NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorder Division
Washington, D.C. 20594

January 2, 2013

Electronic Control Modules

Specialist's Factual Report
By Ben Xu

1. EVENT

Location:	Chesterfield, New Jersey
Date/Time:	February 16, 2012 / 0800 EST
Vehicle/ID:	2004 Mack CV713 / 1M2AG11C54M012315
Operator:	Herman's Trucking Inc.
NTSB Number:	HWY12MH007

2. DETAILS OF DEVICE INVESTIGATION

The NTSB's Vehicle Recorder Division received the following devices:

Device:	Vehicle Electronic Control Unit (VECU)
Device Serial Number:	M028M31000101
Device:	Engine Electronic Control Unit (EECU)
Device Serial Number:	12MS526M

The VECU and EECU were in good condition as seen in Figures 1 and 2, respectively. Data in the modules was imaged by an approved Mack service provider under the supervision of NTSB staff.

Figure 1: VECU (S/N M028M31000101)

Figure 2: EECU (S/N 12MS526M)

2.1. ECM Device Description

The VECU and EECU are electronic control modules (ECMs) for Mack engines. The modules have the ability to store vehicle data and incident logs including one last stop and one acceleration-triggered event.

A last stop event is triggered when the vehicle speed exceeds 45 MPH and then decreases to less-than-or-equal to 0.5 MPH. The driver must engage the parking brake to save the data.

An acceleration-triggered event is defined by a change in vehicle speed of +/- 10 MPH per second combined with a change in engine speed of +/- 50 RPM per second. These trigger thresholds are user programmable.

Both event types record 15.8 seconds before the trigger and 16 seconds after the trigger at a 5 Hz sampling rate. These time intervals are also user programmable.

The devices recovered from this accident were programmed to the default vehicle speed, engine RPM, and recording time intervals.

2.2. ECM Time Correlation

The ECM is equipped with an onboard real-time clock without battery backup. The clock's accuracy can be degraded over time due to power interruptions. The ECM and PC times during imaging can be seen in Section 2.1 of Attachment 1. An additional 2 minutes 33 seconds should be subtracted from the ECM clock to account for time elapsed between applying power to the modules and imaging the clock. Table 1 summarizes the time correlation results.

Source	Date	Time
ECM (Adjusted)	February 8, 2012	04:15:56
PC (Synchronized)	February 22, 2012	17:40:23
Total Offset	**14 days**	**13:24:27**

Table 1: Time Correlation Results

Therefore, the total offset of 14 days, 13 hours, 24 minutes, and 27 seconds should be added to the timestamps recorded by the ECM.

2.3. ECM Imaged Data

An acceleration-triggered event was recorded by the ECM on September 17, 2009 at 18:57:53 (ECM time). This data was determined to be unrelated to the accident.

The devices recovered from this accident were running software version “Step 12B.” This software version has a known issue where the module will only record the first acceleration-triggered event encountered. Subsequent acceleration-triggered events will not be recorded.

3. ATTACHMENTS

Attachment 1 is the Data Imaging Report generated by the Mack approved service provider.

Attachment 2 is the Fault Code Supplemental Report generated by the Mack approved service provider.