CCM CODE READING *By Andy Bogus*

C4guru TECH TIP

Overview

One of the most significant advancements General Motors ever implemented was the installation of the Central Control Module, or CCM, for the 1990 model year.

The CCM is the main system computer for the entire car. It communicates with the Engine Control Module (ECM) and the Electronic Brake Control Module (EBCM).

By reading the CCM Codes, one can check codes on all three main systems, the CCM itself, the ECM and the ECBM.

The amount of data available within the CCM is simply staggering. This Tech Tip should easily help one navigate through the CCM and learn more about what is going on with their C4.

Over the next few issues, this will be updated to reflect the other years. For the most part, the function is the same, it's the codes that change.

One final comment - The buttons do not react to a light touch, it requires an element of dedication to make them perform their functions.

Stay tuned, in time we will delve into these codes, and give detailed instructions on how to resolve them. Our **Tech Tip's**® will include real world experiences, which will help to resolve problems faster and easier!

Time and Effort

How long: Minutes.
How hard: Piece of cake.

Models Affected

- 1992 and 1993, **ONLY**

Tools Needed

1. Paperclip
2. Pad of paper
3. Helms Manual®

Please read these directions completely BEFORE starting the project!

The Process

This is the high tech tool required to pull codes from the CCM - a paperclip. Bend it into a shape that will allow it to span the connector.
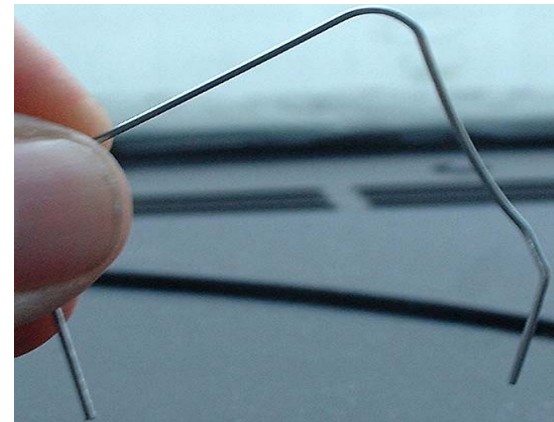

Photo 1

Photos by author

CCM CODE READING

Carefully insert the paper clip into the top right (Pin "A") and lower left (Pin "G") pins of the Assembly Line Diagnostic Link (ALDL).

Turn the key on, **DO NOT START THE ENGINE!!!** At least not yet. The motor can be run during some of the tests to see the values change.
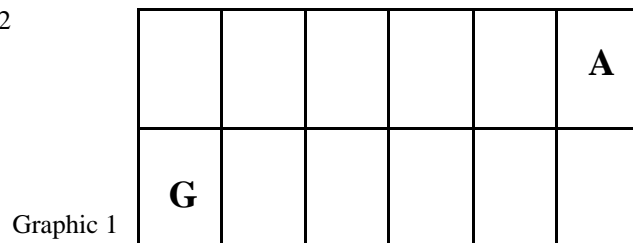

Photo 2

Graphic 1
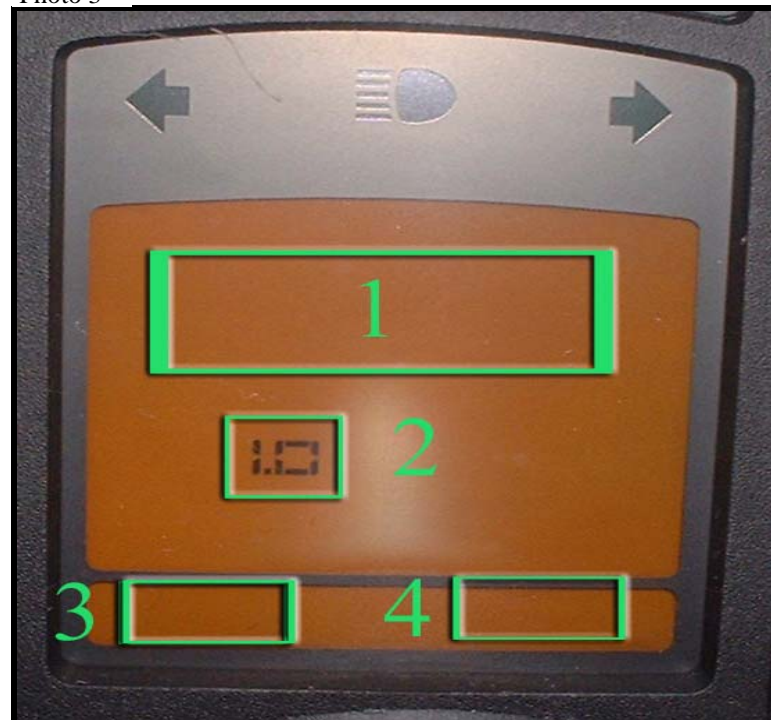
Photo 3, below, shows how the screen looks when in the CCM Diagnostics Mode. Currently, the screen is waiting for instructions.

1) Display space for any code(s).
2) Displays the Module and Segment being manipulated
3) Displays the items within a Segment
4) Displays the Values associated with the item from #3.

As mentioned before, there is a ton of data to be had!

Photo 3

CCM CODE READING

Before one can understand how to move around, the need to understand where, and why, is required.

There are three Modules:

      1. - Contains CCM codes and commands
      4. - Contains ECM codes and commands
      9. - Contains EBCM codes and commands

All three modules contain these standard segments:

      X.0 - *Waiting for instructions*. This is essentially a cursor, waiting for the user to do something.

      X.1 - *Display Error Codes*. This is where a code (or codes) is displayed.

      X.7 - *Reset Error Codes*. So much easier than disconnecting the battery, and it won't clear the stereos' memory! More on this function on **Page 11**.

As stated on **Page 2**, there are some tests that permit, or even require, the engine to be started. This story is not going to go into that level of detail - mainly, because those tests are specific to certain codes, and this space does not provide for that level of detail.

Photo 4 - *The Trip Monitor, above, is used to navigate through the various functions of the CCM, detailed instructions are on **Page 4**. This photo is of a 1992 Trip Monitor; 1993 is identical.*

All three Modules contain the aforementioned standard instructions; the CCM (**Module 1.**) adds the following Segments:

      1.2 Display Data
   **1.3 Inputs**
      1.4 Outputs

CCM CODE READING

The Trip Monitor buttons are the keys used to navigate through the various Modules and Segments within the CCM.

We will handle these movements in order:

The Module is the main level. To go from **1.** to **4.**, press the Module Up, or **Trip Reset**, to go from **4.** to **9.**, press the same button again. To go down, press the Module Down, or **Fuel Reset**, button.

None of the buttons go around, once at the top, going down is the only way out; or, if within a Segment, press the Module Up/Down to go to the next appropriate Module.
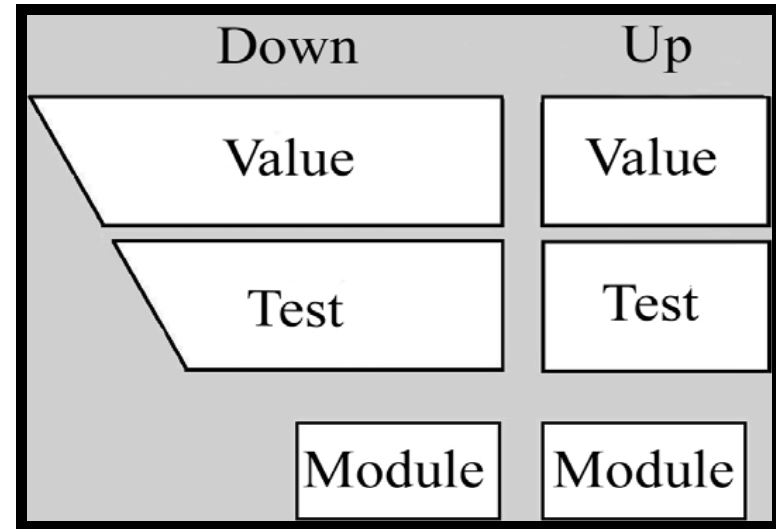
Graphic 2

When switching from Module to Module, the display will change from **1.** to **4.** to **9.**. All that has been done is change from one Module to the next. To actually see codes, press Test Up, or **Trip Odo**, button, to enable the viewing of codes. After the code viewing segment, **.1** has been selected, to view all codes, move up by pressing the Value Up, or **English/Metric** button and back down by pressing the Value Down, or, and down the **Fuel Info** button.

It's really that simple.

Over the next several pages, the codes and test values which are displayed within each Module and Segment are listed.

Code 12 is standard throughout all three systems to indicate the system is functioning fine. If a Code 12 is **not** present, a larger problem exists and must be resolved. More than likely, it means that a communications problem exists with a subsystem, or, the CCM itself is faulty. It is most rare for a CCM to fail. It is located inside the dash board, behind the radio head unit. This makes it very well protected from dust, heat and moisture. If the CCM fails, strange values will display on the speedometer (or none at all). All codes will be preceded with either an "**H**" for History (old) or "**C**" for Current (new). Code 12 will be displayed as **C12**.

CCM Codes - 1.1

These codes are read through Module 1, Segment 1, on the speedometer display. These codes will direct you to specific chapters in the GM Factory Service Manual.

Code	Description	Code	Description
13	DIC Switches Error	36	Data Strobe Circuit Open
14	DIC Switches Open	37	M Clock Circuit Error
16	Ignition three fuse blown	38	M Clock Circuit Open
21	Horn Circuit Error	41	ECM Data Communications Lost
22	Rear Defroster Circuit Error	51	PASS-Key - Key Error
24	Courtesy Lamp Circuit Error	52	PASS-Key - Circuit Error
25	Courtesy Lamp Circuit Open	53	PASS-Key - Circuit Open
26	LCD Blanking Control Circuit Error	54	FEDS - Fuel Enable Error
27	LCD Blanking Control Circuit Open	61	PASS-Key - Key resistance out of range
31	LCD Data Circuit Error	62	PASS-Key - Key Resistance too high
32	LCD Data Circuit Open	63	PASS-Key - Key Resistance too low
33	Data Clock Circuit Error	71	LCD Dimming Error
34	Data Clock Circuit Open	72	LCD Dimming Open
35	Data Strobe Circuit Error	73	LED Display Error
36	Data Strobe Circuit Open	74	LED Display Open

CCM CODE READING CCM DIAGNOSTICS

The CCM Diagnostic Functions are available through Module 1.2, as displayed on the speedometer.

These functions allow you to better troubleshoot some of the error codes that might present themselves. These diagnostics will come in handy when testing is required of a specific function. The GM Factory Service Manual might request some of these values as needed to better help troubleshoot problems.

Item	Description
01	Fuel Level
02	Dimmer Switch
03	Ambient Light Sensor
04	Rear Defogger
05	Vehicle Speed
06	PASS-Key
07	Ignition Voltage
08	Switched Battery Voltage
09	IP Cluster Lamp Dimming (0-100%)
10	IP LCD Backlight Dimming (0-100%)
11	Radio/Climate Control LCD Dimming (0-100%)
12	LED Dimming (0-100%)
13	Oil Monitor Count (Each Count = 100,000 revolutions).
14	CCM Software version

The CCM Diagnostic Functions are available through Module 1.3, as displayed on the speedometer.

These functions allow you to better troubleshoot some of the error codes that might present themselves. These diagnostics will come in handy when testing is required of a specific function.

When a value of "1" is displayed on the speedometer (**Photo 3, Page 2**), it means the item is enabled.

Item	Description	Value = 1
01	PASS-Key Fuel	Enabled
02	English or Metric	Metric
03	Door Key Switch	On
04	Right Door Ajar	Open
05	Left Door Ajar	Open
06	Key in Ignition	Closed
07	Hatch Ajar	Open
08	Power Door Unlock	Yes
09	Power Door Lock	Yes
10	Parking Lights	On
11	Rear Defogger	On
12	Seat Belts	Buckled
13	High Beams	On
14	Low Oil Level	On

The CCM Diagnostic Functions are available through Module 1.4, as displayed on the speedometer.

Within this module, you can actually TEST a function! Turn them on, or off, as needed to test the circuit. It's a great way to test, for example, a bad horn button. If the circuit works, then the problem has to be before the CCM, right? Very useful tool. Also, it can help you test for blown bulbs in the instrument cluster.

Item	Description
01	Change Oil
02	Check Gauges
03	Fasten Seatbelt light
04	Security Light
05	High Beam Light
06	Chime 1
07	Chime 2
08	LCD Blanking Control
09	Rear Defogger
10	Courtesy Lamp
11	Low Oil Lamp
12	Starter Relay
13	Delayed Accessories
14	Horn

LT1 (VIN P) ECM Error Codes - 4.1

These are the error codes available within Module 4, segment 1 , the second of three Modules that are managed by the CCM, the ECM.

Code	Description
13	Left Oxygen Sensor Open
14	Coolant Temp High
15	Coolant Temp Low
16	OptiSpark Low Resolution (Fuel)
21	TPS Signal Voltage High
22	TPS Signal Voltage Low
23	Intake Air Temp Low
24	Vehicle Speed Sensor
25	Intake Air Temp High
26	Quad Driver 1
27	Quad Driver 2
28	Quad Driver 3
32	EGR (Valve and/or Circuit)
33	MAP Voltage High (Low Vacuum)
34	MAP Voltage Low (High Vacuum)
36	OptiSpark High Resolution (Timing)
41	EST (Knock Sensor) Error

Code	Description
42	EST (Knock Sensor) Grounded
43	EST (Knock Sensor) Circuit Error
44	Left Oxygen Sensor Lean
45	Left Oxygen Sensor Rich
51	MEM-CAL (ECM Chip) Error
52	Engine Oil Temp Sensor (Low Temp)
53	System Voltage Error
55	Fuel Lean Monitor
62	Engine Oil Temp Sensor (High Temp)
63	Right Oxygen Sensor Open
64	Right Oxygen Sensor Lean
65	Right Oxygen Sensor Rich
66	A/C Pressure Sensor Error
67	A/C Pressure Sensor or Clutch Error
68	A/C Relay Error
69	A/C Clutch Circuit
72	Gear Selector Switch Error

LT5/ZR1 (VIN J) ECM Error Codes - 4.1

Code	Description	Code	Description
13	Left Oxygen Sensor Open	43	ESC Circuit Error
14	Coolant Temp High	44	Left Oxygen Sensor Lean
15	Coolant Temp Low	45	Left Oxygen Sensor Rich
16	DIS Error	51	MEM-CAL (ECM Chip) Error
21	TPS Signal Voltage High	52	Engine Oil Temp Sensor (Low Temp)
22	TPS Signal Voltage Low	53	System Voltage Error
23	Intake Air Temp Low	54	Fuel Pump Voltage (Low)
24	Vehicle Speed Sensor	55	Fuel Lean Monitor
25	Intake Air Temp High	56	Vacuum Sensor Voltage Error
31	Cam Sensor Error	61	Secondary Throttle Error
33	MAP Voltage High (Low Vacuum)	62	Engine Oil Temp Sensor (High Temp)
34	MAP Voltage Low (High Vacuum)	63	Right Oxygen Sensor Open
36	DIS Error	64	Right Oxygen Sensor Lean
41	Cylinder Select Error	65	Right Oxygen Sensor Rich
42	EST (Knock Sensor) Error	66	Engine Power Switch Voltage Error (High or Low)

CCM CODE READING ASR/ABS

EBCS Error Codes - Module 9.1

These codes reflect errors related to the ASR/ABS systems.

Code	Description	Code	Description
21	RF Wheel Speed Sensor Error	58	EBCM Internal Adjuster Error
23	RF Wheel Speed Sensor Open/Shorted	61	Pump Motor/Relay Error
25	LF Wheel Speed Sensor Error	62	Tachometer Data Error
27	LF Wheel Speed Sensor Open/Shorted	63	Valve Solenoid Circuit Error
28	Wheel Speed Sensor Frequency Error	64	TPS Error
31	RR Wheel Speed Sensor Error	65	Adjuster Assembly Error
33	RR Wheel Speed Sensor Open/Shorted	66	Adjuster Assembly Control Error
35	LR Wheel Speed Sensor Error	71	EBCM Internal Error
37	LR Wheel Speed Sensor Open/Shorted	72	Serial Data Link Error
41	RF Valve Solenoid Error	73	Spark Retard Monitoring Error
44	Pilot Valve Solenoid Error	74	Low Voltage
45	LF Valve Solenoid Error	75	Lateral Accelerometer Error
51	RR Valve Solenoid Error	76	Lateral Accelerometer (Signal out of Range)
55	LR Valve Solenoid Error	83	Brake Fluid Level Low
57	Cruise Control Data Error		

CCM CODE READING SUMMARY

One last trick of the CCM - the ability to clear codes! Normally, code clearing has to be done with either a high-tech computerized scanning tool, or, by disconnecting the battery. Each alternative has it's problems.

Within any Module, there is segment **X.7**. That segment is the code reset option. When selected, press the Value Up, or **English/Metric,** button and it will reset the codes for that Module. Once cleared, three dashes will appear (- - -) on the speedometer.

On **Page 1**, under *Tools Needed,* I refer to the Helms Manual, this is the factory GM Service Manual. It is all but required to do the repairs that will come from any of the codes found within the CCM. The other general purpose repair manuals are not thorough enough to get the job done. If nothing else, this guide will help the owner determine a problem before taking to a service center. Information is a powerful ally.

Getting ones arms wrapped around the huge mass of data available within the CCM is somewhat daunting the first few times, but after that, it's a piece of cake.

Some of these elements are all but required to test faulty circuits and subsystems. I am not just referring to the simple extraction of codes, either. The testing functions available within the CCM (Module 1, Segments 2, 3 and 4) are most helpful in resolving complex issues. Take advantage of them!

The next time the horn dies, test it though the CCM - it might be as simple as a bad switch!

Some of these tests can be performed while the engine is running, however, that will be saved for when specific tests and diagnostics are written.