

V-MUX System Report Documents -- Inputs and Outputs

The V-MUX system is created by the OEM builder and can be referenced with a spreadsheet document.

The Microsoft Excel[®] program is used to create these spreadsheets. Two main reference documents will be created for you to use:

- The Input/Output Nodal Specification
- The Nodal Relationships Specification

Inputs -- Top-level Headings

"Node" -- The V-MUX node for this list is identified by node number within the full system of 1-32 and node type.

Example:

System ID = Node 1 Type = Hercules-04

"Digital Inputs" -- This list consists of the wired inputs from On/Off switches.

The suffix '-04' indicates that by sub-type
this is a fourth generation Hercules node

igital	Inputs		Node 1 (Hercules-04)			Location: Center-From
:h #	Pin #	OEM Wire	Name	On State	Туре	Comments
1	34	HEADLT SW: YELLOW	HL Low Beam	Ground	Latching N/O	
2	35	HEADLT HI SW: BLUE	HL High Beam	Ground	Latching N/O	
3	17	BACKUP LT SW: WHITE	Reverse	Ground	Latching N/O	
4	18	TURN SW LFT: ORANGE	Turn Signal Left	Ground	Latching N/O	
5	19	TURN SW RT: RED	Turn Signal Right	Ground	Latching N/O	
6	20	MARKER LT SW: BROWN	Marker Lamps	Ground	Latching N/O	
7	8	IGN SW: GREEN	Ignition	Ground	Latching N/O	
8	21	PUMP SHIFT: WHITE	Pump Mode	+Batt	Latching N/O	
9	33		Input 9	Ground	Latching N/O	
10	16	PUMP IN GEAR SW: WHITE	Pump Engaged Detect	+Batt	Latching N/O	
11	6		Input 11	Ground	Latching N/O	
12	2		Input 12	Ground	Latching N/O	
13	9		Input 13	Ground	Latching N/O	
14	10		Input 14	Ground	Latching N/O	
15	22	Q2B SW: ORANGE	Mechanical Siren Activate	Ground	Latching N/O	
16	23		Input 16	Ground	Latching N/O	

"Location" -- Indicates where in the vehicle the node is located.

Coordinate options **x-location:** Left, Center, Right **y-location:** Front, Mid Front, Mid, Mid Rear, Rear

		Inpu	uts Secor	d-lev	vel Head	lings	
esign so	oftwar	input channel as listed re. This column is not roubleshooting.		th •	e switch cir +Batt = B	cuit is 'On'. attery positive	
Pin #" The physical pin assignment on the arness connector to the node. This is relevant o service-level troubleshooting.				 Ground = Battery negative (-) +Batt or Ground = Bipolar (+ or -) Not +Batt = Ground or Open circuit Not Ground = +Batt or Open circuit Floating = Open circuit 			
gs on t	he ha	Indicates any color rness wire for the circ	uit. In		Funo" Cur	· · 1 · · · · · · · · · · · · · · · · ·	
ooting	5.	isual guides for circui		•	N/O' = swi	itch type: Latch itch is Normally O rmally Closed	•
ooting		isual guides for circui	t trouble-	•	N/O' = swi	itch is Normally O	
ooting	nputs	OEM Wire		•	N/O' = swi	itch is Normally O	pen
ooting Digital	Inputs		Node 1 (Hercules-	•	[•] N/O' = swi [•] N/C' = Not	itch is Normally O rmally Closed	pen Location: Center-From
Digital	Inputs Pin # 34	OEM Wire	Node 1 (Hercules-	•	'N/O' = swi 'N/C' = Nor On State	itch is Normally O rmally Closed Type	Location: Center-From Comments
Digital Ch #	Inputs Pin # 34 35	OEM Wire HEADLT SW: YELLOW	Node 1 (Hercules- Name HL Low Beam	•	'N/O' = swi 'N/C' = Nor On State Ground	itch is Normally O rmally Closed Type Latching N/O	Location: Center-From Comments Additional helpful
Digital Ch #	Pin # 34 35 17	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE	Node 1 (Hercules- Name HL Low Beam HL High Beam	•	'N/O' = swi 'N/C' = Nor On State Ground Ground	tch is Normally O rmally Closed Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 2 3 4 5	Pin # 34 35 17 18 19	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse	•	'N/O' = swi 'N/C' = No: On State Ground Ground Ground	Type Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful
Digital Ch # 1 2 3 4 5 6	Pin # 34 35 17 18 19 20	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left	•	'N/O' = swi 'N/C' = No: On State Ground Ground Ground Ground	Type Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 5 6 7	Pin # 34 35 17 18 19 20 8	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right	•	'N/O' = swi 'N/C' = No: On State Ground Ground Ground Ground Ground	Type Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 5 6 7 7 8	Pin # 34 35 17 18 19 20 8 21	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps	•	'N/O' = swi 'N/C' = Nor On State Ground Ground Ground Ground Ground Ground	Type Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 4 5 6 7 8 9	Pin # 34 35 17 18 19 20 8 21 33	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9	4)	'N/O' = swi 'N/C' = Nor On State Ground Ground Ground Ground Ground Ground Ground	Type Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 4 5 6 6 7 8 9 9	Pin # 34 35 17 18 19 20 8 21 33 16	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pump Engaged Dete	4)	'N/O' = swi 'N/C' = Nor On State Ground Ground Ground Ground Ground Ground HBatt	Type Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 4 5 6 6 7 7 8 9 10 11	Pin # 34 35 17 18 19 20 8 21 33 16 6	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pun p Engaged Dete Input 11	4)	'N/O' = swi 'N/C' = No: 'N/C' = No: Ground Ground Ground Ground Ground Ground Ground HBatt Ground +Batt Ground	Type Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # 1 2 3 4 4 5 6 6 7 7 8 8 9 10 11 12	Pin # 34 35 17 18 19 20 8 21 33 16 6 2	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pump Engaged Dete Input 11 Input 12	4)	'N/O' = swi 'N/C' = No: 'N/C' = No: Ground Ground Ground Ground Ground Ground HBatt Ground +Batt Ground Ground Ground	Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # Ch # Ch # Ch # Ch # Ch # Ch # Ch #	Pin # 34 35 17 18 19 20 8 21 33 16 6 2 9	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pump Engaged Dete Input 11 Input 12 Input 13	4)	'N/O' = swi 'N/C' = No: 'N/C' = No: Ground Ground Ground Ground Ground Ground HBatt Ground +Batt Ground Ground Ground Ground Ground	Type Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # Ch # Ch # Ch # Ch # Ch # Ch # Ch #	Pin # 34 35 17 18 19 20 8 21 33 16 6 2 9 10	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE PUMP IN GEAR SW: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pump Engaged Dete Input 11 Input 12 Input 13 Input 14	4)	'N/O' = swi 'N/C' = No: 'N/C' = No: Ground Ground Ground Ground Ground Ground HBatt Ground HBatt Ground Ground Ground Ground Ground Ground Ground	Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may
Digital Ch # Ch # Ch # Ch # Ch # Ch # Ch # Ch #	Pin # 34 35 17 18 19 20 8 21 33 16 6 2 9 10 22	OEM Wire HEADLT SW: YELLOW HEADLT HI SW: BLUE BACKUP LT SW: WHITE TURN SW LFT: ORANGE TURN SW RT: RED MARKER LT SW: BROWN IGN SW: GREEN PUMP SHIFT: WHITE	Node 1 (Hercules- Name HL Low Beam HL High Beam Reverse Turn Signal Left Turn Signal Right Marker Lamps Ignition Pump Mode Input 9 Pump Engaged Dete Input 11 Input 12 Input 13	4)	'N/O' = swi 'N/C' = No: 'N/C' = No: Ground Ground Ground Ground Ground Ground HBatt Ground +Batt Ground Ground Ground Ground Ground	Type Type Latching N/O Latching N/O	Location: Center-From Comments Additional helpful information may

The center column: "Name" or "Command"

if using

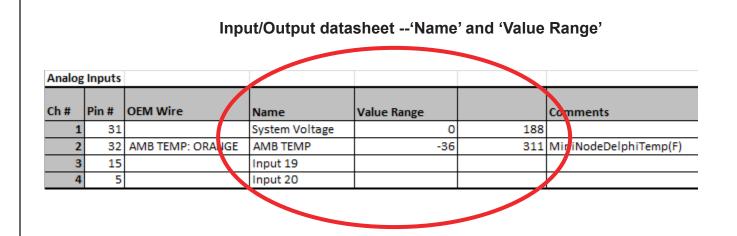
- **Input/Output datasheet** >> **"Name"** -- The functional name of the input. This usually defaults to be identical with **Command** but the OEM designer can edit the name field to be any text.
- **Relationships Datasheet** >> **"Command"** -- The actual V-MUX Command that the input causes the node to issue onto the network.

"Analog Inputs" -- This list consists of the wired inputs from variable 0-5 V sensors, such as Temperature

Input/Output datasheet -- Name and Value Range

"Name" -- The functional name of the sensor input.

"Value Range" -- The physical range of the sensor -- for example, a Temperature range. There may or may not be an implied decimal point within the range



Relationships Datasheet -- Threshold Command with On and Off Thresholds

"Threshold Command" -- If a sensor reaches a certain defined value, called the Threshold, this is the V-MUX Command that the node issues onto the network.

"On Threshold" -- The physical value that issues the Command ON

"Off Threshold" -- The physical value that issues the Command OFF

Relationships datasheet -- 'Threshold Command' with 'On' and Off values

Ch #	Pin #	OEM Wire		Threshold Command	On Threshold	Off Threshold	Comments
1	31		L	low Voltage	157	159	
2	32	AMB TEMP: ORANG	F 4	Ambient Temp Switch	27	23	NiniNodeDelphiTemp(F)
3	15		(none)			
4	5		(none)			

The Output List of an Input/Output datasheet

Amperage capacities of the Output channels

Output channels are rated to a steady state Amperage limit.

- "High capacity" delivers 10.5 or 13 Amp/channel at +VBATT polarity -- Hercules, 8x16 nodes
- "Medium capacity" delivers 7.5 Amp/channel at +VBATT polarity -- Mini 4x12 node
- "Low capacity" = delivers 4 Amp/channel at +VBATT polarity -- Hercules node
- "Ground Outputs" = delivers 4 Amp/channel at -GND polarity -- Hercules, 8x16 nodes

Example: Hercules node outputs listed in sec-"Max Amps" -- Indicates the tions based by Amps capacity. Amp limit at steady state. "Amps" -- Indicates expected device Amp load at steady state. High Capacity Outputs Node 1 (Hercules-04) Location: Center-Front Max Priority Amps Shedding CH # PIT # OEM Wire Amps Comments Name R HEADLT LO LFT: ORANGE HEADLT LO LFT 10.5 No Shed 1 4 2 S HEADLT LO RT: YELLOW HEADLT LO RT 4 10.5 No Shed 3 F HEADLT HI LFT: BLUE 10.5 No Shed HEADLT HI LFT 8 4 T HEADLT HI RT: BLUE HEADLT HI RT 10.5 No Shed 8 G WARN 1: ORANGE 5 WARN 1 4 10.5 No Shed NON-FLASHING 4 6 U WARN 2: RED WARN 2 10.5 No Shed NON-FLASHING 7 н Output 7 10.5 No Shed A/C COMPRESSOR 8 V A/C COMP: ORANGE 2 10.5 1 (12.5 V) 9 L Output 9 10.5 No Shed 10.5 No Shed 10 B ENG COMPT LT: WHITE ENG COMPT LT 2 10.5 No Shed 11 M WARN 4: BLUE WARN 4 4 NON-FLASHING 12 4 C WARN 3: GREEN WARN 3 10.5 No Shed NON-FLASHING N Q2B SOL: WHITE 10.5 No Shed 13 Q2B SOL 14 D 10.5 No Shed Output 14 0 15 Output 15 10.5 No Shed P 16 Output 16 10.5 No Shed Total 46 Low Capacity Outputs Priority Max CH # |Pm # |OEM Wire Amps Shedding Name Amps Comments Q OK TO PUMP: GREEN 4 No Shed 17 OK TO PUMP 1 18 E 123-PUMP MODE INPUT: PUMP MODE INPUT 123 1 4 No Shed PUMP MODE REQ A PTO LT: RED 19 PTO LT 1 4 No Shed 20 J AER PTO LT: BLUE 1 4 No Shed AER PTO LT 21 W 4 No Shed Output 21 22 X FUEL PRIME: YELLOW FUEL PRIME 1 4 No Shed 23 K Output 23 4 No Shed 7 INTERAXLE VLV: BLUE 24 INTERAXLE VLV 1 4 No Shed Total 6 Ground Outputs Max Priority CH # |PIN # |OEM Wire Name Amps Amps Shedding Comments 25 14 4 No Shed Output 25 11 122-PUMP ENABLE: YELLOV 122-PUMP ENABLE 26 4 No Shed TO TRANS 1 1 Total

Load Management of the Output channels

"Priority Shedding" -- Indicates at which voltage threshold the channel will be shut down by the node load manager. Each V-MUX node has its own built-in Load Manager and Load shedding is on a per channel basis as set by the OEM designer.

"No shed" : the output is not Load Managed.

			Ot	herwis	e, for	a 12 V	Volt Syster	n
						5 (10.9 Volt)		
					(12.1			6 (10.5 Volt)
								,
					(11.7			7 (10.1 Volt)
				4	(11.3	Volt)		8 (9.7 Volt)
							•	
High Ca	apacity	Outputs	Node 1 (Hercules-04)					Location: Center-Front
сн #	Pin #	OEM Wire	Name		Amps		Priority Shedding	Comments
1	R	HEADLT LO LFT: ORANGE	HEADLT LO LFT		4	10.5	No Shee	
2		HEADLT LO RT: YELLOW	HEADLT LO RT		4		No Shed	if set for for a
3		HEADLT HI LFT: BLUE	HEADLT HI LFT	<u> </u>	8		No Shed	
4		HEADLT HI RT: BLUE	HEADLT HI RT	_	8		No Shed	<u>24 Volt System</u>
5		WARN 1: ORANGE	WARN 1	_	4		No Shed	N 1 (25.2 Volt)
6		WARN 2: RED	WARN 2	<u> </u>	4		No Shed	2 (24.4 Volt)
7	н		Output 7	<u> </u>			No Shed	3 (23.6 Volt)
8	V V	A/C COMP: ORANGE	A/C COMPRESSOR	<u> </u>	2		1 (12.5 V)	4 (22.8 Volt)
9			Output 9	+	-		No Shed	
10		ENG COMPT LT: WHITE	ENG COMPT LT	+	2		No Shed	5 (22.0 Volt)
11 12		WARN 4: BLUE WARN 3: GREEN	WARN 4	+	4		No Shed No Shed	6 (21.2 Volt)
12		Q2B SOL: WHITE	WARN 3 Q2B SOL	+	4		No Shed	7 (20.4 Volt)
13		-	Output 14	+	1		No Shed	8 (19.6 Volt)
14			Output 15	+	-		No Shed	
16			Output 16	+			No Shed	
				Total	46			
Low Ca	apacity	Outputs						
CH #	Pin #					Max	Priority	
	FIII#	OEM Wire	Name		Amps		Shedding	Comments
17		OEM Wire OK TO PUMP: GREEN	Name OK TO PUMP		Amps 1	Am	-	Comments
17 18	Q		ОК ТО РИМР			Am _k s 4	Shedding	PUMP MODE REQ
	Q	OK TO PUMP: GREEN	OK TO PUMP		1	Am₁ s 4 4	Shedding No Shed	
18	Q	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O	OK TO PUMP PUMP MODE INPUT 123		1	Am ₁ s 4 4 4	Shedding No Shed	
18 19	Q	OK TO PUMP: GREEN 123-PUMP MODE INPUT: (PTO LT: RED AER PTO LT: BLUE	OK TO PUMP PUMP MODE INPUT 123 PTO LT		1 1 1	Am ₁ s 4 4 4	Shedding No Shed No Shed No Shed	
18 19 20	Q E A J W	OK TO PUMP: GREEN 123-PUMP MODE INPUT: (PTO LT: RED AER PTO LT: BLUE	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT		1 1 1	Am <mark>1</mark> s 4 4 4 4 4	Shedding No Shed No Shed No Shed No Shed	
18 19 20 21 22 23	Q E A J W X K	OK TO PUMP: GREEN 123-PUMP MODE INPUT: (PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23		1 1 1 1 1	Amps 4 4 4 4 4 4 4 4	Shedding No Shed No Shed No Shed No Shed No Shed No Shed	
18 19 20 21 22	Q E A J W X K	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME			Amps 4 4 4 4 4 4 4 4	Shedding No Shed No Shed No Shed No Shed No Shed	
18 19 20 21 22 23 24	Q E A J W X K 7	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW INTERAXLE VLV: BLUE	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23	Total	1 1 1 1 1	Amps 4 4 4 4 4 4 4 4	Shedding No Shed No Shed No Shed No Shed No Shed No Shed	
18 19 20 21 22 23 24	Q E A J W X K	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW INTERAXLE VLV: BLUE	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23	Total		Am ₁ 5 4 4 4 4 4 4 4 4 4 4	Shedding No Shed No Shed No Shed No Shed No Shed No Shed	
18 19 20 21 22 23 24 Ground	Q E A J W X K 7	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW INTERAXLE VLV: BLUE	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23	Total		Am, s 4 4 4 4 4 4 4 4 4 4 4 8 4 8 7 8 7 8 7 8	Shedding No Shed No Shed No Shed No Shed No Shed No Shed	
18 19 20 21 22 23 24 Ground	Q E A J W W X K C 7	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW INTERAXLE VLV: BLUE Its OEM Wire	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23 INTERAXLE VLV	Total	1 1 1 1 1 1 1 6	Am, s 4 4 4 4 4 4 4 4 4 4 4 8 4 8 7 8 7 8 7 8	Shedding No Shed No Shed No Shed No Shed No Shed No Shed Priority	PUMP MODE REQ
18 19 20 21 22 23 24 Ground	Q E A J W X K K 7 d Outpu Pin # 14	OK TO PUMP: GREEN 123-PUMP MODE INPUT: O PTO LT: RED AER PTO LT: BLUE FUEL PRIME: YELLOW INTERAXLE VLV: BLUE Its OEM Wire	OK TO PUMP PUMP MODE INPUT 123 PTO LT AER PTO LT Output 21 FUEL PRIME Output 23 INTERAXLE VLV Name Output 25	Total	1 1 1 1 1 1 1 6	Am, s	Shedding No Shed No Shed No Shed No Shed No Shed No Shed Priority Shedding	PUMP MODE REQ

The Output List of a Relationship datasheet

Output Channel Relationships

"Relationships" -- Lists the set of V-MUX Commands that logically combine to control the output channel. The Commands may be from various sources. Here are a few examples:

- Wired switch inputs (Ex: Park Brake On/Off)
- Wired sensors with defined thresholds (Ex: 12.6 Volt = Low Voltage)
- CAN/J1939 signals (Ex: Check Engine)
- User inputs (Ex: E Warning Lights On/Off)

More than one Command may control an output and the logical relationship between the listed Commands is important. The entire Relationships list must evaluate as logically TRUE before the Output will turn On.

Logic used with a single Command or the leading Command of a list: <ON> : TRUE if item is logically 'On', 'True' <NOT> : TRUE if item is logically 'Off', 'False' (Ex: a released Park Brake is <NOT> Park Brake)

A note about NOT. Any <NOT> Command that does not lead the Relationships list must be preceded by a logical separator such as <AND>. This is an important rule.

Output

Relationships

<u>Logic used with two or more Commands:</u> <AND> : TRUE if both items are 'On', 'True' <OR> : Inclusive OR. TRUE if either or both items are 'On', 'True' <XOR> : Exclusive OR. TRUE if either but not both items are 'On', 'True'

High Capacity Outputs			Node 1 (Hercules-04)						
CH #	Pin #	OEM Wire	Name	Priority Shedding	Relationships				
1	R	HEADLT LO LFT: ORANGE	HEADLT LO LFT	No Shed	<not> HL High Beam <and> HL Low Beam Level1: <on> Ignition <not> Park Brake</not></on></and></not>				
2	s	HEADLT LO RT: YELLOW	HEADLT LO RT	No Shed	<not> HL High Beam <and> HL Low Beam Level1: <on> Ignition <not> Park Brake</not></on></and></not>				
3	F	HEADLT HI LFT: BLUE	HEADLT HI LFT	No Shed	<on> HL High Beam <and> <not> HL Low Beam Level1: <on> E Emergency Master</on></not></and></on>				
4	т	HEADLT HI RT: BLUE	HEADLT HI RT	No Shed	<on> HL High Beam <and> <not> HL Low Beam Level1: <on> E Emergency Master</on></not></and></on>				
5	G	WARN 1: ORANGE	WARN 1	No Shed	<on> E Emergency Master <and> E Secondary</and></on>				
6	U	WARN 2: RED	WARN 2	No Shed	<on> E Emergency Master <and> E Secondary</and></on>				
7	Н		Output 7	No Shed	(None)				
8	V		Output 8	No Shed	(None)				
9	L		Output 9	No Shed	(None)				
10	В	ENG COMPT LT: WHITE	ENG COMPT LT	No Shed	<on> Cab Ajar</on>				
11	М	WARN 4: BLUE	WARN 4	No Shed	<on> E Emergency Master <and> E Secondary</and></on>				
12	С	WARN 3: GREEN	WARN 3	No Shed	<on> E Emergency Master <and> E Secondary</and></on>				
13	N	Q2B SOL: WHITE	Q2B SOL	No Shed	<on> Mechanical Siren Activate <and> E Emergency Master</and></on>				

The Output List of a Relationship datasheet

Output Channel Relationships -- Relationship Levels

"Relationship Levels" are a method by which an Output channel may change behavior depending on the inputs that are True at any one instant. For example:

- to change between steady and flashing mode
- to change between full and partial intensity (change PWM rate)
- to change an On or Off delay timer

Example: Channels 1,2 pins R,S = Headlight, Lowbeam, Left/Right ("HEADLT LO LFT", "HEADLT LO RT") The normal mode is to turn HL Low Beam On at full intensity unless High Beam is On.

TOP LEVEL MODE:

Level 1 mode is to run HL Low Beam as Daytime Running Lights at partial intensity (PWM % is not shown)

SUB LEVEL 1 MODE: <ON> Ignition <AND> <NOT> Park Brake

There may be several defined levels. If more than one level is True at the same time, any upper level will supersede any lower level. So in this example a headlight in partial 'Daytime' mode could be switched instantly into full intensity Low Beam.

Example

Top Level ----- <NOT> HL High Beam <AND> HL Low Beam Sub Level ----- Level 1: <ON> Ignition <AND> <NOT> Park Brake

High Capacity Outputs			Node 1 (Hercules-04)		
				Priority	
CH #	Pin #	OEM Wire	Name	Shedding	Relationships
					<not> HL High Beam <and> HL Low Beam</and></not>
1	R	HEADLT LO LFT: ORANGE	HEADLT LO LFT	No Shed	Level 1: <on> Ignition <not> Park Brake</not></on>
					<not> HL High Beam <and> HL Low Beam</and></not>
2	S	HEADLT LO RT: YELLOW	HEADLT LO RT	No Shed	Level 1: <on> Ignition <not> Park Brake</not></on>
					<on> HL High Beam <and> <not> HL Low Beam</not></and></on>
3	F	HEADLT HI LFT: BLUE	HEADLT HI LFT	No Shed	Level 1: <on> E Emergency Master</on>
					<on> HL High Beam <and> <not> HL Low Beam</not></and></on>
4	Т	HEADLT HI RT: BLUE	HEADLT HI RT	No Shed	Level 1: <on> E Emergency Master</on>
5	G	WARN 1: ORANGE	WARN 1	No Shed	<on> E Emergency Master <and> E Secondary</and></on>
6	U	WARN 2: RED	WARN 2	No Shed	<on> E Emergency Master <and> E Secondary</and></on>
7	н		Output 7	No Shed	(None)
8	v	1	Output 8	No Shed	(None)
9	L		Output 9	No Shed	(None)
10	В	ENG COMPT LT: WHITE	ENG COMPT LT	No Shed	<on> Cab Ajar</on>
11	м	WARN 4: BLUE	WARN 4	No Shed	<on> E Emergency Master <and> E Secondary</and></on>
12	С	WARN 3: GREEN	WARN 3	No Shed	<on> E Emergency Master <and> E Secondary</and></on>
13	N	Q2B SOL: WHITE	Q2B SOL	No Shed	<on> Mechanical Siren Activate <and> E Emergency Mast</and></on>