

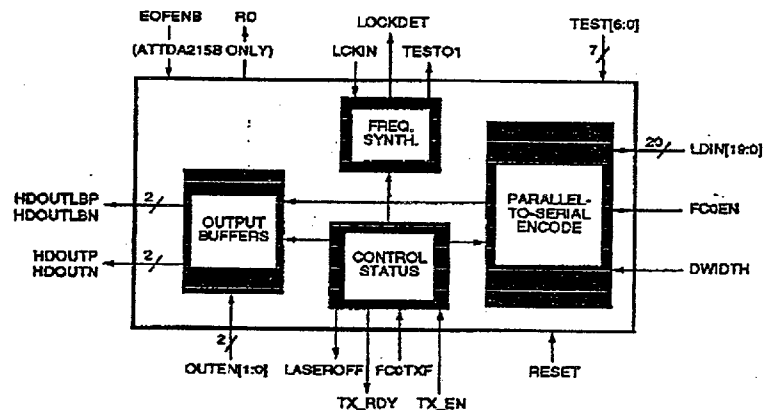
Preliminary

Radiation Hardened 215BRPQ

Fibre Channel Transmitter

For Space Applications

SEI's 215BRPQ (RP for RAD-PAK®) high speed Fibre Channel Transmitter integrated circuits features a minimum 100 kilorad (Si) total dose tolerance. Fully equivalent to the commercial ATTTDA215B, the 215BRPQ combines AT&T advanced technology and SEI's radiation hardened RAD-PAK® packaging. The 215BRPQ Transmitter provides data transmission over coaxial media at 1.0625 Gbits/s. This device accepts TTL data at the parallel input port. It also accepts the low speed TTL system clock and uses this clock to synthesize the internal high speed serial bit clock. Parallel data is optionally 8B/10B encoded, which is user's option, and then serialized using the synthesized 53 MHz high speed clock. The serialized data is then made available at the differential ECL output to drive a 75 Ohm coaxial copper media. Capable of surviving space environments, the 215BRPQ is ideal for satellite, spacecraft, and space probe missions. It features the same system performance and architecture as the commercial AT&T counterpart. The RAD-PAK® technology incorporates radiation shielding in the microcircuit package. It eliminates box shielding while providing lifetime in orbit. The 215BRPQ is offered in Class S packaging and screening.



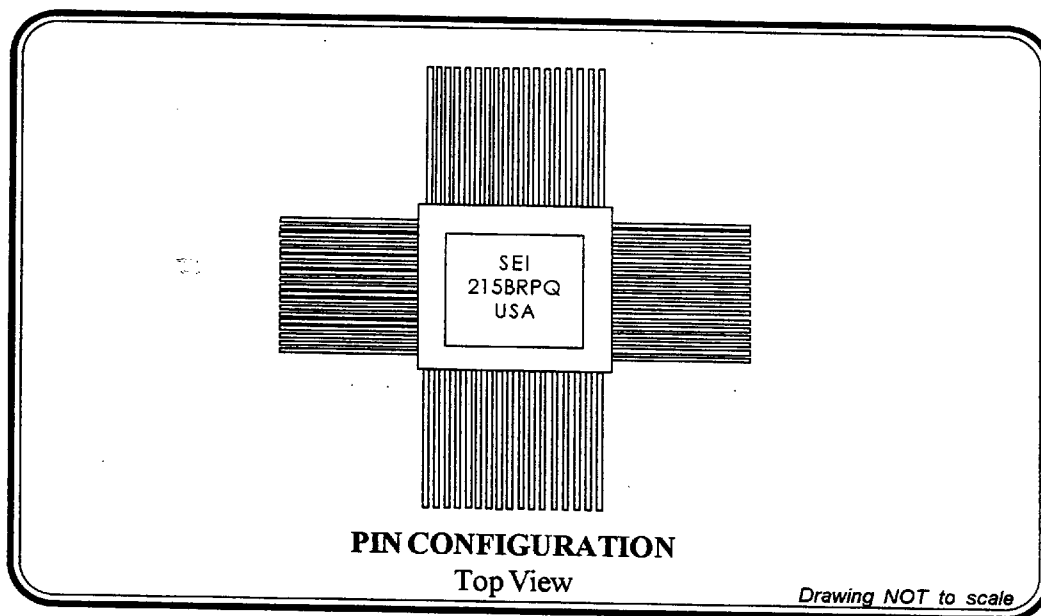
SPACE
ELECTRONICS
INCORPORATED

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SEI 215BRPQ RAD-PAK HARDWARE TRANSMITTER

Radiation Hardened 215BRPQ

Fibre Channel
Transmitter



Features:

- Meets Compliance with the Fibre Channel Standard X3T11
 - Provides FC-0 service @ 1.0625 Gbits/s
 - Provides FC-1 service @ 1.0625 Gbits/s
- Pin Compatible to ATTTDA215B
- RAD-PAK[®] Radiation Hardened Against Natural Space Radiation
- Total Dose Hardness >100 krad (Si)
- Package:
 - 80 Pin RAD-PAK[®] quad flat pack (1.10 in. x 1.10 in.)
 - Weight – 19 grams
- User programmable
- Built-in 270 Ω Pull-down Resistors on Outputs
- Total Worst-Case Power Dissipation
 - 1.75 W with Single 5.0 V Supply
- User-enabled 8B/10B Encode/Decode Circuitry On-chip
- PECL High-speed Interface I/O Using 75 Ω Coaxial Copper Media
- 20-bit Parallel TTL Interface
- Internal High-speed Serial Bit Clock
- Screening per TM 5004
- QCI per TM5005

Specifications and design are subject to change without notice.



April 1996

For Further Information Contact:

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215BRPQS ABSOLUTE MAXIMUM CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Power Supply Voltage	V_{CC}	4.5	5.5	V
Ambient Operating Temperature	T_A	-25	+95	°C
Storage Temperature	T_{STG}	-40	+125	°C

215BRPQ DC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Input Low Voltage, TTL Inputs ¹	V_{IL}		0.8	V
Input High Voltage, TTL Inputs ¹	V_{IH}	2.0		V
Output Low Voltage, TTL Outputs $I = 4mA$	V_{OL}		0.4	V
Output High Voltage, TTL Outputs $I = -400\mu A$	V_{OH}	2.4		V
Input Low Leakage Current, TTL Inputs $V_{IN} = 0.4V$	I_{IL}		-400	μA
Input High Leakage Current, TTL Inputs $V_{IN} = 2.7V$	I_{IH}		20	μA
ECL Output Low Voltage ²	V_{OL}	$V_{CC} - 1.81$	$V_{CC} - 1.62$	V
ECL Output High Voltage ²	V_{OH}	$V_{CC} - 1.02$	$V_{CC} - 0.88$	V
Power Supply Current $V_{CC} = 5.25$	I_{CC}	245	354	mA

Notes:

1. Tested by application of the signal. No value was recorded.
2. Driving 50 Ohms terminated to $V_{CC} - 2V$.

215BRPQ AC ELECTRICAL CHARACTERISTICS

PARAMETER	SYMBOL	MIN	MAX	UNIT
Data In Hold	t_{LKHDIX}	3.0		ns
Data In Setup	t_{DIVLKH}	3.0		ns
LCKIN Period	t_{INHINH}	18.822	18.825	ns
RESET Pulse Width High	t_{RHRL}	20		ns



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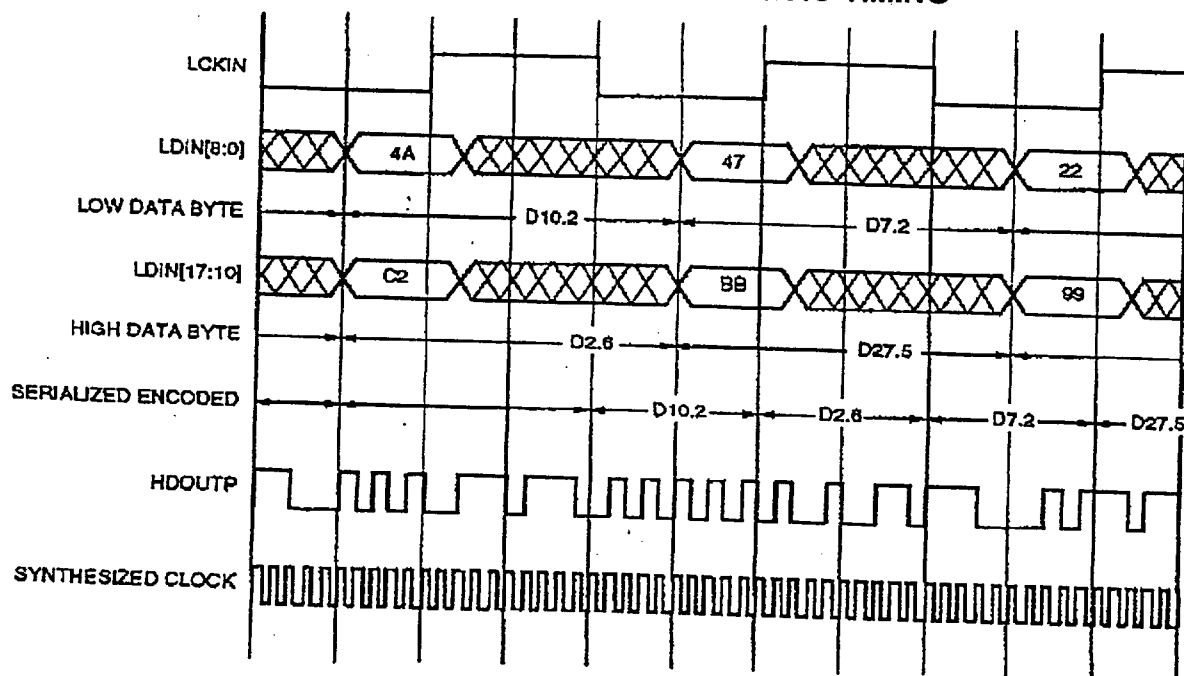
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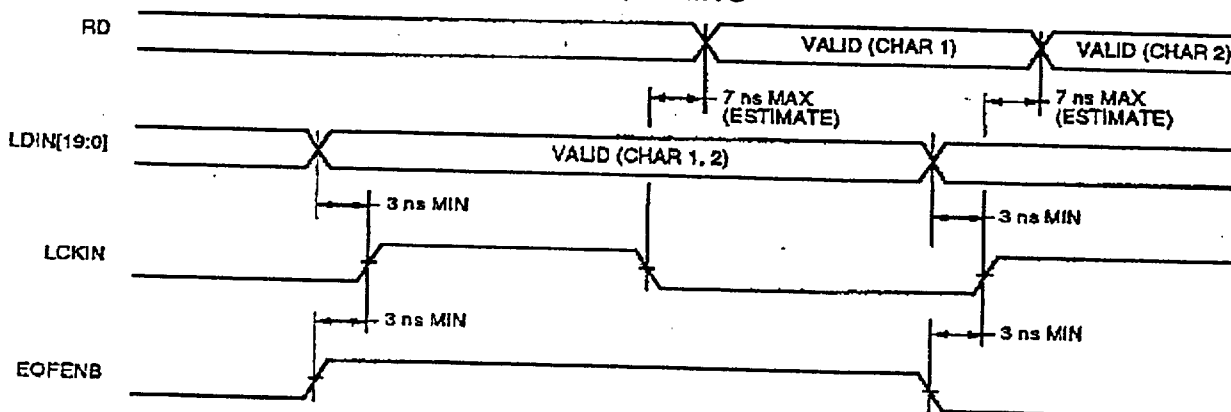
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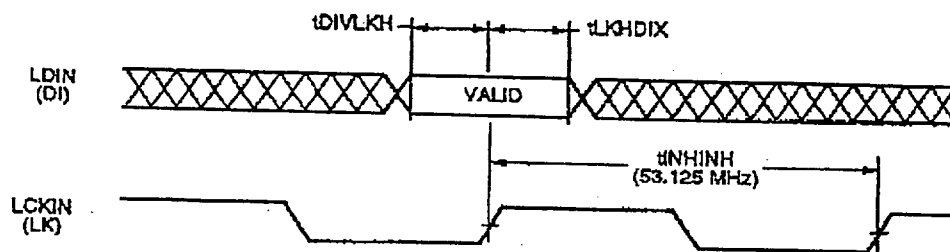
215BRPQ TRANSMITTER IC TIMING



215BRPQ TIMING



215BRPQ TRANSMITTER PORT TIMING



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215BRPQS TRANSMITTER PACKAGE

PIN	Description	PIN	Description
1	GND	41	NVCC
2	TEST4	42	LDIN15
3	TEST5	43	LDIN16
4	VCC	44	LDIN17
5	FCOEN	45	NGND
6	OUTEN1	46	LDIN18
7	OUTEN0	47	LDIN19
8	GND	48	NVCC
9	DWDTH	49	TEST01
10	VCC	50	NGND
11	TEST6	51	LCKIN
12	GND	52	NVCC
13	VCC	53	TX_RDY
14	TEST3	54	QVCC
15	GND	55	LOCKDET
16	NVCC	56	QGND
17	LDIN0	57	TEST2
18	NGND	58	QVCC
19	LDIN1	59	TX_EN
20	NVCC	60	RESET
21	LDIN2	61	QGND
22	NGND	62	TEST1
23	LDIN3	63	TEST0
24	NVCC	64	QVCC
25	NGND	65	QGND
26	LDIN4	66	RD
27	LDIN5	67	EOFENB
28	LDIN6	68	GND
29	NVCC	69	VCC
30	LDIN7	70	GND
31	LDIN8	71	HDOUTLBN
32	LDIN9	72	HDOUTLBP
33	NGND	73	GND
34	LDIN10	74	HDOUTN
35	LDIN11	75	HDOUTP
36	NVCC	76	GND
37	LDIN12	77	VCC
38	LDIN13	78	LASEROFF
39	LDIN14	79	FC0TXF
40	NGND	80	GND



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