

3.7.2 Deviations from this Standard. Deviations from the requirements of this standard shall have been agreed upon. Such requirements shall be specified on component drawings, test certificates, reports, etc.

4 Requirements and Procedure

4.1 Common Circuit Database. The Common Circuit database will consist of five items of information for, each circuit, i.e., circuit number, circuit color, circuit subsystem, abbreviated circuit description, and circuit description. The database

will be accessible and searchable. Database queries will be presented in a tabular form. Users will be provided with a method for requesting new circuit numbers and commenting on existing circuits. The database will be managed according to 4.1.1 thru 4.1.6 requirements.

4.1.1 Database Format. The database will be stored on a network server as a colon delimited text file. The database will be formatted for presentation as five columns of information. See Table 1.

Table 1: Common Circuit Database Description

No	Color	Subsystem	Abbreviated Description	Description
1	RD	Power and Ground Distribution	BAT	Battery – Unfused
2	RD/BK	Power and Ground Distribution	BAT_FU_TYP_I	Battery – Fused – Type I
3	VT/BK	Power and Ground Distribution	IGN_SWOT_RC	Ignition Switch – Output – Run/Crank

4.1.2 Database Access. The database will be accessible within the Electrical Design Schematic Design Tool. Currently this is Integrated Vehicle Electrical Design (IVED).

4.1.2.1 Access from Within GM Schematic Design Tool. The GMW Circuit List is available when using the GM Schematic Design Tool. Currently this is IVED Design Architect.

4.1.2.2 Access from the GM Intranet. The GMW Circuit List is stored in Teamcenter Community (TcC) as part of the IVED configuration.

4.1.3 Circuit Additions. Circuits can be added to the database by making requests to the IVED Configuration Owner.

The requester will need to supply the function of the circuit and may request a preferred color and subsystem in accordance with rules contained herein.

4.1.4 Circuit Corrections. Circuit corrections may need to be made to eliminate errors from the database. It is preferred to correct circuit descriptions without changing the function of the circuit.

4.1.5 Circuit Obsolescence/Deletion.

4.1.5.1 An obsolescence/deletion process will be implemented to eliminate unused or unnecessary circuits from the database. Circuits that are no longer used by a vehicle platform or are incorrectly numbered and/or described can be deemed obsolete.

4.1.5.2 A method of communication will exist to inform users of when a circuit is considered obsolete and when it will be deleted. An alternative circuit number will be communicated to the user whenever an alternative is available.

4.1.5.3 An obsolete circuit will be removed from the database and stored separately for four years. Should a vehicle platform need to use an obsolete circuit they can request that the circuit be added back into the database. The circuit will be added to the database when it conforms to the requirements of this manual. If after four years, the obsolete circuit has not been returned to the database, it will be deleted, removing all record of the circuit.

4.1.6 Reuse of a Circuit. Obsolete circuits can be assigned as new circuits after four years of inactivity. The new circuit can be unrelated to the obsolete circuit in electrical function and description.

4.2 Circuit Numbers. A unique number will be assigned to each GMW circuit according to 4.2.1 thru 4.2.3 guidelines.

4.2.1 Circuit Number Rules and Reserved Circuit Numbers. Circuit descriptions shall be numbered and reserved in accordance to the rules of Table 2.

4.2.2 Assigning New Circuit Numbers. Preferably, new circuit numbers will be added in consecutive order starting with the first available number. Exceptions will be made for reserved circuit numbers.

4.2.3 Developmental Circuit Numbers. Circuit numbers 900 to 999 and 9000 to 9999 will not be assigned in the GMW Circuit List. These numbers are available for developmental use.

4.3 Circuit Color. Circuit color will be represented in the database by an abbreviation. A stripe may be added to a primary circuit color when needed. The 10 base colors to be used are shown in Table 3. The determination and naming of the color codes is based on ISO 6722 and IEC 757. Deviating from the pre-given Reichsausschuss für Lieferbedingungen (RAL) color coding is permissible as long as correct determination to IEC 757 and avoiding of misinterpretation is

guaranteed. An overview of the possible stripe combinations are shown in Appendix A.

4.3.1 Basic Color. Color which covers the whole surface of a wire or the surface at its highest percentage.

4.3.2 Strip color. Color given as two symmetrically opposite sided small stripes on the wire. The individual stripe shall be a minimum of 7% wide, but not more than 15% of the circumference of the wire.

4.3.3 Nomenclature. For wires wearing additional strip colors, the basic color is separated from the strip color by using a slash character, e.g., BK/WH. In this case BK is the basic color and WH is the strip color.

Table 3: Insulation Colors

Color	Color Abbreviation to IEC 757	Color According to IEC 304	Similar to SAE J1128	
Black	BK	RAL 9005	BK	PED C-1661 N2.25/
Brown	BN	RAL 8003	TN	PED C-1631 5YR 5.5/4.6
Red	RD	RAL 3000	RD	PED C-1628 4.4 R 3.4/10.4
Orange	OG	RAL 2003	OG	PED C-1629 8.75 R5.75/12.5
Yellow	YE	RAL 1021	YE	PED C-1632 8Y 8.5/11.2
Green	GN	RAL 6018	L-GN	PED C-1626 0.5 G 5.6/7.0
Blue	BU	RAL 5015	D-BU	PED C-1623 4.6 PB 3.8/10.2
White	WH	RAL 1013	WH	PED C-1660 5Y 9/1
Gray	GY	RAL 7000	GY	PED C-1633 N 5.7/(10GY.0.2)
Violet	VT	RAL 4005	PU	PED C-1624 4.4 P 3.9/6.7

4.3.4 Color Circuit Rules. The color rules are shown in Table 2.

4.3.4.1 Reserved Circuit Color. Certain colors are reserved for particular circuit descriptions per Table 2. The reserved colors shall only be used for

those descriptions. Other colors are “assigned” to particular circuit descriptions but are not reserved. Assigned colors can be used for other circuit descriptions.

New Color Rules			
Circuit Class	Circuit No. Rule	GMW3176 Color Rule	Reserved Color?
Un-Switched Power			
Battery-Unfused	1	RD	Y
Battery-Type I Fuse	2, xx02 (reserved below 3100 only)	RD + Stripe (Not RD/BK)	Y
Battery-Type II Fuse	xx42 (reserved below 3100 only)	RD + Stripe (Not RD/BK)	Y
Battery-Type III Fuse	xx40	RD + Stripe (Not RD/BK)	Y
Switched Power			
Run/Crank (Ign 1)	3, xx39	VT/BK, VT/GN, VT/GY, VT/WH	N
Run (Ign 3)	300, xx41 (reserved below 3100 only)	VT/BN	N
Accessory	4, xx43 (reserved below 3100 only)	VT/YE	N
Powertrain (Main) Relay	No Rule	VT/BU	N
Retained Accessory Power (RAP)	No Rule	VT	N
Voltage Reference (Vref) (5 to 14V, or unspecified)	No Rule	Base + RD Stripe (not BK/RD, not OG/RD)	Y
Ground			
Dirty Ground	xx50	BK	Y
Clean Ground	xx51	BK/WH	Y
Ground Reference	No Rule	BK + Stripe (not BK/RD, BK/WH) BK/OG only for SIR	Y
Serial Data			
LS GMLAN	No Rule	GN	N
MS GMLAN+	No Rule	YE	N
MS GMLAN-	No Rule	WH	N
HS GMLAN+ (Primary)	No Rule	BU	N
HS GMLAN- (Primary)	No Rule	WH	N

New Color Rules			
Circuit Class	Circuit No. Rule	GMW3176 Color Rule	Reserved Color?
HS GMLAN+ (Additional)	No Rule	BU + Stripe	N
HS GMLAN- (Additional)	No Rule	WH	N
Accessory/WU	No Rule	VT/YE	N
Comm/Enable	No Rule	WH/BU	N
LIN	No Rule	Green + Stripe	N
Other			
SIR	No Rule	OG + Stripe, or Base + OG Stripe, BK/OG for Ground Ref, (Not OG w/o Stripe, Not OG/BK, which are reserved for High Voltage)	Y
High Voltage (DC)	No Rule	OG for Power, OG/BK for Ground	Y
High Voltage (AC)	No Rule	120 VAC to follow U.S. NEC Standard: - RD= 120VAC Phase A - BK = 120 VAC Phase B - WH = 120 VAC Neutral - GN = 120 VAC Ground 230 VAC to follow Europe Standard: - BN = 230 VAC Power - BU = 230 VAC Neutral - GN/YE = 230 VAC Ground	N
Mid Voltage	No Rule	No Rule	N
All Other Circuits	No Rule	Not any of the reserved color combinations	N

4.4 Circuit Subsystem. Each circuit will be assigned to a subsystem. This will enable circuits with related functions to be grouped together for purposes of information gathering. A subsystem table can be found in Appendix B.

4.5 Circuit Description. A circuit description will exist for each circuit in the GMW Circuit List. The description will describe the device and/or function of the circuit in a consistent construct according to 4.5.1 thru 4.6 requirements.

4.5.1 General Text Constructs. General text constructs will be applied to each circuit description to maintain consistency and readability. First letter capitalization will be applied in all cases except when a system power mode is being described. System power modes will be all capital letters.

Paragraphs 4.5 and 4.6 give details on how to construct specific circuit descriptions. Optional fields are enclosed in greater-than less-than symbols (i.e., <Optional Field Value>).

4.5.2 Root Component Name. A root component name will be an identifier that associates the circuit with a specific vehicle feature or component. The root component name will identify groups of related circuits. To maintain consistent naming, the root component name should match those already existing in the common circuit database. A root component table can be found in Appendix C.

4.5.2.1 Root Component Type. A root component name may require an identifier that specifies application. A root component type will precede the root component name in the description and will be used to specify the application of a root component (e.g., Exhaust Brake, etc.). To maintain consistent

naming, the root component type should match those already existing in the common circuit database. Root component type can be found in the root component table in Appendix C.

4.5.3 Device Name. A device name will be a single word that identifies the generic device (e.g., Fuse, Lamp, Relay, Switch, etc.). The device name can be determined according to circuit origin or destination, whichever is applicable. To maintain consistent naming, the device name should match those already existing in the common circuit database. A device name table can be found in Appendix D.

4.5.3.1 Device Name Type. A generic device name may require an identifier that specifies function. A device name type will precede the device name in the description and will be used to identify the function of a device name (e.g., Limit Switch, Pressure Sensor, etc.). To maintain consistent naming, the device name type should match those already existing in the common circuit database. Device name type can be found in the device name table in Appendix D.

4.5.3.2 Internal Component. A generic device may require an identifier that specifies an internal component and the function/state of the internal component. The internal component and internal component function/state will be appended to the device name. To maintain consistent naming, the internal component identifier should match those already existing in the common circuit database. Internal component can be found in the device name table in Appendix D.

4.5.4 Device Description. A device description will be constructed by appending the root component, device name type, and device name together. The device description will be constructed as follows: Root Component<Device Name Type>Device Name<internal Component – Internal Component Function/State>, e.g., Stop Turn Lamp Relay - Contact – N.O.

4.5.5 Function Description. The function description will specify the purpose, state, or action of the circuit. The function description can be constructed as a signal followed by the function description or a location descriptor.

The function description can be constructed as Function - Function Description when the circuit is uniquely and unambiguously described by the function description itself (e.g., Lamp Monitor Data Request, etc.). To maintain consistent naming, the function and function description should match those already existing in the common circuit database. A Function/Mode/State/Action table can be found in Appendix E.

4.5.6 Location Descriptor. A location descriptor is an optional field that will identify an area of the vehicle (e.g., Driver, Left Front, etc.). The descriptors, Driver and Passenger, will be used to denote location of a function or device that impacts the interior realm of the vehicle. The other descriptors, Front, Rear, etc., will be used to denote the location of a function or device that impacts the exterior realm of the vehicle. To maintain consistent naming, the location descriptor should match those already existing in the common circuit database. A location/Identifier table can be found in the Product Data Management (PDM) system.

4.5.7 Identifier. An identifier will be a number that uniquely identifies identical circuits, (e.g., Windshield Wiper Switch - Signal - 1, Windshield Wiper Switch - Signal - 2, etc.). To maintain consistent naming, the identifier should match those already existing in the common circuit database. A location/Identifier table can be found in the Product Data Management (PDM) system.

4.5.8 Power Feed Circuit. A power feed circuit will be classified as one of two types: ignition power feed, battery power feed.

4.5.8.1 Ignition Power Feed. An ignition power feed will describe a circuit that supplies a fused, ignition switched power feed. An ignition power feed circuit will have an ignition switch signal as a function description and a device description of Fused - Type I, II, III. The redundancy of the device description makes the function description more meaningful to the GMW Circuit List user. An ignition power feed description will be constructed as follows: Function Description - Device Description (e.g., Accessory - Fused - Type III, etc.). All ignition power feed circuits will reside in the Power and Ground Distribution subsystem.

4.5.8.2 Battery Power Feed. A battery power feed will describe a circuit that supplies a fused, unswitched power feed. A battery power feed will have a device description of Fused - Type I, II, or III and a root component of Battery. A battery power feed circuit will be constructed as follows: Root Component - Device Description (e.g., Battery - Fused - Type I, etc.).

4.6 Abbreviated Circuit Description. The abbreviated circuit description will be constructed by abbreviating the circuit description. To maintain consistent naming, the abbreviated circuit description should match those already existing in the common circuit database. An abbreviation table can be found in the Product Data Management (PDM) system.

5 Provisions for Shipping

Not applicable.

6 Notes

6.1 Glossary. Not applicable.

6.2 Acronyms, Abbreviations, and Symbols.

BEC	Bus Electrical Center
BTSI	Brake Transmission Shift Interlock
CAD	Computer Aided Design
EGR	Exhaust Gas Recirculation
ELC	Electronic Level Control
ESC	Electronic Spark Control
EVO	Electronic Variable Orifice
Gnd	Ground
IEC	International Electrotechnical Commission
Ign	Ignition
IUE	IVED User Enhancements
IVED	Integrated Vehicle Electrical Design
MSVA	Magnetic Steering Variable Assist
N.C.	Normally Closed
N.O.	Normally Open
Opt	Optional
PED	Packard Electric Division
PDM	Product Data Management
PWM	Pulse Width Modulated
RAL	Reichsausschuss für Lieferbedingungen (National Board of Supply Conditions)
RTD	Real Time Damping
TC	Traction Control
TcC	Teamcenter Community
TCC	Torque Converter Clutch
Telcomm	Telecommunications

7 Additional Paragraphs

7.1 All parts or systems supplied to this standard must comply with the requirements of GMW3059, **Restricted and Reportable Substances for Parts.**

7.2 Central Database. The circuit list is stored in tabular form for the support in automatic development systems. The extension of the list is obliged to a central helpdesk request system maintained by the owner responsible for standardizations.

7.3 Format of the List. The list is centrally stored in IVED as a colon separated text file.

7.4 Access to Database. The reading accessibility is given electronically by Online Web-Browser facilities. Copying and file distribution is centrally controlled and executed for the provision of several CAD applications, e.g., Design-Architect.

8 Coding System

This standard shall be referenced in other documents, drawings, etc., as follows:
GMW3176

9 Release and Revisions

9.1 Release. This standard originated in November 1998. It was first approved in December 1998 by the Electrical Group. It was first published in February 1999. Content that was added in the May 2008 publication of GMW3176 is replacing GME 8740.

9.2 Revisions.

Rev	Approval Date	Description (Organization)
A	FEB 1999	Modify database access section 3.1.2.1 (R. A. Trickett)
B	MAY 2008	Add GME 8740 content. (Global Technology Engineering)