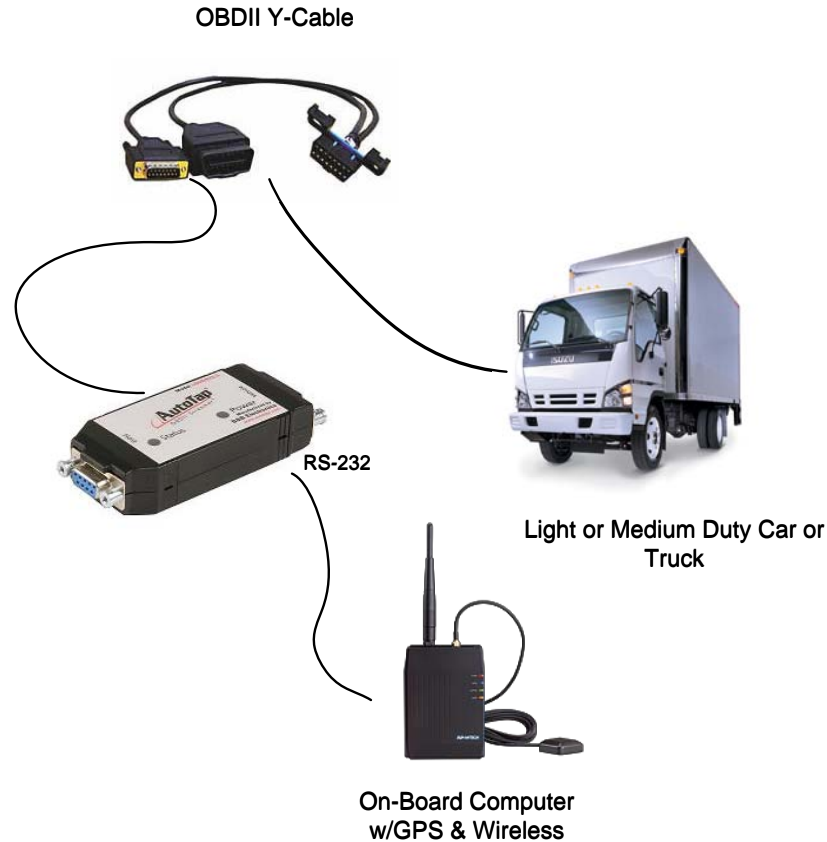


## Model LDVDSV2 Advanced OBDII Data Streamer

The B&B Electronics AutoTap™ OBDII Data Streamer Model LDVDSV2 connects your PC, driver terminal, Java-enabled phone, or other on-board computing device to the OBDII diagnostic bus of light and medium duty vehicles. It enables the retrieval of the most commonly used parameters of value in telematics and fleet management applications.

The LDVDSV2 provides a simple operational protocol to communicate to the OBDII bus. It provides a common interface and deterministic response time for all vehicles. The complete Command and Response protocol is published on B&B's website [www.rvdstreamer.com](http://www.rvdstreamer.com).



### Supported Vehicles

The OBDII Streamer supports any 1996 or newer vehicles that comply with the SAE's J1979 OBDII specification.

### Supported Parameters

- Vehicle Identification Number
- Vehicle Speed - Monitor aggressive driving
- Engine Speed - Monitor idle time and engine abuse
- Throttle Position
- Odometer/Distance Traveled - Monitor trip distance and HOS
- Instantaneous Fuel Rate in Gallons per Hour
- Total Fuel - Monitor MPG & Protect against theft
- Ignition status – Track Idle time

### Supported Protocols

- SAE J1850 VPW
- SAE J1850 PWM
- SAE J2284/ ISO 15765 (CAN)
- ISO 9141-2
- ISO 14230-4 (KWP2000)

- Battery Voltage – Watch for charging system failures
- PTO Status - Automatically figure fuel tax savings
- Diagnostic Trouble Codes
- MIL Status
- Emissions Readiness Monitors - Check remotely if vehicles are ready for emissions certification
- Brake Switch Status and Seatbelt Fastened available on most Ford & GM trucks/vans
- Other parameters available on a custom basis

**Additional Features**

- Vehicle Speed Signal Output pulse for driving external distance meters
  - 0V to 5V pulses, 1 kOhm output impedance.
  - 50% Duty Cycle
  - 3,500 pulses/km (5,632.7 pulses/mi.)
- Ignition-On Signal Output
- Status LED's for vehicle connection and power

	Red LED (Power)	Green LED (Activity)	Red LED (Debug)	Actual State	Customer Description
1	On	On	Off	Normal operation	Normal operation
2	On	SB	Off	Detecting vehicle	Detecting vehicle
3	Off	FB	Off	Database version mismatch	Database needs to be updated
4	Off	SB	Off	Update in progress	Update in progress
5	Off	VSB	VSB	Device asleep	Device asleep
6	Off	Off	Off	Device unpowered	Device unpowered
7	Off	On	FB	Error FPGA Image Invalid	Firmware needs to be updated
8	Off	Off	FB	Error with EMM code	Update System Manager
9	Off	Off	FB	EMM checking CRC of Images	Wait 10 seconds if state does not change see 8
10	Off	SB	FB	Error writing/reading to/from flash during update	Restart update of current component

## LED state descriptions:

- On (LED\_ON): lit, solid
  - Off (LED\_OFF): unlit
  - FB (LED\_FAST): Alternating on-off; 125ms on, 125ms off
  - SB (LED\_SLOW): Alternating on-off; .5 sec on, .5 sec off
  - VSB (LED\_VERY\_SLOW): Alternating on-off; .25 sec on, 2 sec off
- Automatic low power mode senses when vehicle speed & engine speed is zero.
  - Automatic disconnect when technician scan tool is connected (Requires separate OBDII Y-Cable)
  - Proprietary vehicle detection algorithm and embedded database lets the same hardware work on all compliant vehicles
  - Configurable parameter reporting by polling, at a fixed rate, or when a threshold is exceeded.
  - Wide Operating Temperature: -40 to 85 °C (-40 to 185 °F)
  - Low Power Consumption: 2W in Operating Mode; 0.15W in Automatic Sleep Mode (Key Off)

**Available Form Factors****External Box****Vehicle Bus Connection: DB15 female**

Pin 1	ISO9141 K/
Pins 4, 5:	J1850-, J1850+
Pin 6, 7	Ground
Pin 9	Vehicle unswitched Vbat
Pin 10	ISO9141 L
Pin 11	Vehicle Vbat to external scan tool
Pin 12	CAN Low
Pin 13	CAN High

**RS-232 Connection: DB9 female, DCE**

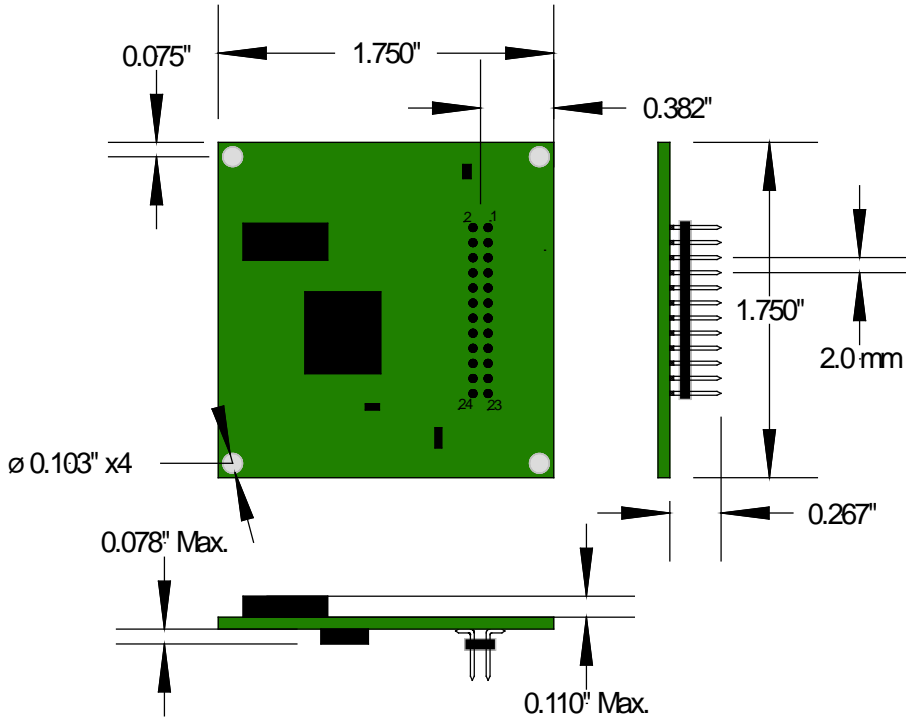
Pins 1,4,6	Connected together
Pin 2	RD
Pin 3	TD
Pin 5	Ground
Pin 7	RTS
Pin 8	CTS (Vehicle Ignition Status)
Pin 9	Vehicle Speed Sensor Output Signal, VBAT Power out (2 separate build options)

Dimensions: 4.1 x 1.7 x 0.8 in (104.1 x 43.2 x 20.3 mm)

Operating Voltage Range: 8 to 30 VDC

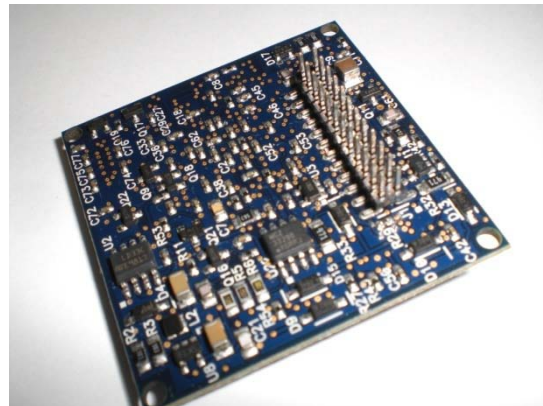
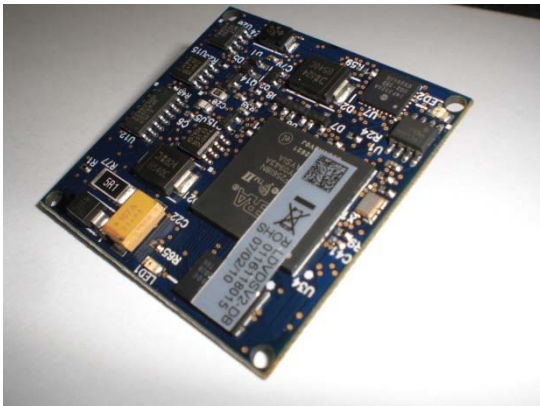
Calculated MTBF: 111,440 Hours

### Daughter Board Module

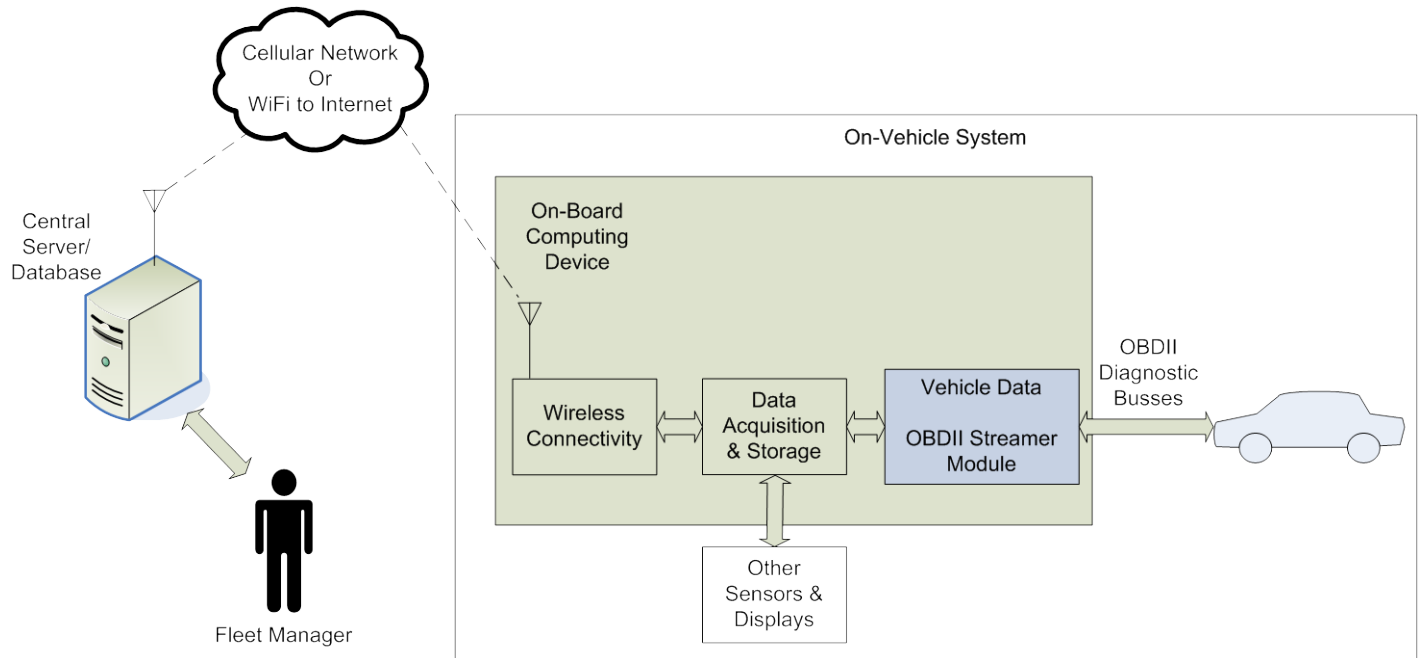


Connector:  
 24-Pin Header  
 0.5mm Square Pins  
 2.0mm Pin Spacing  
 Samtec P# TMM-112-06-T-D-SM

Suggested Stand-Off:



Signal	Pin	Direction	Description
Serial Rx	1	Board to Streamer	0 to 3.3V Asynchronous serial signal (0V = Space, +5V = Mark) Max Voltage 3.3V
Serial Tx	2	Streamer to Board	0 to 3.3V Asynchronous serial signal (0V = Space, +5V = Mark) Max Voltage 3.3V
+5V	3	Board to Streamer	Regulated (+/-5%) 5V Supply @ 200 mA Max Max Voltage 5.5V
Enable	4	Board to Streamer	OBDII Streamer Enable/Reset Pin (0-5V, Enabled = High) Max Voltage 5V
Engine On	5	Streamer to Board	Indicates RPM or Vehicle Speed > 0
Vehicle Speed Pulse	6	Streamer to Board	0 to 5V signal with frequency proportional to vehicle speed
J1850+	7	Both	J1850+ line from J1962 Pin 2
J1850-	9	Both	J1850- line from J1962 Pin 10
CANh	8	Both	CAN High line from J1962 Pin 6
CANl	10	Both	CAN Low line from J1962 Pin 14
ISO K	11	Both	ISO 9141 K Line from J1962 Pin 7
ISO L	12	Both	ISO 9141 L Line from J1962 Pin 15
Scan Tool Present	13	Streamer to Board	Indicates a technician scan tool has been plugged in Max continuous voltage 45V Max transient voltage 65V
Vbat	14	Board to Streamer	Vehicle battery voltage from J1962 Pin 16
+12V to Service Tool	15	Streamer to Board	+12V out to 3rd party scan tool
GND	16	Both	Vehicle battery ground from J1962 Pin 4 and 5
PGC	17	Board to Streamer	Microchip ICSP Clock for programming & debug
PGD	18	Both	Microchip ICSP Data for programming & debug
MCLR	19	Board to Streamer	Microchip ICSP MCLR/Program Voltage for programming & debug
+3.3V	20	Streamer to Board	+3.3V supply for Microchip ICSP programming & debug
TDI	21	Board to Streamer	JTAG data pin for FPGA programming & debug
TDO	22	Streamer to Board	JTAG data pin for FPGA programming & debug
TMS	23	Board to Streamer	JTAG pin for FPGA programming & debug
TCK	24	Board to Streamer	JTAG clock pin for FPGA programming & debug

Mount Your Own Chip Set

## Included:

- Bill of Materials with manufacturer part numbers and suggested vendor information
- Schematic in Adobe Acrobat and P-CAD Schematic Formats
- Net List
- PCB Layout in Adobe Acrobat, P-CAD PCB, & Gerber Formats
- Hex file with hardware description and firmware
- Serial interface command and response specifications
- External box w/OBDII Y-Cable to be used in application development.
- QuickTester PC application w/source code
- Unlimited Layout & Integration support for 1 year.
- Maintenance releases and vehicle upgrades for 1 year.
- Production test specifications.
- Production test software w/source code

**Choosing the right Product:**

Product	B&B Supplied Items	Customer Requirements	Advantages	Disadvantages	Pricing Model
Box	<ul style="list-style-type: none"> <li>Interface external box</li> <li>Optional OBDII Y-Cable</li> </ul>	<ul style="list-style-type: none"> <li>On-board computer (OBC) with RS-232 Serial Port</li> <li>Software to read/write to serial port</li> </ul>	<ul style="list-style-type: none"> <li>Quickest time to market</li> <li>No hardware modification required to the OBC</li> <li>Automatic updates to new units</li> </ul>	<ul style="list-style-type: none"> <li>Most expensive solution</li> <li>Two cables in the installation</li> <li>Can't test OBC/OBDII combination until install</li> </ul>	<ul style="list-style-type: none"> <li>Per-piece hardware price</li> </ul>
Daughter Board	<ul style="list-style-type: none"> <li>OBDII module with plug-in interconnect &amp; mounting holes</li> <li>Optional OBDII Y-Cable</li> </ul>	<ul style="list-style-type: none"> <li>OBC with TTL serial port, matching plug-in interconnect, 5V Supply, DB-15 connector to go to OBDII Y-Cable.</li> <li>Software to read/write to serial port</li> </ul>	<ul style="list-style-type: none"> <li>Minimal software integration.</li> <li>Reduce steps of installation</li> <li>Less expensive than box</li> <li>Automatic updates to new units</li> <li>Test OBC/OBDII combination in the factory at build time</li> </ul>	<ul style="list-style-type: none"> <li>PCBD Change required on OBC</li> <li>OBC enclosure has to accommodate daughter board</li> <li>Possibly more expensive than chip set.</li> </ul>	<ul style="list-style-type: none"> <li>Per-piece hardware price</li> </ul>
Chip Set	<ul style="list-style-type: none"> <li>Schematic</li> <li>Bill of Materials</li> <li>Example layout</li> <li>FPGA HW Description</li> <li>Firmware in executable form</li> </ul>	<ul style="list-style-type: none"> <li>Integrate Streamer design into the OBC.</li> <li>Software to read/write to serial port</li> <li>Source OBDII chip set for production</li> </ul>	<ul style="list-style-type: none"> <li>Minimal software integration.</li> <li>Reduce steps of installation</li> <li>Can lay out OBC PCBD to fit best in enclosure</li> <li>Possibly less expensive than daughter board</li> <li>Test OBC/OBDII combination in the factory at build time</li> </ul>	<ul style="list-style-type: none"> <li>Extensive PCBD layout on OBC</li> <li>Software updates for OBDII have to be implemented in customer production</li> <li>Any hardware updates require a new PCBD layout for the OBC.</li> <li>Requires high quantities of chip set purchase to get cost savings.</li> <li>Replicates processors compared to IP version.</li> </ul>	<ul style="list-style-type: none"> <li>First year NRE</li> <li>Consecutive year maintenance fee</li> <li>Per-piece license fee</li> </ul>
IP Libraries	<ul style="list-style-type: none"> <li>Firmware in library form (CAN Only)</li> <li>Embedded Database (CAN Only)</li> </ul>	<ul style="list-style-type: none"> <li>Design a CAN interface into the OBC</li> <li>Write an interface between the Streamer libraries and the OBC application.</li> <li>Write board support libraries between the Streamer libraries and the OS/Hardware.</li> </ul>	<ul style="list-style-type: none"> <li>No redundant hardware costs.</li> <li>Can achieve a small form factor.</li> </ul>	<ul style="list-style-type: none"> <li>No support for vehicles without CAN (older than 2008)</li> <li>Extensive software integration required.</li> <li>Hardware CAN interface design required.</li> <li>Longest time to market</li> <li>Software updates for OBDII have to be integrated into software before production</li> </ul>	<ul style="list-style-type: none"> <li>First year NRE</li> <li>Consecutive year maintenance fee</li> <li>Per-piece license fee</li> </ul>

**EMC Testing**

Radiated RF Interference:	SAE J1113/41
Load Dump and Transient Protection	SAE J1113/11
ESD Immunity	SAE J1113/13

**Environmental Testing**

## Temperature Test:

Ten (10) temperature cycles as follows with unit operating normally

1. Room (25°C) to Tmin in 15 minutes.
2. Soak at Tmin 1 Hour with power removed from unit
3. Start unit at Tmin, confirm successful start by executing a command/response. Power-down unit. Maintain unit un-powered for one minute between power-ups.
4. Repeat Step 3 three times
5. Start unit at Tmin and ramp Tmin to Tmax in 30 minutes
6. Operate at Tmax for 1 hour
7. Ramp Tmax to Tmin in 15 minutes
8. Repeat steps 1 through 7 nine times for a total of 10 cycles:
  - a. 5 cycles at Vmin input
  - b. 5 cycles at Vmax input

**Vibration Test:**

IEC 60068-2-6

10 sweeps of 10 to 500 to 10Hz at rate 0.5 oct/min. each axis.

Level to be 10 to 36Hz, 0.06 in DA 36 to 500Hz, 4g's

Unit must remain operational during and after the test.

**Shock Test:**

IEC 60068-2-27

18 to 50g's, 11ms, ½ sine pulses, 3 each direction each axis

Unit must remain operational during and after the test.

**Drop Test:**

IEC 60068-2-32

10 Freefall drops from 1 meter onto concrete surface.

Drop 1 time one each face (6), 1 on a corner and the 3 edges of this corner.

The drop unit shall return to normal operation without physical damage.