Tiffin Instrument Panel Specification

Version 8.0

(March 3, 2010)

REVISION HISTORY

REV	AUTHOR	Description of Change	Date
1.0	TH	Original Draft	12/16/09
2.0	TH	Mark ups and corrections	12/17/09
3.0	TH	Added more corrections and detail	01/22/10
4.0	SR	Added Icon Graphics supplied by Customer	01/26/10
5.0	SR	Added Graphical Display Requirements provided by customer and updated to capture Customer Input from Engineering Teleconference.	01/28/10
6.0	SS	Added SAE J1455 and note to section 4 References per Medallion requirement ISO-P-028	02/02/10
7.0	SR	Documented Back Light Color Selection and added new Icons	02/15/10
8.0	SR	Updated message set and inserted latest panel illustrations	03/03/10

APPROVAL SIGNATURES

_____ _____

Program Manager Date

_____ _____

Product Manager Date

_____ _____

Author of Current Version Date

1. Purpose

The purpose of this document is to specify the operation of the Tiffin Instrument Panel.

2. Scope

This document applies to the Tiffin MY2011 Power Glide Application using Cummins ISL and ISC engines.

3. Timing

This product would be introduced to production at Tiffin at the Model Year Change Over currently scheduled for the week of March 22nd, 2010.

4. References

SAE	J1939
SAE	J1455
Medallion	M3 Peripheral Communications Protocol

Note: Unless otherwise noted, specifications referenced in this design record apply at the revision level in effect on the original date of issuance of the design record.

5. Definitions

LIN	Analog Instrument Data Bus
IPA	Instrument Panel Assembly
GDIG	Graphical Data Interface Gauge
ECU	Engine Control Unit

6. System Definition

6.1. SYSTEM DESCRIPTION AND CONTENT

Each Tiffin Instrument Panel Assembly shall consist of 6 components:

- A Chameleon Warning Lamp Assembly
- A 5” GDIG Speedometer with a Graphical Info Center
- A 5” 4N1 Gauge
- A 5” 3N1 Gauge
- A Panel
- Harnessing

6.2. PANEL OPTIONS

DESCRIPTION	PART NUMBER	ILLUSTRATION
MY2010 IPA	**4571-11037-01**	
MY2011 IPA	**4571-11039-01**	

Panel Part Number Identifier
Table - 1

6.3. CHAMELEON WARNING LAMP ASSEMBLY DESCRIPTION

The GDIG interfaces with a Chameleon module via the LIN bus to indicate vehicle warning conditions to the operator. The Chameleon Module features LED indicators that illuminate via messages on the J1939 bus, direct inputs to the GDIG, or direct inputs to the Chameleon Module itself. The following indicators are supported:

ICON	NAME	GRAPHIC	COLOR	SOURCE	PIN	SIGNAL	CONTROL	ALARM
1	RIGHT TURN		GREEN	DIRECT	J3-1	ACTIVE HIGH	ON SOLID	5
2	STOP ENGINE		RED	J-1939 DM-1		PGN: 65226 SPN 623	ON SOLID	3
3	CHECK ENGINE		AMBER	J-1939 DM-1		PGN: 65226 SPN 624	ON SOLID	4
4	COOLANT TEMP		RED	J-1939		DM1	ON SOLID	NONE
5	DEF LEVEL		AMBER	J-1939		PGN: 65110 SPN: 5245	ON SOLID	NONE
6	MIL		AMBER	J-1939 DM-1		PGN: 65226 SPN 1213	ON SOLID	NONE
7	WAIT TO START		AMBER	J-1939		PGN: 65252 SPN 1081	ON SOLID	4
8	SPARE							
9	OIL PRESSURE		RED	J-1939		DM1	ON SOLID	NONE
10	PARK BRAKE		RED	DIRECT	J2-5	ACTIVE LOW	ON SOLID	NONE
						LOW + SPEED ≥ 2 MPH	FLASH @ 0.3S	2
						OPEN AND IGN OFF	FLASH @ 0.3S	2

TABLE CONTINUED ON NEXT PAGE

ICON	NAME	GRAPHIC	COLOR	SOURCE	PIN	SIGNAL	CONTROL	ALARM
11	ABS		AMBER	J-1939		PGN: 61441 SPN 1793	ON SOLID	4
12	LOW AIR		RED	GDIG		ON @ ≤ 65 PSI OFF @ ≥ 72 PSI	ON SOLID	1
13	LOW VOLTAGE		RED	J-1939		ON @ ≤ 11.5 V OFF @ ≥13.2 V	ON SOLID	NONE
14	LEFT TURN		GREEN	DIRECT	J3-2	ACTIVE HIGH	ON SOLID	5
15	DPF STATUS		AMBER	J-1939		SPN 3697 SPN 3697	ON SOLID FLASH	4
16	HOT EXHAUST (HET)		AMBER	J-1939		SPN 3698	ON SOLID	NONE
17	SPARE			DIRECT	J3-3			
18	SPARE			DIRECT	J3-4			
19	SPARE			DIRECT	J3-5			
20	HIGH BEAM		BLUE	DIRECT	J3-6	ACTIVE HIGH	ON SOLID	NONE
21	JACKS DOWN		RED	DIRECT	J3-7	ACTIVE LOW	ON SOLID	4
22	SPARE			DIRECT	J3-8			
23	CHECK INFO		AMBER	DIG		ON WITH ACTIVE WARNING	ON SOLID	NONE
24	CHECK TRANS		AMBER	J-1939		DM1	ON SOLID	4

Chameleon Warning Lamp Descriptions
Table - 2

Chameleon Warning Lamp Locations
Figure - 1

6.4. GENERAL GAUGE STYLING REQUIREMENTS

FEATURE	REQUIREMENT
Dial Graphic	Custom Tiffin
Graphic Back Light Color	Amber
Bezel Finish	Chrome
Pointer Type	Standard
Pointer Color	Red Lisa
Pointer Cap	Black Button
Pointer Back Light Color	Red

General Styling Requirements
Table - 3

6.5. SPEEDOMETER DESCRIPTION

GDIG Speedometer
Figure - 2

6.5.1. DIG Requirement

The Speedometer is a GDIG and acts as the instrument system controller for the IPA.

6.5.2. Speedometer Scale

The Speedometer shall have a zero to 120 scale with units displayed as dead fronted icons.

6.5.3. Button Description

The Speedometer shall have integral buttons for controlling the LCD

6.5.4. Required Dead Front Icons

NAME	GRAPHIC	COLOR	SOURCE	SIGNAL	CONTROL	ALARM
SEAT BELT		RED	TIMED	ON @ IGN	30 SEC	NONE
LOW FUEL		AMBER	GDIG	ON @ < 12.5% OFF@>18%	ON SOLID	NONE
CRUISE		GREEN	J-1939	SPN527	ON SOLID	NONE
WATER IN FUEL	WIF	AMBER	J-1939		ON SOLID	4
MPH	MPH	AMBER	GDIG		ON SOLID	NONE
km/h	KMH	AMBER	GDIG		ON SOLID	NONE

6.5.5. Driver's Information Center Description

The Speedometer shall include a Graphical Drivers Information Center.

The functionality of the Driver's Information Center can be broken down into 5 categories:

1. A Pre Drive Check List
2. A main or default screen in which the following information is displayed:

   Main Odometer Data Block
   Trip Odometer Data Block (Trip1 and Trip 2 can share a data block)
   Gear Attained Data Block

3. The display of user selectable digital data:

DATA	SOURCE	FORMAT
BATTERY VOLTAGE	J-1939	XX.X VOLTS
ENGINE HOURS	J-1939	XX,XXX.XX HOURS
ENGINE RPM	J-1939	XXXX RPM
INSTANTANEOUS FUEL ECONOMY	J-1939	XX.X MPG
AVERAGE FUEL ECONOMY	DIG CALCULATED	XX.X MPG
TRANSMISSION TEMPERATURE	J-1939	XXX.Xº (F/C)
ENGINE LOAD	J-1939	XX %
GENERATOR HOURS	DIG	XX,XXX.XX HOURS

User Selectable Digital Data
Table – 4

4. There shall be pop up warning messages for the following conditions:

ALARM CONDITION	SOURCE	NOTES
"LOW VOLTAGE"	J-1939	
"ATC Warning"	J-1939	PGN: 61441 SPN: 1438
"TRANSMISSION TEMP"	J-1939	
'COMMUNICATION ERROR"	J-1939	Engine, Trans, or ABS
"TURN SIGNAL ON"	DIG	Turn Signal "On" + 1 Mile Traveled
"GENERATOR LOW FUEL"	DIG	Generator "On" + Fuel $\leq$ 20%

Info Center Pop Up Warning Messages
Table – 5

Notes: 1) Each of the above alarms will turn on the "Check Info" Warning Lamp.
2) Each of the above alarms will activate audible alarm 4.
3) Each of the above alarms require user acknowledgement to clear

5. There shall be utility screens to support the following functions:

FUNCTION	FORMAT
UNITS SELECTION	ENGLISH OR METRIC
IDLE SPEED ADJUSTMENT	XXXX RPM
CHASSIS DIAGNOSTICS: ABS FAULT CODES ENGINE FAULT CODES TRANSMISSION FAULT CODES	SPN: XXXX FMI: XX
IPA DIAGNOSTICS: GAUGE TEST ROUTINE DISPLAY OF INPUT SIGNAL VALUES WARNING BAR TEST ROUTINE DISPLAY TEST ROUTINE	
ODOMETER SERVICE ROUTINE	

Utility/Set Up Screens
Table – 6

6.5.6. Pre-Drive Checklist Description

- The Pre-Drive Checklist will be displayed at key on.
- Each item in the list must be acknowledged by the operator.
- Edit Function
  The check list items actually displayed at key on shall be user selectable from a Master List of items.
- The Master Pre-Drive Checklist Items include:
  - € JACKS / AIR LEVELER UP
  - € CHECK TOW VEHICLE
  - € TIRE PRESSURE
  - € ENGINE MAINTAINANCE
  - € DISCONNECT POWER
  - € DISCONNECT WATER
  - € DISCONNECT SEWER
  - € BAY DOORS CLOSED
  - € SHOWER DOOR LOCKED
  - € ROOF VENTS CLOSED
  - € AWINING ARMS LOCKED
  - € COUNTERTOP CLEAR
  - € ALL DOORS LOCKED
  - € DRAWERS LATCHED
  - € APPLIANCES SECURED
  - € SLIDES IN AND SECURED
  - € WINDOWS CLOSED
  - € CB RADIO ON

6.5.7. Odometer Operation

- The odometer is to be displayed as 0 to 999,999 without leading zeros and with no tenths displayed.
- The GDIG shall calculate and maintain the odometer value.
- The odometer accuracy shall exceed the requirements of SAE J-1226.
- The trip odometer is to be displayed, on command, as 0.0 to 9999.9 without leading zeros.
- The odometer and trip odometer are to be displayed in English or metric units as commanded.
- The accumulated odometer value must be stored at least every kilometer.
- In the event of a power failure, the odometer value must be saved in memory and retrievable for at least five years.
- In the event of an engine controller failure (no data on the data bus), the accumulated odometer value is to be stored and not incremented until a valid odometer value or increment rate is received from the engine. At this time the odometer should begin incrementing the stored value at the rate dictated by the engine.
- The odometer should ignore any message that would decrease the stored odometer value or increase the stored value in more than 25Km increments.
- The design life of the odometer is to be at least 2 million miles.

6.5.8. Wake Up

The GDIG shall wake up when the voltage at pin-3 is increased to a logic high level.

On the Tiffin Chassis the Wake Up signal shall be provided by the MUX System so that instrument system can wake up, regardless of the state of the Ignition Switch, to support the following features:

- Generator Hour Meter
- Generator Low Fuel Alarm
- Turn Signal On Alarm

6.5.9. Generator Support

1) The MUX System will transmit generator status as follows:
   PGN 65280
   DATA PAGE 0
   PRIORITY 5
   DATA LENGTH 8 Bytes
   REP RATE 1 Sec, update on change, max 40/sec
   Generator Status
   Byte 1, Bit 3
   0 = OFF
   1 = ON
   Source 209
2) The GDIG will track, save and display accumulated generator hours.
3) The GDIG shall illuminate the Check Info warning lamp, display a warning message in the Drivers Information Center, and actuate the Alarm-4 when the fuel level falls below 20% while the generator is running.

6.5.10. Turn Signal Support

1) The MUX System will transmit Turn Signal status as follows:
   PGN 65280
   DATA PAGE 0
   PRIORITY 5
   DATA LENGTH 8 Bytes
   REP RATE 1 Sec, update on change, max 40/sec

Turn Signal RH	**Turn Signal LH**
Byte 1, Bit 5	Byte 1, Bit 6
0 = OFF	0 = OFF
1 = ON	1 = ON
Source 210	Source 210

2) When the GDIG senses that either turn signal has been left on for a distance equal to or greater than 1 mile The GDIG shall illuminate the Check Info warning lamp, display a warning message in the Drivers Information Center, and actuate the Alarm-4

6.5.11. Alarm Description

The DIG shall provide an active low output capable of driving an external audio transducer as described below:

Alarm Priority	Tone	Pulse Width	Repetition Rate
1	900 Hz	--	Continuous
2	900 Hz	160 milliseconds	880 milliseconds
3	900 Hz	160 milliseconds	2.2 seconds
4	900 Hz	750 milliseconds	Once No Repeat

Alarm Definition
Table – 7

Alarm 1 is the highest priority alarm and 4 is the lowest. If while an alarm is active, a higher priority alarm becomes active, the DIG will detect the change and sound the alarm that has the higher priority.

The external audio transducer shall be part of the Medallion harness.

6.6. 3N1 GAUGE DESCRIPTION

6.6.1. 3N1 Gauge Illustration

3N1 Gauge
Figure – 3

6.6.2. Tachometer

Label:	RPM
Displayed Range:	0 – 3000 RPM
Red Zone:	None
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	190
PGN:	61444

6.6.3. Main Fuel Tank Level

Label: FUEL

Displayed Range: E – F

Red Zone: Below 15%

Data Source: Analog input

Data Type: Resistive (33-240Ω)

DIG Input Pin: 16PIN-10

Fuel Table:

EMPTY	239
2.60%	204.9
6.10%	177.6
9.60%	156
13.20%	141.9
16.70%	129.9
20.20%	118.7
23.70%	108.3
27.30%	99.6
30.80%	92.6
36.00%	85.8
42.10%	79.3
48.40%	72.7
55.10%	66.4
61.90%	60.9
69.00%	55.5
76.10%	50.1
83.20%	44.6
90.30%	38.9
97.40%	33.2
FULL	30

6.6.4. Generator Fuel Level

The Fuel Level Dial Graphic has a Dual Scale to indicate the available fuel remaining for the Generator.

Label GEN

Empty on The Generator Fuel Scale equates to 15% on the Main Fuel Scale

Red Zone: Below 25%

6.6.5. DEF

Indicates the current exhaust fluid level available

Label	DEF
Displayed Range:	E – F
Red Zone:	12.5%
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	1761
PGN:	65110

6.7. 4N1 GAUGE DESCRIPTION

6.7.1. 4N1 Gauge Illustration

4N1 Gauge
Figure – 4

6.7.2. Front Air

Label:	FRONT AIR
Displayed Range:	0-150 psi
Data Source:	Analog input
Data Type:	Voltage (0.5 – 4.5V) = (0 – 150 psi)
Input Pin:	DIG 16PIN-12

6.7.3. Rear Air

Label:	REAR AIR
Displayed Range:	0-150 psi
Data Source:	Analog input
Data Type:	Voltage (0.5 – 4.5V) = (0 – 150 psi)
Input Pin:	DIG 16PIN-11

6.7.4. Oil Pressure

Label:	OIL PRESS
Displayed Range:	0 – 120 PSI
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	100
PGN:	65263

6.7.5. Coolant Temperature

Label:	COOLANT
Displayed Range:	145 – 245 ° F
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	110
PGN:	65262

6.8. AUXILLARY GAUGE SUPPORT

6.8.1. Voltmeter

Displayed Range:	8-18 Volts
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	158
PGN:	65271

6.8.2. Transmission Oil Temperature

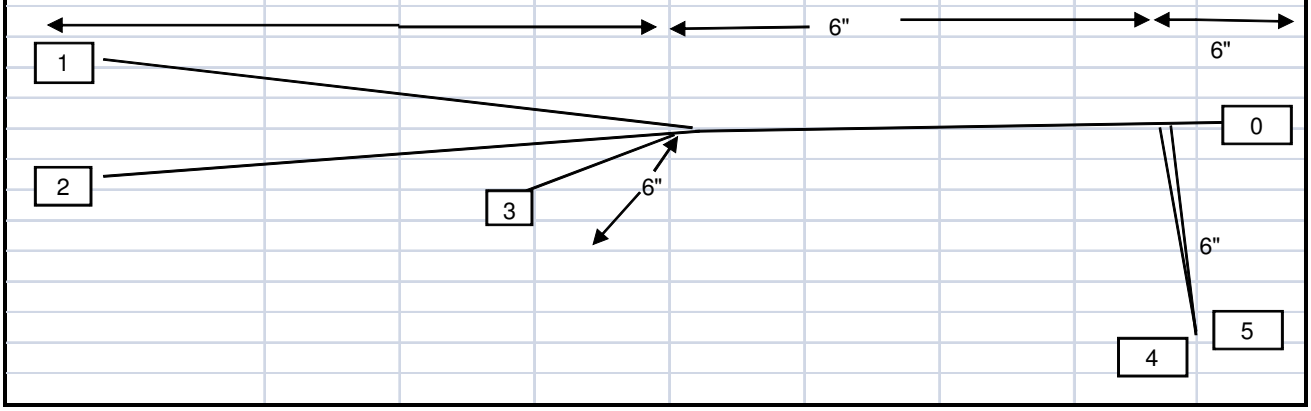
Displayed Range:	106-325 °F
Data Source:	Transmission ECU
Data Type:	J1939
Source Address:	3
SPN:	177
PGN:	65272

6.8.3. Boost Pressure

Displayed Range:	0-75 psi
Data Source:	Engine ECU
Data Type:	J1939
Source Address:	0
SPN:	102
PGN:	65270

APPENDIX A MAIN HARNESS DETAIL

Connector Information								
Plug Number	0	1	2	3	4	5		WIRE COLOR TBD
Mates with:	Chassis	DIG	Chameleon	Chameleon	Front Air	Rear Air		
Connector Type	Connector TBD	MOLEX 16	MOLEX 8	TYCO 10	Delphi 3	Delphi 3	Buzzer	
Connector Part Number		33472-1606	33472-0806	770580-1	13532244	13532244	Piezo	
Terminal		33012-1002	33012-1002	794407-1	15326267	15326267		
Lock					15452678	15452678		
Seal					15305351	15305351		
Signal Information								
Signal Description		Pin Out						
CA-1939-H		4						
CA-1939-L		5						
Batt V+ Dash		2						
Batt V- Main GND CR		1	2		1	1		
Ignition VMM Frt OP		3	1				Positive	
Park Brake Sig			5					
HeadImps HB PS				6				
LH Turn Lamps				2				
RH Turn Lamps				1				
Service Brake Sig		11						
PNL Lmp Ctrl PWM		7						
Fuel Level		10						
Jacks Down				7				
Cruise ON/OFF		14						
Cruise set		12						
Cruise Resume		13						
Cruise Cancel		11						
Buzzer		16					Negative	
Sensor +5vdc		15			2	2		
Front Air		8			3			
Rear Air		9				3		



APPENDIX B TIFFIN J-1939 DATA SUMMARY

	DESCRIPTION 1	DESCRIPTION 2	PGN	SPN	DEFINITION		Source
?	Electronic Brake Controller 1	EBC1	61441	1438	ATC Warning Lamp	R	11
?	Electronic Brake Controller 1	EBC1	61441	1793	ABS Warning Lamp	R	11
?	Electronic Engine Controller	EEC2	61443	92	Percent load	R	0
?	Electronic Engine Controller 1	EEC1	61444	190	Engine speed	R	0
?	Electronic Trans Controller 2	ETC2	61445	523	Transmission Current Gear	R	3
?	DM1	DM1	65226	1214	DTC-SPN	R	0,3,11
?	DM1	DM1	65226	1215	DTC-FMI	R	0,3,11
?	DM1	DM1	65226	624	Amber warning lamp	R	0,3,11
?	DM1	DM1	65226	623	Red Stop lamp	R	0,3,11
?	DM1	DM1	65226	1213	Malfunction lamp	R	0,3,11
?	Shutdown	Shutdown	65252	1081	Wait to start	R	0
?	Shutdown	Shutdown	65252	594	Idle Shutdown Alert	R	0
?	Shutdown	Shutdown	65252	1109	Engine Protect Approaching Shutdown	R	0
?	Engine Hours	Hours	65253	247	Total engine hours	R	0
?	Engine Temperature 1	ET1	65262	110	Engine coolant temp.	R	0
?	Engine Fluid Level/Pressure 1	EFL/P1	65263	100	Engine oil pressure	R	0
?	PTO Information		65264	979	PTO Enable Sw	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	84	Wheel-based vehicle speed	R	0
?	Cruise Control/Vehicle Speed	CCVS	65265	596	Cruise Control Enable	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	597	Service brake switch	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	70	Park brake switch	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	599	Cruise set	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	601	Cruise resume	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	527	Cruise State	R	0
?	Cruise Control/Vehicle Speed	CCVS	65265	968	Idle Increment	T	23
?	Cruise Control/Vehicle Speed	CCVS	65265	967	Idle Decrement	T	23
?	Fuel Economy	LFE	65266	184	Instantaneous Fuel Economy	R	0
?	Fuel Economy	LFE	65266	185	Average Fuel Economy	R	0
?	Inlet/Exhaust Conditions 1	IC1	65270	102	Boost pressure	R	0
?	Vehicle Electrical Power	VEP	65271	158	Battery potential (volts), sw	R	0
?	Transmission Fluids	TF	65272	177	Transmission oil temp.	R	3
?	Water In Fuel Indicator	WFI	65279	97	Water In Fuel Indicator	R	0
?	DEF Level		65110	1761	DEF Tank level	R	0