BIM-13-2
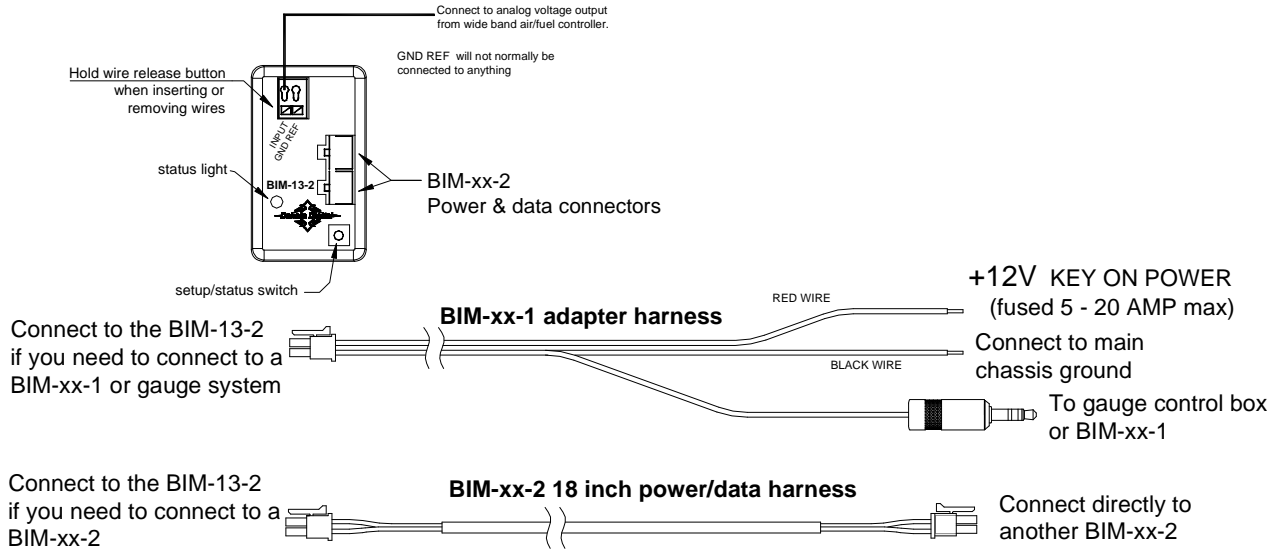# Bus Interface Module for Air/Fuel ratio
(Requires a wide band air/fuel controller with a voltage output)

Connect to analog voltage output from wide band air/fuel controller.

GND REF will not normally be connected to anything

Hold wire release button when inserting or removing wires

status light

BIM-13-2

setup/status switch

BIM-xx-2 Power & data connectors

BIM-xx-1 adapter harness

Connect to the BIM-13-2 if you need to connect to a BIM-xx-1 or gauge system

RED WIRE

+12V KEY ON POWER (fused 5 - 20 AMP max)

BLACK WIRE

Connect to main chassis ground

To gauge control box or BIM-xx-1

Connect to the BIM-13-2 if you need to connect to a BIM-xx-2

BIM-xx-2 18 inch power/data harness

Connect directly to another BIM-xx-2

This Bus Interface Module has one input to monitor the air/fuel ratio output from a wide band air/fuel controller with an analog voltage output. It is programmable to provide either an air/fuel ratio display or a lambda display. The module can be programmed to work with different scaling values of a voltage between 0 – 5 volts. This allows it to be set for nearly any wide band system available. There are two interface (I/O) ports on the module. Either one can be connected to the gauge system or to another module, allowing several units to be daisy chained together. Do not connect the I/O port to anything other than a Dakota Digital gauge or BIM. Do not mount the module in the engine compartment; it should be mounted in interior of the vehicle.

Each unit connected to the bus needs a unique ID number assigned to it. The unit comes preset with an ID value that should not conflict with any other BIM connected to your system. If needed the ID can be automatically reset to an unused value.

Label for the input is:
AIR/FUEL -   voltage input. This will display A-F, AF, A/F, or AIR/FUEL.

Specs for each input mode are:

	Mode	Range	Resolution	(WARN LO) 0V setting	(WARN HI) 5V setting
Air / Fuel	A-F ratio	0 – 5.00 V	0.1	00.0 – 12.6	4.4 – 74.0
Air / Fuel	lambda	0 – 5.00 V	0.01	0.00 – 0.63	1.00 – 5.00

Common LO and HI settings for popular analog output signals:
Consult your wide band air fuel installation and operation manual for details on the type of analog output provided.

Output type	A/F LO	A/F HI	Lambda LO	Lambda HI
10 = 1.0V, 20 = 2.0V	0.0	50.0	0.00	3.40
0 = 0.0V, 50 = 5.0V	0.0	50.0	0.00	3.40
9 = 0.0V, 16 = 5.0V	9.0	16.0	0.61	1.10
7.35 = 0.0V, 22.39 = 5.0V	7.4	22.4	0.50	1.50
Lambda 0.5 = 0.5V, 1.5 = 1.5V	0.0	74.0	0.00	5.00
8.5 = 0.5V, 18 = 4.5V	7.4	19.2	0.50	1.30

Different fuel types will require different scaling values for the air fuel ratios. Consult your wide band air fuel installation and operation manual for more details on using different fuel types.

To change between Air / Fuel and lambda readings:
- Turn the key on so the gauge and BIM-13-2 are powered.
- Press and hold the setup/status switch on the BIM-13-2. The status light will slowly flash red and green.
- After about 10 seconds the status light will begin flashing rapidly. Release the switch.
- The reading will now be changed.

To set or change the ID number:
       The ID will not normally need to be changed. A green-red-red flash on the BIM-13-2 status light indicates an ID conflict with another connected BIM. The following procedure will allow the BIM-13-2 to automatically select a new, unused ID.
- Press and hold the setup/status switch on the BIM-13-2 while turning the key on. The BIM status light will be steady RED.
- Release the switch.
- When the status light begins flashing, it is finished.

This module does not use warning points, so the warning setup is used to program the display range matching your wide band controller analog output. These settings are changed on the gauge system display. Common settings are listed on the front page of the manual.
Only VFD3/3X controls with a plastic case support adding BIM's.
For VFD3, VFD3X, and VHX systems follow these steps:
- Make sure the BIM units are all connected to the gauge control box.
- Hold the SW1 switch from the gauge system control box while turning the key on. The message display should show SETUP.
- Release SW1.
- Press and release SW1 until BIM is shown on the message display.
- Press and hold SW1. The message display should show SCAN followed by the number of BIM channels detected. Release SW1.
- If 0 is shown, check all connections and then press and hold SW1 with SCAN shown to retry reading the modules.
- Otherwise, if any other number is shown, press and release SW1 until SETUP is shown.
- Press and hold SW1 until the speed display shows " – " or the message changes.
- Release SW1. On the VFD3 systems the message display will show the label assigned to the first channel found and the speed display will show "C" followed by the channel ID number. On the VHX systems the message display will show "CH" followed by the channel ID number on one line and the label currently assigned on the second line.
- Press and release SW1 until the desired channel ID number is shown.
- Press and hold SW1. The message display will show "LABEL".
- Release SW1. The message display will show the label assigned to this channel.
- This label cannot be changed, so press and hold SW1. The message display will show "WARN".
- Release SW1. The message display will show "L" followed by the current 0 volt display setting.
- Press and release SW1 to change the 0 V display setting to the desired value.
- Press and hold SW1 until the speed display shows " – ".
- Release SW1. The message display will show "H" followed by the current 5 volt display setting.
- Press and release SW1 to change the 5 V display setting to the desired value.
- Press and hold SW1. The message display will now show "DONE".
- This can be repeated for additional channels, or the key can be turned off to exit setup.

For HDX systems follow these steps:
- Make sure the BIM units are all connected to the gauge control box.
- With the ignition on, press and hold both switches to enter SETUP. With external switches hold either one while turning the ignition on. Release the switches when SETUP is shown.
- Press and release either switch until BIM is selected. Press and hold either switch to enter BIM setup menu.
- Release the switch. A list of the BIM's found should be shown. If NONE FOUND is displayed then check connections to the BIM-13-2.
- Press and release either switch until BIM-13 is selected. The status LED on the BIM will flash RED-GREEN.
- Press and hold either switch to enter the BIM-13 setup.
- Release the switch.
- Press and release either switch until WARN LO is selected.
- Press and hold either switch to change the WARN LO setting. This will be the 0 volt display setting.
- Release the switch. The message display will show the current 0 volt display setting.
- Press and release either switch to change the 0 V display setting to the desired value.
- Press and hold either switch to go back to the previous setup menu.
- Release the switch.
- Press and release either switch until WARN HI is selected.
- Press and hold either switch to change the WARN HI setting. This will be the 5 volt display setting.
- Press and release either switch to change the 5 V display setting to the desired value.
- Press and hold either switch to go back to the previous menu.
- Select BACK to return to the BIM list menu.
- Select BACK to return to the main menu.
- Select EXIT SETUP to return to normal operation.

With HDX systems the setup can also be done with the Dakota Digital app for Apple and Android devices.

Troubleshooting quick tips:
While the BIM is operating normally, the status light will flash green.
A steady green indicates it is powered up but not receiving any bus activity.
A flashing yellow-red (steady red with a flashing green) indicates an open or shorted temperature sensor connection.
A green flash-red flash indicates the BIM is currently selected in the gauge setup menu.
A green-red-red flash indicates an ID conflict with another connected BIM.

Troubleshooting guide.

Problem	Possible cause	Solution
Sensor does not show on gauge readout. BIM will not light up at all.	PWR wire does not have power.	Connect to a location that has power.
	GND wire does not have a good ground.	Connect to a different ground location.
	Power/data harness is damaged.	Inspect harness. Repair or replace any damaged areas.
	Module is damaged.	Return for service. (see instructions)
Sensor does not show on gauge readout. BIM has a steady green light.	Interface cable is damaged.	Inspect the 3-wire harness for damage.
	Interface cable is loose.	Make sure both ends of the cable are seated in securely.
	Another BIM is set with the same channel ID.	Test module works when connected to control box alone. Change ID on one of the modules so each module uses a unique ID.
	On VHX systems, the BIM display for this channel is disabled.	Follow instructions in VHX manual to enable the BIM display screen.
Sensor does not show on gauge readout. BIM light is flashing green-red-red	Another BIM is set with the same channel ID.	Test module works when connected to control box alone. Change ID on one of the modules so each module uses a unique ID.
Gauge lights up, but does not read correctly.	Loose connection on sensor wires.	Inspect and reconnect wires.
	Connector not seated on sensor.	Reattach the sensor plug, making sure the locking tab clicks in place.
	Wrong setting for 0V display	Reset the 0V display setting using the system BIM setup menu. This is the WARN LO setting.
	Wrong setting for 5V display	Reset the 5V display setting using the system BIM setup menu. This is the WARN HI setting.
	Voltage or wiring problem in the vehicle wiring harness.	Check wiring harness for loose or damaged wires.

VFD/VHX wiring tip:
When connecting to a VFD or VHX display system with the round 3.5mm jack you can easily get power and ground from the control box FUEL+ and FUEL- terminals. These terminals are normally not used. Connect the BIM-xx-1 adapter harness RED wire to the FUEL+ terminal and connect the BIM-xx-1 adapter harness BLACK wire to the FUEL- terminal.

SERVICE AND REPAIR

DAKOTA DIGITAL offers complete service and repair of its product line. In addition, technical consultation is available to help you work through any questions or problems you may be having installing one of our products. Please read through the Troubleshooting Guide. There, you will find the solution to most problems.

Should you ever need to send the unit back for repairs, please call our technical support line, (605) 332-6513, to request a Return Merchandise Authorization number. Package the product in a good quality box along with plenty of packing material. Ship the product by UPS or insured Parcel Post. Be sure to include the RMA number on the package, and include a complete description of the problem with RMA number, your full name and address (street address preferred), and a telephone number where you can be reached during the day. Any returns for warranty work must include a copy of the dated sales receipt from your place of purchase. Send no money. We will bill you after repair.

Dakota Digital Limited Lifetime Warranty

DAKOTA DIGITAL warrants to the ORIGINAL PURCHASER of this product that should it, under normal use and condition, be proven defective in material or workmanship for the lifetime of the original vehicle it was installed in, such defect(s) will be repaired or replaced at Dakota Digital's option.

This warranty does not cover nor extend to damage to the vehicle's systems, and does not cover diagnosis, removal or reinstallation of the product. This Warranty does not apply to any product or part thereof which in the opinion of the Company has been damaged through alteration, improper installation, mishandling, misuse, neglect, or accident.   Dakota Digital assumes no responsibility for loss of time, vehicle use, owner inconvenience nor related expenses.

Dakota Digital will cover the return standard freight once the product has been evaluated for warranty consideration, however the incoming transportation is to be covered by the owner.

This Warranty is in lieu of all other expressed warranties or liabilities. Any implied warranties, including any implied warranty of merchantability, shall be limited to the duration of this written warranty. No person or representative is authorized to assume, for Dakota Digital, any liability other than expressed herein in connection with the sale of this product.

> ⚠**WARNING:** This product can expose you to chemicals including lead, which is known to the State of California to cause cancer and birth defects or other reproductive harm. For more information go to www.P65Warnings.ca.gov

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