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NATIONAL HYBRID, INC.
2200 Smithtown Avenue, Ronkonkoma, NY 11779
(516) 981-2400 FAX 516-981-8888

Mil-Std-1553/MacAir Products
NHI-1540
Variable Output Voltage Transceiver

Features/Applications:

- **Device Types Available for Test Instrumentation and Simulation Equipment Requiring Mil-Std-1553A/B, MacAir A3818, A4905, A5232, A5690 Interfaces.**
- **Controllable Output Voltage Provides Capability to Automate the Remote Terminal Validation and Production Test Plans.**
- **Very Low Standby Power**
- **Totally Isolated Channels**
- **Short Circuit Proof**
- **Superior Noise Performance**

Description:

The NHI variable output voltage transceivers are available in both single and dual channel, +12V and +15V power supply source, and packaged in both plug-in and surface mount package styles.

Each receiver converts the 1553 bus bi-phase data to complementary RX and RX_L TTL digital outputs for use by the manchester decoder. The device provides independent receiver enables for each channel.

The transmitters will output bi-phase manchester to the coupling transformer when the TX and TX_L inputs are driven by complementary TTL digital data. The device provides an independent transmitter inhibit TXINH for each channel. The transmitter output voltage to the data bus is controlled by a single control voltage input pin.

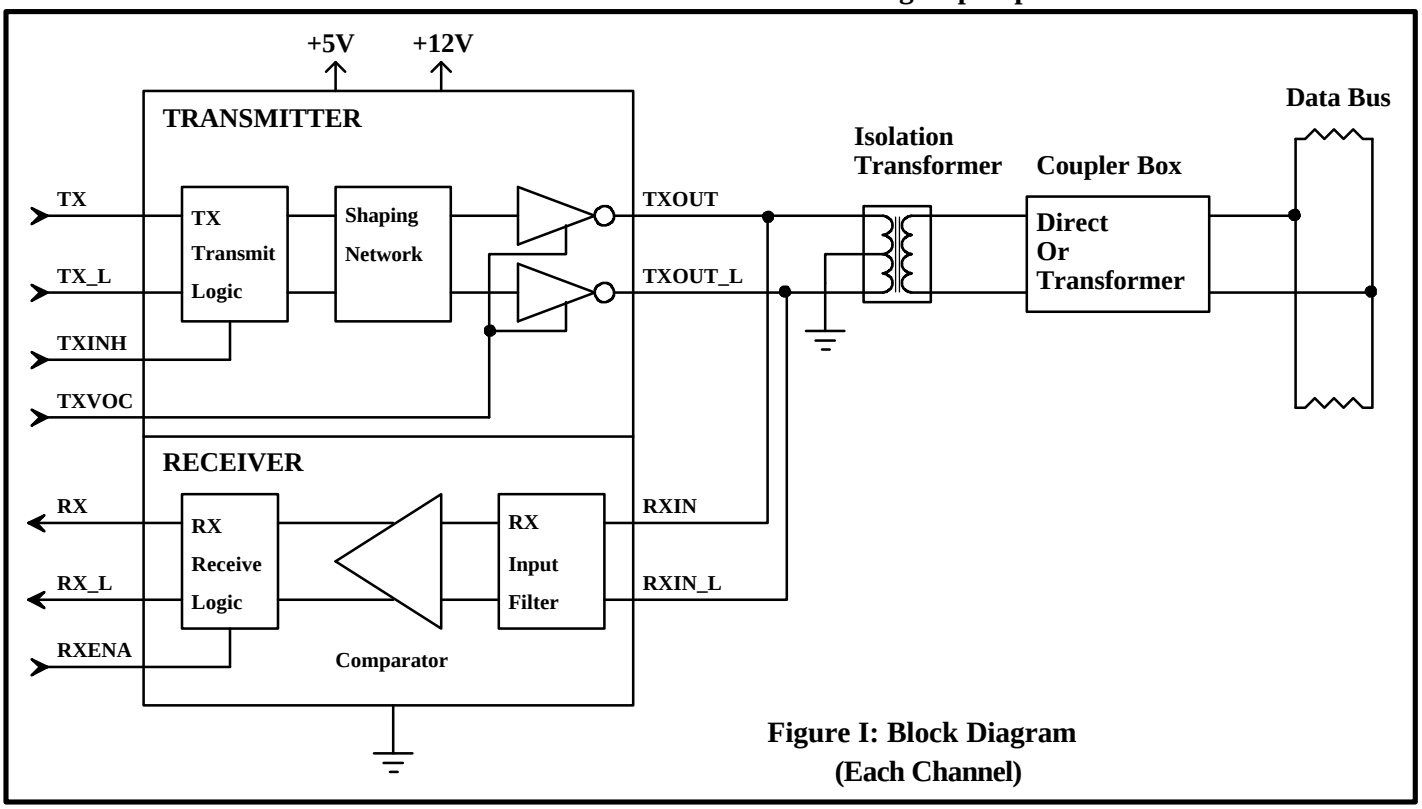


Figure I: Block Diagram
(Each Channel)

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NHI-1540

TABLE I: Electrical Specifications

Parameter	Condition	Symbol	Min	Typ	Max	Units
POWER SUPPLY REQUIREMENTS		Vcc	4.7		5.5	V
		+V	11.4		12.6	V
		TXVOC	0		12.6	V
V_{CC} SUPPLY CURRENT	Vcc=5.0V, +V=12.0V, total hybrid	Icc			50	mA
+V SUPPLY CURRENT	Vcc=5.0V, +V=12.0V, each channel	+I			25	mA
TXVOC SUPPLY CURRENT	Vcc=5.0V, +V=12.0V=TXVOC, One channel @ 100% duty cycle	I_{TXVOC}			190	mA
POWER DISSIPATION	Vcc=5.0V, +V=12.0V, Transmit one channel @ 100% duty cycle	Pd2			0.96	W
OPERATING TEMPERATURES	Junction	Tj	-55		160	°C
	Case	Tc	-55		125	°C
	Storage	Ts	-65		150	°C
THERMAL IMPEDANCE	Junction to Case	θjc			8.8	°C/W
LOGIC I/O						
RXENA_A, TXA, TXA_L, TXINH_A, RXENA_B, TXB, TXB_L, TXINH_B	Vcc= 5.5V, Vil= 0.0V	Iil			-0.8	mA
	Vcc= 4.5V, Vih= 2.7V	Iih			40	uA
RXA, RXA_L, RXB, RXB_L	Vcc= 5.5V, Iol= -8 mA	Vol			0.5	V
	Vcc= 4.5V, Ioh= 400 uA	Voh	2.5			V
RECEIVER						
Input Resistance	1 MHz sine wave	Rin	7			k Ω
Input Capacitance	1 MHz sine wave	Cin			5	pF
Common Mode Rejection Ratio		CMRR	40			dB
Threshold Voltage	Differential	Vth	0.56		1.0	Vpp
Input Level	Differential	Vin	40			Vpp
Receiver Delay	Zero Crossing on bus to RX or RX_L	t_{RD}			400	nS
TRANSMITTER						
Output Voltage	Across 35 W load TXVOC = +V = 12.0V	V_{OUT}	6		9	Vpp
Rise/Fall Time	10% to 90% of peak to peak output	t_R , t_F	100	150	300	nS
Transmitter Delay	TX or TX_L edge to bus zero crossing	t_{TD}			250	nS
Output Dynamic Offset Voltage	Across 35 W load	Vdyn	-90		90	mV
Output Noise	Differential	Vnpp			10	mVpp
Output Resistance	Differential, not transmitting	Rout	10			kΩ

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NHI-1540

36 Pin Package Functions			
Pin#	Function	Pin#	Function
1	TXOUT_A	36	TXA_L
2	TXOUT_A_L	35	TXA
3	TXVOC_A	34	TXINH_A
4	GND_A	33	+5V_A
5	RXA	32	NC
6	RXENA_A	31	GND_A
7	GND_A	30	RXIN_A_L
8	RXA_L	29	RXIN_A
9	NC	28	+12V_A
10	TXOUT_B	27	TXB_L
11	TXOUT_B_L	26	TXB
12	TXVOC_B	25	TXINH_B
13	GND_B	24	+5V_B
14	RXB	23	NC
15	RXENA_B	22	GND_B
16	GND_B	21	RXIN_B_L
17	RXB_L	20	RXIN_B
18	NC	19	+12V_B

Transformer Requirements:

The NHI-1540 requires a transformer with a turns ratio of 1.25:1.00 for Direct Coupling, and a turns ratio of 1.66:1.00 for Transformer Coupling to the Mil-Std-1553 Bus. Technitrol part number Q1553-3 or equivalent is recommended. The center tap on the transceiver side of the isolation transformer must be grounded.

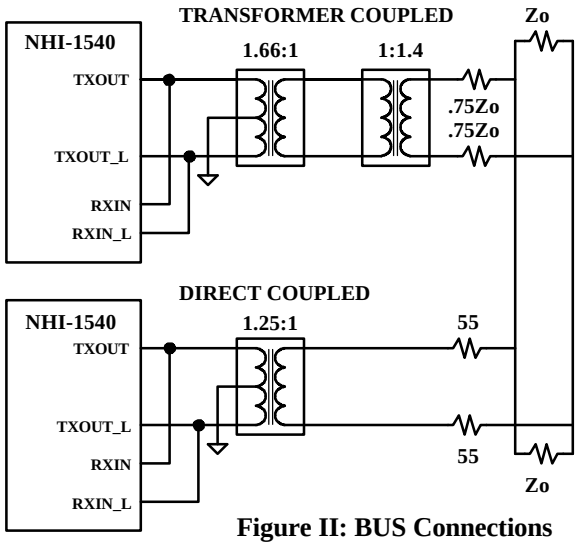
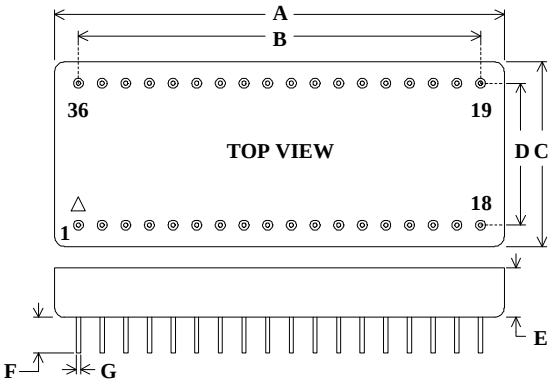
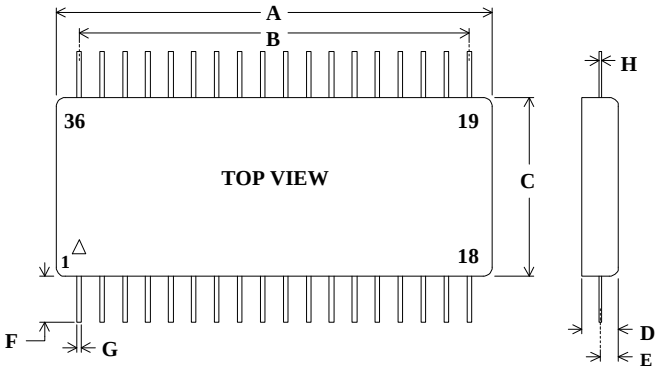


Figure II: BUS Connections



36 Pin Plug-In Package Detail



36 Pin Flatpack Package Detail

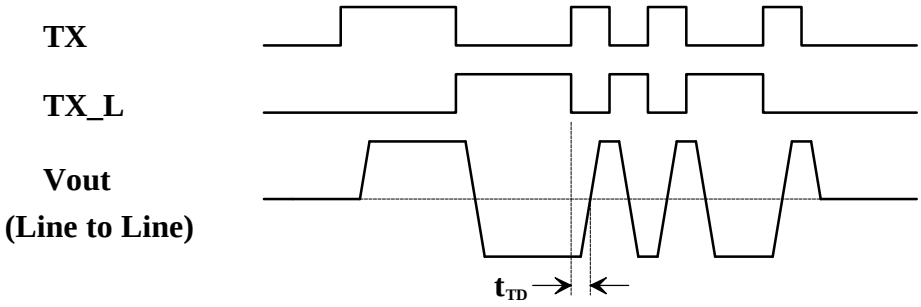
DIM	TYP (inches)	TOL (+/- inches)
A	1.900 SQ	0.010
B	17 EQ SP @	0.100 = 1.700
C	0.780	0.010
D	0.600	0.010
E	0.185	0.010
F	0.250	MIN
G	0.018	0.002

DIM	TYP (inches)	TOL (+/- inches)
A	1.900 SQ	0.010
B	17 EQ SP @	0.100 = 1.700
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H	0.010	0.002

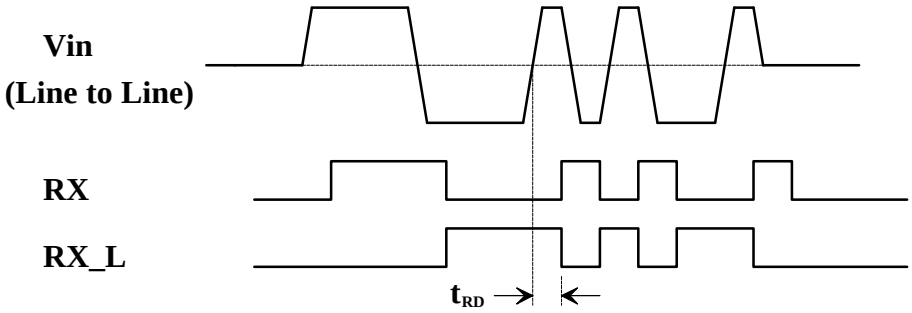
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NHI-1540

Transmit Waveforms



Receive Waveforms



Transmitter Operation:

A high level input on TXINH will inhibit the transmitter outputs. If the TX & TX_L transmitter inputs are both high or both low, the transmitter is also inhibited.

The transmitter output level is controlled by the supply voltage applied to the TXVOC input pin for each channel. Bus voltage range is 0.0 to 7.5 Vpp typical with 0.0 to 12.0 Vdc applied respectively.

A 470uF capacitor from the TXVOC control line to ground is recommended for each channel.

Receiver Operation:

A low level input on RXENA will disable the receiver outputs RX & RX_L regardless of bus activity.

Ordering Information:

NHI-1540 FP / M

Reliability Grade

M = Military, -55 to +125 °C
Blank = Industrial, -40 to +85 °C

Package Style

Blank = Plug-In
FP = Flatpack

Decoder Compatibility

40 = RX & RX_L, Standby = Logic 0

V: October 2005

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