



NATIONAL HYBRID, INC.

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Mil-Std-1553 Products NHI-1503 Series +12V Dual Transceivers

Features/Applications:

- Very Low Standby Power
- Low Thermal Resistance
- Totally Isolated Channels
- Short Circuit Proof
- Superior Noise Performance
- Screened to Mil-PRF-38534

Description:

The NHI +12V dual transceivers are available in 1.900" x .780", 36 pin plug-in and flatpack packages.

Each receiver converts the 1553 bus bi-phase data to complementary RX and RX_H TTL digital outputs for use by the manchester decoder. The device provides independent receiver enables for each channel. Devices are available with receiver outputs normally HIGH or LOW during standby mode for compatibility with industry standard decoders.

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.

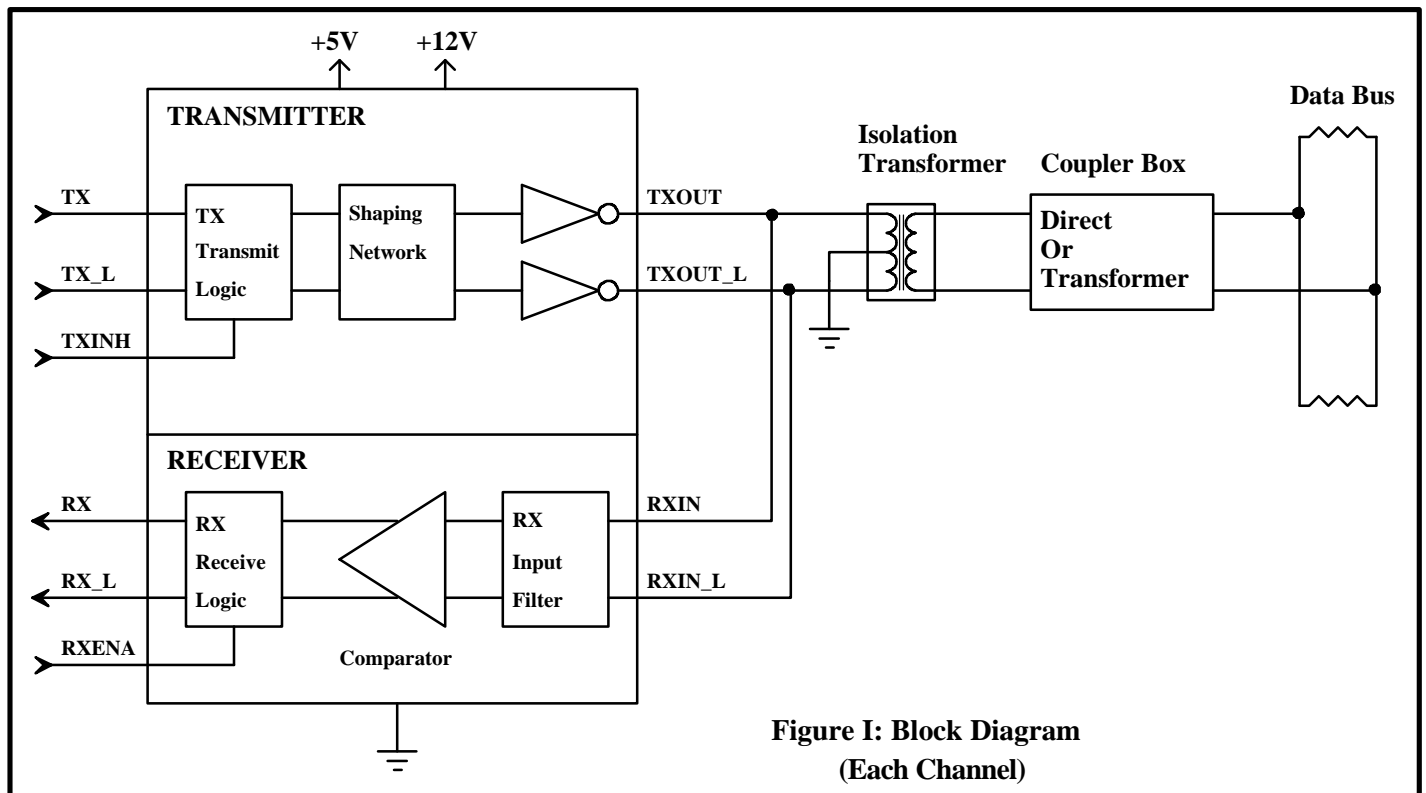


Figure I: Block Diagram
(Each Channel)

NHI-1503 Series

TABLE I: Electrical Specifications

Parameter	Condition	Symbol	Min	Typ	Max	Units
POWER SUPPLY REQUIREMENTS		V _{cc}	4.5		5.5	V
		+V	11.25		12.75	V
V_{cc} SUPPLY CURRENT	V _{cc} =5.0V, +V=12.0V, total hybrid	I _c			25	mA
+V SUPPLY CURRENT	V _{cc} =5.0V, +V=12.0V, each channel, not transmitting	+I			25	mA
	V _{cc} =5.0V, +V=12.0V, One channel @ 100% duty cycle	+I _{100%}			210	mA
POWER DISSIPATION	V _{cc} =5.0V, +V=12.0V, Transmit one channel @ 100% duty cycle	P _d			0.96	W
OPERATING TEMPERATURES	Junction	T _j	-55		160	°C
	Case	T _c	-55		125	°C
	Storage	T _s	-65		150	°C
THERMAL IMPEDANCE	Junction to Case	θ _{jc}			8.8	°C/W
LOGIC I/O						
RXENA_A, TXA, TXA_L, TXINH_A, RXENA_B, TXB, TXB_L, TXINH_B	V _{cc} = 5.5V, Vil= 0.0V	I _{il}			-0.8	mA
	V _{cc} = 4.5V, Vih= 2.7V	I _{ih}			40	uA
RXA, RXA_L, RXB, RXB_L	V _{cc} = 5.5V, Iol= -8 mA	V _{ol}			0.5	V
	V _{cc} = 4.5V, Ioh= 400 uA	V _{oh}	2.5			V
RECEIVER						
Input Resistance	1 MHz sine wave	R _{in}	7			k Ω
Input Capacitance	1 MHz sine wave	C _{in}			5	pF
Common Mode Rejection Ratio		CMRR	40			dB
Threshold Voltage	Differential	V _{th}	0.56		1.0	V _{pp}
Input Level	Differential	V _{in}	40			V _{pp}
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	V _{pp}
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	V _{dyn}	-90		90	mV
Output Noise	Differential	V _{npp}			10	mV _{pp}
Output Resistance	Differential, not transmitting	R _{out}	10			kΩ

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36 Pin Package Functions

Pin#	Function	Pin#	Function
1	TXOUT_A	36	TXA_L
2	TXOUT_A_L	35	TXA
3	GND_A	34	TXINH_A
4	NC	33	+5V_A
5	RXA	32	NC / -12V_A
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	GND_B	25	TXINH_B
13	NC	24	+5V_B
14	RXB	23	NC / -12V_B
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-1503 requires a transformer with a turns ratio of 1.40:1.00 for Direct Coupling, and a turns ratio of 2.00:1.00 for Transformer Coupling to the Mil-Std-1553 Bus. Technitrol part number Q1553-2 or equivalent is recommended. The center tap on the transceiver side of the isolation transformer must be be grounded.

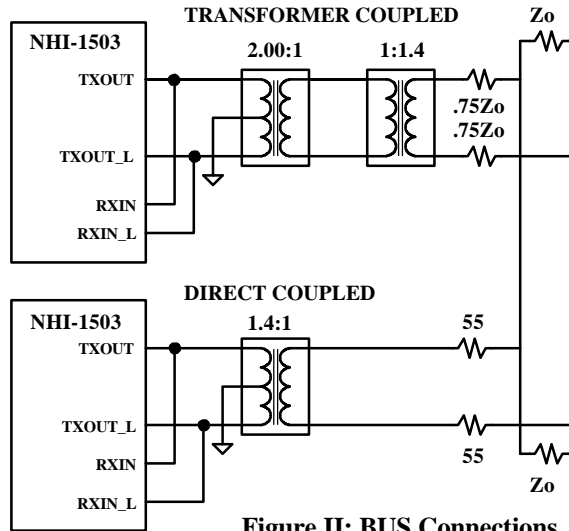
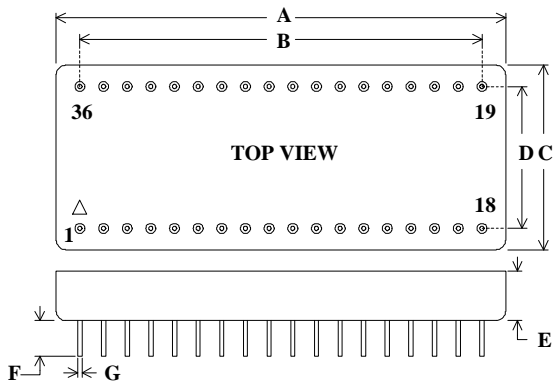
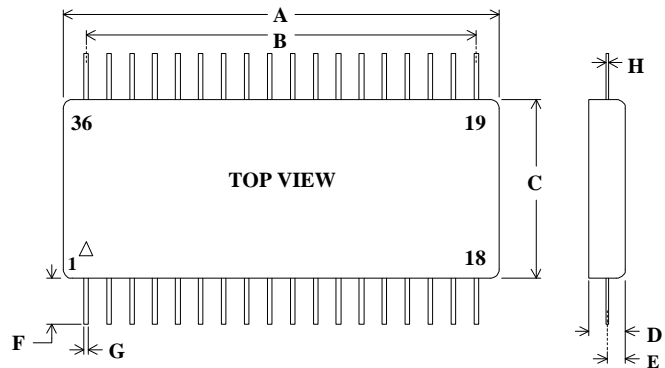


Figure II: BUS Connections



36 Pin Plug-In 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

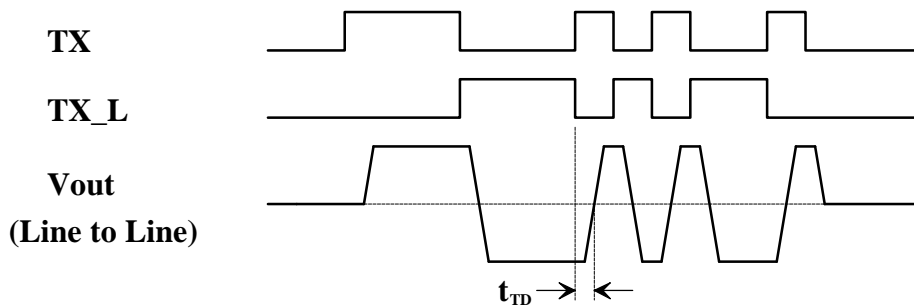


36 Pin Flatpack Package Detail

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	0.185	0.012
E	0.080	0.010
F	0.500	MIN
G	0.018	0.002
H	0.010	0.002

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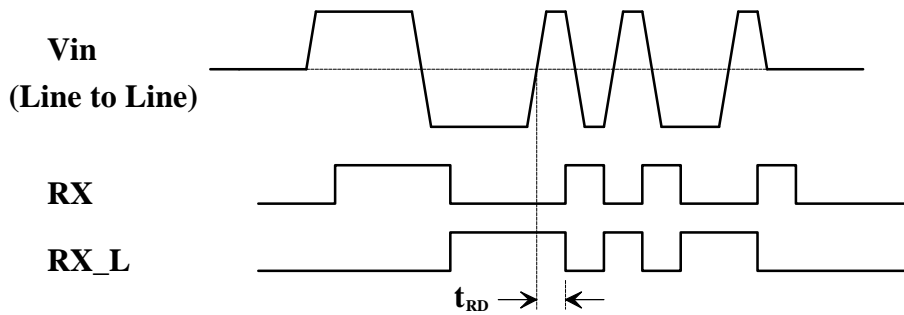
Transmit Waveforms



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.

Receive Waveforms



Receiver Operation:

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

The receiver output compatibility may be specified as logic 0 or logic 1 when in standby mode.

** See Ordering Information

Ordering Information:

NHI-1503 FP / 883

Reliability Grade

883 = Fully Compliant with Mil-Std-883

M = Military, -55 to +125 °C

Blank = Industrial, -40 to +85 °C

Package Style

Blank = Plug-In

FP = Flatpack

GW = NHI Standard Gull Wing Lead Formed Surface Mount Flatpack

Decoder Compatibility

03 = RX & RX_L, Standby = Logic 1

** SMD Listing: Not Applicable

See QML-38534 for NHI's Manufacturer Qualification Under Mil-PRF-38534