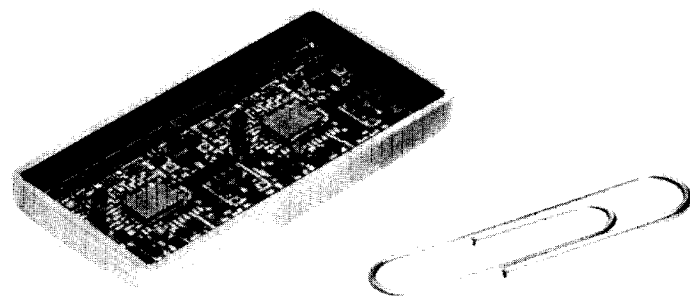


REDUCED SIZE DUAL ARX 3400 SERIES CURRENT SOURCE TRANSCEIVERS for MIL-STD-1553



Features:

- Monolithic construction for low parts count
- Very low standby power consumption
- Ultra small dual plug in transceiver (23% reduction in area)
- Outstanding MIL-STD-1553 electrical performance
- ± 15 volt or ± 12 volt power supply operation
- Plug in and flat pack versions
- MIL-STD-883 screened
- DESC part number available, 5962-8944701HUX, ZX



General Description:

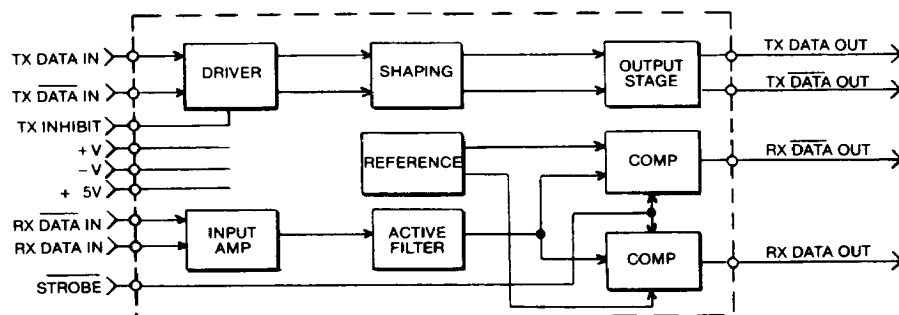
The Aeroflex Laboratories Incorporated Series 3400 Transceivers are a second generation design which utilize an Application Specific Integrated Circuit (ASIC) with Large Scale Integration (LSI) fabricated in Bipolar technology as its main element. The only parts external to the LSI device in the hybrid are the precision resistors and capacitors required in the filter and other portions of the circuit, and the components which make up the power driving stage of the transmitter. These transceivers take 23% less surface area than the industry standard 36 pin package and should be used where space is a premium. All units provide full compliance with MIL-STD-1553 A and B requirements and exhibit outstanding electrical performance.

Design of these transceivers reflect particular attention to dynamic characteristics such as output offset, low bit and word error rate, waveform purity and absence of zero crossover distortion. Efficient overall electrical design provides very low internal power dissipation and thermal design keeps heat rise to a minimum.

Each channel of the dual transceiver is completely separate from the other and fully independent. This includes all power leads as well as signal lines and grounds. Hence each channel may be connected to a different data bus with no interaction between them.

Transmitter

The transmitter section accepts bi-phase TTL level data signals at the input and when coupled to the data bus with a transformer of appropriate turns ratio, isolated on the data bus side with two 52.5 ohm fault isolation resistors, and loaded by two 70 ohm terminations plus additional receivers, the data bus signal produced is 7.5 volts nominal peak-to-peak at A-A. (See Figure 5).



Block diagram (without transformer)

When both "DATA" and "DATA" inputs are held low or high the transmitter output becomes a high impedance and is "removed" from the line. Alternately, an overriding "INHIBIT" input provides for removal of the transmitter output as well. Logic high applied to the "INHIBIT" disables the transmitter (See Transmitter Logic Waveform, Figure 1.) The transmitter may be safely operated for an indefinite period with output short circuited at 100% duty cycle.

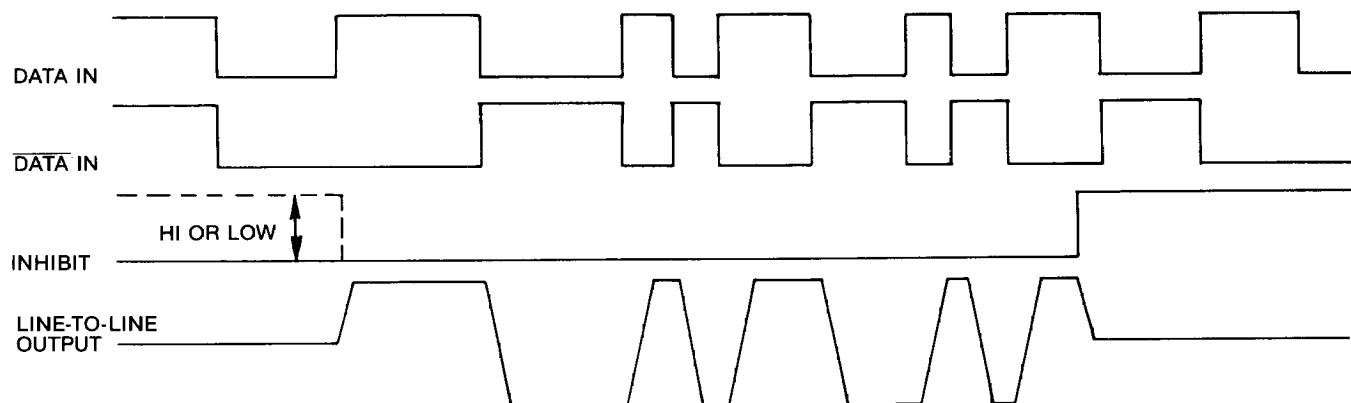
Receiver

The Receiver section accepts bi-phase differential data at the input

and produces two TTL level signals at the output. The outputs are "Rx DATA OUT and Rx DATA OUT", and represent positive and negative excursions (respectively) of the input above a predetermined threshold. (See Receiver Logic Waveform, Figure 2.)

The pre-set internal threshold will detect data bus signals exceeding 1.15 volts p-p and reject signals less than 0.6 volts p-p when used with appropriate transformers. (See Figure 5 and ordering information table for transformer data and typical connections.)

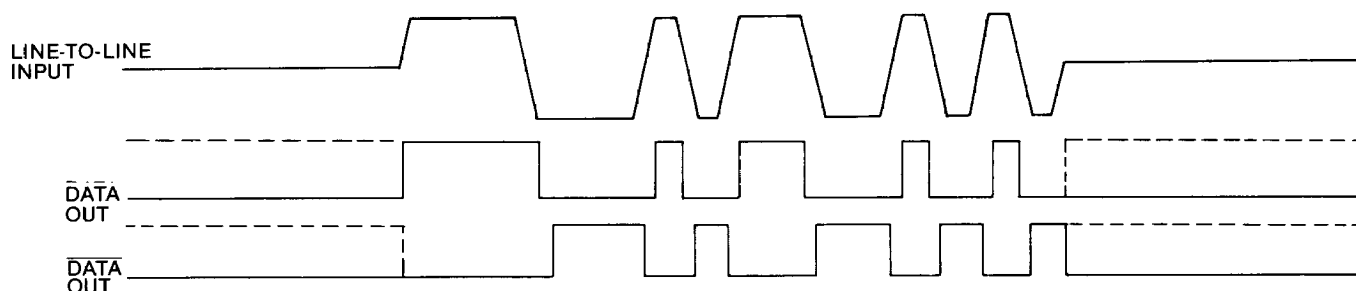
Figure 1. Transmitter Logic Waveform



NOTES:

- 1: DATA and DATA inputs must be complementary waveforms, or 50% duty cycle average, with no delays between them.
- 2: DATA and DATA must be in the same state during off time. (both high or both low)

Figure 2. Receiver Logic Waveform



NOTES:

- 1: Receiver output waveforms shown are for normally low devices. For normally high devices the two outputs are inverted and swapped, as shown by the dashed lines.

Absolute Maximum Ratings

Supply voltage, V +	– 0.3 to + 18.0V
Supply voltage, V –	+ 0.3 to – 18.0V
Supply voltage, V _L	– 0.3 to + 7.0V
Logic Input Voltage	– 0.3 to + 5.5V
Receiver Differential Input	± 20V (40V p-p)
Receiver Input Voltage (Common Mode)	± 15V
Driver Peak Output Current	300mA
Max. power dissipation (Max. Power Supplies Voltages) (Total hybrid at 100% duty cycle)* (Total hybrid standby mode)	Dual* 2031 mW 880 mW
Maximum power dissipation in hottest die @ 100% duty cycle (Derates to zero in standby mode)	477mW
θ _{JC} (junction to case) for hottest die	88°C/W
θ _{CA} (case in air) typical	Dual 20°C/W;
Max. junction to case temperature rise for the hottest device (@ 100% duty cycle)	42° C

* One channel transmitting at 100% duty cycle and the second channel at standby.

Electrical Characteristics, Driver Section

Input Characteristics, TX DATA in or TX DATA in

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
"0" Input Current	V _{IN} = 0.4V	I _{ILD}			– 0.4	mA
"1" Input Current	V _{IN} = 2.7V	I _{IHD}			40	μA
"0" Input Voltage		V _{ILD}			0.7	V
"1" Input Voltage		V _{IHD}	2.0			V

Inhibit Characteristic

"0" Input Current	V _{IN} = 0.4V	I _{ILI}			– 0.4	mA
"1" Input Current	V _{IN} = 2.7V	I _{IHI}			40	μA
"0" Input Voltage		V _{ILI}			0.7	V
"1" Input Voltage		V _{IHI}	2.0			V
Delay from TX Inhibit (0→1) to inhibited output	Note 1	t _{DXOFF}		150	350	nS
Delay from TX Inhibit (1→0) to active output	Note 1	t _{DXON}		120	200	nS
Differential output noise, inhibit mode		V _{NOI}			10	mVp-p
Differential output impedance (inhibited)	Note 1	Z _{OI}	10K			ohms

Output Characteristics

Differential output level	R _L = 35 ohms	V _O	6	7.5	9	Vp-p
Rise and Fall times (10% to 90% of p-p output)		t _r	100		300	nS
Output offset at point A-A' in Fig. 5, 2.5 μs after mid-bit crossing of the parity bit of the last word of a 660 μs message	R _L = 35 ohms	V _{OS}			± 90	mV peak
Delay from 50% point of TX DATA or TX DATA input to zero crossing of differential output	Note 1	t _{DTX}		150	350	nS

Note 1. Characteristic guaranteed by design; not production tested.

Note 2. Measured at bus side of transformer, including contribution from transformer.

Electrical Characteristics, Receiver Section

PARAMETER	CONDITION	SYMBOL	MIN	TYP	MAX	UNIT
Differential Input Impedance	$f = 1\text{MHz}$	Z_{IN}	10K			ohms
Differential Voltage Range		V_{IDR}			± 20	V peak
Input Common Mode Voltage Range	Note 1	V_{ICR}	± 10			V peak
Common Mode Rejection Ratio	Note 2	CMRR	40			dB
Threshold Characteristics (Sinewave input.) Note: Threshold voltages are referred to the bus.	100KHz to 1MHz	V_{TH}	.60		1.15	Vp-p

Strobe Characteristics (Logic "0" inhibits Output) If not used, a 1K ohm pullup to 5V is recommended.

"0" Input Current	$V_S = 0.4\text{V}$	I_{IL}	-0.5		-0.4	mA
"1" Input Current	$V_S = 2.7\text{V}$	I_{IH}			40	μA
"0" Input Voltage		V_{IL}			0.7	V
"1" Input Voltage		V_{IH}	2.0			V
Strobe Delay (turn-on or turn-off)	Note 1	t_{SD}		125	250	nS

Output Characteristics, RX DATA & DATA

"1" State	$I_{OH} = -0.4\text{mA}$	V_{OH}	2.5	3.4		V
"0" State	$I_{OL} = 4\text{mA}$	V_{OL}			0.5	V
Delay (average) from differential input zero crossings to RX DATA and RX DATA output 50% points	Note 1	t_{DRX}		350	400	nS

Power Data

Device Type

Voltage Range (volts)

15 volt versions	+ 14.25 to + 15.75 - 14.25 to - 15.75
12 volt versions	+ 11.40 to + 12.60 - 11.40 to - 12.60
Logic power supply (all versions)	4.50 to 5.50

Currents, maximums per channel

Duty cycle	+12V	-12V	5V	+15V	-15V	5V
0%	1 mA	16.5 mA	30 mA	1 mA	16.5 mA	30 mA
50%	160 mA	25 mA	30 mA	110 mA	25 mA	30 mA
100% Note 1	320 mA	30 mA	30 mA	220 mA	30 mA	30 mA

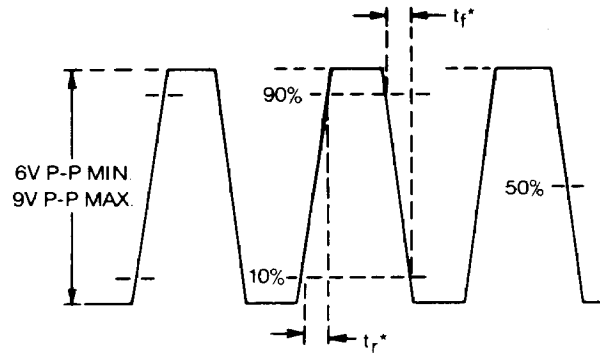
General

Temperature Range Operating (Case) -55° to +125°C Storage (Ambient) -55° to +150°C Weight 0.5 oz. typ.	Maximum transmitting duty cycle when case is held to 125°C maximum 100%
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Configurations and Ordering Information

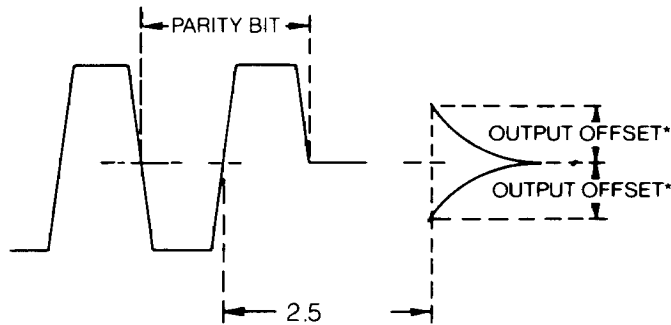
Model No.	Power Supply	Transformer Turns Ratio N1 : N2 N1 : N3		Receiver Data Outputs (Bus inactive)	Configuration	DESC Number
ARX 3431	$\pm 15\text{V}$	1.4 : 1	2 : 1	Normally low	Dual	TBD
ARX 3436	$\pm 15\text{V}$	1.4 : 1	2 : 1	Normally high	Dual	5962 - 8944701HUX
ARX 3439	$\pm 12\text{V}$	1 : 1	1:707	Normally low	Dual	TBD
ARX 3433	$\pm 12\text{V}$	1 : 1	1:707	Normally high	Dual	TBD
To order flat package, add "FP" suffix to ARX Part No. and change last two letters of DESC No. to "ZX".						

Figure 3. Transmitter (TX) Data Differential Output Waveforms



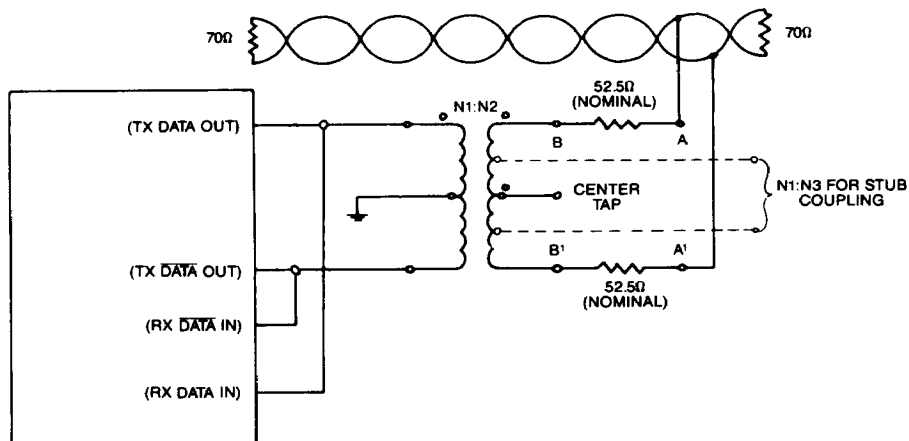
* Rise & Fall Times—
measured at point A-A' in figure 5.

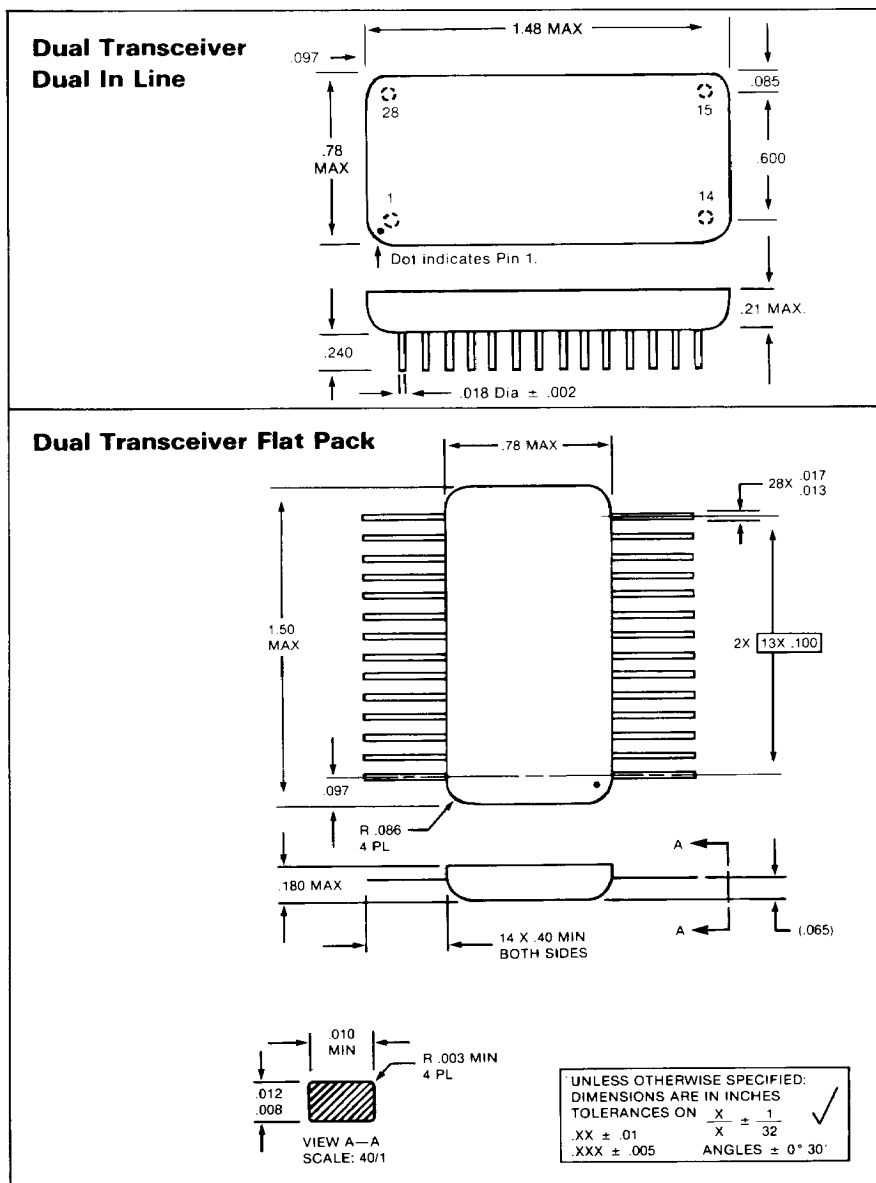
Figure 4. Transmitter (TX) Output Offset



* Offset measure at
point A-A' in figure 5.

Figure 5. Typical Transformer Connection





Terminal Connections

PIN NO.	PIN FUNCTION	CHANNEL
1	Tx DATA OUT/Rx DATA IN	A
2	Tx DATA OUT/Rx DATA IN	A
3	GND	A
4	Rx STROBE	A
5	Rx DATA OUT	A
6	Rx DATA OUT	A
7	CASE	
8	Tx DATA OUT/Rx DATA IN	B
9	Tx DATA OUT/Rx DATA IN	B
10	GND	B
11	Rx STROBE	B
12	Rx DATA OUT	B
13	Rx DATA OUT	B
14	N/C	B
15	GND	B
16	-V	B
17	V _L	B
18	Tx INHIBIT	B
19	Tx DATA IN	B
20	Tx DATA IN	B
21	+V	B
22	GND	A
23	-V	A
24	V _L	A
25	Tx INHIBIT	A
26	Tx DATA IN	A
27	Tx DATA IN	A
28	+V	A

NOTES:

- Dimensions shown are in inches.
- Lead identification numbers are for reference only.
- Pins are equally spaced at $.100 \pm .002$ tolerance, non-cumulative, each row.

Specifications subject to change without notice.

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