Blue Bird School Bus
Diagnostic Training
Bus Layout

• (1) CV-CCM-D (Master)
  – Nodes A1, A2, and G1

• (1) CV-ICM-1515-01 (Slave)
  – Nodes B1 and B2
Revision Indication at Power Up

• If there is no program loaded, all lights will light up and stay on.
Revision Indication at Power Up

- The PORT, I/O, CH#, and ZONE S lights will stay on. Then the ZONE A light will flash the number of the revision.
  - I.e. A = 1 Flash, M = 13 Flashes
Dinex Communication

- The two modules will communicate information between themselves.
  - Both modules know what the other is doing.
Communication Failure

• The CV-CCM-D module will indicate any loss in communication with the CV-ICM-1515-01 module.

• Will indicate Comm. Failure in Normal Mode and in Zone B Diagnostic Mode
Communication Failure

• When in Normal Mode the Zone B light will turn on to indicate a Comm. Failure with the CV-ICM-1515-01 module.
Communication Failure

- When in Diagnostic Mode the Zone B light will flash to indicate a Comm. Failure with the CV-ICM-1515-01 module, but only while trying to display the Zone B Information.
What Causes Comm. Failure?

• A short in the wires responsible for communication between the modules.
• No power to the Zone B module.
• Incorrect wiring.
• Failure within the module.
Diagnostic Mode

• Used for trouble shooting busses.
  – Will display following components
    • Inputs
    • Outputs
    • Feedback (When Available)
  – Use the DIAGNOSE button to cycle through components
Diagnostic Mode

• Use the DIAGNOSE button to cycle through components
Diagnostic Mode Order

- Normal Mode
- A1 Input
- A1 Output
- A1 Feedback
- A2 Input
- A2 Output
- A2 Feedback
- B1 Input
- B1 Output
- B2 Input
- B2 Output
- Normal Mode
Sleep Mode Indicator

- The ZONE S indicates that the module is awake when lit.
- The ZONE S light turns off when the module enters Sleep Mode.
What is Sleep Mode?

- The module will enter a low power state. This minimizes the battery drainage the Dinex system will require.
- The module will exit sleep mode after receiving a Wake-Up signal.
  - It takes a few seconds for a module to wake-up from sleep mode.
ZONE Indicator

- A and B represent the two zones in the Multiplex System while in Diagnostic Mode.
J1939 Data Indicator

- The J1939 LED indicates that the module is receiving J1939 data over the J1939 databus.
PORT Indicator

- The PORT shows which sub-unit of a Zone is being displayed.
  - When no PORT is shown, then the module is in Normal Mode.
**I/O Indicator**

- Identifies what information is being displayed on the CH#
  - Input
  - Output
  - Feedback
CH# Indicator

• Identifies what signals are ON and OFF.
  – I/O indicator determines what signals are displayed.
Input Indication

- Inputs are any signals that are being brought into the module and used in the vehicle program.
  - To display the inputs of a Zone the I/O Indicator must have the IN light on.
Input Indication

- The CH# lights that are on indicate that the input is ON.
- The CH# lights that are off indicate that the input is OFF
Output Indication

- Outputs are any signals that are being sent from the modules to other devices.
  - To display the outputs of a Zone the I/O Indicator must have the OUT light on.
Output Indication

- The CH# lights that are on indicate that the output signal is being sent to the device.
- The CH# lights that are off indicate that the output is OFF.
Feedback Indication

- Feedback is an acknowledgement that there is continuity with the given output.
  - To display the feedback of a Zone the I/O Indicator must have the FB light on.
What is Feedback?

• Continually sends a low level current to check if there is a complete circuit between the module and the output, while not turning on the output.

• When there is continuity then the indicator light is active.

• Note: The CV-ICM-1515-01 does not have feedback capabilities.
Diagnostic Mode Practice

- Information Displayed
  - A1 Inputs

- Active Inputs
Diagnostic Mode Practice

- **Information Displayed**
  - B2 Outputs
- **Active Outputs**
- **B2-o1, B2-o2, & B2-o5**
Diagnostic Mode Practice

- **Information Displayed**
  - None, Normal Mode

- **What does the Zone B Light On Indicate?**
  - Communication error with the Zone B module.
Diagnostic Mode Practice

- Information Displayed
  - A1 Inputs

- Active Inputs
Reading Ladder Logic

- Logic Diagrams
  - Show all the inputs required to provide an output.
Checking Ladder Logic

- Ladder logic consist in a group of inputs needed to turn an output on.
- There are two important symbols you need to learn:
  - On (active) symbol
  - Off (inactive) symbol
Flags and Outputs

• When Flags or Outputs are used as inputs in the ladder logic you will need to check the condition of the Flag or Output.

  – On (active) symbol

  – Off (inactive) symbol
Timers

- There are four different types of timers, and all timer values are in seconds.
  - Flash Timer
  - Delay On Timer
  - Delay Off Timer
  - Turn On Timer
Timers

• A Flash Timer will be turned On then Off at the programmed rate that can be found in the Node Descriptions.

<table>
<thead>
<tr>
<th>Timer</th>
<th>Timer Type</th>
<th>Time</th>
<th>Time Off</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>B1-T01</td>
<td>Delay Off</td>
<td>10.00</td>
<td></td>
<td>SCC TIMER</td>
</tr>
<tr>
<td>B1-T02</td>
<td>Flash</td>
<td>0.40</td>
<td>0.40</td>
<td>W/L FLASHER</td>
</tr>
<tr>
<td>B1-T03</td>
<td>Delay On</td>
<td>10.00</td>
<td></td>
<td>10 SEC INT</td>
</tr>
</tbody>
</table>
Timers

- A Delay On Timer will delay the Output from turning on for the programmed amount of time.

<table>
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</tr>
<tr>
<td>B1-T03</td>
<td>Delay On</td>
<td>10.00</td>
<td></td>
<td>10 SEC INT</td>
</tr>
</tbody>
</table>
Timers

- A Delay Off Timer will keep the output on for the programmed amount of time after the ladder logic would cause the output to go from on to off.

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<tr>
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<td></td>
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</tr>
<tr>
<td>B1-T03</td>
<td>Delay On</td>
<td>10.00</td>
<td></td>
<td></td>
<td>10 SEC INT</td>
</tr>
</tbody>
</table>
Timers

• A Turn On Timer will allow the output to turn on for only the programmed amount of time.

<p>| | | |</p>
<table>
<thead>
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<th></th>
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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>B1-T04</td>
<td>Delay On</td>
<td>8.00</td>
</tr>
<tr>
<td>B1-T05</td>
<td>Delay On</td>
<td>6.00</td>
</tr>
<tr>
<td>B1-T06</td>
<td>Delay On</td>
<td>4.00</td>
</tr>
<tr>
<td>B1-T07</td>
<td>Delay On</td>
<td>2.00</td>
</tr>
<tr>
<td>B1-T08</td>
<td>Turn On</td>
<td>900.00</td>
</tr>
</tbody>
</table>
Timers

• All Timers will reset when the ladder logic states that the output or flag should be off.
Ladder logic’s will show Name & Address

- **Name** Indicates the name of the circuit.
- **Address** Indicates the connection to I/O modules.

```
A2-in7  LEFT TURN SW
A1-in4  IGNITION SWITCH
A2-in8  RIGHT TURN SW
A1-F01  FLASHER
A2-o1   LEFT TURN SIGNAL
```
Reading a Simple Ladder Logic

A2-in7 LEFT TURN SW
A1-in4 IGNITION SWITCH
A2-in8 RIGHT TURN SW
A1-F01 FLASHER
A2-o1 LEFT TURN SIGNAL
Reading a Simple Ladder Logic

- A2-in7 LEFT TURN SW
- A1-in4 IGNITION SWITCH
- A2-in8 RIGHT TURN SW
- A1-F01 FLASHER
- A2-o1 LEFT TURN SIGNAL
Reading a Simple Ladder Logic
Reading a Simple Ladder Logic

A2-in7
LEFT TURN SW
A1-in4
IGNITION SWITCH
A2-in8
RIGHT TURN SW
A1-F01
FLASHER
A2-o1
LEFT TURN SIGNAL

DIAGNOSE

ZONE
PORT
I/O
CH#
Reading a Simple Ladder Logic

- Check the Flag Status

Flashing Logic Diagram:
- A2-in7 LEFT TURN SW
- A1-in4 IGNITION SWITCH
- A2-in8 RIGHT TURN SW
- A1-F01 FLASHER
- A2-o1 LEFT TURN SIGNAL
- A1-T01 HALF SECOND
- A1-F01 FLASHER

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Reading a Simple Ladder Logic

• The Flash Timer will Flash ON/OFF at the set rate of Half a second.
Reading a Simple Ladder Logic

- Output will be Off
Reading a Simple Ladder Logic

A2-in7
LEFT TURN SW

A1-in4
IGNITION SWITCH

A1-F01
FLASHER

A2-in8
RIGHT TURN SW

A2-o1
LEFT TURN SIGNAL
Reading a Simple Ladder Logic

- Output will be On
Reading a Simple Ladder Logic

A2-in7 LEFT TURN SW
A1-in4 IGNITION SWITCH
A2-in8 RIGHT TURN SW
A1-F01 FLASHER
A2-o1 LEFT TURN SIGNAL
I/O Controls
DINEX® Intelligent System Provider

Tech Support

I/O Controls Phone Numbers
When I need help or need parts who do I call?

Sales Office       972-424-6488
Tech Support     626-812-5353