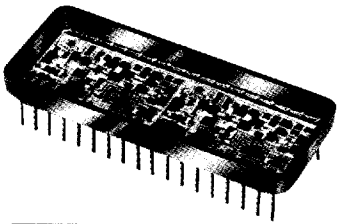
DDC ILC DATA DEVICE CORPORATION

T-75-45-09

BUS-63147



MIL-STD-1553 DATA BUS +5V DUAL TRANSCEIVER

DESCRIPTION

The BUS-63147 transceiver is a complete transmitter and receiver pair conforming fully to MIL-STD-1553A and 1553B. Features include: +5V power supply voltage, Harris interface type, completely independent dual redundant operation, and small size (36 pin DDIP).

The receiver section of the BUS-63147 series accepts phase-modulated bipolar data from a MIL-STD-1553 Data Bus and produces TTL signal data at its outputs: RX DATA OUT and RX $\overline{\text{DATA}}$ OUT. These outputs represent positive and negative variations of the input data signals beyond an internally fixed threshold level. An external STROBE input enables or disables the receiver's outputs.

The transmitter section accepts biphase TTL signal data at its TX DATA and TX $\overline{\text{DATA}}$ inputs and produces phase-modulated bipolar data at the TX DATA and TX $\overline{\text{DATA}}$ outputs. The transmitter's output voltage level is typically 30Vpp. An external input, INHIBIT, takes priority over the transmitter inputs and disables the transmitter when activated with a logic "1".

The small size, +5V power supply voltage, and compliance with MIL-STD-1553 simplify engineering design, making it an excellent choice for interfacing with any MIL-STD-1553 system.

FEATURES

- *ONLY REQUIRES +5V POWER SUPPLY*
- *SMALL SIZE – 36 PIN DDIP*
- *LOW POWER*
- *MIL-STD-883B SCREENING AVAILABLE*
- *DUAL REDUNDANT PACKAGING*
- *HARRIS I/O COMPATIBILITY*
- *CONFORMS FULLY TO MIL-STD-1553A AND 1553B*

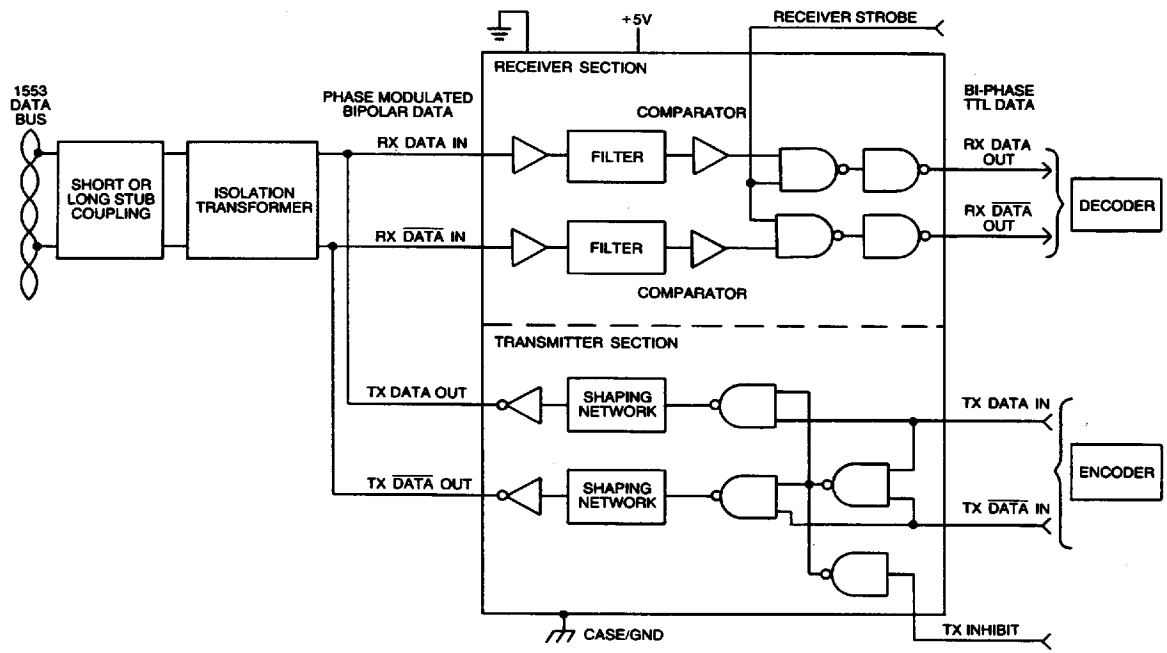


FIGURE 1. BUS-63147 BLOCK DIAGRAM

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TABLE 1. BUS-63147 SPECIFICATIONS	
RECEIVER	
Strobe	2 LS Loads
Input Level	40Vpp, Diff, max
Threshold Level*	0.56Vpp min, 1.0Vpp max
CMRR	40 db, min
Input Resistance – Diff	2KΩ, min
Input Capacitance – Diff	5pf, max
Output Fan Out	10 LS Loads
TRANSMITTER	
TX DATA Input	2TTL Loads
TX $\overline{\text{DATA}}$ Input	2 TTL Loads
TX Inhibit	1 TTL Load
Output Level (Direct Coupled)	30Vpp, nom across 140Ω load
Rise/Fall Time (nsec)	100 min, 150 typ, 300 max
Output Noise	10mVpp, Diff, max
Output Offset Voltage	±90mVpp, max across 35Ω load
Output Impedance (Non-Transmitting)	
Output Resistance – Diff	10KΩ, min
Output Capacitance – Diff	5pf, max
POWER SUPPLY REQUIREMENTS	Each channel +5V – 5% +10%
Non-Transmitting – (typ/max)	29/49mA
Transmitting – 50% duty cycle (typ/max)	164/199.5mA
Transmitting – 100% duty cycle (typ/max)	299.5/349.5mA

TABLE 1. BUS-63147 SPECIFICATIONS (Continued)	
THERMAL	
Operating Junction Temperature	–55°C to +160°C
Operating Case Temperature	–55°C to +125°C
Storage Temperature	–55°C to +160°C
Thermal Impedance –	
Junction to Case	110°C/W (Hottest Die)
Case to Air (typ)	20°C/W
POWER DISSIPATION Single Channel	(Total Hybrid, one channel transmitting, other at idle)
Non-Transmitting – (typ/max)	0.29/0.49W
Transmitting – 50% duty cycle (typ/max)	1.25/1.80W
Transmitting – 100% duty cycle (typ/max)	2.49/3.10W
POWER DISSIPATION Hottest Die	(Each Channel)
Non-Transmitting – (typ/max)	0.0W
Transmitting – 50% duty cycle (typ/max)	0.13/0.16W
Transmitting – 100% duty cycle (typ/max)	0.27/0.32W
MECHANICAL	
Size	36 Pin DDIP
Dimensions	1.895" x 0.775" x 0.210"
Weight	.6 oz

* The Threshold Level, as referred to in this specification, is meant to be the maximum peak to peak voltage (measured on the Data Bus) that can be applied to the receivers' input without causing the output to change from the OFF state.

GENERAL

The BUS-63147 is a dual redundant transmitter and receiver packaged in a 36 pin DDIP. It is directly compatible to Harris 15530 encoder/decoder and has internal (factory preset) threshold levels. Requiring only a +5V power supply, the BUS-63147 is designed for use in any MIL-STD-1553 application.

Figure 2 illustrates the BUS-63147 connected to a MIL-STD-1553 Data Bus. Once transformer isolated, coupling to Data Bus can be either short stub (direct) or long stub (transformer). The recommended transformer for long stub and short stub coupling is DDC's BUS-41429.

TRANSMIT OPERATING MODE

The transmitter section accepts encoded TTL data and converts it to phase-modulated bipolar form by means of a waveshaping network and driver circuitry. These driver outputs are coupled to a MIL-STD-1553 Data Bus via a transformer which is driven from the TX DATA OUT and TX $\overline{\text{DATA}}$ OUT terminals. These output terminals can be put into a high impedance state when transmitting by enabling INHIBIT, or by placing both inputs at the same logic level following the Manchester II truth table. Table 2, Transmit Operating Mode, lists the functions for the output data and input data in reference to the state of INHIBIT.

The transceivers are able to operate in a "wraparound" mode. This allows output data to be monitored by the receiver section and returned to the decoder where it can be checked for errors. Reference DDC Protocol Monolithics (BUS-65600 or BUS-65112) for more information.

RECEIVER OPERATING MODE

The receiver section accepts data from a MIL-STD-1553 Data Bus when properly coupled in either of the two possible configurations (long or short stub). This data is converted to bi-phase TTL and made available for decoding at the RX DATA and $\overline{\text{RX DATA}}$ output terminals. Applying a logic "1" to the STROBE input allows data to pass through to the receiver output. Applying a logic "0" to the STROBE input, turns the receiver output OFF.

The BUS-63147 receiver outputs are both at a logic "0" when they are either strobed off, or no signal is being received. This is directly compatible with Harris type of encoder/decoder. Compatibility to Smiths type of encoder/decoder can be accomplished by swapping the RX DATA and RX $\overline{\text{DATA}}$ outputs and then inverting them (see figure 3).

BUS-63147 WAVEFORMS

Figure 4 illustrates the waveforms for the BUS-63147 with Harris type encoder/decoders. Note that DATA and $\overline{\text{DATA}}$ inputs must be complementary waveforms of 50% duty cycle. Care must be taken that the Manchester bi-phase truth table is followed if other encoder/decoders are used.

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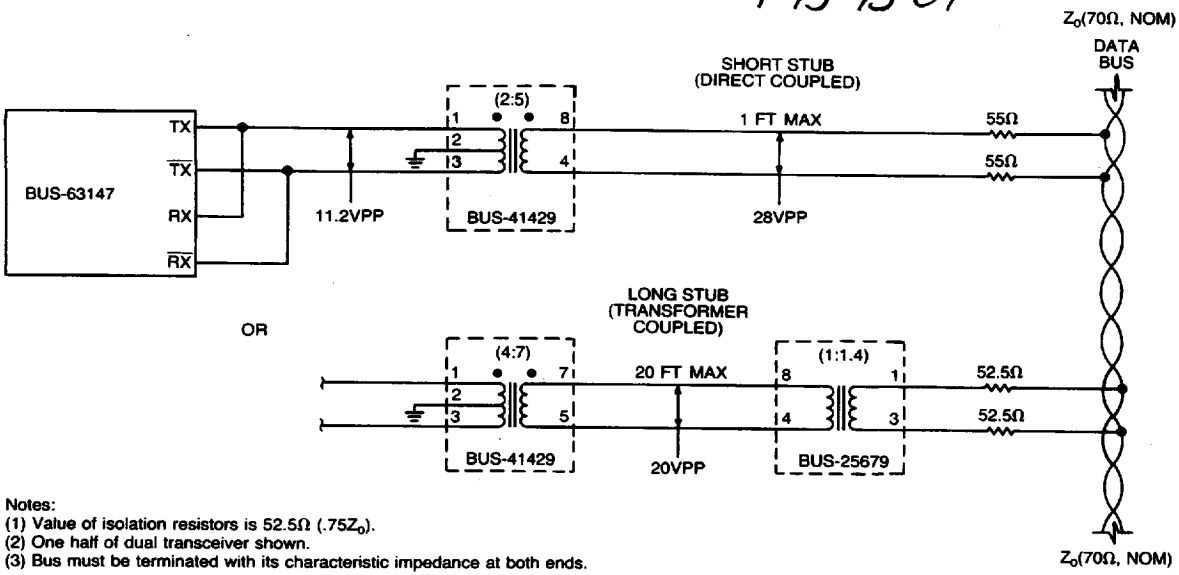


Notes:
(1) Value of isolation resistors is 52.5Ω (.75Z_0).
(2) One half of dual transceiver shown.
(3) Bus must be terminated with its characteristic impedance at both ends.

FIGURE 2. BUS-63147 CONNECTIONS TO DATA BUS

TABLE 2. TRANSMIT OPERATING MODE

TX DATA IN	TX $\overline{\text{DATA}}$ IN	TX INHIBIT	DRIVER OUTPUT[2]
X[1]	X	H	OFF[3]
0	0	X	OFF
0	1	L	ON
1	0	L	ON
1	1	X	OFF

Notes:
(1) X = Don't care.
(2) DRIVER OUT = TX DATA OUT and TX $\overline{\text{DATA}}$ OUT
(3) DRIVER OUTPUT terminals are in the high impedance mode during OFF time, independent of INHIBIT status.

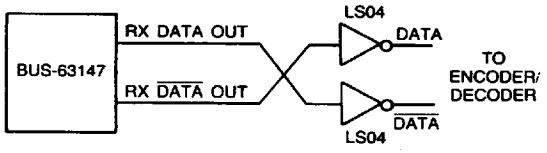
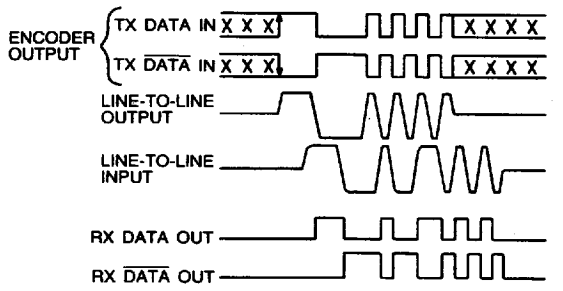


FIGURE 3. SMITHS ENCODER/DECODER COMPATIBILITY



Notes:
(1) TX DATA IN and RX DATA OUT are TTL signals.
(2) TX DATA IN inputs must be at opposite logic levels during transmission, and at the same logic level when not transmitting.
(3) LINE-TO-LINE output voltage is measured between TX DATA OUT AND TX $\overline{\text{DATA}}$ OUT.
(4) LINE-TO-LINE input voltage is measured on the Data Bus.

FIGURE 4. BUS-63147 WAVEFORMS

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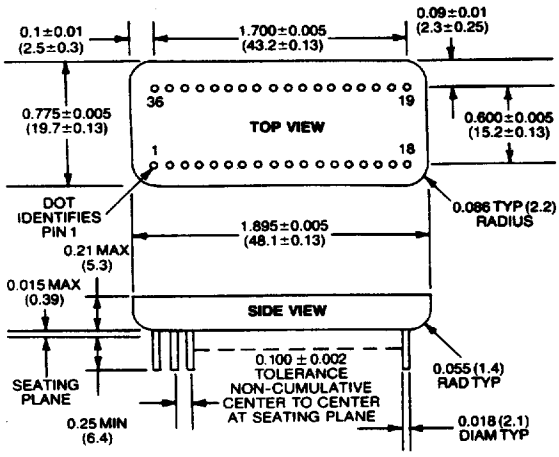
TABLE 3. BUS-63147 PIN FUNCTIONS

PIN	FUNCTION		PIN	FUNCTION	
1	TX DATA OUT	*	19	NC	
2	TX $\overline{\text{DATA}}$ OUT	*	20	RX DATA IN	**
3	GND	*	21	RX $\overline{\text{DATA}}$ IN	**
4	NC	*	22	GND	**
5	RX DATA OUT	*	23	NC	**
6	STROBE	*	24	+5V	**
7	GND	*	25	INHIBIT	**
8	RX $\overline{\text{DATA}}$ OUT	*	26	TX DATA IN	**
9	GND (CASE)	*	27	TX $\overline{\text{DATA}}$ IN	**
10	TX DATA OUT	**	28	NC	
11	TX $\overline{\text{DATA}}$ OUT	**	29	RX DATA IN	*
12	GND	**	30	RX $\overline{\text{DATA}}$ IN	*
13	NC		31	GND	*
14	RX DATA OUT	**	32	NC	
15	STROBE	**	33	+5V	*
16	GND	**	34	INHIBIT	*
17	RX $\overline{\text{DATA}}$ OUT	**	35	TX DATA IN	*
18	NC		36	TX $\overline{\text{DATA}}$ IN	*

*Channel One
**Channel Two



Dimensions in inches (millimeters).

FIGURE 5. BUS-63147 MECHANICAL OUTLINE

ORDERING INFORMATION

BUS- 63147 - 883B

Reliability Grade:
883B = Fully compliant with MIL-STD-883
B = Screened to MIL-STD-883 but without QCI testing
Blank = 0° to 70° C operation

Decoder Compatibility:
7 = Standard Decoder
8 = DDC Bus-65612 PGA

Matching transformer BUS-41429.
SMD Listing: DESC# 5962-89522-01XC