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## **APPLICATION NOTE**

### ***SHARING INTELLIGENT SOLUTIONS***

**KEY WORDS:**

<b>Title:</b>	Multipoint To Multipoint Interrogation
<b>Products Applicable:</b>	C-Bus

This Critical Design Consideration should be taken into account when installing C-Bus onto a large site. It is particularly important when designing C-Bus networks that must be capable of carrying vast amounts of C-Bus network traffic.

One of the most significant advantages of C-Bus is the patented MMI system. The MMI also may expose programming errors which will show both indicators and loads turn on or off, for no apparent reason. This document will explain why.

#### **Multipoint to Multipoint Interrogation**

The MMI (Multipoint to Multipoint Interrogation) is a highly efficient status reporting technique used by C-Bus. Its main purpose is to ensure that all group addresses on a single given C-Bus network are in sync with each other. If the MMI detects that group addresses are out of sync, the units on the network will automatically self correct the discrepancy.

The MMI is generated for every Lighting application that exists on a C-Bus network, i.e. \$30 - \$5F. Older units may however initiate MMI's regardless of which application address they are using. When an MMI is initiated, units will buffer any C-Bus commands until the MMI has completed its error checking for that particular application.

#### **Status Report Interval**

The Status Report Interval (SR Interval) is a time period, which specifies how often an MMI is to be initiated. The SR Interval is set from within most input units, with the exclusion of Touch Screens and the Telephone Interface. The default SR Interval is set to 3 seconds, but this can be modified anywhere between 1 to 255 seconds.

Each MMI will use 128ms to complete its error checking. So on a busy C-Bus network it may be wise to increase the time period used in how often the MMI is initiated. For example, if a C-Bus network has group addresses being used across 5 separate applications, 640ms out of 3 seconds (the default SR Interval) will be used by the MMI messages.

By increasing the SR Interval, any delay of C-Bus messages being transmitted onto the bus will be minimised. However the default 3 second SR Interval is a reasonably safe operating value. The compromise introduced by increasing the SR Interval is that discrepancies will take longer to be rectified.

**Note:** - For the SR Interval to be increase, modifications to the programming need to be made to **every** input unit on the C-Bus network on that application. If there are 4 input units using an application and only 3 of them have their SR Interval set to 5 seconds and the 4<sup>th</sup> unit is set to 3 seconds then the MMI's will still occur every 3 seconds. This is because the shortest SR Interval has priority.

### **How An MMI Works**

As mentioned previously, an MMI is initiated by default every 3 seconds (by the SR Interval) for each Lighting Application on the network. The MMI will then go out to all units on the C-Bus network. The MMI will then look at each Group Address on each unit, and make sure that all group addresses are in sync, either on or off. If the MMI shows that two or more C-Bus units that share the same Group Address are out of sync, then the last unit to transmit a message for that Group Address re-transmits the level of that Group onto C-Bus.

Synchronisation is made by determining which of the input units issued the last valid C-Bus command.

- If the last valid command by an input unit was an off command, then that input unit will re-transmit an off command for that group.
- If the last valid command by an input unit was an on command, then that input unit will re-transmit an on command for that group.

This process will then be repeated for each application that exists on the C-Bus network that contains input units.

**Note:** - A MMI will only recognise discrepancies when the group address exists in an output unit on the network.

**Note:** - A MMI will only recognise discrepancies between the on or off state of group addresses. If two units think that the group address is on, but at different levels, then the MMI will not correct this discrepancy in the actual level.

### **Other Information About MMI's**

- Only output devices contribute to the MMI.
- A discrepancy in states, between an input device and an output device will result in NO transmission on the network. The input device will change state to match that of the output device.
- An MMI can only be initiated by an input device (not output units or system units), so if there are no input devices on a network, there will be no MMI's.
- No reaction to a discrepancy between states on an MMI will occur, until at least 3 consecutive MMI's show the same condition. This is required because the MMI frame has no error checking.

## **Technical Support and Troubleshooting**

For technical assistance call: 1300 722 247 (Australia)  
0800 888 219 (New Zealand)

CIS web site: <http://www.clipsal.com/cis/>

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