VLCB Versatile Layout Control Bus

CBUS Differences Information Sheet

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Document History

Date	Changed by	Summary of changes
18th October 2022	Ian Hogg M.5144	Initial document
14 March 2023	Ian Hogg M.5144	Latest update
14 April 2023	Ian Hogg M.5144	Changed name to VLCB
25 April 2023	Ian Hogg M.5144	Improved descriptions of changes.
15 May 2023	Ian Hogg M.5144	Added change for service discovery flag, Bit #6 of module flags parameter

1 Introduction

This document attempts to collate the differences between VLCB and CBUS(™). Although every effort is made to ensure that all the differences are captured here it is unfortunately possible that changes made in the VLCB Minimum Node Specification (MNS) and the VLCB Profiles are not reflected within this document. In the case of any discrepancies the VLCB specifications take precedence over this information document.

It is hoped that this document can serve as a useful reference for module developers when upgrading modules from CBUS to VLCB.

2 Changes

2.1 Module versions

CBUS expresses a module version as being a major version number, a minor version letter and a BETA number. VLCB changes the meaning of the BETA number to be a build number. Therefore VLCB has no direct indication of test/released version

2.2 SLiM

VLCB has removed SLiM from the minimum node specification.

SLiM may be added in the future as an optional service.

There is no longer a requirement for a green SLiM LED.

2.3 Push button and LEDs

VLCB supports greater flexibility to show mode and status, not just mandating yellow/green LEDs. E.g. Character displays are now supported.

VLCB permits additional ways of requesting a node number, not just holding a push button. E.g. a terminal command line is now supported.

2.4 Mode changes

VLCB introduces a MODE operation to allow programmatically changing module states. This includes existing Learn mode and Boot modes and new modes such as NoHeartbeat and EventAck.

Modules should continue to support NNLRN, NNULN opcodes for backwards compatibility with CBUS.

2.5 Setup timeout

VLCB has a Setup mode timeout of 30 seconds so that if a SNN is not received within 30 seconds the module shall return to its previous mode.

CBUS has no timeout and will potentially wait indefinitely.

2.6 CAN Priority

CBUS assigns a message priority for each opcode. CBUS also implements a priority ratcheting to increase priority if the message fails to be sent.

VLCB assigns a message priority to each opcode to ensure well-behaved message handling but does not support the priority ratcheting mechanism.

2.7 Message length checking

If a module identifies that a message targeted to itself does not have the expected message length then the VLCB modules shall respond with GRSP(Invalid command).

CBUS does not specify a response and module implementations generally do not check the message length which can lead to unexpected behaviour.

2.8 Module (type) parameter

CBUS uses two bytes for Manufacturer and ModuleId. VLCB uses a single 16 bit value to define the module type. This allows greater flexibility of moduleId assignment.

2.9 Module Flags parameter, Bit 6

Bit #6 of the module flags parameter #8 has been allocated to indicate whether the module supports service discovery functionality. VLCB mandates service discovery and CBUS leaves the bit unassigned with a value of 0 so that this bit can be used to indicate whether the module is VLCB compliant.

The Module Flags value is also present in the PNN response to QNN.

3. New Functionality

3.1 Service concept to aid documentation

The concept of Services has been introduced.

3.2 MNS: Service discovery

VLCB introduces the concept of services to aid documentation, implementation and module capability discovery. Diagnostic data and Error response codes are also scoped by the service number so that a global list of diagnostic codes and error codes are not required.

Profile flags are no longer used for the purpose of indicating module functionality but kept for backwards compatibility.

A module may be interrogated to find the set of services supported by a module using the RQSD request. A module shall respond with an ESD message or a set of SD messages.

The use of Service discovery is recommended over any indications of functionality provided by module parameters.

A module developer may request a new service number (Service#) using the service request process.

Services may define additional opcodes or reuse existing opcodes using the opcode request process. They may also define additional error codes and diagnostic information without additional approval.

3.2 MNS: Diagnostics

VLCB adds a multitude of diagnostic data. Each service supports its own set of diagnostic parameters. The diagnostic values may be returned for a service using the RDGN request. The value is contained in the DGN response.

CBUS contains no diagnostics.

3.3 MNS: Module Heartbeat

VLCB specifies that modules will generate a regular HEARTB message, CBUS defines no such message or requirement.

The regular heartbeat message may be temporarily disabled by putting the module into NOHEARTB Mode.

The HEARTB message includes a module status byte which is zero under normal conditions otherwise is a time based calculation of error conditions.

In addition a heartbeat health event may be defined. An OFF event indicates that the module is operating normally whereas an ON event indicates a non-normal status. This event may be used, for example, to illuminate an indicator on a module status display panel. .

3.4 Event Acknowledge

The VLCB Event Acknowledge service provides a capability for a module to acknowledge a consumed event with the ENACK opcode. The ENACK message includes the module's NN, event opcode and event NN:EN. This is useful for debugging events.

CBUS does not support Event Acknowledge.

3.5 NVRD #0

VLCB allows requesting a read of NV#0 which will return a sequence of messages returning a NVANS message for each NV.

This is new functionality and not supported or used by CBUS.

3.6 REQEV #0

VLCB allows requesting a read of EV#0 will return an EVANS message of EV#0 containing the number of EVs followed by an EVANS message for each of the EV values.

This is new functionality and not supported or used by CBUS.

3.7 RQNPN #0

VLCB allows requesting a read of param #0 will return an PARAN message of param #0 containing the number of parameters followed by a PARAN message for each of the param values.

This is new functionality and not supported or used by CBUS.

3.8 GRSP

VLCB Modules are now required to respond to requests with a GRSP message to indicate OK or a specific error. This allows service specific responses to be defined without conflict with other services.

Modules are required to also respond with WRACK and CMDERR for backwards compatibility with CBUS.

4 General and New Requirements

4.1 Auto self canid mandated

VLCB mandates auto CANID self enumeration and auto CANID conflict resolution. This prevents multiple modules having the same CANID which causes CAN networking issues.

4.2 Mandated testing and Conformance Test Kit

Modules must confirm that they conform to the VLCB specification. There is the intention of supplying a conformance test kit to facilitate this process.

4.3 Mandated documentation

A module must document its I/O, power supply requirements and NV/EV usage. User documentation for the module must also be provided.

4.4 Improved module documentation

A VLCB module must document its I/O, power supply requirements and NV/EV usage. User documentation for the module must also be provided.

CBUS has no requirements for documentation.

4.5 Set NV with Read

VLCB specifies a new opcode to allow a NV to be set and then return the value actually written to the NV. This allows for situations where there are constraints on the NV value.

5 Clarifications

5.1 Events with Data

CBUS does not specify if modules taught to handle ACON/ACOF/ASON/ASOF events should also handle events with data. VLCB specifies:

a) If a module has been taught an event and requires associated data and that module receives the event without data then it should send a GRSP error (of some kind)
b) If a module handles events with no data then it can optionally handle events with data in the same way only if documented.

5.2 Event Actions

VLCB states that modules need to provide actions for Start of Day, if applicable. This ensures that all necessary VLCB modules handle SoD.

CBUS has no such requirement.

5.3 ASRQ

VLCB specifies that a module shall respond to a ASRQ (request event) if the specified NN matches its node number OR the specified NN is zero.

CBUS does not clarify this behaviour and actually has no requirement that ASRQ is supported by the module.

6 Opcode changes

6.1 Removals - no longer required

- ACK
- NACK
- HLT
- BON

6.2 Deprecated - Used for CBUS compatibility

- WRACK
- CMDERR

6.3 Additions

- GRSP - General response to configuration messages
- MODE - Change module operating mode
- NVSETRD - Set NV with Read
- HEARTB - Module heartbeat
- RDGN / DGC - Diagnostics
- RQSD / SD/ ESD - Service discovery
- ENACK - Event acknowledge