126138

Memorandum

NHTSA-00-7699-3

U.S. Department
of Transportation

**National Highway
Traffic Safety
Administration**

Subject: Submittal of Documents for the NHTSA R&D Truck and Bus Event Data Recorder (T&B EDR) Working Group to Docket No. NHTSA-00-7699

Date: MAR 26 2001

From: Raymond P. Owings, Ph.D.
Associate Administrator for
Research and Development

Reply to
Attn. of: NRD-01

To: The Docket

THRU: John Womack
Acting Chief Counsel

Please place the following material in the subject docket:

1- Meeting minutes of the NHTSA Research and Development Truck and Bus Event Data Recorder (T&B EDR) Working Group meeting #2, held in October, 2000.

2- Meeting handouts from meeting #3, held on February 15/16, 2001.

Meeting history:

Meeting #	Date	Location
1	June 8, 2000	Linthicum, MD
2	October 25,2000	Washington, DC
3	February 15-16, 2001	Boca Raton, FL

Attachments

Approved & Final Minutes for Meeting #2
October 25,2000
Washington, DC

NHTSA Research and Development
Final Minutes for the Truck and Bus Event Data Recorder Meeting held on Wednesday, October 25, 2000 at USDOT Headquarters, 400 Seventh Street, Washington, DC 20590

Minutes prepared by Will Schaefer

Meeting Scope:

These minutes document the second (2nd) meeting of a group of industry, academic, and government representatives assembled to address event data recorders (EDRs) in heavy-duty trucks and buses. This second meeting of the Truck and Bus EDR Working Group gave attendees opportunity to see an example of a NTSB accident analysis using EDR data, an overview of an available event recording product from VDO, and a presentation of crash statistics and types of crashes where EDRs may show benefit. There was also a discussion of numerous issues surrounding event data recorders.

Notice of NHTSA's Role

Meeting Chairman John Hinch from the National Highway Traffic Safety Administration (NHTSA) convened the meeting by explaining the objectives of the group and defining limitations of the NHTSA's role. It was emphasized that this meeting has a fact finding mission and the group cannot make recommendations to regulatory agencies. It can however compile information to provide input for future decisions.

Materials

Materials circulated at the meeting included our agenda, draft minutes from the EDR Task Force of the The Maintenance Council including its draft Recommended Practice, and a white paper from Bob McElroy of Forensic Accident, Inc. Attached is a brief survey of EDR capabilities which was distributed and collected for compilation by next meeting. All materials circulated in the meeting are considered public and will be posted online through the Docket Management System (DMS). Visit **http://dms.dot.gov/search/** and search Docket Number **NHTSA-2000-7699.**

NTSB Presentation

Mr. Vernon Roberts of the National Transportation Safety Board presented the data analysis of an actual fatal crash of a tour bus. The overview showed the benefits as well as the shortcomings of analyzing data that was recorded by the engine's electronic control unit (ECU). The data analysis allowed the NTSB to make some conclusions that couldn't have been made otherwise and it raised some questions regarding the specific crash that might not have been otherwise considered.

From the crash analysis the group could see potential benefits and liabilities of the use of data recorders. In this example the data set is limited to those items recorded by the engine ECU but it still provided insight to where this group's discussion might lead.

VDO Presentation

Mr. Dan May of VDO North America, which manufacturers its Accident Data Recorder for the automotive industry, presented an overview of VDO's product including some of the data storage parameters and accident reconstruction features. Also, benefits of implementing VDO's product in a police vehicle population in Germany were shown. Mr. May's presentation offered the group a view of one commercially available event data recorder.

Mr. Tom Kowalick

Mr. Tom Kowalick of Click Incorporated presented highway crash fatality and injury statistics to show a need for more crash reduction efforts. Included in his presentation were summarized crash data as well as photographs of different types of crashes which illustrated various scenarios where EDRs may record useful information.

After these three presentations, Mr. Will Schaefer of NHTSA Research and Development gave a brief synopsis of the efforts of the EDR Task Force currently active in the Maintenance Council (TMC) of the American Trucking Associations. The TMC task force is in the process of writing a recommended practice that suggests a standard array of data elements that are readily available and uniform in format for easy comparison.

Meeting Adjourned for Lunch

Discussion

After lunch, the group addressed some of the more specific needs within industry and government for recording data elements. A survey (see attachment) of EDR capability information was distributed to the group and analyzed. The importance of each individual data element was assessed at least to some degree.

It was suggested that some data elements had more clear cut function and ease of recording than others. For example, vehicle speed is rather non-arbitrary yet one can measure it in numerous ways–wheel speed sensors, transmission output, engine speed/gear selection, radar, etc. Another example is brake application, where it could be defined as an application of the pedal or a certain pressure applied to the pedal or the simple fact that the brake light turned on. These discussions are ongoing.

Discussion Questions from Meeting #1

In the first meeting of this group, several questions were brought up and they were outlined in the minutes for the first meeting. Those questions are repeated below where they are followed by an update on continued discussion from Meeting #2.

I. **What data elements need to be recorded?** At this second meeting of the working group, we informally surveyed the attendees to catalog the perceived usefulness of several

data elements. These are listed on the attached survey list. The survey list doesn't include all possible data elements and thus further discussion will occur.

II. **What is to be gained by putting recorders on a bus, given the low numbers of bus passenger deaths each year?** It was reiterated that EDRs should not necessarily be required in all vehicles.

III. **What are the benefits of event recorders?** Some of the benefits of event recorders were evident from the presentation by the NTSB where additional information that was not recorded in that particular accident could have been useful for accident reconstruction. Also, Mr. Kowalick's presentation highlighted various types of accidents where EDRs could be beneficial.

IV. **What are some of the drawbacks to event recorders?** Again, event recorders add cost to a vehicle in hardware and maintenance labor. Additionally, it was restated that not all vehicles will demonstrate an effective cost benefit because, statistically, so few of some types of vehicles such as school buses are involved in serious crashes.

V. **What is the goal of the EDR? Is it to record what the driver does or is it for finding mechanics of a crash, change in velocity, acceleration, etc.? Is it to find culpability or causes of injuries?** These questions remain as the working group continues to explore all aspects of the EDR.

VI. **Will EDR's be mandated?** This certainly is not the end goal of this working group. It was pointed out that some form of standardization will be beneficial for those who need or want EDRs.

VII. **What constitutes an event? Does the crash event occur when an air bag is deployed, or is it something else?** This question was brought up and discussed extensively and it remains to be answered. It was suggested that some key definitions for these issues are an important first step. This is a key definition that remains to be defined.

X. **Can current recording devices accept analog inputs as well as digital inputs?** Yes.

Next meeting:

The next meeting of the Truck and Bus Event Data Recorder Working Group will be hosted by Florida Atlantic University (FAU), located in Boca Raton, FL. The meeting will be held on Friday, February 16, 2001. FAU will be hosting a reception the evening of Thursday, Feb 15, 2001. Again, please note all materials circulated in the meeting will not be circulated with the minutes but are posted online through the Docket Management System. Visit: **http://dms.dot.gov/search/** and search Docket Number **NHTSA-2000-7699.**

Attendee List (combined from meetings #1 and #2).

NAME	ORGANIZATION
Raul Arbelaez	IIHS
David Bolen	New World Tours
Kris Bolte	NTSB
John Bradley	SAE International
Brad Cohen	Loss Management Services
Wanda Curtis	Thomas Built Buses
Dan D'Angelo	SAE
Ken Dodson	Thomas Built Buses
Bob Douglas	American Transportation
Steve Ezar	SAE
Charlie Gauthier	NASDPTS
Whit Harris	Thomas Bus
Kate Hartman	FMCSA
John Hinch	NHTSA-R&D
Kevin Holland	ATA
Charles Hott	NHTSA-NPS
Rich Kempf	International Truck & Engine Corp.
Tom Kowalick	Click, Inc.
Larry Kuhn	International Truck & Bus Co.
Norm Littler	UMA
Andy Mackevicus	Loss Management Services, Inc.
John Mackey	Loss Management Services, Inc.
Bill Mahorney	American Bus Association
Joe Marsh	Ford
Dan May	VDO North America
Sarah McComb	NTSB
Linda McCray	NHTSA
Bob McElroy	Forensic Accident, Inc
Douglas Mckelvey	FMCSA
Joseph Mickley	Smiths Industries
Rod Nash	Collins Industries, Inc.
Jennifer Ogle	Georgia Tech
Duane Perrin	NHTSA-R&D
Doug Read	SAE
Richard Reed	Accident Research & Analysis
Vernon Roberts	NTSB
Mary Russell	FAU
Will Schaefer	NHTSA-R&D
Larry Strawhorn	American Trucking Associations
Tom Turner	Blue Bird Body Co.
Susan Walker	FAU

Attachment: Survey

Survey of current EDR capability within industry by Working group						
				Short term: within 2-3 years		
Name:				Long term: beyond 2-3 years		
Company:						
If involved with a specific platform, indicate below:	Useful	Priority		Availability		
Vehicle Type (SB, MC, Tk, Other):	Y/N	Hi/Med/Lo		Now	Short term	Long term
lateral acceleration						
longitudinal acceleration						
vertical acceleration						
heading						
vehicle speed						
engine speed (RPM)						
driver's seat belt status						
braking input						
steering input						
gear selection						
turn signal status (left/right)						
brake light status (on/off)						
head/tail light status (on/off)						
passenger door status (open/closed)						
emergency door status (open/closed)						
hazard light status (on/off)						
brake system status (normal/warning)						
flashing red light status (on/off) (school buses)						
status of additional seat belts						
airbag deployment criteria						
airbag deployment time						
airbag deployment energy						
Other data needs						

Handouts from Meeting #3
February 15/16, 2001
Boca Raton, FL

Item Index

Items from the February15, 2001, Showcase

- Showcase Program
- Caterpillar Engine Data Report
- Cummins Engine Data Report
- Detroit Diesel Engine Data Report
- International Engine Data Report
- The Benefits of Vehicle Mounted Video Recording Systems, Evicam International, Inc.
- Florida Atlantic University Research Report - Visual Cues Provide Keys to Driverless Vehicles, Vol 1, No 1/ September 1994 w/ related articles
- Vetronix's Crash Data Retrieval System, Don J Felicella, ACTAR, Felicella Consulting Engineers, Inc.
- We are a people of Choices, Susan Walker, Esq., Kanouse & Walker, 2000
- Legal Framework for the Implementation of EDR Technology, Susan Walker, Esq., Kanouse & Walker, February 15, 2001
- VDO Kienzle - Slides on their UDS EDR system
- Who's looking out for you, Drive Cam

Items from the February 16, 2001 working group meeting.

- Agenda
- Event Data Recorder (EDR) Issues and Recommendations, Smiths Group
- Update on Current EDR Technologies
  - Status of EDR technology, Robert McElroy, Forensic Accident Investigations, Inc
  - VDO Crash recorder, VDO North America, Tony Reynolds
- Emerging Technologies and Applications
  - Safety Intelligence Systems, Ricardo Matinez
  - Solutions for a Dynamic Marketplace, Insurance Services Office, Ed Quinones

- Meeting Handouts
  - Working Group Objectives
  - Definitions
  - Survey Results
  - Data Element List

Showcase Program

NHTSA R&D Event Data Recorder Working Group

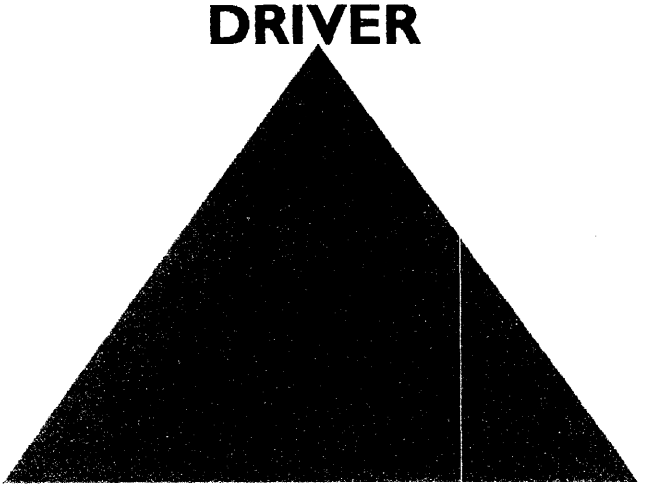
Showcase of Collision Analysis & Vehicle Data Systems for Private Passenger Vehicles, Fleet Vehicles, Trucks and Buses

Date: February 15, 2001

Time: 4:30—6:30 PM

Welcome to the Showcase of Collision Analysis & Vehicle Data Systems for Private Passenger Vehicles, Fleet Vehicles, Trucks, and Buses. The Showcase will allow guests to view state-of-the-art technologies in vehicle collision analysis. In addition, visitors will have the opportunity to meet team members from Florida Atlantic University's Event Data Recorder Project while exploring the project's components. The Showcase has been designed to allow you to move freely about the center to listen to presentations, see displays, interact with technologies, ask questions, and network with colleagues.

Factors Contributing to Driving



SHOWCASE PROGRAM

Display/ Topic	Representative / Presenter	Location
Wrecked county bus with Cummins engine	Howie Subbert– Palm Tran Jack Chavarria, Steve Ottoway, Sam Glickson– Cummins	Garage
New Peterbilt tractor trailer cab powered by Detroit Diesel	Detroit Diesel	Garage
Wrecked Chevrolet; Airbag module downloads	Donald Felicella– crash reconstructionist	Garage
UDS 2.0	Tony Reynolds VDO	Garage
i3000	Joe Dandy– Cosworth	Garage
I-Witness Drive-Cam	Jay Vitagliano	Garage
Tow truck with Caterpillar engine	Jim Sturko– Caterpillar	Garage
GIS	John Harlin / Brian Kelly	EDR Center Room 7
Driving Simulations and Traffic Models	Tom Kelly	EDR Center Room 7
Remote Data Transmission	Wayne Bullock	Garage
Loomy Driverless vehicle	Dani Raviv	Garage
Legal Issues	Susan Walker	Conf. Room
Human Aspect of Driving	Wendy Stav	Conference Room
Driver Assessments	Desiree Lanford / Wendy Stav	Driver assessment area

FAU EDR Team Members

Project Director	Dr. Mary Russell
Crash Recontructionist	Dr. Robert McElroy
Global Information System	Dr. John Harlin
Global Information System	Brian Kelly
Engineering	Dr. Dani Raviv
Engineering	Tom Kelly
Remote Data Transmission	Wayne Bullock
Legal Counsel	Susan Walker, Esq.
Driver Assessment	Wendy Stav, PhDc, OTR/L
Driver Assessment	Desiree Lanford, MOT, OT/L
Equipment Installation	Jay Vitagliano
Website design	Dr. Sam Hsu

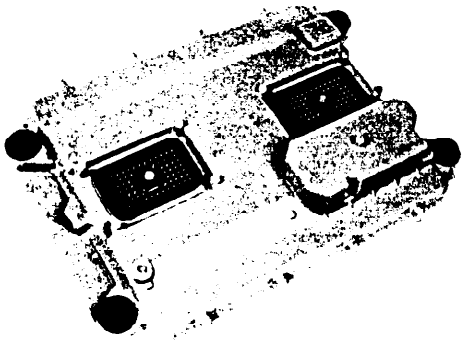
Event Data Recorder Technology

... Saving lives through accurate data collection

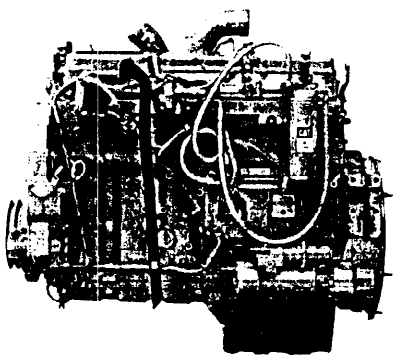
Florida Atlantic University's Event Data Recorder project is supported by funding from Loss Management Services, Incorporated.

Caterpillar Engine Data Report

Engine Data Report



CATERPILLAR



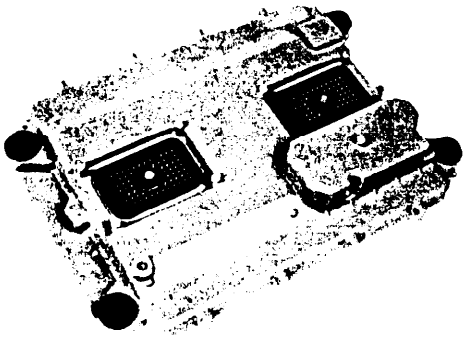
Introduction

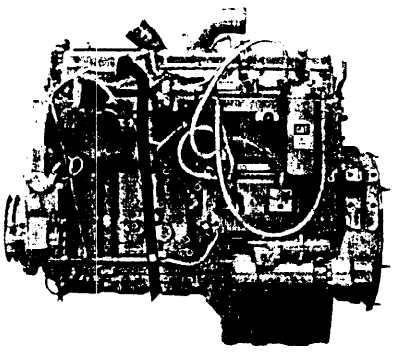
By the early 1980s, it had become evident that new engine technologies would have to be brought to bear if Caterpillars, or any other diesel engine manufacturer, was to prosper in the rapidly evolving market environment. A combination of increased government regulation prompted by legitimate environmental concerns, stronger competition, and m demanding market expectations dictated totally new approaches to diesel engine design.

In order to meet this challenge, Caterpillar embarked on an ambitious development program to create totally new diesel engines. That program resulted in the 3176 and the 340GB PEEC. Since 1987, the use of electronics on Caterpillar on-highway truck engines has grown. The model year 2000 electronic engine line includes the C-l0 C-12, 312GB, C-15, and C-l6 (Caterpillar manufactures a wide variety of electronic engines for applications as varied as locomotives and very large earth movers. This booklet covers on-highway truck engines only.)

Today, electronics do much more than control the combustion process to meet ever-toughening emission standards and customer fuel economy expectations. They allow the engine to talk to and coordinate with driveline components. They allow monitoring and control of driving habits to meet business objectives. Remote programming and monitoring ability allows minute-to-minute fleet control from an office. In today's changing economic environment a fleet manager must juggle economy and driver satisfaction. Cat electronically controlled engines allow a fleet manager to spec a driveline free of the usual compromises and then program the engines to reflect desired driving habits. The Driver Reward feature allows the manager to automatically reward drivers who meet preset fleet objectives.

Incorporation of the latest, most powerful ECM, ADEM 2000, has equipped Cat' Truck Engines with numerous electronic features. This book outlines Cat electronic features that have changed the way fleets operate. It is now possible to program fleet truck engines, and sit back and let the electronics take over.



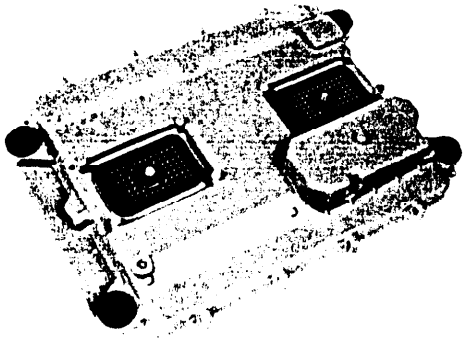


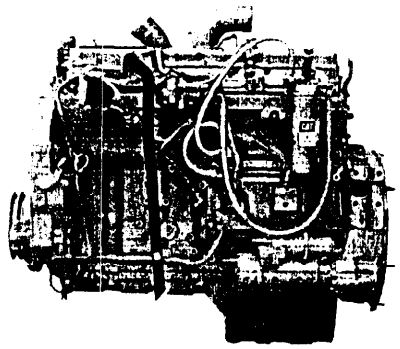
Understanding the Electronic Controls

This booklet is designed to aid you in choosing appropriate programmable values. Some features fall into a "non-programmable" or "programmable only by your authorized Cat dealer" category. While you may not need to be concerned about programming these parameters, we have included them in this booklet so you can have a greater understanding of the Caterpillar electronic system.
Cat electronic truck engines offer a wide range of features. These include but are not limited to:

- Maximum Vehicle Speed Limiting (VSL)
- Maximum engine rpm limiting
- Progressive shift prompts
- Idle-shutdown timer
- Wide variety of cruise control features
- Retarder control
- Dedicated PTO control features
- Driver Reward feature
- Engine Monitoring System (EMS)
- Engine diagnostics with fault logging including snapshot recording
- Numerous trip recording options
- Powertrain (J1922 or J1939) interface
- Powertrain (J1587) data link
- Cooling fan control including A/C high pressure

Not all of these features fall into the "customer programmable" category. Some features, like the powertrain data link, have to do with the way the engine electronics are integrated into the truck and drivetrain electronics. Another example is the setting for tachometer calibration, which comes preset from the truck factory and should not be changed. (In fact, most features come with a preset value from the factory.)
Other features, like password protection, can only be set by a customer.





In short, the programmable features fall into two basic categories:

Factory Specified parameters and features which include both;

1 - Caterpillar Standard Features.
2 - Truck manufacturers' (OEM) standard features

Customer specified parameters and specifications which include both;

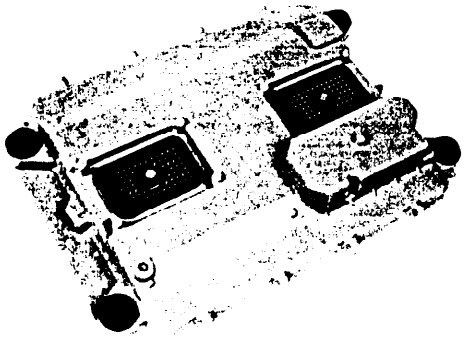
1 – OEM Data Book Features (the ones chosen as the truck is spec'd and ordered)
2 - Optional Programmable Features (parameters unique to the application and normally set after the truck is delivered.)

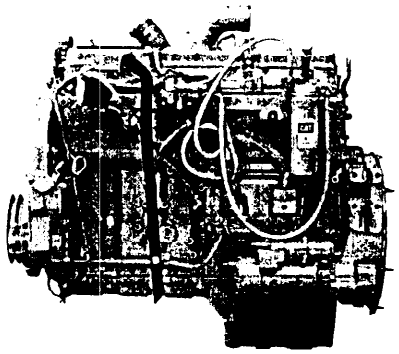
Customer programmable features with a ~ icon in the title bar can be locked for additional security. (See Customer Parameter Lockout, page 108, for details.)

Note: Since the introduction of the 3176B and 3406E engines in 1993, Caterpillar has continued to add and enhance the features available to both the fleet owner and the owner-operator. These additions and enhancements are made by changing the software in the Personality Module (PM), which is in the Electronic Control Module (ECM) on the engine. New personality module software can be installed by an authorized Caterpillar dealer. Throughout this booklet, references are made to software release dates to define when a particular feature became available. Listed below are the dates of the major personality module software updates.

Name	Date
Aug-93	August-93
Dec-93	December-93
Apr-94	April-94
Jan-95	January-95
Jun-95	June-95
Nov-95	November-95
Aug-96	August-96
Nov-96	November-96
Mar-97	March-97
Oct-97	October-97
Dec-91	December-97
Feb-98	February-98
Nov-98	November-98
Mar-99	March-99

These dates may or may not correspond to model year changes.





Factory Specified Parameters and Features

Each new engine comes with several features set at factory default settings. Some of these, like oil sump capacity, are set at the engine factory. Others, like tachometer calibration, are set by the truck manufacturer. All of these default settings fall into one of three categories.

1 - A specific value required by the engine or truck electronics for proper operation (example — oil sump capacity, tachometer calibration)
2 - A standard value set for convenience (example —PTO Ramp Rate is set at 50 rpm/sec)
3 - A value set at the upper limit of its range to ensure the specific feature does not take effect until reset by the customer (example — Vehicle Speed Limiting is set at 127 mph)

Customer Programmable Parameters and Specifications

On the following pages you will see an explanation of each electronic parameter. Along with the explanations are helpful recommendations, and in some cases, split chart examples to help in specification development. Another aid in determining parameters and specifications is Cat Truck Engine Pro software.

Customer specified parameters are divided into two groups,

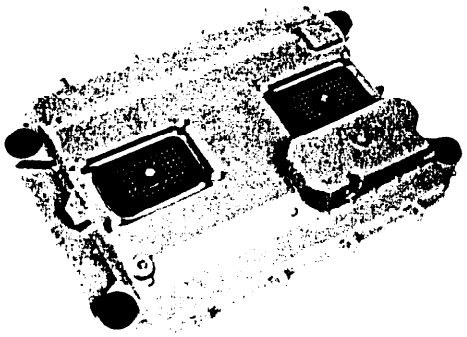
OEM Data Book Programmable Features, used to spec and order a truck, and
Optional Programmable Features, used to customize the engine for your operation.

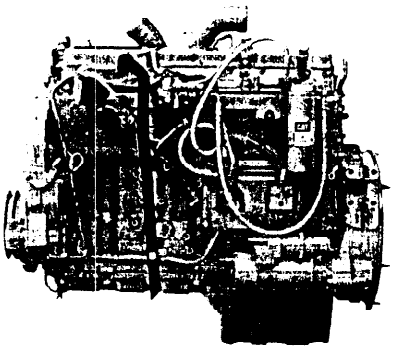
OEM Data Book Programmable Features:

- ✓ Vehicle Speed Limit (VSL)
- ✓ Cruise control parameters
- ✓ Engine/gear parameters
- ✓ PTO/fast idle features
- ✓ Idle shutdown timer
- ✓ Retarder control
- ✓ Tamper resistance
- ✓ Password protection
- ✓ Engine monitoring system

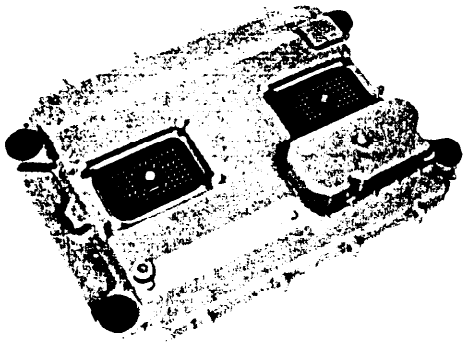
Optional Programmable Specifications

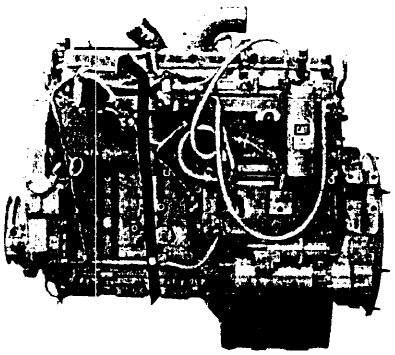
- ✓ Vehicle ID (required for Caterpillar Fleet information Software)
- ✓ Dedicated PTO features
- ✓ Fuel usage correction factor (ECM vs measured)
- ✓ Oil capacity adjustment for maintenance indicator
- ✓ Customer specified PM interval for maintenance indicator
- ✓ Programmable low idle rpm



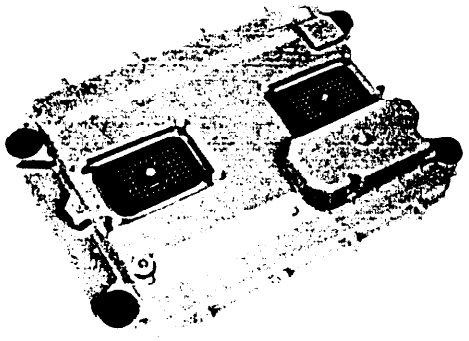


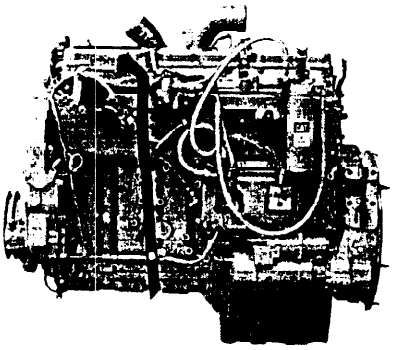
Features	3126 Basic	3126 Full Feature	C-10	C-12	C-15 & C-16
Vehicle ID	•	•	•	•	•
Vehicle Speed Calibration	•	•	•	•	•
Vehicle Speed Limit	•	•	•	•	•
VSL Protection	•	•	•	•	•
Tachometer Calibration	•	•	•	•	•
Soft Vehicle Speed Limit	•	•	•	•	•
Two-Speed Range Axle Ratio			•	•	•
Low Cruise Control Set Speed Limit	•	•	•	•	•
High Cruise Control Set Speed Limit	•	•	•	•	•
Engine Retarder	•	•	•	•	•
Engine Retarder Delay			•	•	•
Engine Retarder Minimum Vehicle Speed Limit Type			•	•	•
Engine Retarder Minimum Vehicle Speed			•	•	•
Auto Retarder in Cruise			•	•	•
Auto Retarder in Cruise Increment			•	•	•
Cruise/Idle/PTO Switch Configuration	•	•	•	•	•
Soft Cruise Control	•	•	.	.	.
Idle Vehicle Speed Limit	•	•	•	•	•
Idle rpm Limit	•	•	•	•	•
Ldle/PTO rpm Ramp Rate	•	•	•	•	•
Ldle/PTO rpm Ramp Rate	•	•	•	•	•
Fast Idle Engine rpm #1	•	•			
Fast Idle Engine rpm #2	•	•			
PTO Configuration	•	•	•	•	•
PTO Top Engine Limit	•	•	•	•	•
PTO Engine rpm Set Speed	•	•	•	•	•
PTO to Set Speed	•	•	•	•	•
PTO Cab Throttle rpm Limit	•	•	•	•	•
PTO Vehicle Speed Limit	•	•	•	•	•
Torque Limit	•	•	•	•	•
PTO Shutdown Timer	•	•	•	•	•
PTO Activates Cooling Fan	•	•	•	•	•
Lower Gears Engine rpm	•	•	•	•	•
Lower Gears Turn Off Speed	•	•	•	•	•
Intermediate Gears Engine rpm Limit	•	•	•	•	•
Intermediate Gears Tern Off Speed	•	•	•	•	•
Gear Down Protection rpm Limit	•		•	•	•
Gear Down Protection Turn On Speed	•	•	•	•	•
Low Idle Engine rpm	•	•	•	•	•
Transmission Style	•	•	•	•	•
Eaton Top 2— Top Gear Ratio			•	•	•
Eaton Top 2—Top Gear Minus One Ratio			•	•	•
Eaton Top 2—Top Gear Minus Two Ratio			•	•	•





Features	3126 Basic	3126 Full Feature	C-10	C-12	C-15 & C-16
Eaton Top 2 Override with Cruise Control Switch		•	•	•	•
Idle Shutdown Timer	•	•	•	•	•
Allow Idle Shutdown Override			•	•	•
Minimum Idle Shutdown Outside temperature			•	•	•
Maximum Idle Shutdown Outside temperature			•	•	•
A/C Pressure Switch Fan On Time		•	•	•	•
Fan with Engine Retarder in High Mode	•	•	•	•	•
Engine Monitoring Mode	•	•	•	•	•
Coolant Level Sensor		•	•	•	•
Maintenance Indicator Mode	•	•	•	•	•
PM1 Interval	•	•	•	•	•
Engine Oil Capacity	•	•	•	•	•
Fuel Correction Factor			•	•	•
CAT ID Change Fuel Correction Factor			•	•	•
CAT ID PM1 Reset	•	•	•	•	•
CAT ID Fleet Trip Reset			•	•	•
CAT ID State Enabled			•	•	•
CAT ID Soft Cruise	•	•			
CAT ID Fast Idle #1 RPM	•	•			
CAT ID Fast Idle #2 RPM	•	•			
CAT ID Low Idle RPM	•	•			
Theft Deterrent	•	•	•	•	•
Theft Deterrent Password	•	•	•	•	•
Quick Stop Rate			•	•	•
Multi-Function Output #2			•	•	•
Multi-Function Output #3			•	•	•
Multi-Function Output #4			•	•	•
Fan Control Type		•	•	•	•
Customer Password #1	•	•	•	•	•
Customer Password #2	•	•	•	•	•
Powertrain Datalink		•	•	•	•
Customer Parameter Lockout	Some	Some	•	•	•
Current Totals			•	•	•
Fleet trip Totals			•	•	•
Driver Trip Totals			•	•	•
Histograms			•	•	•
Custom Data			•	•	•
Driver Reward Feature			•	•	•





Quick Stop Rate

Description:
The Quick Stop Rate parameter value is the threshold at which a Quick-Stop Event (date, time, and snapshot) will be logged in the ECM memory. The ECM monitors the rate of change of vehicle speed. If the rate of change is greater than or equal to the value programmed into the Quick Stop Rate parameter, a Quick-Stop Event will be logged. Quick Stop Rate value is application-sensitive; light loads may require a higher value and heavy loads, a smaller value. If the Quick Stop Rate parameter is programmed to zero, the feature is disabled and no Quick-Stop Events will be logged.

Available:
C-10, C-12, 3406E, C-15, and C-16 electronic engines with NOV95 or newer personality module software.

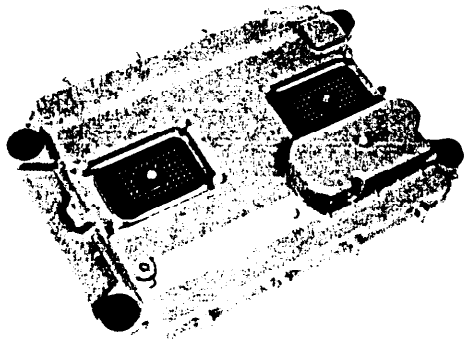
Range:

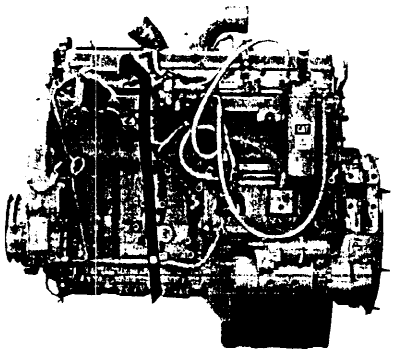
Range		Cat	Increment
Minimum	Maximum	Default	
0/mph/sec (0/km/h/sec)	15/mph/sec (24/km/h/sec)	0	1 mph/sec (1/km/h/sec)

Advantages:
All ECM-recorded vehicle and engine conditions can be replayed for 44 seconds before and 15 seconds after a Quick-Stop Event. This data may provide valuable information on drivetrain component wear.

Disadvantages:
None

Recommendations:
✓ Program a value of 7 mph/sec as a starting point.





Customer Parameter Lockout

Description:
If a security level higher than a customer password (see page 104) is required, either by the customer or local laws, the following parameters can be "locked out.

Parameter	C-10,C-12, 3406E, C-15, C16	3126B Basic and Full Feature	3126B Full Feature Only
Vehicle Speed Limit (VSL)	•	•	
VSL Protection	•	•	
Vehicle Speed Calibration	•	•	
High Cruise Control Speed set Limit	•	•	
Top Engine Limit (TEL)	•		
Soft Vehicle Speed Limit	•	•	
A/C Pressure Switch Fan-On Time	•		•
Transmission Style	•		•
Top Gear Ratio	•		
Top Gear Minus One Ratio	•		
Top Gear Minus Two Ratio	•		
Engine Retarder Delay	•		
Fan Control Type	•		
Driver Reward Enable (PM MAR99 and Newer)	•		
Engine Monitoring Lamps (PM Oct99 and Newer)	•		
Input # 6 (PM MAR98 and Newer)		•	
Two Speed Axle Range Ratio (PM MAR98 and Newer)	•	•	

AUG96 or newer personality module software is required

These parameters have been labeled throughout this book with the Lock Icon in the title bar.

Available:
C-10, C-12, 3406E, C-15, and C-16 electronic engines with JAN95 or newer personality module software. Some parameters can be locked out on the 3126B truck engine.

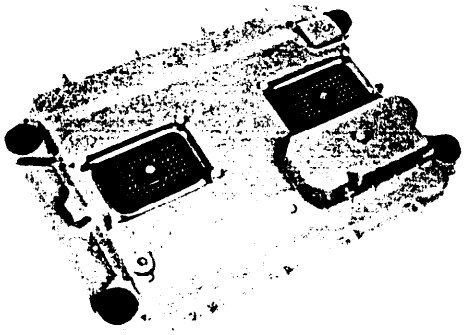
Range:

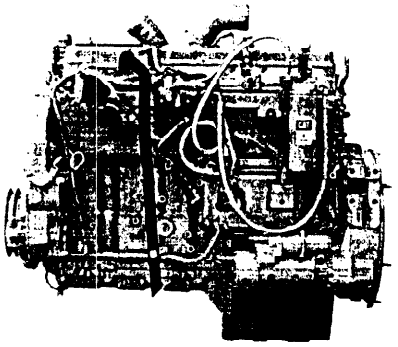
Range	Default
Unlocked	Unlocked
Locked	

Advantages:
The ability to lock certain critical parameters to comply with either local laws or customer requests

Disadvantages:
None

Recommendations:
Lock only those parameters either required by local laws or customer request.





Powertrain Data Link

Description:
The Powertrain Data Link parameter determines when or how the [CM will communicate with a powertrain device, such as a wheel-slip or anti-lock brake control. Different data links are used by the various controls depending on the manufacturer of the powertrain device. The standard ECM for the C-1O, C-12, 3406E, C-15, and C-16 engines has the SAE J1922 data link installed. If the powertrain device requires the SAE J1939 data link, an optional ECM must be installed. The optional ECM has both SAE J1922 and SAE J1939 data links. An optional ECM with a J1939 data link is available for the 3126B Full Feature truck engine.

Available:
C-10, C-12, 3406E, C-15, and C-16 electronic truck engines

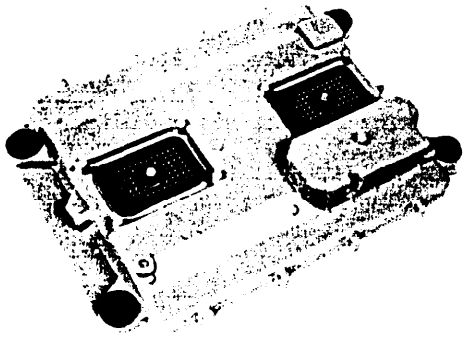
Range:

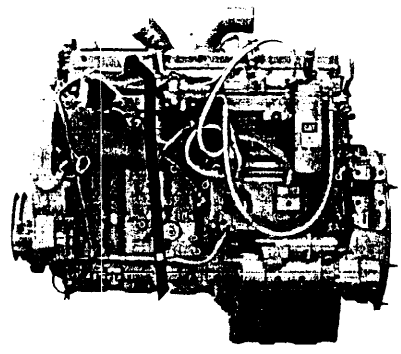
Engine	Range	Default
C-10, C12, 3406E (PM NOV98 and Earlier)	None J1922 J1939	J1922
C-10, C12, 3406E, C-15, C16 (PM NOV98 and Later	J1922 & J1939	OFF
3126 Full Feature	None J1939	None

Advantages:
The Powertrain Data Link parameter allows the [CM to work with the various "Industry Standard" data links available on powertrain devices today.

Disadvantages:
None

Recommendations:
V This parameter should be programmed to the data link necessary to communicate with the powertrain device(s) installed on the truck.





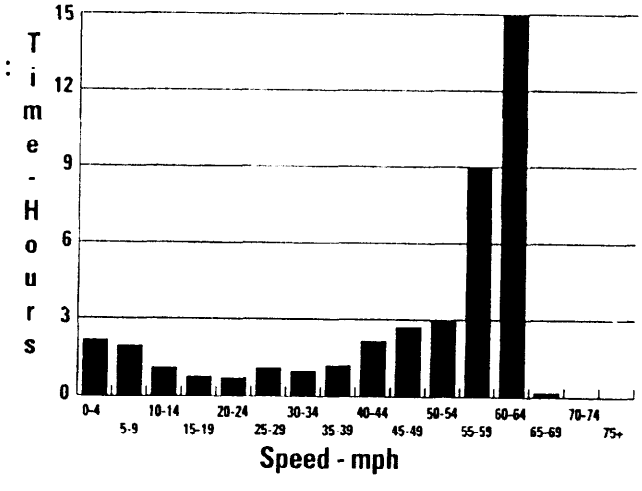
Histograms

Description:
The ECM records the amount of time that the truck has been operated at various rpm and mph. This information is stored in "buckets." The rpm buckets are 100 rpm segments. The mph are in 5 mph segments. This information is displayed on the service tool or Fleet Information Software as a bar chart called a Histogram. Fleet Information Software also displays a three-dimensional Histogram to evaluate engine operation and driver effectiveness.

The Histogram time period is the same as the Fleet Trip data.

Available:
C-10, C-12. 3406E, C-15, and C-16 electronic engines

Example: Vehicle Speed Histogram



Example: Vehicle Engine Speed Histogram Example