

SECTION 15

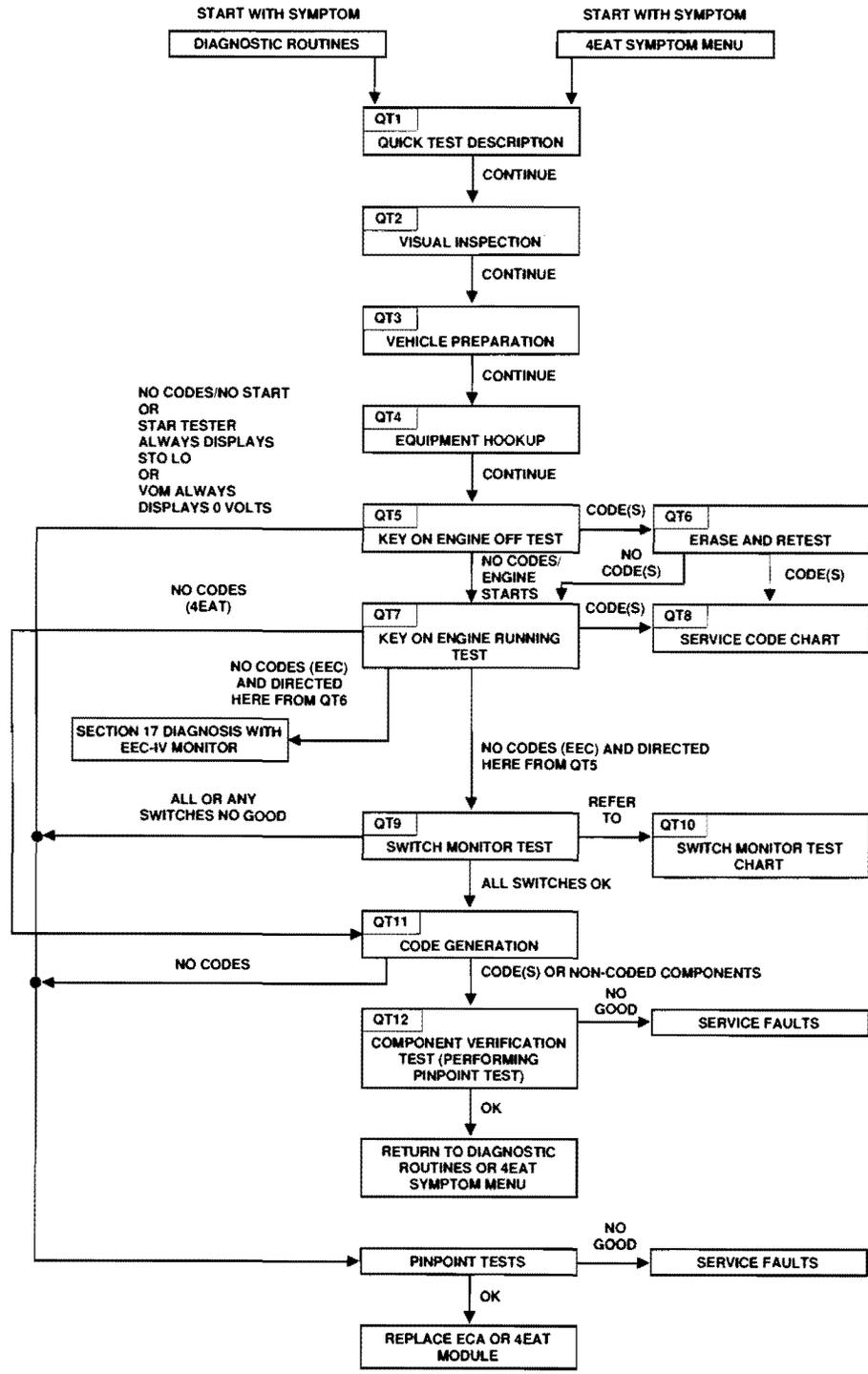
EEC and 4EAT Quick Test—All Engines

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Quick Test Flow Chart

QT



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Quick Test Flow Chart

QT

QT1 DESCRIPTION

- For detailed descriptions on EEC Self-Test and equipment operation, refer to the appendix (pages 15-12 through 15-18).

- This diagnostic procedure is used on the following Vehicle Systems:

1.6L Naturally Aspirated

1.6L Turbo

DEFINITION

- Quick Test is a check of these systems electronics which utilizes the control module of each system to perform its own diagnostics on itself and its circuitry. This capability of the module is referred to as Self-Test. Since little effort is required by the technician to initiate Self-Test but in return gain vital information quickly, this overall procedure is referred to as Quick Test.

CAUTION

- Although Quick Test appears to be a fast and powerful diagnostic aid, unfortunately it cannot detect all possible failures that can occur within the EEC or 4EAT systems. Therefore, the Quick Test procedure in this manual has been carefully constructed to also guide you and refer you to Pinpoint Tests that inspect components and circuitry as associated with a particular symptom.
- Keep in mind that all the things that previously went wrong with cars, before the age of electronics reached the automobile, can still go wrong and are still the cause of the majority of the driveability problems. That's why the best diagnosis starts with a list of symptoms and possible causes, followed by a careful checking of those causes in the most probable order. Refer to Section 2 "Diagnostic Routines" and Group 17 "4EAT Symptom Menu" for a list of Symptoms and Probable Causes.

DIRECTION

- When the Symptom Charts direct you to Quick Test, perform all of "Quick Test" step by step following directions in the "Action to Take" column. If all phases of Quick Test give no indication of a problem, it is likely that the problem is non-electronic related and will be found elsewhere. You should return to Section 2 "Diagnostic Routines" or the "4EAT Symptoms Menu" and refer to the next possible fault for that particular symptom.
- When directed to a Pinpoint Test always read the cover page(s) for special notes and look carefully at the Pinpoint Test Schematic. When a repair has been made, erase codes and rerun Quick Test to confirm repair was effective.

DIAGNOSTIC AIDS

- The following flow chart can be used as a guide for a better understanding of the Quick Test flow path. It is not intended as a diagnostic procedure on its own, nor consist of the detailed information required to run Quick Test.

ACTION TO TAKE

- Proceed to Test Step **QT1** only if you were directed here from Section 2 "Diagnostic Routines" or Group 17 "4EAT Symptom Menu".

Quick Test Flow Chart

QT

TEST STEP	RESULT	ACTION TO TAKE
QT2 VISUAL INSPECTION <ul style="list-style-type: none"> • Inspect the air cleaner and inlet ducting. • Check all engine vacuum hoses for damage, leaks, cracks, blockage, proper routing, etc. • Check the EEC or 4EAT wiring harness for proper connections, bent or broken pins, corrosion, loose wires, proper routing, blown fuses, etc. • Check the processor, sensors and actuators for physical damage. • Check engine coolant for proper level. • Check transmission fluid level and quality. • Check engine oil level and quality. • Do all components and fluids appear OK? 	Yes No	GO to QT3 . SERVICE fault(s) in system as required and RE-EVALUATE symptom(s).
QT3 VEHICLE PREPARATION <ul style="list-style-type: none"> • Perform all the following safety steps required to start and run vehicle tests: <ul style="list-style-type: none"> — Apply parking brake. — Place shift lever firmly into PARK position (NEUTRAL on manual transmission). — Block drive wheels. • Turn off ALL electrical loads. <ul style="list-style-type: none"> — Radios — Lights — A/C - Heater Blower Fans, etc. • Start engine and run until at operating temperature. • Have all safety steps been performed, electrical loads turned off, and engine at operating temperature? 	Yes No	GO to QT4 . Personal safety and correct diagnostic results are dependent on Test Step QT3 . MAKE all necessary repairs to perform vehicle preparation.

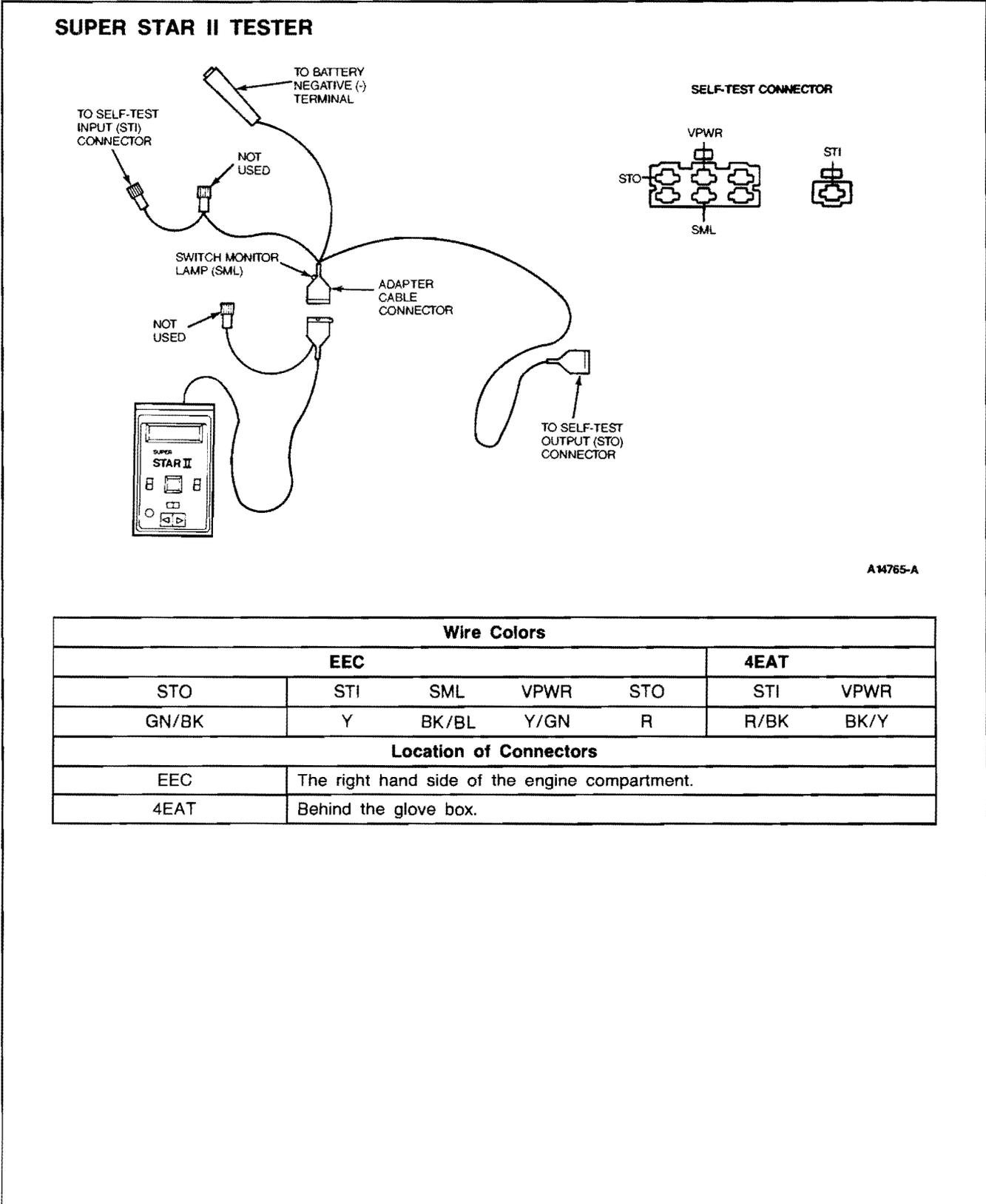
Quick Test Flow Chart

QT

TEST STEP	RESULT	ACTION TO TAKE
QT4 EQUIPMENT HOOKUP		
<p><u>Using SUPER STAR II Tester:</u></p> <ul style="list-style-type: none"> • Turn ignition key off. • Connect the color coded adapter cable to the SUPER STAR II tester. • Connect the adapter cable leads to the EEC or 4EAT STO and STI diagnostic connectors depending on symptom(s) (See illustration). • Ground the adapter cable. • Slide the SUPER STAR II tester switch to MECS position. <p><u>Using Analog VOM:</u></p> <ul style="list-style-type: none"> • Turn ignition key off. • Connect VOM positive (+) lead to the EEC or 4EAT STO line depending on symptom(s), and negative (-) lead to engine ground. • Jumper EEC or 4EAT STI to engine ground consistent with VOM hookup. • Set the VOM on a DC voltage range to read from 0 to 20 volts. <p><u>Using "CHECK ENGINE" Light (MIL):</u></p> <ul style="list-style-type: none"> • If running EEC Self-Test, no special equipment is required. • To use the MIL light, jumper EEC STI line to engine ground. <p>NOTE: If MIL light flashes continuously prior to equipment hookup, go to Section 16, Test ST11.</p>	<p>Yes</p> <p>No</p>	<p>GO to QT5.</p> <p>SERVICE fault(s) as necessary and REPEAT QT4.</p>

Quick Test Flow Chart

QT



Quick Test Flow Chart

QT

TEST STEP	RESULT	ACTION TO TAKE
QT5 KEY ON ENGINE OFF TEST		
<p><u>Using SUPER STAR II Tester:</u></p> <ul style="list-style-type: none"> • Latch the center button in the "Test" position. • Turn ignition key on. • Turn SUPER STAR II Tester on. (The Tester will sound and "88" will be displayed for two seconds). • Unlatch and relatch center test button. • After all codes are received, unlatch center button to review all codes retained in tester memory. <p><u>Using Analog VOM:</u></p> <ul style="list-style-type: none"> • Connect a jumper wire from the STI line to ground. • Turn ignition key on. • Turn VOM on. • Connect STI jumper to ground. • Observe VOM needle for any code indications. <p><u>Using "CHECK ENGINE" Light (MIL):</u></p> <ul style="list-style-type: none"> • Turn ignition key on. • Connect EEC STI to ground. • Observe MIL light. • Record Service Codes. <p><u>Using "Manual Shift" Light (MSL):</u></p> <ul style="list-style-type: none"> • Turn ignition key on. • Connect 4EAT STI to ground. • Observe MSL. • Record Service Codes. 	<p>Code(s) ▶</p> <p>STAR Tester Always Displays STO LO or VOM Always Displays 0 Volts ▶</p> <p>No Codes and Engine Starts ▶</p> <p>No Codes and No Start ▶</p>	<p>GO to QT6 .</p> <p>GO to Pinpoint Test STI .</p> <p>PASS; GO to QT7 .</p> <p>GO to Pinpoint Test VPWR .</p>

<h1>Quick Test Flow Chart</h1>	<h2>QT</h2>
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TEST STEP	RESULT	ACTION TO TAKE
<p>QT6 ERASE AND RETEST</p> <p>NOTE: Erasing Service Codes and retesting will give an indication if Service Codes received in Test Step QT5 are hard or intermittent faults. Hard faults will be repeated immediately and codes will be displayed during retest.</p> <ul style="list-style-type: none"> • Confirm code(s) were received in Test Step QT5 . • Disconnect negative battery cable and depress brake pedal for 5-10 seconds to erase codes in memory. • Turn SUPER STAR II Tester or VOM off. • Perform "Key On Engine Off" test as instructed in Test Step QT5 . <p>NOTE: If codes retrieved the first time cannot be recreated, it may be necessary to tap suspect sensors, shake and wiggle harness, or drive the vehicle in order to induce a failure. Repeat Test Step QT5 each time.</p> <ul style="list-style-type: none"> • Record Service Codes. 	<p>Code(s) ▶</p> <p>No Code(s) ▶</p>	<p>GO to QT8 and REFER to the Service Code Chart for Pinpoint Test direction.</p> <p>GO to QT7 .</p>
<p>QT7 KEY ON ENGINE RUNNING TEST</p> <ul style="list-style-type: none"> • Deactivate Self-Test. • Run engine at 2000 RPM for two minutes. • Latch center button on SUPER STAR II Tester or jumper STI to ground if using VOM or lamp. • Turn engine off. • Turn ignition key on and wait 10 seconds. • Run engine at idle. • Activate Self-Test by unlatching and relatching SUPER STAR II Tester by connecting STI jumper if using VOM or "CHECK ENGINE" light. • Record Service Codes. 	<p>Code(s) ▶</p> <p>No Codes and performing EEC Self-Test (Sent here by QT5) ▶</p> <p>No Codes and performing EEC Self-Test (Sent here by QT6) ▶</p> <p>No Codes and performing 4EAT Self-Test. ▶</p>	<p>GO to QT8 and refer to the Service Code Chart for Pinpoint Test direction.</p> <p>PASS; GO to QT9 .</p> <p>GO to Section 17. EEC-IV Monitor Intermittent Fault Diagnosis.</p> <p>PASS; GO to QT11 .</p>

Quick Test	QT
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QT8	SERVICE CODE CHART	
	SERVICE CODE	PINPOINT TEST STEP
	01	GO to IDM
	03	GO to CID
	06	GO to VSS
	08	GO to VAF
	09	GO to ECT
	10	GO to VAT
	12	GO to TP
	14	GO to BP
	15	GO to EGO
	17	GO to EGO
	25	GO to PRCV
	26	GO to CANP
	34	GO to ISC
	55	GO to TCS
	60	GO to SCP
	61	GO to SCP
	62	GO to SCP
	63	GO to SCP

<h1>Quick Test</h1>	<h1>QT</h1>
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TEST STEP	RESULT	ACTION TO TAKE
<p>QT9 SWITCH MONITOR TEST</p> <ul style="list-style-type: none"> • The Switch Monitor Test checks input signals from the individual input switches to the EEC System's ECA. • Test all switches individually – leaving a switch on while testing another will lead to a false test result. • Turn engine off, and allow to cool before starting Switch Monitor Test. • Deactivate Self-Test. • Turn all accessories off. • Place transmission in NEUTRAL (MTX) or PARK (ATX). Set park brake. • Turn ignition key on. • If using SUPER STAR II Tester, leave tester connected, latch center button, and watch the output of the LED on the Adaptor Cable as each switch is exercised. • If using VOM, jumper STI to ground, connect VOM (+) lead to SML line and (-) lead to engine ground. (See Illustration in QT4). • Exercise all switches listed in QT10 and record results. 	<p>All Switches OK</p> <p>All Switches No Good</p> <p>Any Switch No Good</p>	<p>GO to QT11 .</p> <p>GO to Pinpoint Test SMC .</p> <p>GO to the Pinpoint Test(s) for all Switches that are no good. REFER to Test Step QT10 for the list of Pinpoint Tests.</p>

<h1>Quick Test</h1>	<h1>QT</h1>
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QT10	SWITCH MONITOR TEST	
SWITCH	LED on or LESS THAN 1.5 VOLTS UNDER THESE CONDITIONS	PINPOINT TEST
Neutral Gear Switch/Clutch Engage Switch	In Gear and Clutch Pedal Released	GO to NGS/CES
Neutral Safety Switch	In Park or Neutral	GO to NSS
Idle Switch	Accelerator Pedal Depressed	GO to IDL
Brake On-Off Switch	Brake Pedal Depressed	GO to BOO
Headlamp Switch	Headlamps On	GO to ELU
Blower Motor Switch	Blower Switch at Position 2 or Above	GO to ELU
A/C Switch	A/C Switch On and Blower On	GO to ACC
Defroster Switch	Defroster On	GO to ELU
Cooling Fan	Cooling Fan On	GO to ELU

APPENDIX: Self-Test Description

The Self-Test is divided into three specialized tests: Key On Engine Off Self-Test, Engine Running Self-Test, and the Switch Monitor Test. The Self-Test is not a conclusive test by itself, but is used as a part of the functional Quick Test diagnostic procedure. The processor stores the Self-Test program in its permanent memory. When activated, it checks the Electronic Engine Control or 4EAT System by testing its memory integrity and processing capability, and verifies that various sensors and actuators are connected and operating properly.

Unlike EEC-IV, no sensors or switches are exercised during Self-Test. Also, intermittent codes are not erased if the fault is removed after 40 vehicle cycles. Therefore, any intermittent code will be stored in permanent memory until erased.

KEY ON ENGINE OFF SELF-TEST

At this time, a test of Electronic Engine Control or 4EAT System is conducted with power applied and engine off.

ENGINE RUNNING SELF-TEST

At this time, a test of the Electronic Engine Control or 4EAT System is conducted with the engine running. The sensors are checked under actual operating conditions and at normal operating temperatures.

SWITCH MONITOR TEST

At this time a test of EEC input switches is made with the engine off and cool.

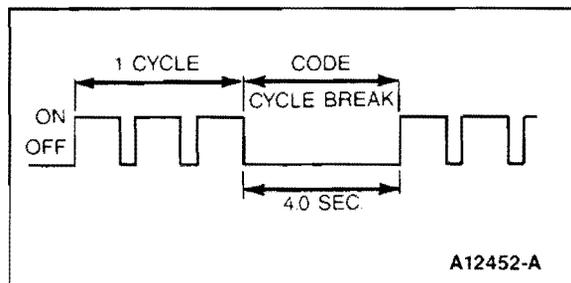
APPENDIX: Code Output Format

SERVICE CODES

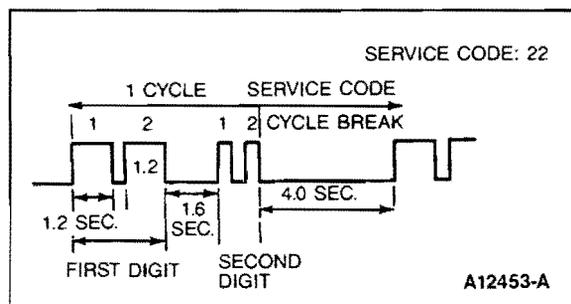
The EEC and 4EAT Systems communicate service information by way of the Self-Test service codes. These service codes are two-digit numbers representing the results of Self-Test.

The service codes are transmitted on the Self-Test Output (STO) line found in the vehicle Self-Test connector. They are in the form of timed pulses, and read by the technician on a voltmeter or on the SUPER STAR II Tester. On the voltmeter each pulse corresponds to a needle sweep.

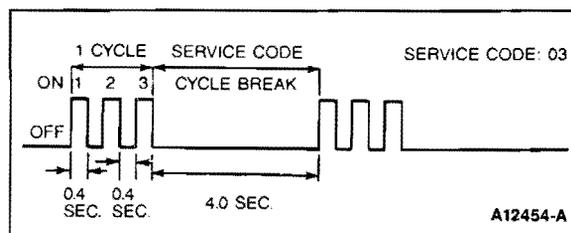
- Code cycle break



- First digit of service code (tens position) during one cycle.



- Second digit of service code (ones position) during one cycle.



APPENDIX: Reading Codes With SUPER STAR II Tester

READING CODES - SELF - TEST AUTOMATIC READOUT (SUPER STAR II) TESTER

After hooking up the SUPER STAR II Tester and turning on its power switch, the tester will run a display check and the numerals 88 will begin to flash in the display window. A steady 0 will then appear when center button is unlatched to signify that the SUPER STAR II Tester is ready to start the Self-Test and receive the test's service codes.

NOTE: The EEC system does not transmit a "PASS" code. A blank screen will appear continuously.

To receive input and/or output service codes, latch the center button in the "test" position at the front of the SUPER STAR II Tester, turn key on, turn the SUPER STAR II Tester on, unlatch then relatch the center button.

If for any reason the technician wishes to clear the display window during the Self-Test, he must turn off the vehicle's engine, release and press the tester's push button once to latch down the button. Every time the SUPER STAR II Tester is turned off, the low battery indicator (LO BAT) should show briefly at the upper left corner of the tester's display window. If the LO BAT indicator shows steadily at any other time during the operation of the SUPER STAR II Tester with any service code, turn its power switch to OFF and replace the 9-volt battery in the tester.

The SUPER STAR II Tester will display the last service code received, even after disconnecting it from the vehicle. It will hold the service code on the display until the power is turned off or the push button is unlatched and relatched.

WARNING

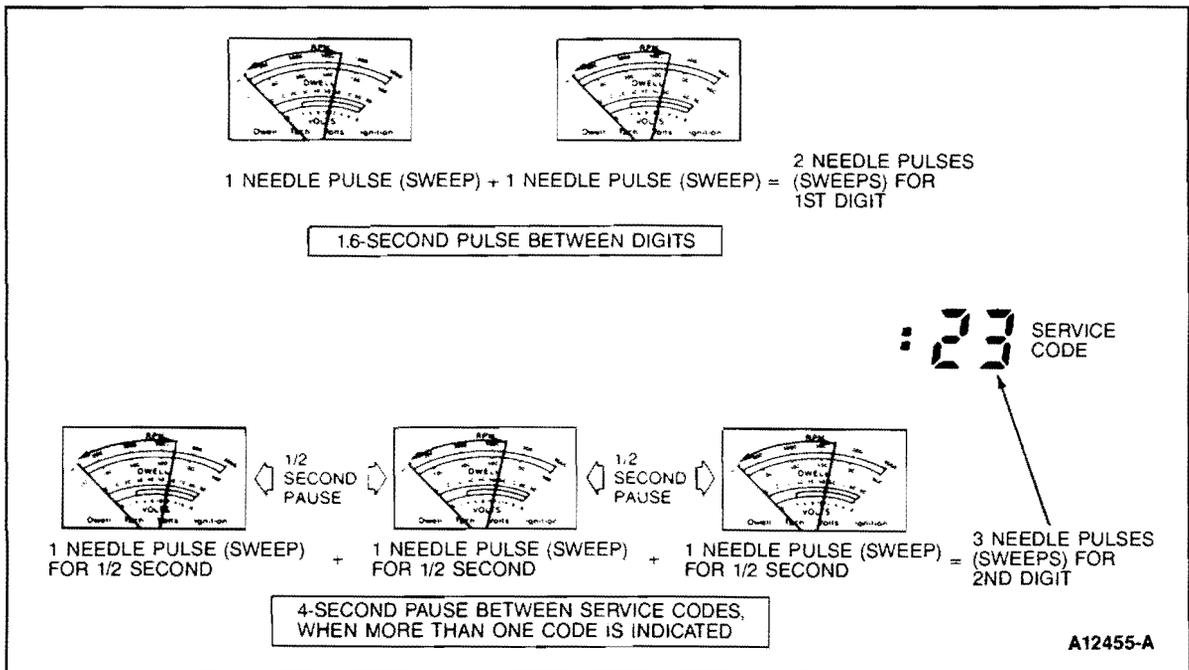
ANYONE WHO DEPARTS FROM THE INSTRUCTIONS PROVIDED IN THIS PUBLICATION MUST FIRST ESTABLISH THAT HE COMPROMISES NEITHER HIS PERSONAL SAFETY NOR THE VEHICLE INTEGRITY BY HIS CHOICE OF METHODS, TOOLS, OR PARTS.

APPENDIX: Reading Codes With Analog Voltmeter

READING CODES – ANALOG VOLTMETER

When a service code is reported on the analog voltmeter for a function test, it will represent itself as a pulsing or sweeping movement of the voltmeter's needle across the dial face of the voltmeter. Therefore, a single-digit number of three will be reported by three needle pulses (sweeps). However, as previously stated, a service code is sometimes represented by a two-digit number, such as 23. As a result, the Self-Test's service code of 23 will appear on the voltmeter as two needle pulses (sweeps) then, after a 1.6-second pause, the needle will pulse (sweep) three times.

The continuous memory codes are not separated from the Key On Engine Off codes. They are produced on the voltmeter in the same manner as the Key On Engine Off codes.



APPENDIX: Reading Codes With "CHECK ENGINE" Light (MIL)

The "CHECK ENGINE" light is intended to alert the driver of certain malfunctions in the engine control system. If such a fault occurs, the processor will substitute a value or values and continue operating. This process is called "Limited Operating Strategy (LOS)". In some cases this action may result in a slight change in driveability.

System OK

The "CHECK ENGINE" Light will remain on while the key is in the RUN position, and go off once the vehicle has started.

System Not OK

If the "CHECK ENGINE" Light should remain on after the vehicle has started, run Key On Engine Off Test to completion. If the light continues to remain on, GO to Pinpoint Test **PGC**. If the "CHECK ENGINE" Light never comes on, GO to Pinpoint Test. If the light comes on for a period then goes off, and a Service Code is present, the fault is intermittent.

If the Manual Shift Light flashes during driving, run Key On Engine Off Test to completion. If the light never comes on, GO to Pinpoint Test.

NOTE: When EEC is in Self-Test, the "CHECK ENGINE" Light will also flash Service Codes.

APPENDIX: Erasing Memory Codes

Erasing Memory Codes

1. Disconnect negative battery cable and depress the brake pedal for 5-10 seconds.
2. Rerun Quick Test to verify Service Code(s) have been erased.

Test Equipment

- Super Self-Test Automatic Readout II, (SUPER STAR II) Rotunda No. 007-00028.
- Analog Volt-Ohmmeter, 0-20V DC (alternate to SUPER STAR II).
- Jumper Wire.

