

VDX 404

Application Document

Feature Summary

The VDX 404 allows four video inputs to be routed to four video outputs in virtually any combination. The switch status is controlled by both a set of discrete inputs and also RV-C commands.

The unit also has two programmable outputs, which are also controlled by the inputs and RV-C commands.

The unit monitors the SLIDE_STATUS PGN, which operates in an analogous manner to the discrete inputs.

The unit may broadcast DIGITAL_INPUT_STATUS PGNs, triggered by the status of any input. The Instance reported is configurable.

The unit detects that the vehicle is in Reverse via the RV-C interface. SilverLeaf is applying to the RVIA for an update to the Chassis Mobility Status PGN. In the meantime the TM102 will bridge the J1939 Transmission Gear Status PGN 0xF005 to provide Reverse for the VDX.

General Specifications

Input Voltage	9 VDC - 18 VDC
Input Amperage	200 mA
Temperature Range	-40 - 160 Deg F
Environmental Limitations	Not sealed for exterior mounting.
Source Address	Static 117 (0x75)
Default Source Address	117 (0x75)

Product ID

The VDX-404 transmits PRODUCT_ID PGN (0xFEED) data upon request. Details on this PGN are found in the RV-C Protocol Manual. The format of the data appears as:

SILVERLEAF*VDX404-v.vv-A***

Where:

v.vv product version number

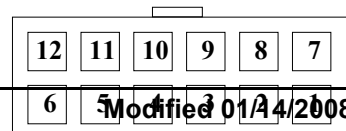
Connectors

Connector Types

All diagrams are "wire-side" view.

Molex 12-Pin

Receptacle - Molex 5557 Series. Part #39-01-2120



Strain Relief - 41995 Series. Part #15-04-0345
 Crimp-on Connectors - 5556 Series. Part #39-00-0039

Connector Pinouts

Main Connector

12-pin Molex

Pin	Designation	Type	Notes
1	GROUND	Ground	
2	Unused		
3	Unused		
4	Unused		
5	RV-C DATA +	CAN	Attach to RV-C Bus
6	RV-C DATA -	CAN	Attach to RV-C Bus
7	POWER	12V Power Input	Attach to constant power source
8	Serial Transmit	RS-232	Do Not Connect (Used for Diagnostic purposes)
9	Serial Receive	RS-232	Do Not Connect (Used for Diagnostic purposes)
10	Serial Ground	RS-232	Do Not Connect (Used for Diagnostic purposes)
11	OUTPUT1	Active Low Output	
12	OUTPUT2	Active High Output	

Input Connector

12-pin Molex

Pin	Designation	Type	Notes
1	Input 1	Active Low Input	
2	Input 2	Active Low Input	
3	Input 3	Active Low Input	
4	Input 4	Active Low Input	
5	Input 5	Active Low Input	
6	Input 6	Active Low Input	
7	Input 7	Active High Input	
8	Input 8	Active High Input	
9	Input 9	Active High Input	
10	Input 10	Active High Input	
11	Input 11	Active High Input	
12	Input 12	Active High Input	

Maintained States

In the case of a power cycling, the VDX404 does not maintain its internal states. Instead it will resume to its normal automatic mode.

System Configuration

System configuration is through a series of proprietary PGNs following the general RV-C guidelines.

PGNs Supported

Name:	PROP_VIDEOSWITCH_CONFIGURE		
PGN:	0xEF75		
Byte 1:	Operation	Always 0xF9	
Byte 2:	Input Instance	0 = Default Position 1 - 12 = Discrete Input Circuit 13 - 32 = Virtual Input 249 = Reverse Signal	
Byte 3:	Type	0 = Standard Latching Switch 1 = Blinker 2 = Momentary On/Off 3 = Momentary Multiple Position	
Bit 4.1-4.4	Output 1 Source	0 = Off, 1 - 4 = Input Source 1-4, 0xC = Do Not Change, 0xF = No Data	
Bit 4.5-4.8	Output 2 Source	0 = Off, 1 - 4 = Input Source 1-4, 0xC = Do Not Change, 0xF = No Data	
Bit 5.1-5.4	Output 3 Source	0 = Off, 1 - 4 = Input Source 1-4, 0xC = Do Not Change, 0xF = No Data	
Bit 5.5-5.8	Output 4 Source	0 = Off, 1 - 4 = Input Source 1-4, 0xC = Do Not Change, 0xF = No Data	
Bit 6.1-6.4	Digital Output #1	0 = Off, 1 = On 0xC = Do Not Change, 0xF = No Data	
Bit 6.5-6.8	Digital Output #2	0 = Off, 1 = On 0xC = Do Not Change, 0xF = No Data	
Byte 7	Priority	0 - 250. Highest value prevails when two or more inputs are in conflict. The Default is always priority zero. If two Instances have the same priority, the Instance number is the tie-breaker (higher value wins). Must be unique for each VDX state.	
Byte 8:	Digital Input Status Inst.	0 = Not Enabled 1-250 = Instance for DIGITAL_INPUT_STATUS reports.	

If the Input Type is Momentary Multiple Position, then the format is different.

Byte 4	State 1	0 - 32 = Instance to "Activate". 33+ = Skip this State.
Byte 5	State 2	0 - 32 = Instance to "Activate". 33+ = Skip this State.
Byte 6	State 3	0 - 32 = Instance to "Activate". 33+ = Skip this State.
Byte 7	State 4	0 - 32 = Instance to "Activate". 33+ = Skip this State.
Byte 8	State 5	0 - 32 = Instance to "Activate". 33+ = Skip this State.

Each pressing of the switch will turn off the current Position Instance and turn on the next Position Instance. No more than four states are allowed in the cycle.

Example

Video Input #1: Rear Camera
 Video Input #2: Left Side Camera
 Video Input #3: Right Side Camera
 Video Input #4: Security Camera
 Video Output #1: Main Dash Monitor
 Video Output #2: Dedicated Rear Camera Monitor
 Video Output #3: Bedroom TV
 Video Output #4: Living Room TV
 Digital Input #1 : Left Blinker
 Digital Input #2 : Right Blinker
 Digital Input #3 : Bedroom Momentary Switch. Cycles through all four camera inputs.
 Digital Input #4-8 : Living Room Multi-position Switch.
 Digital Output #1: Reverse Indicator
 Digital Output #2: Reverse + Turn Signal Indicator
 RV-C Output: Turns on Bedroom TV

Instance	Out 1	Out 2	Out 3	Out 4	Dig 1	Dig 2	RV-C	Priority
0 (Default)	1	1	4	4	1	1	0	0
249 (Reverse)	1	N/C	N/C	N/C	2	2	0	1
1 (Left)	2	N/C	N/C	N/C	1	2	0	2
2 (Right)	3	N/C	N/C	N/C	1	2	0	3
3	Multiposition Momentary. States 28, 29, 30, 31, 32							
4	N/C	N/C	N/C	4	N/C	N/C	0	4
5	N/C	N/C	N/C	1	N/C	N/C	0	5
6	N/C	N/C	N/C	2	N/C	N/C	0	6
7	N/C	N/C	N/C	3	N/C	N/C	0	7
8	N/C	N/C	N/C	0	N/C	N/C	2	8
28	N/C	N/C	0	N/C	N/C	N/C	1	9
29	N/C	N/C	4	N/C	N/C	N/C	0	10
30	N/C	N/C	1	N/C	N/C	N/C	0	11
31	N/C	N/C	2	N/C	N/C	N/C	0	12
32	N/C	N/C	3	N/C	N/C	N/C	0	13

Note that this configuration will elicit DIGITAL_INPUT_STATUS reports with Instances 1 and 2. These two values will be the *inverse* of whether there is a video output to the bedroom and living room monitors.

Name: PROP_VIDEOSWITCH_SLIDE_CONFIGURE
 PGN: 0xEF75
 Byte 1: Operation Always 0xF5
 Byte 2: Slide 1 State Instance 13-32 - Virtual State to trigger on movement. 0 = Ignore
 Byte 3: Slide 2 State Instance 13-32 - Virtual State to trigger on movement. 0 = Ignore
 Byte 4: Slide 3 State Instance 13-32 - Virtual State to trigger on movement. 0 = Ignore
 Byte 5: Slide 4 State Instance 13-32 - Virtual State to trigger on movement. 0 = Ignore

When these values are set to valid State Instances, the VDX monitors RV-C PGN SLIDE_STATUS (0x1FFE8). When it sees movement on the indicated slide instances (i.e. Byte 1, Motion, is non-zero) it triggers the indicated VDX state, exactly as though a conventional switch input was activated. The state remains active for one second after the last non-zero transmission.

Note that all four slides may be activated at once, and the State Priority determines the result.

Name: PROP_VIDEOSWITCH_COMMAND
 PGN: 0xEF75
 Byte 1: Operation Always 0xF8
 Byte 2: Operating Mode 0 = Automatic, 1 = Manual Mode
 Byte 3: Reserved
 Bit 4.1-4.4 Output 1 Source 0 = Off, 1 - 4 = Input Source 1-4, 0xC, 0xF = N/C
 Bit 4.5-4.8 Output 2 Source 0 = Off, 1 - 4 = Input Source 1-4, 0xC, 0xF = N/C
 Bit 5.1-5.4 Output 3 Source 0 = Off, 1 - 4 = Input Source 1-4, 0xC, 0xF = N/C
 Bit 5.5-5.8 Output 4 Source 0 = Off, 1 - 4 = Input Source 1-4, 0xC, 0xF = N/C
 Bit 6.1-6.4 Digital Output #1 0 = Off, 1 = On. 0xC,0xF = No Change,
 Bit 6.5-6.8 Digital Output #2 0 = Off, 1 = On. 0xC,0xF = No Change,

If any of the Output Sources is specified, then the unit automatically enters a "Manual" state, and ignores all inputs. The unit can be restored to its normal automatic mode by setting the Operating Mode to zero.

PGNs Reported

Name: PROP_VIDEOSWITCH_CONFIGURATION_REPORT
 PGN: 0xEF##
 Byte 1: Operation Always 0xF7
 Byte 2-7 : see PROP_VIDEOSWITCH_CONFIGURE

Name: PROP_VIDEOSWITCH_STATUS
 PGN: 0xEF##
 Byte 1: Operation Always 0xF6
 Byte 2: Operating Mode 0 = Automatic, 1 = Manual Mode
 Byte 3: Reserved
 Bit 4.1-4.4 Output 1 Source 0 = Off, 1 - 4 = Input Source 1-4
 Bit 4.5-4.8 Output 2 Source 0 = Off, 1 - 4 = Input Source 1-4
 Bit 5.1-5.4 Output 3 Source 0 = Off, 1 - 4 = Input Source 1-4
 Bit 5.5-5.8 Output 4 Source 0 = Off, 1 - 4 = Input Source 1-4
 Bit 6.1-6.4 Digital Output #1 0 = Off, 1 = On
 Bit 6.5-6.8 Digital Output #2 0 = Off, 1 = On

This PGN is sent in response to any PROP_VIDEOSWITCH_COMMAND, and can be requested by sending that command with no data. This is primarily for troubleshooting.

Name: PROP_VIDEOSWITCH_SLIDE_CONFIGURATION_REPORT
 PGN: 0xEF##
 Byte 1: Operation Always 0xF4
 Byte 2-7: See PROP_VIDEOSWITCH_SLIDE_CONFIGURE

Name: DIGITAL_INPUT_STATUS
PGN: 0x1FFB8
Byte 1: Instance 1-250. The Digital Input Instance of the State
Byte 2: Position 0 = State is not active.
1 = State is active.

This PGN is sent on a change of status for the state, or on request.

DM1 Report

The VDX404 reports a DM1 every five seconds, with DSA 0x75. The operating status is always "On" and "Ok", and no errors are ever transmitted.