WELDON
A DIVISION OF AKRON BRASS

Type 6444 Vehicle Data Recorder (VDR) with 6204 Occupant Restraint Indicator

devices meet NFPA 1901:2009 requirements

Software User Manual
Device Installation and Set-Up Manual

v1.4 -- June 2009 (for VEHICLE USER)

Table of Contents

Vehicle Data Recorder (VDR) and Occupant Restraint Indicator Functions

Vehicle Data Recorder (VDR):

- Maintains time-stamped data of the most recent 100 hours of vehicle operation.
- The data consists of password protected records that receive a time-stamp upon each Power-on event to the system. (This includes the very first Power-on event during factory production tests.)
- Data records are sequential such that no record within the last 100 hours can be overwritten by a newer record.
- Records must always be newer in time than the last record. If for any reason the VDR detects that a current record pre-dates the last record, the entire device will stop recording data.
- Is able to receive information from wired switches, CAN/J-1939, or the Weldon V-MUX® multiplex system.

Occupant Restraint Indicator:

- Provides a visual indicator of the status of up to 12 seats.
- Supports an audible alarm for non-compliant (unbuckled while Park Brake released) occupied seat events.
- Supports a dimmer control to set the brightness level of the display.

*** About the relationship between the Weldon Vehicle Data Recorder and the Weldon V-MUX® multiplex system***

Software: The VDR Configuration Tool program runs independently from Weldon V-MUX software. It can read from and write to the VDR. Users of V-MUX System Designer software will be able to write to, but not read from, the VDR.

Hardware: The VDR and Occupant Restraint Indicator devices are able to run independently of the Weldon V-MUX multiplexed electrical system. They are compatible with V-MUX but do not require it.

VDR and Computer Preparation

It will be necessary for the computer which runs Weldon VDR software to use the Microsoft Windows® XP or Windows Vista operating system and also have the Microsoft®.NET Framework v3.5 installed and running. The most recent update of the .NET Framework is version 3.5 Service Pack 1 (released 11/18/08).

To see which version (if any) of the .NET Framework is installed on the computer go to the Windows Control Panel and select the "Add or Remove Programs" wizard. In Windows XP the start button path is <Start -- Control Panel -- Add or Remove Programs>. The wizard provides a list of Currently Installed Programs to view. Within the list there will be an item for "Microsoft .NET Framework 3.5" if it is installed.

It will also be necessary for the computer to have installed USB driver software for the VDR. Weldon VDR software is available online at www.weldoninc.com.

(required USB drivers for computer-to-VDR communication)

- http://www.weldoninc.com/pages/downloads/vdr/VDR-USB-Drivers.zip

(VDR Setup; use this if .NET Framework v3.5 is already installed -- filesize = 8 MB)

- http://www.weldoninc.com/pages/downloads/vdr/VDR-UNN-Setup.zip

(VDR Setup; use this if there is no internet connection available on the install computer and .NET Framework v3.5 is not installed -- filesize = 245 MB)

- http://www.weldoninc.com/pages/downloads/vdr/VDR-UDN-Setup.zip

Depending on the exact download unzip and run **VDR-UNN-Setup.exe** or **VDR-UDN-Setup.exe** which will install the three Weldon VDR support programs:

- **VDR Extractor** (transfers recorded data from the VDR to the computer)
- **VDR Viewer** (allows the extracted data to be viewed)
- **VDR Configurator** (sets the device parameters; for example - number of seats)

All three VDR programs are installed at the same time by the setup program. They are located in **C:\Program Files\Weldon\Vehicle Data Recorder**

VDR Data Extractor Program

Two methods are available for port access to the VDR memory.

- V-MUX port access (pins 6,7 on VDR)
- USB adapter access

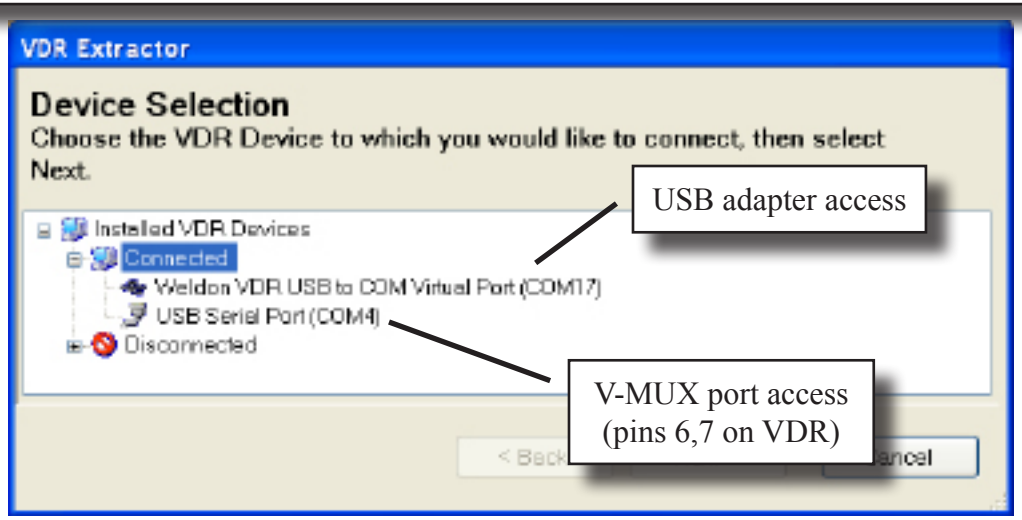
Device Selection

After the computer is physically connected to one of the two available VDR ports run the program **VDRExtractor.exe.** A quick link is provided from **Start - All Programs - Weldon VDR - VDR Extraction Tool**.

A **"Device Selection"** window will appear.

Under the **"Connected"** field select the appropriate access port to begin. (The COM number may vary)

The **"Next >"** button will appear when a Port is selected.

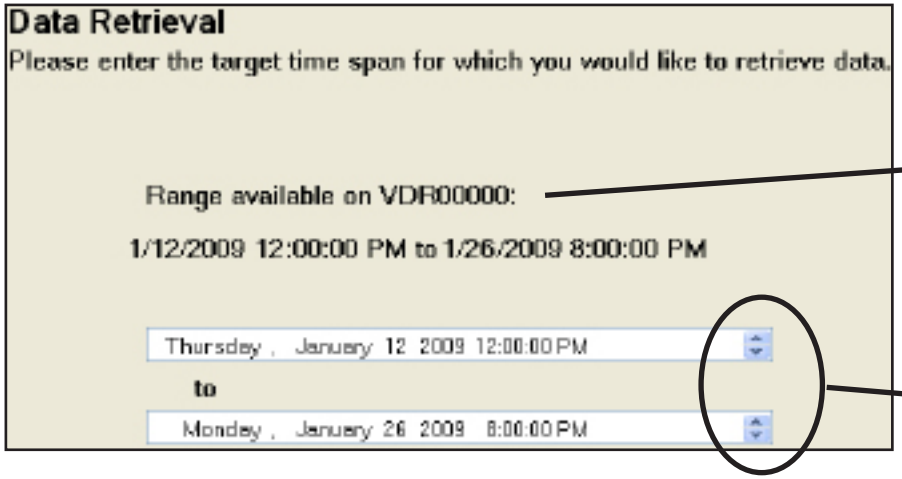


The Extractor Tool requires password authentication for access to the VDR dvice memory.

The default and initial password is “vdr” (all lower case characters). The password may be changed later using the VDR Configuration Tool program.

VDR Data Extractor - Data Retrieval

Select the time range of the data to be viewed



100 Hours of vehicle data are recorded.

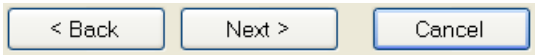
(100 Hours = 4 Days + 4 Hours)

Data is only recorded when the VDR is powered up with the rest of the vehicle. The VDR separates data into discrete records upon each Power-On event. In actual use a vehicle data recorder will have many records of Power ON operation up to the 100 hour limit, at which point the earliest record will get overwritten.

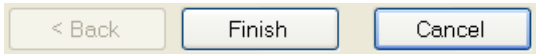
The "Range available" shows the entire span of records over the most recent 100 operating Power ON hours.

The "target time span" selection tool allows for a subset of records within the 100 hour range to be extracted from the VDR memory.

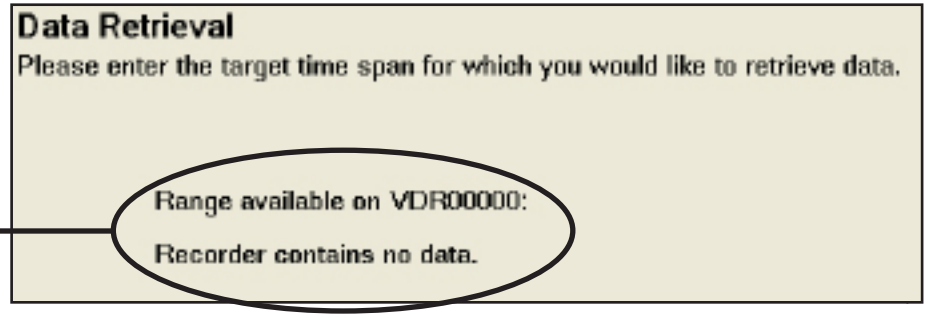
When the desired range of data records has been selected, click the "next" button.



Click the "finish" button to exit the Extractor program.



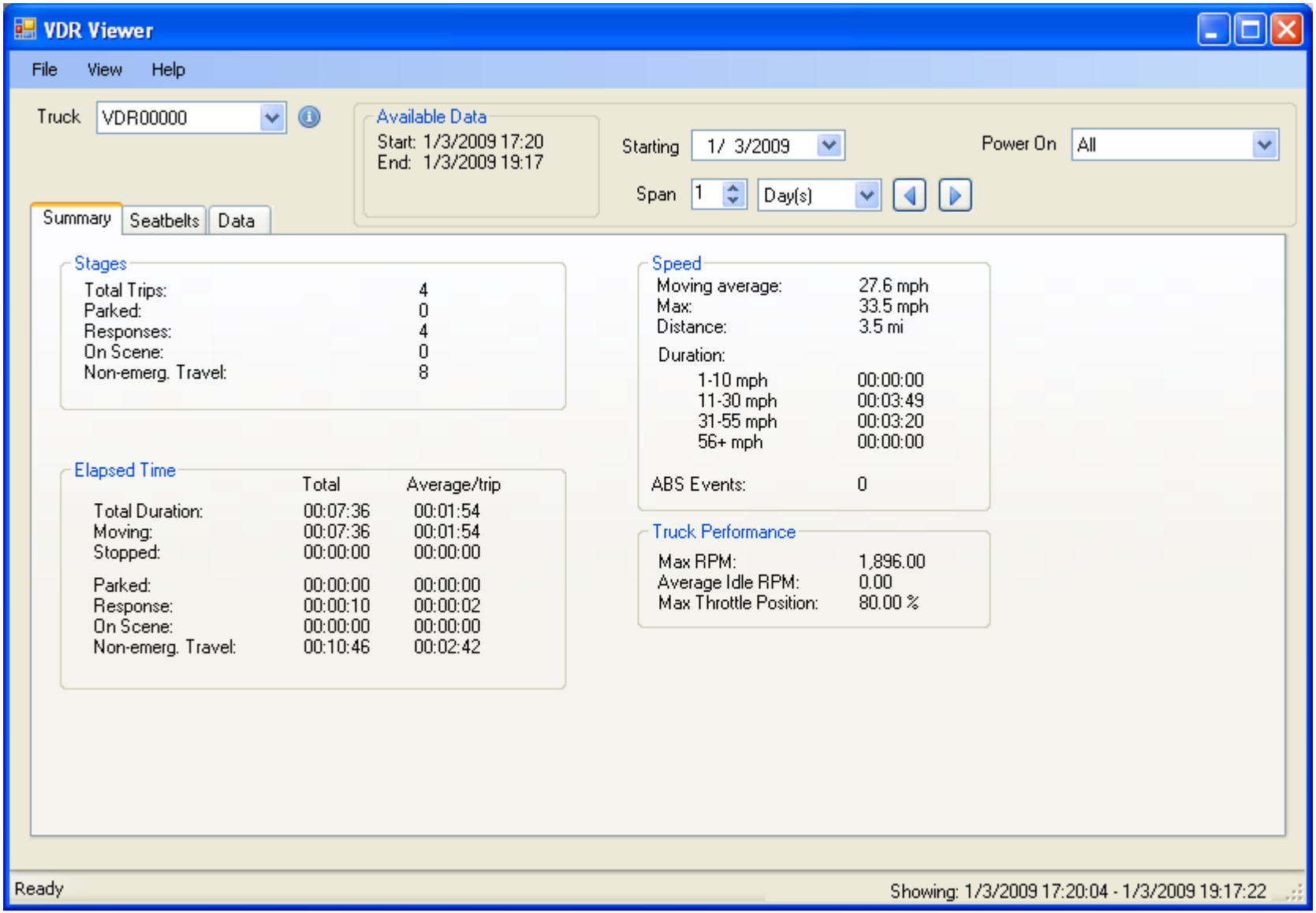
Next step:
View the extracted data records with the program "VDR Viewer.exe"



NOTE: If the password has been reset on the VDR, all records are nullified and the extractor will have no data to select for.

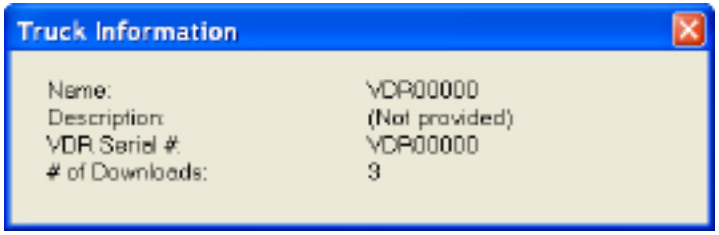
VDR Data Viewer Program

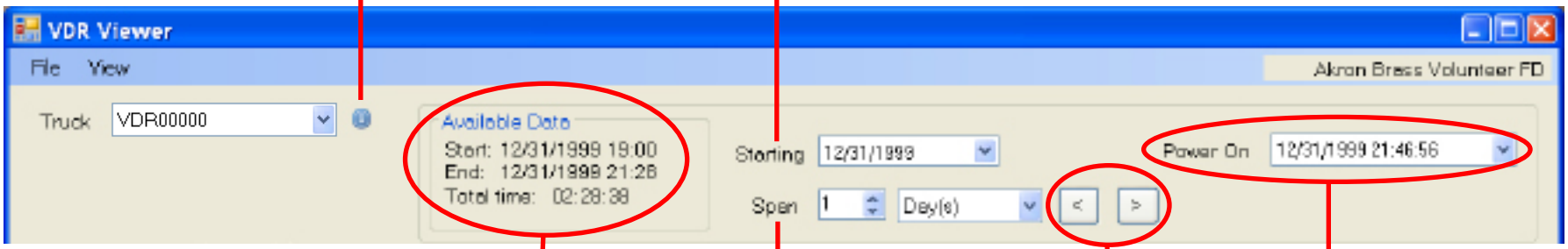
After the Extractor has retrieved the desired range of data from the VDR device you may close that program and run the **VDR Viewer Tool** program. A quick link to it is available from **Start - All Programs - Weldon VDR - VDR Viewer Tool**.



VDR Data Viewer - Upper Main Screen

"Truck Information" is set by V-MUX System Designer or the VDR Configuration Tool program.





"Starting":
Narrow the event log by setting a start date.

"Available Data":
Indicates the first (Start) and last (End) of all events copied from the VDR.

The **VDR Extractor** program is used to obtain data for the **VDR Viewer**.

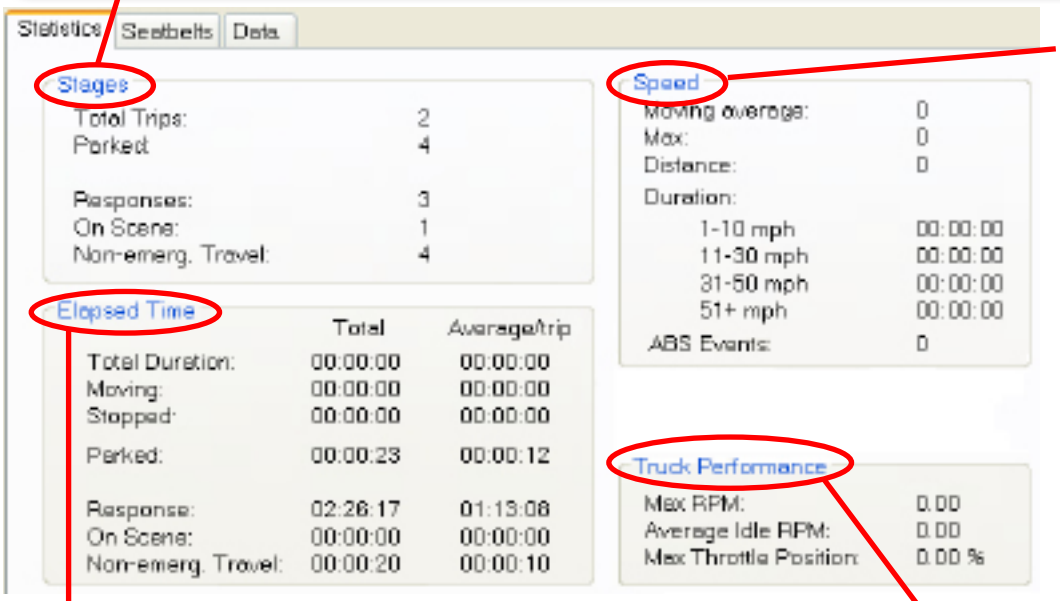
"Span":
Set the range of data to be listed from the start date

Advance tool:
Jump ahead in the data by Span value (example: 1 day)

"Power On":
List the data available for viewing within the spanned range. Each time stamp is set at a Power On event

TAB 1: "Statistics"

"Stages" (events within the selected data range**)**
Total Trips: = all Power On events
Parked: = Park Brake set, vehicle not in motion
Responses: = Park Brake released, vehicle in motion, Emergency Master ON
On Scene: = Park Brake set, vehicle not in motion, Emergency Master ON
Non-emerg. Travel: = Park Brake released, vehicle in motion, Emergency Master OFF



"Speed"
Moving average: = average speed while in motion
Max: = top recorded vehicle speed
Distance: = (Moving average) * (Duration)
NOTE: this figure is not from the odometer

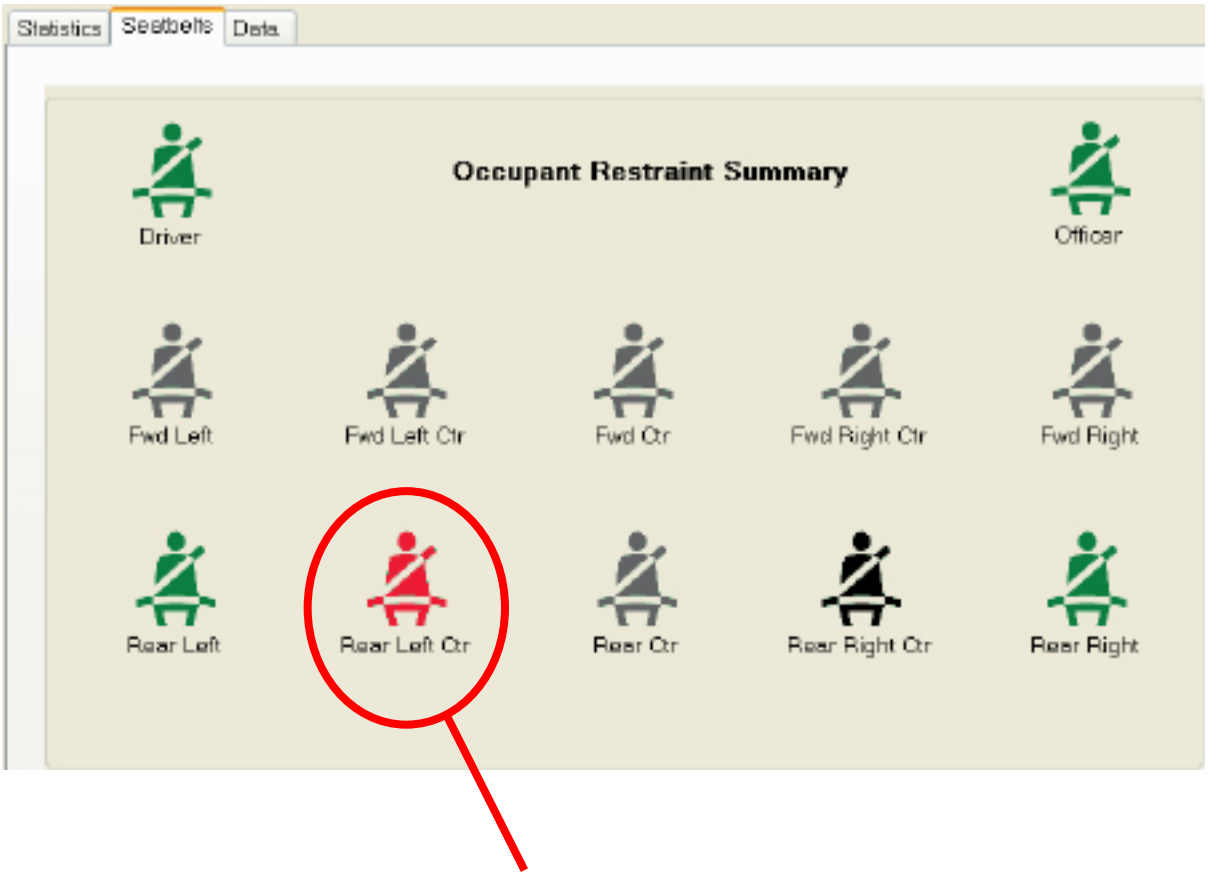
Duration: = time elapsed for vehicle in motion
Categorized into four speed ranges

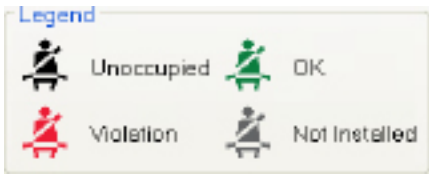
- Anti-Lock Brake System (ABS) Events are triggered by vehicle brake sensors.

"Elapsed Time" (for the selected data range)
Total Duration: sum of all Power On event times
Moving: Vehicle speed > 0 mph
Stopped: Vehicle speed = 0 mph

"Truck Performance"
Max RPM: = top recorded RPM
Average Idle RPM: = average RPM while vehicle not in motion
Max Throttle Position (%): top recorded throttle percentage

TAB 2: "Occupant Restraint Summary"





Violation indicated:

- Occupant does not fasten seatbelt within 30 seconds after the Park Brake is released.
- Seatbelt is unfastened at any time beyond the 30 second limit while the Park Brake is released.
- Seatbelt is fastened but seat is vacant for more than 5 seconds. ("Don't cheat the seat!")

TAB 3: "Data" -- Screen Layout

"Event Category (in text)"
- Grouped by row

"Time stamped history of category"
- Grouped by column
- Hover cursor over time to see date

"Select history interval"
- Smallest display interval is every One Second
- Greatest display interval is every One Day

Statistics | Seatbelts | Data

	21:46:57	21:46:58	21:46:59	21:47:00	21:47:01	21:47:02	21:47:03	One Second
Park Brake	Engaged	Disengaged	Disengaged	Disengaged	Disengaged	Disengaged	Disengaged	
Driver	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	
Officer	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	
Rear Left	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	
Rear Left Ctr	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Unbuckled	Seated/Unbuckled	Seated/Unbuckled	
Rear Right	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	Seated/Buckled	
Rear Right Ctr	Vacant/Unbuckled	Vacant/Unbuckled	Vacant/Unbuckled	Vacant/Unbuckled	Vacant/Unbuckled	Vacant/Unbuckled	Vacant/Unbuckled	

"Summary of displayed range"

"Add hidden Event Category to View"

"Hide Event Category from View"

Park Brake
Driver
Officer
Rear Left
Rear Left Ctr
Rear Right
Rear Right Ctr

Record Break

"Event Category (in color-coded graphics)"
- Grouped by row
- Anomalies are indicated by a hatch pattern

Hover the cursor over any part of the layout to see a context description menu pop-up.

Seat occupied, belt unfastened

Seat vacant, belt fastened

TAB 3: "Data" -- Analog Values

Analog Value columns indicate numerical data. Column data of One second increments is the real-time number as it was recorded. Column data in ranges of Five Seconds or greater will be summarized within the time range as the Minimum, Maximum, or the Average of that range. The summary to view (Min, Max, Avg) is selected from the far right column menu.

Recorded Analog Value Data:
"Engine Speed" (rpm)
"Throttle" (%)
"Vehicle Speed" (from CAN, km/h)

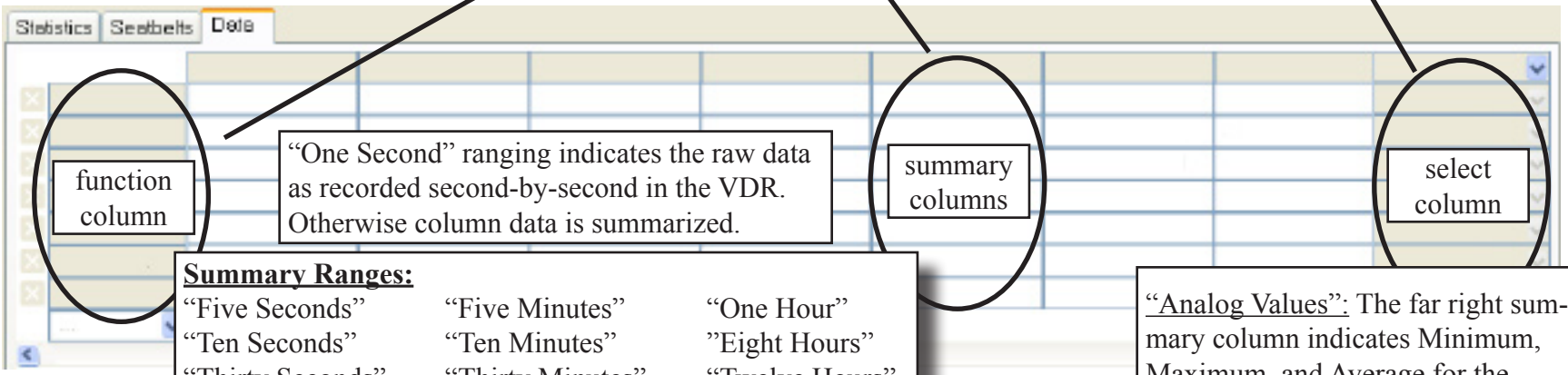
Calculated Analog Values:
"Acceleration" (g)
"Deceleration" (g)

Example: The selected summary time is Five Seconds. We see here one time-stamped column (of many) that summarizes five seconds of data. For this column the summary begins at 21:27:47 and ends five seconds later at 21:27:52. The next column has the next data.

The data indicated (ex: Deceleration = 0.92 g, is the maximum value within that five second range because "Maximum" is what is selected at the far right)

NOTE: Acceleration and Deceleration are calculated by the Viewer program based on the second-by-second record of Vehicle Speed data from the VDR records.

	21:27:47	
Acceleration	0	Five Seconds
Deceleration	0.92 g	Minimum
Engine Speed	780 rpm	Maximum
Throttle	35%	Minimum
Vehicle Speed	0	Average
		Minimum



function column

"One Second" ranging indicates the raw data as recorded second-by-second in the VDR. Otherwise column data is summarized.

summary columns

select column

Summary Ranges:

"Five Seconds"	"Five Minutes"	"One Hour"
"Ten Seconds"	"Ten Minutes"	"Eight Hours"
"Thirty Seconds"	"Thirty Minutes"	"Twelve Hours"
"One Minute"		
		"One Day"

"Analog Values": The far right summary column indicates Minimum, Maximum, and Average for the range of time-stamped columns.

TAB 3: "Data" -- NFPA Vehicle Switch Data

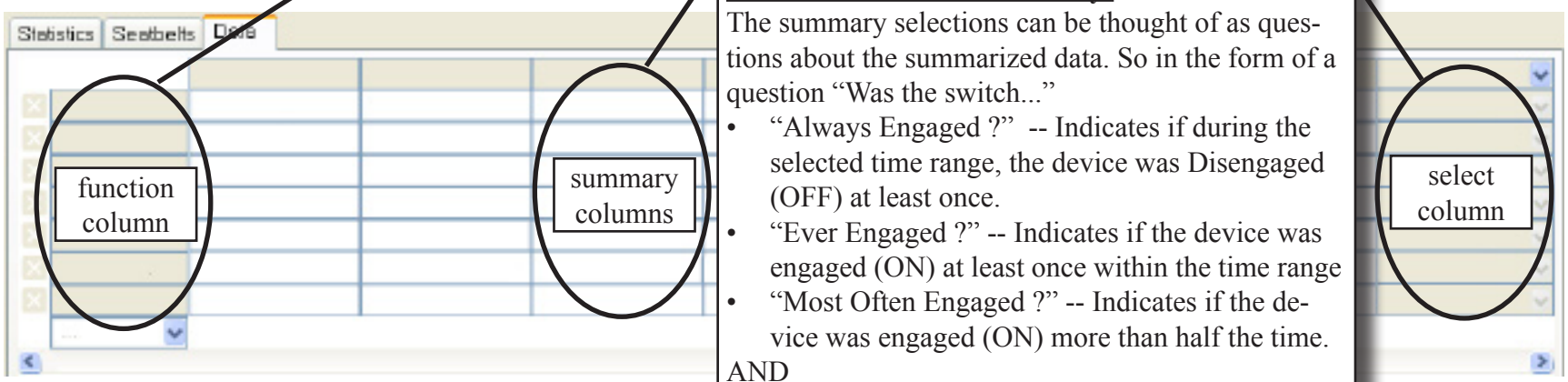
Vehicle switch data indicate the sub-set of switch states that NFPA 1901:2009 requires to be recorded by the VDR.

Recorded Vehicle Switch Data:
"Anti-lock Brakes (ABS)"
"E-Master"
"Park Brake"
"Service Brake"

Example: The selected summary time is Five Minutes. We see here one time-stamped column (of many) that summarizes five minutes of data. For this column the summary begins at 21:27:47 and ends five minutes later at 21:32:47.

The data indicated (ex: Park Brake = "Disengaged", is the switch state most often recorded within that five minute range because "Most Often" is what is selected at the far right)

	21:27:47	Five Minutes
ABS	Disengaged	Always Engaged
E-Master	Engaged	Ever Engaged
Park Brake	Disengaged	Most Often
Service Brake	Disengaged	Halfway In



Vehicle Switch Data Summary:
The summary selections can be thought of as questions about the summarized data. So in the form of a question "Was the switch..."

- "Always Engaged ?" -- Indicates if during the selected time range, the device was Disengaged (OFF) at least once.
- "Ever Engaged ?" -- Indicates if the device was engaged (ON) at least once within the time range
- "Most Often Engaged ?" -- Indicates if the device was engaged (ON) more than half the time.

AND

- "What was the state at Halfway In the Range ?" -- Indicates the status at the midpoint of the time range within the column (five seconds here)

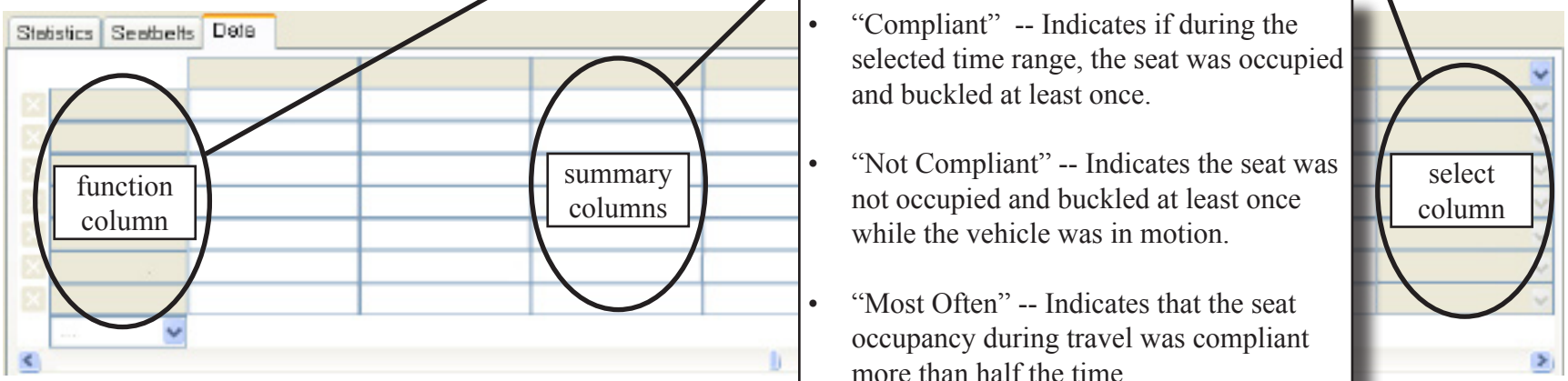
TAB 3: "Data" -- Seat Occupancy

Recorded Occupant Restraint Status:
(not all seats will necessarily be used)
"Driver"
"Officer"
"Fwd Left"
"Fwd Left Center"
"Fwd Center"
"Fwd Right Center"
"Fwd Right"
"Rear Left"
"Rear Left Center"
"Rear Center"
"Rear Right Center"
"Rear Right"
"Seat 13" (Optional)
"Seat 14" (Optional)

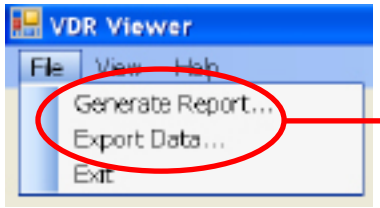
Example: The selected summary time is Five Minutes. We see here one time-stamped column (of many) that summarizes five minutes of data. For this column the summary begins at 21:27:47 and ends five minutes later at 21:32:47.

The data indicated (ex: Officer = "Seated/Unbuckled", indicates that a non-compliance occurred within that five minute range because "Not Compliant" is what is selected at the far right)

	21:27:47	Five Minutes
Driver	Seated/Buckled	Compliant
Officer	Seated/Unbuckled	Not Compliant
Fwd Left	Vacant/Unbuckled	Most Often
Fwd Right	Vacant/Unbuckled	Halfway In



- "Compliant" -- Indicates if during the selected time range, the seat was occupied and buckled at least once.
- "Not Compliant" -- Indicates the seat was not occupied and buckled at least once while the vehicle was in motion.
- "Most Often" -- Indicates that the seat occupancy during travel was compliant more than half the time.
- "Halfway In" -- Indicates the seat status at the midpoint of the time range within the column (five minutes here)



Generate Report creates an Adobe .PDF formatted document of the data.
Export Data saves the data as a Microsoft Excel® formatted .CSV file.

VDR Summary Report

Name: Default Vehicle Name

Prepared: 1/8/2009

Reporting Period: 12/31/1999 - 12/31/1999

Daily Maximum

						Total Count		
Date	MPH	Accel (m/s/s)	Decel (m/s/s)	RPM	Throttle	ABS	E-Master	Seat Violations
12/31/1999	0	0.0	0.0	0	0.0%	0	1	0

Hourly Maximum

12/31/1999

						Total Count		
Hour	MPH	Accel (m/s/s)	Decel (m/s/s)	RPM	Throttle	ABS	E-Master	Seat Violations
- No Data -								
21:00	0	0.0	0.0	0	0.0%	0	1	0
- No Data -								

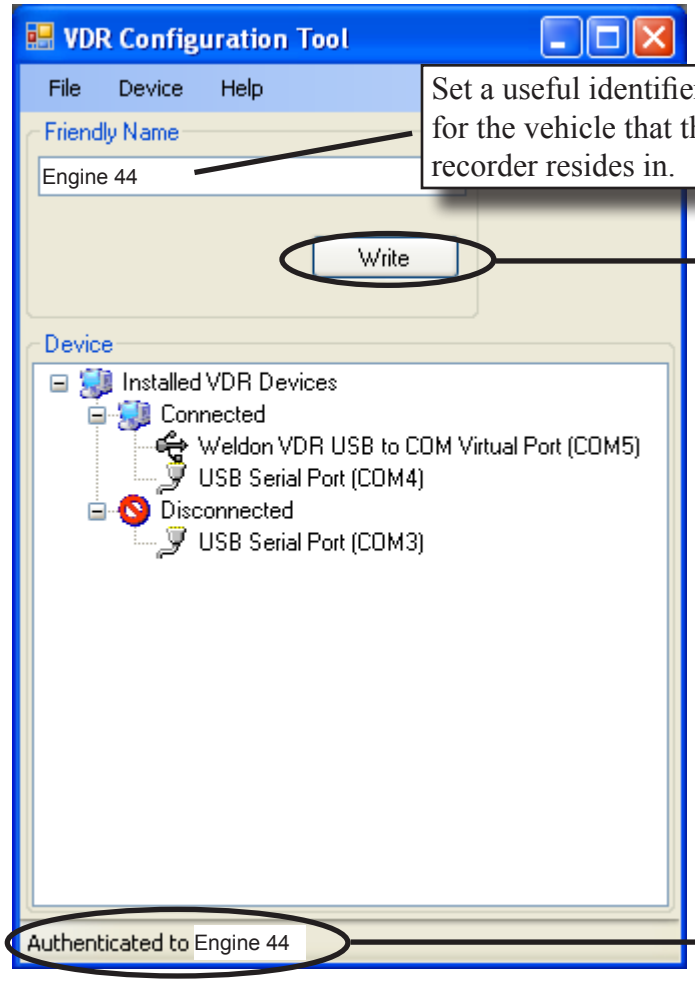
Maximum, Minute-by-Minute

12/31/1999 21:00 - 21:59

						Status at 30 seconds into minute		
Time of Day	MPH	Accel (m/s/s)	Decel (m/s/s)	RPM	Throttle	ABS	E-Master	Seat Violations
- No Data -								
21:27	0	0.0	0.0	0	0.0%	--	--	--
21:28	0	0.0	0.0	0	0.0%	Off	On	0
- No Data -								

VDR Configuration Tool

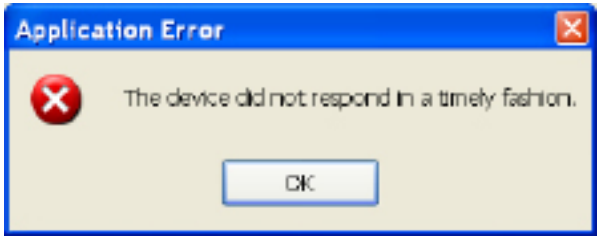
Whenever the Vehicle Data Recorder is connected to the computer the VDR Configuration Tool can be run. This program does not require use of the Data Extrator or Data Viewer tools.
Run the VDR Configuration Tool program from the Start button quick link Start - All Programs - Weldon VDR - VDR Configuration Tool.
If the VDR device drivers have been installed properly, the connection details will be displayed.



Set a useful identifier name for the vehicle that the data recorder resides in.

To access the VDR memory click on the **"Write"** button (memory Read is automatic)

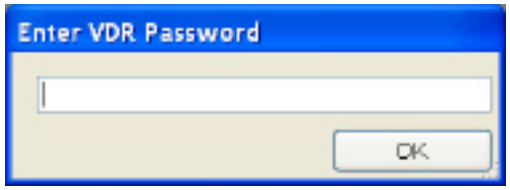
At any time -- problems in communication between the VDR device and the Configuration Tool program will be indicated by a pop-up window announcing the errror.

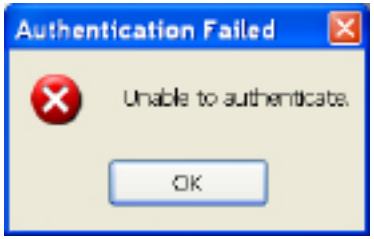


The **"Authentication"** function at the bottom of the Configuration pane confirms that the computer is communicating with the VDR.

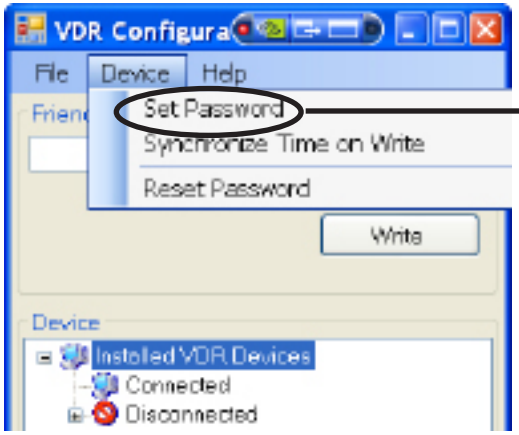
VDR Configuration Tool - Authentication

Accessing the VDR memory -- password required



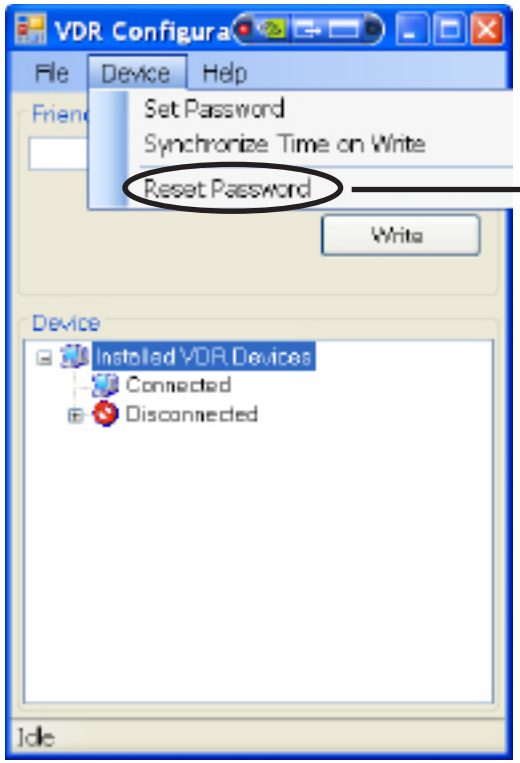


If the entered password does not match the password in the VDR memory, an error pop-up will appear.



Use the top Device menu to select "Set Password" to change an existing known password. An "Enter New VDR Password" pop-up window appears. The "Set Password" function does not erase existing data.

The initial password is "vdr", all in lower case characters.



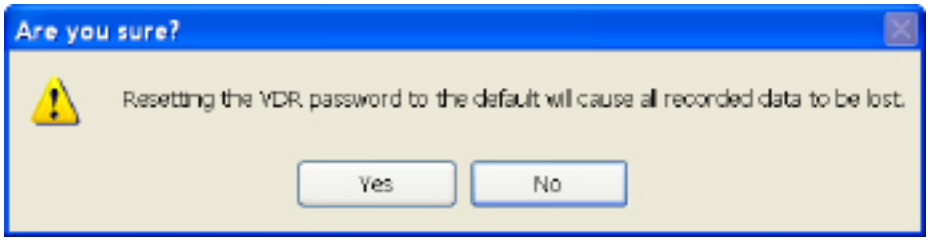
Reset Password

(for example: use Reset if the existing password is lost)

From the Device menu select "Reset Password". The reset password returns to "vdr", as if the device is in its initial state.

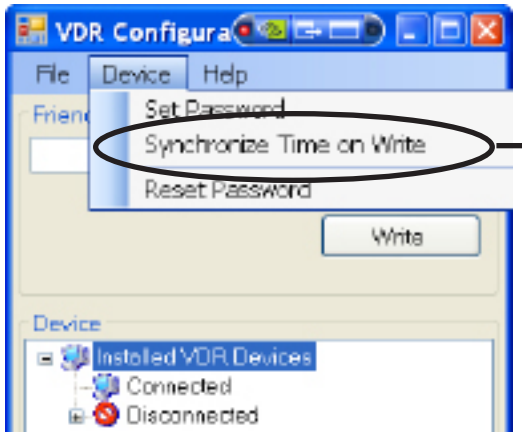
IMPORTANT: Resetting the password will nullify all records stored in the Vehicle Data Recorder. All recorded data in the VDR will be lost.

A user promp requests confirmation.



VDR Configuration Tool - The VDR Real Time Clock

The VDR clock is set at the factory during production and in normal use does not need to be reset (synchronized).
Internally, the VDR clock is set to Universal Time - Coordinated (UTC), the accepted world time standard.
Only when the data is accessed from a computer does the VDR time-stamp get displayed as the local time of the vehicle.
Leap years are handled by the internal clock mechanism while Daylight Saving Time adjustments are handled by the viewing computer.



If the clock must be resynchronized, the Configuration Tool can be set to do this upon the next VDR Configuration Write event.

- From the Device menu check the “Synchronize Time on Write” function. It is unchecked by default.
- The VDR real time clock will resynch to match the computer real time clock.

VDR Hardware - Install Modes, Connecting to the device

Standard Mode -- V-MUX compatible:

When installed the VDR will have Power, Ground, switch signals, and communications provided by way of vehicle harness Connectors A and B. While it is not required that the VDR be connected to a Weldon V-MUX® multiplex network, that option is available through pins 6,7 on Connector A. If connected to V-MUX, access to the VDR device for programming or data extraction may be handled through connector A alone.

Standalone Mode -- no V-MUX:

The VDR may also be configured or read from by way of a USB port situated between Connectors A and B. The USB port is not used during normal vehicle operation and so the cable end (Deutsch DTM06-3S) can be regarded as a device access tap. Harness Connectors A & B are still used for Power/Ground and switch connections.

Connector A
(Deutsch DTM06-12SA)
or
(Weldon 0K14-2070-00)
to standard vehicle harness

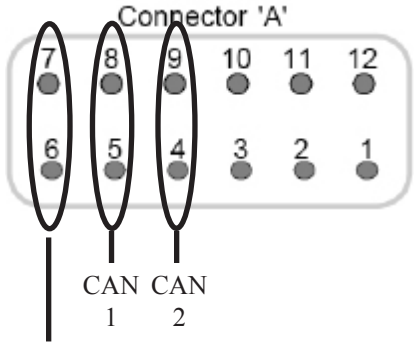
Connector B
(Deutsch DTM06-12SB)
or
(Weldon 0K14-2071-00)
to standard vehicle harness

USB port for VDR Configuration.

This port is not used during normal vehicle operation; only for data extraction or configuration.

NOTE: The USB adapter cable tap only provides for USB communications. It does not have the Power function that is normally provided from a USB cable. Power to the VDR is provided through Connector A.

VDR Hardware - Device Pin Assignments



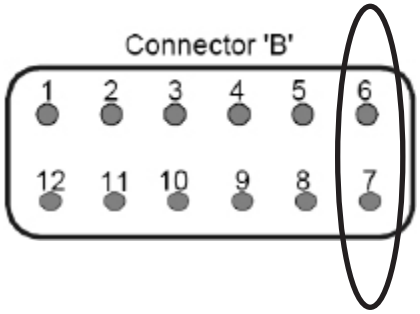
V-MUX
or
6204 SBI

Pin	Name	Function	ON Polarity *
1	Park Brake	Switch ON/OFF	GND *
2	Service Brake	Switch ON/OFF	+VBatt *
3	E-Master	Switch ON/OFF	GND *
4	CAN2-LO	communication	signal low
5	CAN1-LO	communication	signal low
6	V-MUX B	communication	signal low
7	V-MUX A	communication	signal high
8	CAN1-HI	communication	signal high
9	CAN2-HI	communication	signal high
10	Power (12/24V)	+VBatt	
11	Red Indicator		
12	Ground	System Ground	GND

* NOTE: The VDR Configuration Tool is not able to change the indicated switch ON polarities for Park Brake, Service Brake, and E-Master.

- If the ON polarities must be set differently, V-MUX System Designer is used to do so.
- If the Park Brake or Service Brake signals are transmitted along a vehicle Controller Area Network (CAN), it may be easier to use one of the two available CAN ports on the VDR to accept such signals.

V-MUX System Designer™ software must be used to enable the CAN ports.



For each seat location (Example: Seat 6) the seat belt and the seat occupancy switch positions on the connector line up vertically

Pin	Name	Function	ON Polarity *
1	Seat Belt 1	Seat 1 belt switch	+VBatt/GND
2	Seat Belt 2	Seat 2 belt switch	+VBatt/GND
3	Seat Belt 3	Seat 3 belt switch	+VBatt/GND
4	Seat Belt 4	Seat 4 belt switch	+VBatt/GND
5	Seat Belt 5	Seat 5 belt switch	+VBatt/GND
6	Seat Belt 6	Seat 6 belt switch	+VBatt/GND
7	Occupancy 6	Seat 6 occupancy switch	+VBatt/GND
8	Occupancy 5	Seat 5 occupancy switch	+VBatt/GND
9	Occupancy 4	Seat 4 occupancy switch	+VBatt/GND
10	Occupancy 3	Seat 3 occupancy switch	+VBatt/GND
11	Occupancy 2	Seat 2 occupancy switch	+VBatt/GND
12	Occupancy 1	Seat 1 occupancy switch	+VBatt/GND

* The working ON Polarity is set by the Configuration Tool or V-MUX System Designer.

VDR Hardware - USB adapter 4 ft. extension
(Weldon part number 0L40-2597-00)

0L40-2597-00
adapter extension to here.
(Deutsch DTM04-3S)

optional instructions -- fabricate a USB adapter extension (not to exceed 12 ft. length)

Port for the adapter extension end

Deutsch DTM06-3S

Pin	Name	Color
1	D+	green
2	D-	white
3	GND	black

Terminate all wires with Deutsch
#0462-201-20141
(20 AWG terminal socket)

Lock wires in receptacle with
Deutsch WM-3S
orange locking wedge

Cut the USB device end off of the cable and expose the internal wires

1 green
2 white
3 black

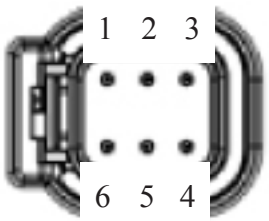
USB cable

Computer end -- flat connector
(preserve this)

IMPORTANT:
Connect the shield conductor
of the USB cable to wire 3
(black wire)

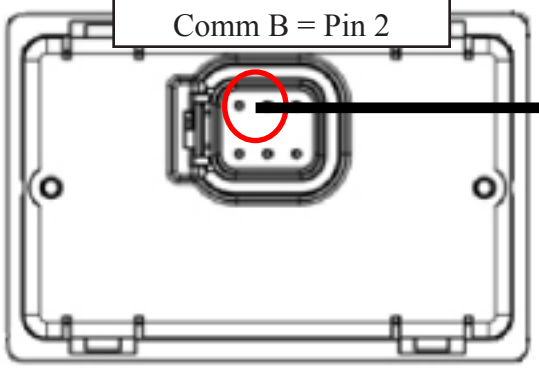
VDR Hardware - Connecting to the Occupant Restraint Indicator

6204 -- pin locations



Recommended interface cable:
RS-485 twisted pair wire with shield (same as V-MUX)

6204 communications
Comm A = Pin 1
Comm B = Pin 2



VDR communications
Comm A = Pin 7
Comm B = Pin 6

6204-0000-00 Occupant Restraint Indicator

The Seat Belt Indicator includes two special functions:

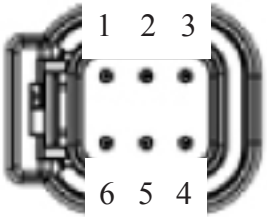
- **LED Dimmer (pin 5):** The brightness level of the LED elements behind the indicators can be adjusted by use of a potentiometer (variable resistor) wired to pin 5. The minimum brightness level is “low”, not zero

  NOTE: the 6204 device is compatible both 12 and 24 Volt applications. For the dimmer control this means that the potentiometer range (0-32V) may vary between applications in order to achieve the same brightness adjustment level.

- **Buzzer (pin 6):** In case an occupied seat becomes unbuckled while the Park Brake is released (NFPA seat belt non-compliance) an audible piezo-electric buzzer alarm may be wired to pin 6. (Not to exceed 80mA of device load)

6204-0000-00 Occupant Restraint Indicator

6204 -- pin locations



Pin	Name	notes
1	Comms A	twisted pair A
2	Comms B	twisted pair B
3	Ground	device GND
4	Power	+VBatt
5	Dimmer	0-32V
6	Buzzer	80mA max.