ramp time. See the RAMP command for additional details.

7.13 C-Bus Group

7.13.1 Object parameters

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Name	The name of this object. (This is not the same as the address and may be set independently of the address)	"unknown"	monitor	operate
Address	The numeric address of this group.	No default	monitor	none
Units	A comma-separated list of units that this group can control <i>on the local network</i> .	No default	monitor	none
Protected	If set to yes, this group will not be included in AllOn, AllOff and AllRamp methods executed on this group's Application.	No default	monitor	none
Level	The current level of this C-Bus group. Level can be in the range of 0 through 255. 0 is considered off. Level 255 in C-Bus is considered on. Setting the level causes a ramp command to be sent with a ramp time of 0 to the level to be set.	No default	monitor	operate
Type	The type of C-Bus group. There are two possible values: group and area .	"group"	monitor	operate
RampTime	The stored ramp time to be used by the CI command when setting the group level. If a group is set with the CI commands, then the ramp time in seconds stored here is used as the ramp time for the level change.	0	monitor	operate

7.13.2 Object methods:

Method name	Access Level	Parameters	Description
Off	operate	None	Sets the level of this group to 0 by executing a C-Bus off command.
On	operate	None	Sets the level of this group to 255 by executing a C-Bus on command.
Ramp	operate	ramp-level SP ramp-time (see the RAMP command (section 4.3.5) for the definition of ramp-level and ramp-time)	Sets the level of this group to ramp-level using a ramp time of ramp-time.
Protect	operate	None	Set the protected parameter for this group.
UnProtect	operate	None	Clear the protected parameter for this group.

7.14 C-Groups

C-Groups provide two basic functions:

- A **control** C-Group allows a number of C-Bus groups to be controlled as one by defining an cgroup with members of all the groups.
- A **power** C-Group sums power consumption for a number of member C-Bus Output Terminals, presenting a single power event for the members.

C-Groups are addressed as system objects. Their names are defined when they are created from the **C-Groups.txt** config file.

7.14.1 Object parameters:

Parameter	Values and impact	Default value	GET Access Level	SET Access Level
Name	The name of this object. (This is not the same as the address and may be set independently of the address)	"unknown"	monitor	operate
Power	The combined <i>calculated</i> total power of all members of this C-Group.	0	monitor	none

Parameter	Description and values	Default value	Can be set by SET command?
Type	The type of C-Group: Either command or power . This parameter can only be set at CGroup creation time.	no default	No

7.14.2 Object methods:

Method name	Access Level	Parameters	Description
Off	operate	None	Sets the level of the members of this C-Group to 0 by executing a C-Bus off command for each group.
On	operate	None	Sets the level of the members of this CGroup to 255 by executing a C-Bus on command for each group.
Ramp	operate	ramp-level SP ramp-time (see the RAMP command (section 4.3.5) for the definition of ramp-level and ramp-time)	Sets the level of the members of this C-Group to ramp-level using a ramp time of ramp-time by executing a C-Bus ramp command for each group.

Method name	Parameters	Description
On	None	Set the level of the group members to ON (255). Equivalent to the ON command.
Off	None	Set the level of the group members to OFF (0). Equivalent to the OFF command.
Ramp	ramp-level SP ramp-time as for 'RAMP' command in section 4.3.5	Send a ramp command to the group, members causing the value of the group(s) to ramp up or down towards the target level in the specified ramp time. Equivalent to the RAMP command.