

NHI-1500 Series

TABLE I: Electrical Specifications

Parameter	Condition	Symbol	Min	Typ	Max	Units
POWER SUPPLY REQUIREMENTS		V _{cc}	4.5		5.5	V
		+V	14.25		15.75	V
V_{CC} SUPPLY CURRENT	V _{cc} =5.0V, +V=15.0V, total hybrid	I _{cc}			25	mA
+V SUPPLY CURRENT	V _{cc} =5.0V, +V=15.0V, each channel, not transmitting	+I			25	mA
	V _{cc} =5.0V, +V=15.0V, One channel @ 100% duty cycle	+I _{100%}			210	mA
POWER DISSIPATION	V _{cc} =5.0V, +V=15.0V, 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
6	RXENA_A	31	NC
7	GND_A	30	RXIN_A L
8	RXA_L	29	RXIN_A
9	NC	28	+15V_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
15	RXENA_B	22	NC
16	GND_B	21	RXIN_B L
17	RXB_L	20	RXIN_B
18	NC	19	+15V_B

Transformer Requirements:

The NHI-1500 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.

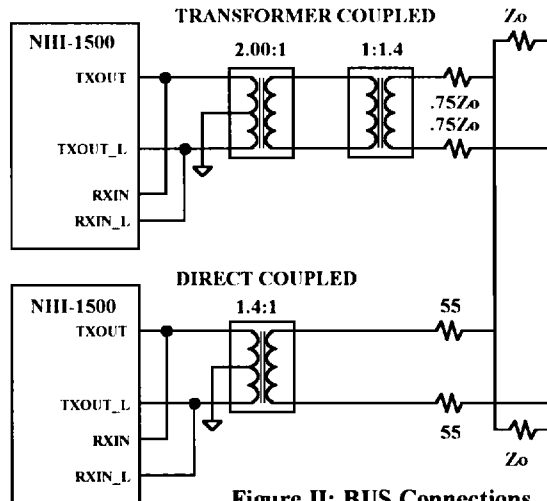
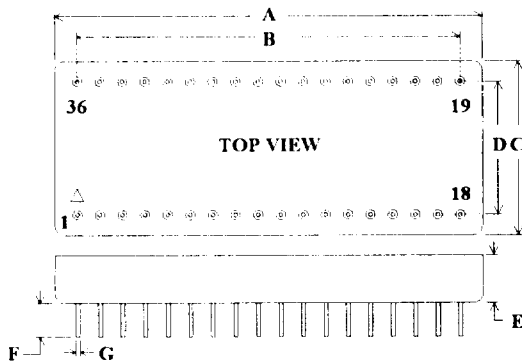
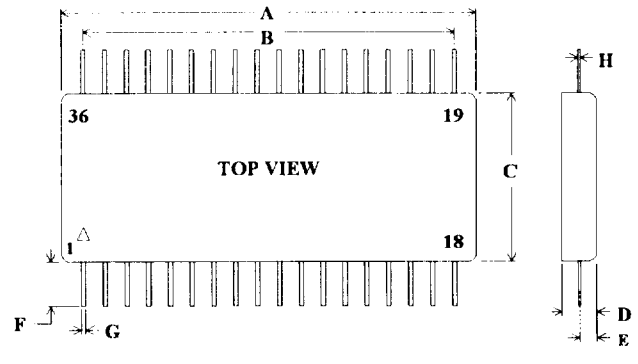


Figure II: BUS Connections



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

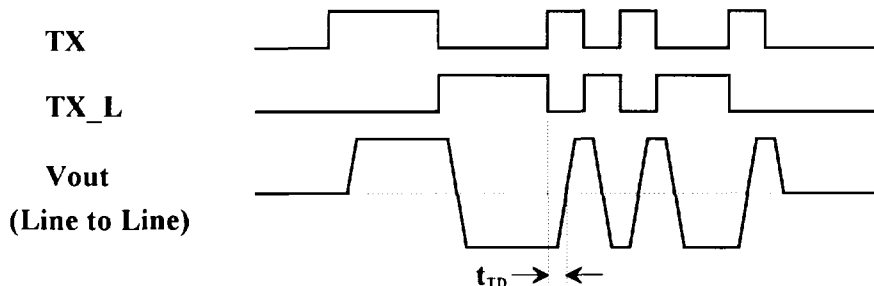


36 Pin Flatpack Package Detail

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

NHI-1500 Series

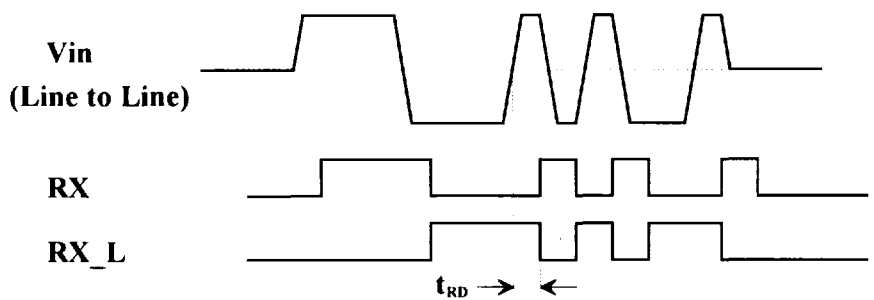
Transmit Waveforms



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-1500 FP / 883

Reliability Grade

883 = Fully Compliant with Mil-Std-883

M = Military, -55 to +125 °C

Blank = Industrial, -25 to +85 °C

Package Style

Blank = Plug-In

FP = Flatpack

Decoder Compatibility

00 = RX & RX_L, Standby = Logic 0

01 = RX & RX_L, Standby = Logic 1

** SMD Listing: DESC Drawing# 5962-87579 for NHI-1500
DESC Drawing# 5962-89447 for NHI-1501

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

REV1500-940901



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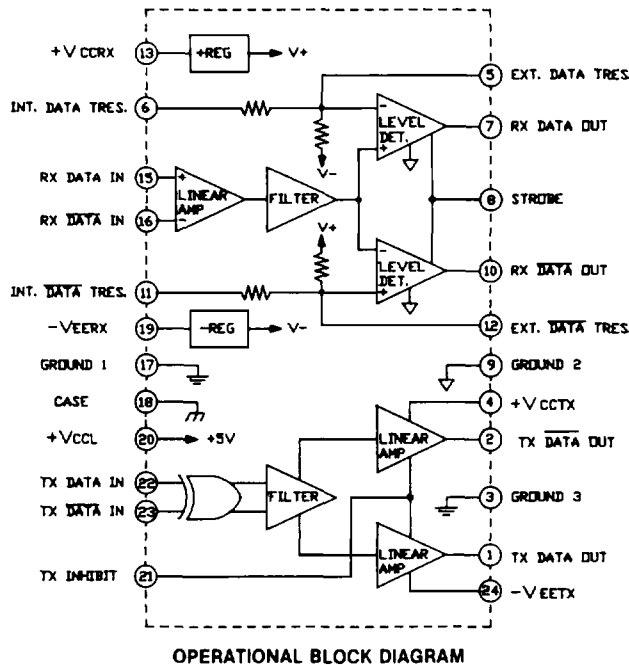
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Mil-Std-1772
Certified & Qualified

Mil-Std-1553/MacAir Products NHI-1513 Series Voltage Driver Single Transceivers

FEATURES:

- 1.5 Watt Total Hybrid Dissipation at 25% Transmitting Duty Cycle.
- Meets MIL-STD-1553A/B and MACAIR.
- TTL Compatible.
- Screened to MIL-STD-883.
- Thick Film Hybrid Technology.
- Integrated Receiver and Driver.
- Plug-in or Flat Pack Configuration.
- Receiver Filtering Enhances S/N Ratio.
- Improved Receiver and Transmitter Filtering.



OPERATIONAL BLOCK DIAGRAM

NOTE: 1. Pin 14 is used on NHI-1515 to control the transmitter output amplitude.
2. All grounds must be externally connected together.

GENERAL DESCRIPTION:

These National Hybrid Data Bus Transceivers contain differential voltage source drivers and differential receivers. They are intended for applications using a MIL-STD-1553A/B data bus or a MACAIR data configured data bus.

The NHI-1513 transceiver is specifically designed to comply with the requirements of the following MACAIR specifications: A-3818, A-5232, A-5690, and A-4905. The transmitter section of this unit contains a specially designed filter which suppresses the higher order components of the transmission in accordance with the MACAIR specifications and producing sinusoidal output waveform. This filter also complies with the group delay requirements of the MACAIR document.

The NHI-1514 transceiver produces a trapezoidal waveform during transmission.

The NHI-1515 transceiver is identical to the NHI-1513 unit but it incorporates a voltage control pin which allows the transmitter output level to be adjusted from 0 volts to maximum level as the control voltage is varied from 0 to +10 volts.

The NHI-1516 and NHI-1517 are separate receivers and transmitters respectively. The Transmitter produces a trapezoidal output wave form for MIL-STD 1553A/B applications.

TRANSMITTER

The transmitter section of these devices is driven by complementary TTL signals into the TX DATA and TX DATA* inputs. This produces a nominal 30 volt peak to peak signal across a 140 ohm load. The transmitter is coupled to the bus via a 1:1 transformer whose secondary is connected to two 52 ohm isolation resistors which feed the terminated 70 ohm bus. This will produce a nominal voltage on the bus of 7.5 volts peak to peak.

The transmitter is automatically inhibited and placed in the high impedance state when both TX DATA and TX DATA* inputs are either at a logic "1" or a logic "0" simultaneously. A logic "1" applied to the TX INHIBIT input is used as a manual override and will disable the transmitter and place it in the high impedance state.

RECEIVER

The receiver is transformer coupled to the bus by a 1:1 transformer. Its differential input stage drives a filter and threshold comparator. TTL data is outputted at the RX DATA and RX DATA* outputs. The positive and negative thresholds may be controlled by internally set resistors. This is accomplished by grounding pins 6 and 11. The thresholds may also be set externally by putting resistors from pins 5 and 12 to ground.

The receiver outputs can be inhibited and pulled high by putting a logic "0" on the strobe input.

Pinouts for NHI-1513/14/15