Agenda

- INTRODUCTION
- INSTRUMENTATION OVERVIEW
- DIAGNOSTICS & CONFIGURATION
- TOOLS / SOFTWARE APPLICATION
- REPLACEMENT
- Q & A / WRAP UP
Agenda

- INTRODUCTION
- INSTRUMENTATION OVERVIEW
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Cluster Overview

- Four (4) Cluster Generations
  - 2007
  - 2010
  - 2010 Export
  - 2013
- Four Versions in each Generation
  - Air Brake (production)
  - Air Brake (service)
  - Hydraulic Brake (production)
  - Hydraulic Brake (service)
- Service versions have “Service Odometer Set” feature enabled
Cluster Overview

- Connector pin out
  - CLU vs. C251 & C261
Cluster Overview

Cluster Connections

- Unswitched power
- Ground
- 2 CAN data buses
- LIN data bus
- +7.6V output for slave devices (800mA max)
- +5V output for sensors (50mA max)
- 7 Analog inputs
- 17 Binary inputs
- 3 Binary outputs
Cluster Overview

- **Gauge Data Sources**
  - Speedometer – J1939 databus from engine ECU
  - Tachometer – J1939 databus from engine ECU
  - Oil Pressure – J1939 databus from engine ECU
  - Coolant Temp – J1939 databus from engine ECU
  - Fuel Gauge – sender pin 34 for gas and diesel; pin 10 for CNG
  - Front Air Gauge – sender pin 11 Kavlico
  - Rear Air Gauge – sender pin 12 Kavlico

- Warning lights and Indicators and display messages have a mix of mux and discrete data sources.
Five (5) Gauge Generations

- BBCV CAT ONLY—non-4IN1
- BBCV CUMMINS—non-4IN1
- A3FE/RE—non-4IN1
- A3RE – D3RE—Rear Run Box
- A3FE/RE—4IN1
- A3FE/RE—4IN1 w/DEF

- English and Metric versions in each Generation
- All versions have “Service Odometer Set” feature enabled by default
- Requires operator to select zero Odometer for new installs
Gauge Overview

- Connector pin out
  - J1 – Speedo Power/Comms
  - J2 – Speedo Discrete I/O
  - J3 – Slave Comms & Power
Gauge Overview

Gauge Connections

- Unswitched power
- Ground
- 1 CAN data buses
- LIN data bus
- +7.6V output for slave devices (800mA max)
- SAE J1708 Data bus
- 8 Analog inputs (some used as binary)
- 5 Binary inputs
- 2 Binary outputs
Gauge Overview

Gauge Data Sources

- Speedometer – J1939 databus from engine ECU
- Tachometer – J1939 databus from engine ECU
- Voltmeter—J1939 databus from engine ECU
- Oil Pressure – J1939 databus from engine ECU (FE)/Pin 6 (RE)
- Coolant Temp – J1939 databus from engine ECU
- Fuel Gauge – J1939 databus (JD CNG)/sender pin 1 (Cummins FE & CAT)/Pin 2 (Cummins CNG)
- Front & Rear Air Gauge –LIN Module
- Applied Front & Applied Rear Air Gauge –LIN Module

Warning lights and Indicators and display messages have a mix of mux and discrete data sources.
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Configurations

- To Enter Configuration Mode
  - Ignition must be turned off
  - Hold both buttons and turn the ignition switch to the ON position
  - The cluster will immediately enter the configuration menu. Here you can modify certain cluster configurations and only view others.

- Configurations will be shown in a list you can scroll through
- Pressing both buttons will toggle through the available options for a given configuration in the list.
- No activity will timeout and reset cluster
- Some Configuration settings are locked after 25 miles
- See service update S1004 for further configuration menu instruction
Configurations

- Buzzer Time Out – Not Locked after 25 Miles
- Test Panel – Locked after 25 Miles (Should be DISABLED)
- Turn Signal Click – Not Locked after 25 Miles
- Ammeter Display – Not Locked after 25 Miles
- Brake System Type – Locked after 25 Miles
- Applied/Susp Air – Not Locked after 25 Miles
Configurations

- Bus Config Type – Locked after 25 Miles (Pre-Common Only)

- Engine Type – Locked after 25 Miles

- Self Test – Not Locked after 25 Miles

- Battery Controlled Lift – Locked after 25 Miles

- Seat Belt Logic – Locked after 25 Miles

- Unlock – Password “1927”
To Enter Diagnostics and Settings Mode

- Ignition must be ON
- Parking Brake must be set
- Hold the lower button > 5 seconds
- The cluster will enter the Diagnostics and Settings menu.

- Diag menu selections will be shown in a list you can scroll through
- Pressing both buttons will enter the selected submenu
Diagnostics & Settings

- Air Brake PSI

![Diagram showing air brake PSI readings: Front Air 72.1 PSI, Rear Air 72.5 PSI]
Diagnostics & Settings

- Set Units

![Diagram showing the 'Set Units' feature with options for 'UNITS' and 'ENGLISH' with a toggle switch and exit button.](image-url)
Diagnostics & Settings

- Contrast
Diagnostics & Settings

- Dimmer
Diagnostics & Settings

- Additional Dimmer Control
  - Backlight turns on when CL_PIN_ 19 is high (Headlights ON)
  - With backlight on and park brake not set the buttons become UP/DN dimmer control
  - All Priority Messages must be acknowledged before dimmer control operates
Diagnostics & Settings

- Backlight Color

BACKLIGHT COLOR

RED  LT BLUE  GREEN  WHITE  BLUE

Press both buttons to Save/Exit  Next

Prev

www.actia.com
### Set Clock

Pressing both buttons will first select the “hours” selection and it will be highlighted. Pressing both buttons again will select minutes. Once a selection is highlighted, then the lower buttons will decrease the setting and the upper button will increase the setting. The clock can be changed from 12 to 24 hour mode. First press and release the lower button which will highlight one section of the display, then press and release both buttons simultaneously to highlight the clock section. Once the clock is highlighted you can be toggle between 12 or 24 mode by pressing and releasing the upper or lower button. If a selection is not made this menu will timeout to the previous menu after 15 seconds.
Diagnostics & Settings

- Instrument Diagnostics

INSTRUMENT DIAGNOSTICS

A-Gauge Test   D-I/O Status
B-Lamp Test    E-Exit
C-LCD Test

Press on both buttons to select

Prev   Next
Diagnostics & Settings

- Gauge Test

- Fuel Level
  - 0%
  - 50%
  - 100%

Exit
Diagnostics & Settings

- Lamp Test
Diagnostics & Settings

- Lamp Test

High Beam
ON
Exit

High Beam
OFF
Exit
Diagnostics & Settings

- LCD Test

INSTRUMENT DIAGNOSTICS

A-Gauge Test  D-I/O Status
B-Lamp Test   E-Exit
C-LCD Test

Press on both buttons to select

Prev  Next
Diagnostics & Settings

- LCD Test
Diagnostics & Settings

- I/O Status
Diagnostics & Settings

- I/O Status

### I/O STATUS

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-9</td>
<td>5V PWR</td>
<td>5V</td>
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<tr>
<td>CL-10</td>
<td>CNG Press</td>
<td>3.5V</td>
</tr>
<tr>
<td>CL-11</td>
<td>Front Air Press</td>
<td>2.5V</td>
</tr>
<tr>
<td>CL-12</td>
<td>Rear Air Press</td>
<td>2.5V</td>
</tr>
<tr>
<td>CL-13</td>
<td>App Frmtr ir</td>
<td>2.5V</td>
</tr>
<tr>
<td>CL-14</td>
<td>App Rear Air</td>
<td>2.5V</td>
</tr>
<tr>
<td>CL-15</td>
<td>Ammeter</td>
<td>3.0V</td>
</tr>
<tr>
<td>CL-16</td>
<td>Spare</td>
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</table>

Press on both buttons to Exit

### I/O STATUS

<table>
<thead>
<tr>
<th>Module</th>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>CL-17</td>
<td>Hyd Brake Fail</td>
<td>LOW</td>
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<tr>
<td>CL-18</td>
<td>Ignition</td>
<td>HIGH</td>
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<tr>
<td>CL-19</td>
<td>HL Alert</td>
<td>HIGH</td>
</tr>
<tr>
<td>CL-20</td>
<td>Hi Beam</td>
<td>HIGH</td>
</tr>
<tr>
<td>CL-21</td>
<td>Left Turn</td>
<td>HIGH</td>
</tr>
<tr>
<td>CL-22</td>
<td>Park Brake</td>
<td>HIGH</td>
</tr>
<tr>
<td>CL-23</td>
<td>Right Turn</td>
<td>HIGH</td>
</tr>
<tr>
<td>CL-24</td>
<td>Service Brk</td>
<td>HIGH</td>
</tr>
</tbody>
</table>

Press on both buttons to Exit
### Diagnostics & Settings

- Read Parameters

#### READ PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
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<tbody>
<tr>
<td>Engine Speed</td>
<td>775 RPM</td>
</tr>
<tr>
<td>Coolant Temp</td>
<td>100°F</td>
</tr>
<tr>
<td>Oil Pressure</td>
<td>54 PSI</td>
</tr>
<tr>
<td>Fuel Level</td>
<td>27%</td>
</tr>
<tr>
<td>Trans Temp</td>
<td>160°F</td>
</tr>
<tr>
<td>Boost Pressure</td>
<td>5 PSI</td>
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<tr>
<td>Engine Load</td>
<td>25%</td>
</tr>
<tr>
<td>Inst Fuel Econ</td>
<td>12 mpg</td>
</tr>
</tbody>
</table>

Press on both buttons to Exit

#### READ PARAMETERS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Avg Fuel Econ</td>
<td>12 mpg</td>
</tr>
<tr>
<td>Intake Manif Temp</td>
<td>100°F</td>
</tr>
<tr>
<td>Engine Hours</td>
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</tr>
<tr>
<td>Vehicle Speed</td>
<td>0 mph</td>
</tr>
<tr>
<td>Batter Voltage</td>
<td>13V</td>
</tr>
<tr>
<td>Ammeter</td>
<td>150A</td>
</tr>
<tr>
<td>Front Air Press</td>
<td>120 PSI</td>
</tr>
<tr>
<td>Rear Air Press</td>
<td>120 PSI</td>
</tr>
</tbody>
</table>

Press on both buttons to Exit
Diagnostics & Settings

- Engine Diagnostic

**Engine Diagnostics**

- 102-02 Boost Pressure Data Incorrect
- 100-18 Low Oil Pressure
- 190-00 Engine Speed gt than 2730 RPM
- 97-15 Water in Fuel sensor circuit

Press on both buttons to Exit
Diagnostics & Settings

- Transmission Diagnostic

Transmission Diagnostics

C021B TBD
P0733 TBD
P1482 TBD

Press on both buttons to Exit
Diagnostics & Settings

- ABS Diagnostic

ABS Diagnostics
254-12 Main controller, safety controller
100-06 Pwr Amp, brk light shrt to gnd
70-10 Parking brake sys, long term superv

Press on both buttons to Exit
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Blue Bird Service/Diagnostic Tool Kit For ACTIA Gauges/Cluster.

Blue Bird Part # 00072987

ACTIA Part # 104379

Kit Contents:

<table>
<thead>
<tr>
<th>ACTIA P/N</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>103533</td>
<td>Harness, Interface, CAT to 4 Pin Adapter</td>
</tr>
<tr>
<td>104382</td>
<td>Harness, Interface, CAT to Diagnostic Port</td>
</tr>
<tr>
<td>104382</td>
<td>Harness, Interface, CAT to Gauge</td>
</tr>
<tr>
<td>111913</td>
<td>Harness, Interface, CAT to Cluster (BB# 10016388)</td>
</tr>
<tr>
<td>IME3501702</td>
<td>Cable, Serial to USB, CAT to Laptop (BB# 10020524)</td>
</tr>
<tr>
<td>IME3501401</td>
<td>CAN Analyzer Tool Set, USB</td>
</tr>
</tbody>
</table>
To properly service Actia instrumentation, special software must be downloaded to a laptop. In order to ensure the latest version Actia software is installed, Blue Bird recommends downloading from the Blue Bird Service website ONLY.
First save the "NEW DEALER DOWNLOADER SOFTWARE ZIP" folder to your laptop.
Next right click the zip folder and do an extract all. The dealer tool software is required to install software updates to Actia instrumentation.
Install the "Downloader v2.10" by double clicking. Follow the Downloader Setup Wizard installation steps. If desired check the box to create a Downloader icon on your desk top.
Next install the "116432v01_00 Basic+ XS & CAT drivers preferred by ACTIA US" by double clicking. It will download the correct drivers from the Actia FTP. Select the language to use during the installation.
NOTE: The following steps may vary based on Windows edition and system type. Example: Windows XP or Windows 7, 32 bit or 64 bit. Follow the Setup Wizard installation steps.
Select the components to install. Click Next to continue.
If unsure select all components. Click Next to continue.
Select "Install"
Tools / Software Application

Select "Install"
Once the I+ME Actia Setup Wizard has finished plug the "CAT CAN Tool" to the desired laptop USB port.
"Installing device driver software" will display. Wait until the device driver software installation is complete before proceeding to the next step.
Once the device driver software installation is complete. Go to "Device Manager" to verify the COM Port number and that the driver software is installed correctly.
Example of device software drivers that are installed correctly. Note the COM Port number for future use.

Example of device software drivers that are NOT installed correctly.

Hardware not working properly. There are many reasons why hardware may not work properly. If Windows recognizes a problem with a device, it is denoted by a black exclamation point (!) on a yellow triangle in the lower right-hand corner of the device’s icon.
Double click on the Downloader icon to open.
Click on Tools and then Comm Port.
Tools / Software Application

Actia Software/Document Reference

Use New Dealer DownLoader Tooling Software For All Actia Instrumentation. To install New Dealer DownLoader Tooling Software Right click, choose “Save Target As”

NEW DEALER DOWNLOADER SOFTWARE ZIP

NOTE: ACTIA PROGRAM KIT BB PART # 00072987 ACTIA PART # 104379-B INCLUDES REQUIRED TOOLING HARDWARE TO CONNECT TO LAPTOP

NOTE: USE TWO BUTTONS LOCATED ON FRONT OF INSTRUMENTATION TO ENTER ODOMETER VALUE AND SET ADJUSTABLE FEATURES ON SERVICE REPLACEMENTS. SEE INSTRUCTIONAL VIDEOS AND SERVICE UPDATE S1004 ALSO REFERENCE APPLICABLE SERVICE MANUAL.

If using Internet Explorer right click software link and select “Save target as”, if using any other browser just left clicking the link will download the software.

|---------|------------|----------------------------|----------------|-----------------|

A3FE & A3RE - Discrete Gauge Package

|---------|------------|----------------------------|----------------|-----------------|

Select the COM Port number noted in the previous “Device Manager” step. The circled area above indicates the COM Port selected.
Tools / Software Application

Make the necessary cable connections from the laptop USB port to the instrumentation and or bus diagnostic port being serviced.
Tools / Software Application

Actia Software/Document Reference

Use New Dealer DownLoader Tooling Software For All Actia Instrumentation To Install New Dealer DownLoader Tooling Software Right click, choose "Save Target As"

NEW DEALER DOWNLOADER SOFTWARE ZIP

NOTE: ACTIA PROGRAM KIT BB PART # 00072987 ACTIA PART # 104378-8 INCLUDES REQUIRED TOOLING HARDWARE TO CONNECT TO LAPTOP

NOTE: USE TWO BUTTONS LOCATED ON FRONT OF INSTRUMENTATION TO ENTER ODOMETER VALUE AND SET ADJUSTABLE FEATURES ON SERVICE REPLACEMENTS. SEE INSTRUCTIONAL VIDEOS AND SERVICE UPDATE S1004. ALSO REFERENCE APPlicable SERVICE MANUAL.

If using Internet Explorer right click software link and select "Save target as", if using any other browser just left clicking the link will download the software.

Note: The software file can be saved in your "Downloads folder, desktop, or folder of your choice.

Verify the Blue Bird part number of the instrumentation on the bus being serviced. The part number can be found on the Blue Bird service part list and is also printed on the labels attached to the part. Download the software file listed for the applicable part number.
Tools / Software Application

Use the drop down tab to select the type instrumentation "ECU" the software will be installed in.

Use the Browse and Open buttons to select the software file to download. Click the Download button to begin.
Tools / Software Application

If using Internet Explorer right click software link and select “Save target as”. If using any other browser just left clicking the link will download the software.

<table>
<thead>
<tr>
<th>BB Part #</th>
<th>Actia Part #</th>
<th>Software To Install in Part #</th>
<th>Service Manual</th>
<th>Odometer Manual</th>
</tr>
</thead>
<tbody>
<tr>
<td>00057498</td>
<td>102806</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>00057499</td>
<td>102807</td>
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<td>00072982</td>
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<td>00100220</td>
<td>107147</td>
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<td></td>
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<tr>
<td>00100221</td>
<td>107148</td>
<td></td>
<td></td>
<td></td>
</tr>
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| 00079091    | 104496       |                                |                |                 |
| 00079092    | 104497       |                                |                |                 |
| 00086739    | 105998       |                                |                |                 |
| 00087005    | 105999       |                                |                |                 |
| 00079080    | 104667       |                                |                |                 |
| 00086659    | 104668       |                                |                |                 |
| 00110407    | 106990       |                                |                |                 |
| 00110408    | 106999       |                                |                |                 |
| 10014984    | 112417       |                                |                |                 |
| 10014985    | 112418       |                                |                |                 |
| 10022202    | 113484       |                                |                |                 |
| 10022203    | 113485       |                                |                |                 |

| 10022274    | 113697       |                                |                |                 |
| 10022275    | 113698       |                                |                |                 |
| 10022248    | 113699       |                                |                |                 |
| 10022429    | 113700       |                                |                |                 |

The first step will erase the current (older version) software application installed in the instrumentation.
The second step will download the (newer version) software application into the instrumentation.
Once the download process is complete the confirmation screen above will display. Click the OK button and then click the Exit button to close.
When software updates are completed on a workbench cycle the 12 volt regulated power supply off and then back on. When software updates are completed on a bus cycle the ignition key off and then back on. The instrumentation will reboot and the software version installed will display on the LCD screen for confirmation. Disconnect cables. The software update is complete.
Troubleshooting -
I try to use the Downloader software and I get the following message:
LoadLibrary failed with error 126: The specified module could not be found.
What should I check?
Verify the correct driver software is installed.
See previous steps for driver software installation and verification.
Troubleshooting

I try to use the Downloader software and I get the following message:
ERROR: Open failed, no XS1U device attached!
What should I check?
Verify the correct COM Port is selected.
See previous steps to verify correct COM Port is selected.
Troubleshooting -
I try to use the Downloader software and I get the following message: (ERROR: Download error!) or (ERROR: Error to target!)
What should I check?
Verify the software file you are trying to install is the correct file for the instrumentation part number being serviced. See previous steps for downloading the software file listed for the applicable part number.
Note: Actia software has three (3) different file "TYPE" extensions based on the instrumentation hardware. (.MHX), (.BHX), or (.AVR32X).
The above error is caused when you try to install the wrong file "TYPE". See the following pages for ways the three (3) file types are displayed.
All Actia Discrete Gauge software files have a “Type” (.mhx) extension and will show as Fujitsu Target.
Tools / Software Application

Early Actia instrument Cluster software files have a “Type” (.bhx) extension and will show as Micronas Target.
Later Actia instrument Cluster software files have a “Type” (.avr32x) extension and will show as Atmel AVR32 Target.
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INTRODUCTION

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DIAGNOSTICS & CONFIGURATION

TOOLS / SOFTWARE APPLICATION

REPLACEMENT

Q & A / WRAP UP
Replacement

- Service Set Odometer
  - Cluster has limited functionality until odometer is set
  - Allows presetting odometer via front panel buttons
  - See service update S1004 for further replacement instruction

Warning – U.S. Federal Law requires that the odometer accurately display the vehicle’s actual mileage. It is the responsibility of the person installing the Cluster or Speedometer to make sure the mileage programmed into the odometer correctly matches the vehicle’s actual mileage.
Replacement

- Service Set Odometer
  - Set in English or Metric units
Replacement

- Service Set Odometer
  - Set a specific value
  - Set odo to zero
Replacement

- Service Set Odometer
  - Selecting Zero Odometer displays the confirmation screen
Service Set Odometer

- Selecting Set Odometer Value displays the first digit to set
- Use UP & DOWN buttons to increment/decrement the digit
- Press both buttons to save the digit
- Example of setting 7654.2 miles
Replacement

- Service Set Odometer
  - Repeat for each digit

Set Digits

* * * * * 0 4.2

Set Digits

* * * * * 0 5 4.2
Replacement

- Service Set Odometer
  - Repeat for each digit

Set Digits

Set Digits

www.actia.com
Service Set Odometer

- All digits must be set
- Pressing both buttons brings up the next digit as zero
- Pressing both buttons lets you quickly save the remaining digits as zero
Service Set Odometer

- When all digits are set the confirmation screen will appear
- Press OK to save
- Press Back to start over
When replacing a cluster be sure to check the following:

- Application Software version for part number – Latest version listed on BB website
- Configuration settings based on the features ordered – See service update S1004
ACTIA Corp. Warranty

- Two (2) Years or 24,000 whichever comes first
- Excludes scratches, dents, or any damage or failure caused by improper handling, misuse, misapplication, accidents, or altered product.
- Product must receive an ACTIA Returned Goods Authorization (RGA) from Blue Bird’s iWarranty site.

- Information must be provided
  - Date the equipment was sold
  - Date of failure
  - Explanation of the problem
  - Vehicle Identification number
  - Mileage at time of failure
Replacement

- If product replacement seems necessary
  - Contact your BB inside service rep first – Not ACTIA directly
  - Perform the diagnostic procedures they request
  - Get vehicle information
  - Note dealer installed options
  - Give a CLEAR, DETAILED description of the issue
    “InOp”, “Broke”, and “doesn’t work” doesn’t help
  - Get a RGA # through the BB IWarranty site
  - Do not send a part without a RGA # clearly marked on the box
Replacement

- If lens replacement seems necessary
  - Lens kits are available and include replacement instructions
  - Recommended only for products outside the warrantee period.
  - 2” (52mm) gauge lens kit - 113922
  - 5” (117mm) master gauge lens kit - 113923
  - 5” (117mm) slave gauge lens kit - 113924
Thank you for your attention!