The Engineering Society For Advancing Mobility Land Sea Air and Space®
INTERNATIONAL
400 Commonwealth Drive, Warrendale, PA 15096-0001

SURFACE VEHICLE RECOMMENDED PRACTICE

SAE J1922

ISSUED DEC89

Issued 1989-12

Submitted for recognition as an American National Standard

POWERTRAIN CONTROL INTERFACE FOR ELECTRONIC CONTROLS USED IN MEDIUM AND HEAVY DUTY DIESEL ON-HIGHWAY VEHICLE APPLICATIONS

Foreword—This Document has not changed other than to put it into the new SAE Technical Standards Board Format.

Electronic controls for engines, transmissions, braking systems, and retarders need to share common measured parameters and have a method for interaction. To eliminate the need for redundant sensors and possible conflicting data, a method of communicating information between electronic controls is required. By sharing information, the vehicle installation costs can be reduced and performance enhanced with interactive control features.

A method of communicating control parameters between engine, transmission, antilock braking system (ABS)/ traction control, and retarder systems is required. A long- and short-term approach has been taken to resolve the problem. This document addresses the short-term need. The SAE Truck and Bus Control and Communications Network Subcommittee is developing a controls communication network document (draft J1939) that will use a high-speed data link, which will address the long-term need.

TABLE OF CONTENTS

QUESTIONS REGARDING THIS DOCUMENT: (724) 772-8512 FAX: (724) 776-0243
TO PLACE A DOCUMENT ORDER; (724) 776-4970 FAX: (724) 776-0790
SAE WEB ADDRESS http://www.sae.org

UNIFIED 1015

1. Scope—This SAE Recommended Practice provides a development or possibly interim production communication protocol between engine, transmission, ABS/traction control, and retarder systems until higher speed communication links are established.

2. References

2.1 Applicable Publications—The following publications form a part of the specification to the extent specified herein. Unless otherwise indicated the latest revision of SAE publications shall apply.

2.1.1 SAE PUBLICATIONS—Available from SAE, 400 Commonwealth Drive, Warrendale, PA 15096-0001.

SAE J1708—Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications

SAE J1587—Joint SAE/TMC Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications

SAE J1843—Accelerator Pedal Position Sensor for Use With Electronic Controls in Medium- and Heavy-Duty Diesel On-Highway Vehicle Applications

3. Definitions

3.1 Percent Torque Value—A percent value for torque which is a percent of the peak engine torque as indicated by byte 18 of the engine to powertrain initialization message (see 5.7.1). Percent torque value is broadcast as a signed short integer (two's complement).

Resolution: 1%/bit
Range: +127% peak engine torque
-128% peak engine torque

3.2 Percent Accelerator Pedal (AP) Position—This signal always reflects the percent AP position as interpreted by the engine. This value shall never reflect override states, the equivalent cruise control value, nor the road speed limiting value. The value is a scaled value such that 0% AP position is represented by 0, and 100% AP position is represented by 255. Additionally, the value of AP position shall be 0% during a fault condition of the AP.

Resolution: 0.392%/bit
Range: 0 to 100%

3.3 Engine Parameter Change—This bit indicates that one of the parameters sent to the transmission in the last initialization message has changed (i.e., idle speed has changed, available torque has changed, etc.). This bit shall remain set until the powertrain has requested a new initialization message, and it has been sent by the engine.

Resolution: Not applicable
Range: Not applicable
Binary bit mapped: 1 = A parameter has changed since last initialization message was sent
0 = No change since last transmission of the initialization message

3.4 Engine's Desired RPM—An indication by the engine to the transmission of the optimal operating speed of the engine for the currently existing conditions. These conditions may include torques generated to accommodate powertrain demand, such as cruise control or vehicle speed governors. Dynamic commands from functions such as smoke control or shift control are excluded from this calculation.

Resolution: 16 RPM/bit
Range: 0 to 4080 RPM

3.5 Engine's Desired RPM Asymmetry Adjustment—This byte is utilized in transmission gear selection routines and indicates the engine's preference of lower versus higher engine speeds should its desired RPM not be achievable. This is a scaled ratio such that 128 represents an equal preference for a RPM lower or higher than the engine's indicated desired RPM. The higher the asymmetry adjustment value is above 128, the more the engine prefers to be operated at or above its indicated desired RPM. Conversely, the lower the asymmetry adjustment value is below 128, the more the engine prefers to operate at or below its indicated desired RPM. Typically, the engine's asymmetry adjustment will be predicated on fuel consumption considerations, and under these situations, the method for computing the asymmetry adjustment is indicated in Appendix A. It should be noted there may be times the engine will deviate from an asymmetry adjustment computation based solely on fuel consumption considerations as done in Appendix A. The engine may include other factors into its asymmetry adjustment calculation such as temperatures, pressures, and other operating parameters.

Resolution: Not applicable
Range: Not applicable
Ratio calculated and scaled per the previous discussion and in Appendix A.

3.6 Desired Engine Speed Value—An actual engine speed requested by the transmission for shift control or the ABS/traction controls.

Resolution: 0.0625 RPM/bit
Range: 0 to 4096 RPM

3.7 Maximum Engine Override Speed—The maximum engine RPM above high idle allowed by the engine control during a momentary high idle override.

Resolution: 16 RPM/bit
Range: 0 to 4080 RPM

3.8 Current Engaged Gear Number—The number assigned to the transmission gear ratios in the transmission to powertrain initialization message by the order of the data. Reverse gear numbers are denoted by negative numbers with the more negative number representing the gear that permits the highest vehicle speed in reverse. The current engaged gear number is broadcast as a signed short integer (two's complement). The current engaged gear number has a value of zero when the transmission is in neutral.

Resolution:	1 gear/bit
Range:	+127 forward gears
	-128 reverse gears

3.9 AP Kickdown Position—Same as kickdown state in SAE J1843.

Resolution:	Not applicable
Range:	Not applicable
Binary bit mapped:	1 = In kickdown position
	0 = Not in kickdown position

3.10 AP Low Idle Position—Same as low idle state in SAE J1843.

Resolution:	Not applicable
Range:	Not applicable
Binary bit mapped:	1 = In low idle position
	0 = Not in low idle position

4. Powertrain Interface—A dedicated SAE J1708 data link shall be used to communicate the following parameters between engine, transmission, ABS/traction control, and retarder systems. The protocol to transfer information is similar to SAE J1587. Variable length message formats shall be used to communicate data between the control devices. The data will be formatted order specific to minimize the data link utilization. In order to have synchronization of broadcast data, it is recommended that the update timer in each device be re-initialized to a fixed time interval (based on the fastest update rate of the data in the message) every time the device gains access to the data link. This method of broadcasting is an attempt to minimize the number of possible collisions.

5. Message Formats—Table 1, Message Identification (MID), was reserved in SAE J1708 MID assignment list in January of 1989. The use of these MIDs will be discussed in detail throughout the rest of Section 5. Message formats adhere to SAE J1708 requirements.

TABLE 1—MESSAGE IDENTIFICATION (MID) TABLE

MID	Description
69	Engine to Powertrain Message
70	Engine to Powertrain Initialization Message
71	Engine to Powertrain Initialization Request Message
72	Engine to Transmission Current Gear Request Message
73	Engine, Reserved
74	Transmission to Powertrain Message
75	Transmission to Powertrain Initialization Message
76	Transmission to Powertrain Initialization Request Message
77	Transmission to Powertrain Current Gear Number Message
78	Transmission, Reserved
79	ABS/Traction Control to Powertrain Message
80	ABS/Traction Control to Powertrain Initialization Message
81	ABS/Traction Control to Powertrain Initialization Request Message
82	ABS/Traction Control, Reserved
83	Retarder to Powertrain Message
84	Retarder to Powertrain Initialization Message
85	Retarder to Powertrain Initialization Request Message
86	Retarder, Reserved

5.1 Engine to Powertrain Message

FORMAT = (MID, BYTE1, BYTE2, BYTE3, BYTE4, BYTE5, CHECKSUM)
PRIORITY 3
Engine MID = 69
Update Period = 0.050 s

MESSAGE CONTENTS

BYTE	UPDATE PERIOD	DESCRIPTION
0	0.050	MID = 69
1	0.050	Percent Torque Value (calculated torque) (Resolution 1%/bit)
2	0.050	% AP Position (Resolution ~0.4%) (0% during fault condition)
3	0.050	Control/Status Byte

BIT	DESCRIPTION
0	Cruise Control Status 1 = Cruise Control Active 0 = Cruise Control Inactive
1	PTO Control Status 1 = PTO Control Active 0 = PTO Control Inactive
2	Road Speed Limiting Status 1 = Road Speed Limit Active 0 = Road Speed Limit Inactive
3	Retarder Control Status 1 = Engine Retarder Enabled 0 = Engine Retarder Not Enabled Alternatively: Retarder Enable Command (for a retarder controlled via data link) 1 = Retarder Enabled 0 = Retarder Disabled
4	AP Kickdown Switch 1 = In Kickdown Position 0 = Not in Kickdown Position
5	AP Low Idle Switch 1 = In Low Idle Position 0 = Not in Low Idle Position
6	Engine Parameter Change 1 = Parameters have changed 0 = Current Parameters valid
7	For Future Use

4	0.050	Engine's Desired RPM (Resolution 16 RPM/bit)
5	0.050	Desired RPM Asymmetry Adjustment (Scaled Ratio)
6	0.050	Checksum

5.2 Transmission to Powertrain Message

FORMAT = (MID, BYTE1, BYTE2, BYTE3, BYTE4, CHECKSUM)
PRIORITY 2
Transmission MID = 74
Update Period = 0.025 s

MESSAGE CONTENTS

BYTE	UPDATE PERIOD	DESCRIPTION
0	0.025	MID = 74
1	0.025	Control/Status Byte
	BIT	DESCRIPTION
	0,1	Override Control Mode Mode = 00 Override Disabled Mode = 01 Engine Speed Value Control Mode = 10 Engine Torque Control Mode Mode = 11 Engine Speed/Torque Limit Control
	2	Retarder Enable 1 = Enable Retarder 0 = Disable Retarder
	3	Momentary High Idle Override 1 = Override Enabled 0 = Override Disabled
	4	Driveline Engaged 1 = Driveline Engaged 0 = Driveline Disengaged
	5	Transmission Retarder Control Status 1 = Transmission Retarder Active 0 = Transmission Retarder Inactive
	6,7	For Future Use
2	0.025	For: MODE = 00Not Broadcast MODE = 01Desired Engine Speed Value (LSB) (Resolution 0.0625 RPM/bit) MODE = 10Not Broadcast MODE = 11Engine Speed Upper Limit (Resolution 16 RPM/bit)
3	0.025	For: MODE = 00Not Broadcast MODE = 01Desired Engine Speed Value (MSB) (Resolution 16 RPM/bit) MODE = 10Desired Percent Torque Value (Resolution 1%/bit) MODE = 11Percent Torque Value Limit (Resolution 1%/bit)
4	0.025	Output Shaft Speed (Resolution 16 RPM/bit)
5	0.025	Checksum

5.2.1 OVERRIDE CONTROL MODES—The transmission to powertrain message is a variable length message that shall have four control modes and they are as defined as follows. The engine shall always honor an override request by the transmission (i.e., transmission takes precedence over road speed limiting and cruise control). In the absence of continued broadcasts from the transmission, the engine shall default to Mode 00 after a predetermined length of time.

a. Mode 00—When operating in this mode, the transmission is not required to provide an override command to the engine; override is disabled. The sending of bytes 2 and 3 shall be omitted.
b. Mode 01—When operating in this mode, the engine shall function as a speed regulator with the transmission providing the speed command in bytes 2 and 3 of the message.
c. Mode 10—When operating in this mode, the engine shall function as a torque regulator with the transmission providing the torque command in byte 3 of the message with byte 2 being omitted.
d. Mode 11—When operating in this mode, the transmission shall command an engine speed upper limit and an engine torque limit designated in bytes 2 and 3, respectively, of the message. Byte 2 of this message is a transmission command to the engine that limits the maximum speed of the engine. Byte 3 contains a value that commands the engine to limit its available torque for the current engine speed.

The transmission control shall be able to request an override of the governed engine high idle RPM up to the maximum engine override speed as defined in the engine to powertrain initialization message.

5.2.1.1 For Override Control Mode = 00 (Override Disabled)

Byte No.	Bit No.	Description
0	Data	MID = 74
1	0,1 = 00	Override Disable
	2 = ___	Engine Retarder Enable
	3 = 0	Momentary High Idle Override
	4 = ___	Driveline Engaged
	5 = ___	Transmission Retarder Control Status
	6,7 = 00	For Future Use
2	Data	Output Shaft Speed
3	Data	Checksum

5.2.1.2 For Override Control Mode = 01 (Desired Engine Speed)

Byte No.	Bit No.	Description
0	Data	MID = 74
1	0,1 = 01	Desired Engine Speed
	2 = ___	Engine Retarder Enable
	3 = ___	Momentary High Idle Override
	4 = ___	Driveline Engaged
	5 = ___	Transmission Retarder Control Status
	6,7 = 00	For Future Use
2	Data	Desired Engine Speed Value - LSB
3	Data	Desired Engine Speed Value - MSB
4	Data	Output Shaft Speed
5	Data	Checksum

5.2.1.3 For Override Control Mode = 10 (Desired Engine Torque Control)

Byte No.	Bit No.	Description
0	Data	MID = 74
1	0,1 = 10	Desired Engine Torque Control
	2 = ___	Engine Retarder Enable
	3 = 0	Momentary High Idle Override
	4 = ___	Driveline Engaged
	5 = ___	Transmission Retarder Control Status
	6,7 = 00	For Future Use
2	Data	Desired Percent Engine Torque Value
3	Data	Output Shaft Speed
4	Data	Checksum

5.2.1.4 For Override Control Mode = 11 (Engine Speed and Torque Limiting)

Byte No.	Bit No.	Description
0	Data	MID = 74
1	0,1 = 11	Engine Speed/Torque Limiting
	2 = ___	Engine Retarder Enable
	3 = 0	Momentary High Idle Override
	4 = ___	Driveline Engaged
	5 = ___	Transmission Retarder Control Status
	6,7 = 00	For Future Use
2	Data	Engine Speed Upper Limit - (16 RPM/bit)
3	Data	Percent Torque Value Upper Limit - (1%/bit)
4	Data	Output Shaft Speed
5	Data	Checksum

5.3 ABS/Traction Control to Powertrain Message

FORMAT = (MID, BYTE1, BYTE2, CHECKSUM)
PRIORITY 1
ABS/Traction Control MID = 79
Update Period =Maximum rate to be broadcast only while ABS/traction control function is in operation with at least one additional transmission after ABS/traction control function has ceased in order to communicate a resumption to normal engine and transmission operation.

MESSAGE BYTE	CONTENTS UPDATE PERIOD	DESCRIPTION
0	0.050	MID = 79
1	0.050	Control/Status Byte BIT DESCRIPTION 0,1 Override Control Mode 00 = Override Disabled 01 = Speed Control Mode 10 = Retarder or Engine Torque Control Mode 11 = Retarder or Engine Torque Limit Mode 2 Retarder or Engine Control Select. Select for modes to control engine driving torque or retarder braking torque. 1 = Retarder Control 0 = Engine Fueling Control 3 Gear Shift Disable 1 = Inhibit Gear Shifts 0 = Allow Shifts as Normal 4 Retarder Disable 1 = Disable Driveline Retarders 0 = Allow Normal Retarder Use 5 Torque Converter Lock Up Disable 1 = Disable Torque Converter Lock Up Clutch 0 = Enable Lock Up as Normal 6 Request to Neutral 1 = Request Transmission De-clutch to Neutral 0 = Allow Normal Operation 7 For Future Use
2	0.050	Data Byte FOR MODE = 00Not Broadcast FOR MODE = 01 RPM Speed Value Command (Resolution 16 RPM/bit) FOR MODE = 10Desired Retarder or Engine Percent Peak Torque Value Command (Resolution 1%/bit) FOR MODE = 11Retarder or Engine Percent Torque Limit Command (Resolution 1%/bit)
3	0.050	Checksum

5.3.1 ABS/TRACTION CONTROL MODES—In the event of conflicting torque requests, limiting requests, and speed requests from both the transmission and the ABS/traction control, the engine shall honor the transmission request.

Note this is a variable length message with byte 2 being omitted if the override control mode is disabled as indicated by bits 0 and 1 of the control/status byte.

Cruise control functions in either the engine or transmission controls must allow for the traction control torque limiting requests to override and/or limit the engine output torque. In the absence of continued broadcasts from the ABS/traction controls, the engine shall default to Mode 00 after a predetermined length of time.

5.4 Retarder to Powertrain Message

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 4
Retarder MID = 83
Update Period = 0.100 s

MESSAGE CONTENTS

BYTE	UPDATE PERIOD	DESCRIPTION
0	0.100	MID = 83
1	0.100	Retarder Status BYTE
		BIT DESCRIPTION
		0 Retarder Active/Inactive
		1 = Active
		0 = Inactive
		1 Retarder Operational Status
		1 = Retarder Selected
		0 = Not Selected
		2,3 For Future Use
		4,5,6,7 Retarding Level Status
		0000 = Off
		1111 = 100% On
		Resolution:6.67%/bit
		Range:0 to 100%
2	0.100	Checksum

5.5 Transmission to Powertrain Current Gear Number Message

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 6
Current Gear MID = 77
Update Period =Sent by transmission to powertrain when engine control requires transmission current gear number.

MESSAGE BYTE	CONTENTS DESCRIPTION
0	MID = 77
1	Current Engaged Gear Number
2	Checksum

5.6 Engine to Transmission Current Gear Request Message

FORMAT = (MID, CHECKSUM)
PRIORITY 5
Current Gear Request MID = 72
Update Period =Sent by engine to transmission when engine control requires transmission current gear number.

MESSAGE BYTE	CONTENTS DESCRIPTION
0	MID = 72
1	Checksum

5.7 Initialization Messages—Initialization messages are used to communicate some of the operating parameters of the various powertrain systems that are of importance to the other controls. This is done to reduce the amount of calibration data required by each control system and to avoid necessary recalibration of the other systems should one device be reconfigured or its operating parameters changed.

Initialization messages are only sent on request by an initialization request message. Typically these requests will be broadcast on power up of the systems, after any system resets, and when any of the initialization parameters have changed during the current period of operation and are so indicated by a bit in a status byte broadcast on a regular basis.

5.7.1 Engine to Powertrain Initialization Message

FORMAT = (MID, BYTE1, BYTE2, BYTE3, ... , BYTE21, CHECKSUM)
PRIORITY 8
Engine Initialization MID = 70
Update Period = On request by powertrain.
The least significant byte of all engine speeds is transmitted first.

MESSAGE BYTE	CONTENTS DESCRIPTION	
0	MID = 70	
1,2	Engine Speed at Idle	(Resolution 0.0625 RPM/bit)
3	% of Peak Torque at Idle	(Resolution 1%/bit)
4,5	Rated Engine Speed	(Resolution 0.0625 RPM/bit)
6	% of Peak Torque at Rated Engine Speed	(Resolution 1%/bit)
7,8	Engine Speed Point 3	(Resolution 0.0625 RPM/bit)
9	% of Peak Torque at Point 3	(Resolution 1%/bit)
10,11	Engine Speed Point 4	(Resolution 0.0625 RPM/bit)
12	% of Peak Torque at Point 4	(Resolution 1%/bit)
13,14	Engine Speed Point 5	(Resolution 0.0625 RPM/bit)
15	% of Peak Torque at Point 5	(Resolution 1%/bit)
16,17	Engine Speed at Peak Torque	(Resolution 0.0625 RPM/bit)
18	Peak Torque of Engine	(Resolution 10 lb-ft/bit)
19,20	Engine Speed at High Idle	(Resolution 0.0625 RPM/bit)
21	Maximum Engine Override Speed	(Resolution 16 RPM/bit)
22	Checksum	

5.7.2 TRANSMISSION TO POWERTRAIN INITIALIZATION MESSAGE

FORMAT = (MID, BYTE1, BYTE2, BYTE3, ... , BYTEn, CHECKSUM)
PRIORITY 8
Transmission Initialization MID = 75
Update Period = On request by the engine

MESSAGE CONTENTS

BYTE	DESCRIPTION
0	MID = 75
1	Number of reverse gear ratios
2	Number of forward gear ratios
3,4	Highest Vehicle Speed Reverse Gear Ratio (1/16 Input RPM/Output RPM)
	|
* , *	Lowest Vehicle Speed Reverse Gear Ratio (1/16 Input RPM/Output RPM)
* , *	Lowest Vehicle Speed Forward Gear Ratio (1/16 Input RPM/Output RPM)
	|
* , *	Highest Vehicle Speed Forward Gear Ratio (1/16 Input RPM/Output RPM)
*	Checksum

5.7.3 ABS/TRACTION CONTROL TO POWERTRAIN INITIALIZATION MESSAGE

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 8
ABS/Traction Control Initialization MID = 80
Update Period - On request

MESSAGE CONTENTS

BYTE	DESCRIPTION
0	MID = 80
1	Status Byte
	Bit
	0 1 = ABS installed
	1 1 = ASR installed
	2 Not used
	3 Not used
	4 Not used
	5 Not used
	6 Not used
	7 Not used
2	Checksum

5.7.4 RETARDER TO POWERTRAIN INITIALIZATION MESSAGE

FORMAT = (MID, BYTE1, BYTE2, CHECKSUM)
PRIORITY 8
Retarder Initialization MID = 84
Update Period = On request by powertrain

MESSAGE BYTE	CONTENTS DESCRIPTION
0	MID = 84
	Status Byte
1	Type of Retarder
	BIT DESCRIPTION
	0 Not used
	1 1 = Engine Compression Release
	2 1 = Exhaust
	3 1 = Transmission Input
	4 1 = Transmission Output
	5 1 = Driveline Retarder (Electric, Hydraulic, Wet Friction)
	6 1 = Trailer Retarder
	7 Not used
2	Peak Torque of Retarder (10 lb-ft/bit)
3	Checksum

5.7.5 ENGINE TO POWERTRAIN INITIALIZATION REQUEST MESSAGE

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 7
Initialization Request MID = 71
Update Period = Sent by engine when any initialization message is required (i.e., power up, reset within ECU, etc.).

MESSAGE BYTE	CONTENTS DESCRIPTION
0	MID = 71
1	Status/Enable Byte
	BITS DESCRIPTION
	0 1 = Request Engine Initialization Message
	1 1 = Request Transmission Initialization Message
	2 1 = Request ABS/Traction Control Initialization Message
	3 1 = Request Retarder Initialization Message
	4-7 For Future Use
2	Checksum

5.7.6 TRANSMISSION TO POWERTRAIN INITIALIZATION REQUEST MESSAGE

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 7
Initialization Request MID = 76
Update Period =Sent by transmission when any initialization message is required (i.e., power up, reset within transmission ECU, engine parameter change bit set in engine to powertrain message, etc.).

MESSAGE BYTE	CONTENTS DESCRIPTION	
0	MID = 76	
1	Status / Enable Byte	
	BITS	DESCRIPTION
	0	1 = Request Engine Initialization Message
	1	1 = Request Transmission Initialization Message
	2	1 = Request ABS/Traction Control Initialization Message
	3	1 = Request Retarder Initialization Message
	4-6	For Future Use
	7	1 = Progressive Shift Disable
2	Checksum	

5.7.7 ABS/TRACTION CONTROL TO POWERTRAIN INITIALIZATION REQUEST MESSAGE

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 7
Initialization Request MID = 81
Update Period =Sent by ABS/traction control when any initialization message is required (i.e., power up, reset within control unit, engine parameter change bit set in engine to powertrain message, etc.).

MESSAGE CONTENTS BYTE	DESCRIPTION	
0	MID = 81	
1	Status / Enable Byte	
	BITS	DESCRIPTION
	0	1 = Request Engine Initialization Message
	1	1 = Request Transmission Initialization Message
	2	1 = Request ABS/Traction Control Initialization Message
	3	1 = Request Retarder Initialization Message
	4-7	For Future Use
2	Checksum	

5.7.8 RETARDER TO POWERTRAIN INITIALIZATION REQUEST MESSAGE

FORMAT = (MID, BYTE1, CHECKSUM)
PRIORITY 7
Initialization Request MID = 85
Update Period =Sent by retarder when any initialization message is required (i.e., power up, reset within control unit, engine parameter change bit set in engine to powertrain message, etc.).

MESSAGE CONTENTS

BYTE	DESCRIPTION	
0	MID = 85	
1	Status/Enable Byte	
	BITS	DESCRIPTION
	0	1 = Request Engine Initialization Message
	1	1 = Request Transmission Initialization Message
	2	1 = Request ABS/Traction Control Initialization Message
	3	1 = Request Retarder Initialization Message
	4-7	For Future Use
2	Checksum	

PREPARED BY THE SAE TRUCK AND BUS DIESEL ENGINE ELECTRONIC CONTROLS SUBCOMMITTEE
OF THE SAE TRUCK AND BUS ELECTRICAL AND ELECTRONIC CONTROLS COMMITEE

APPENDIX A

ENGINE'S DESIRED RPM ASYMMETRY ADJUSTMENT—

The engine's desired RPM asymmetry adjustment is a 1 byte scaled ratio value such that:

$$\frac{\text{Desired RPM Asymmetry Adjustment}}{255} = \frac{\overline{BX}}{\overline{AB}} \qquad \text{(Eq. A1)}$$

where:

A and B are points of equal fuel consumption
$\overline{AB}$ has a length approximately equal to the RPM span of one gear ratio step in the transmission
X is point of optimal fuel consumption

FIGURE A1—

SAE J1922 Issued DEC89

Rationale—Not applicable.

Relationship of SAE Standard to ISO Standard—Not applicable.

Application—This document provides a development or possibly interim production communication protocol between engine, transmission, ABS/traction control, and retarder systems until higher speed communication links are established.

Reference Section

SAE J1708—Serial Data Communications Between Microcomputer Systems in Heavy-Duty Vehicle Applications

SAE J1587—Joint SAE/TMC Electronic Data Interchange Between Microcomputer Systems in Heavy-Duty Vehicle Applications

SAE J1843—Accelerator Pedal Position Sensor for Use With Electronic Controls in Medium-and Heavy-Duty Diesel On-Highway Vehicle Applications

Developed by the SAE Truck and Bus Diesel Engine Electronic Controls Subcommittee

Sponsored by the SAE Truck and Bus Electrical and Electronic Controls Committee