

CT2512 / CT2513 / CT2510 / CT2511 Dual Redundant Remote Terminal

FOR MIL-STD-1553B

Features

- CT2512 Replaces DDC BUS-65112 and BUS-65117
- CT2513 Replaces DDC BUS-65113 and BUS-65118
- CT2510 Replaces DDC BUS-65110 and BUS-65120
- CT2511 Replaces DDC BUS-65111 and BUS-65121
- Functions as a Complete Remote Terminal Unit
- Supports 13 Mode Codes, Illegalization of Codes Allowed
- Transfers Data with DMA Type Handshaking
- Latched Outputs for Command Word and Word Count
- 14 Bit Built-In-Test Word Register
- 4 Error Flag Outputs
- Advanced Low Power VLSI Technology
- Approved DESC SMD# 5962-87535



General Description

The CT2512 contains 2 transceivers, 2 encoder/decoders, bit processors and complete Remote Terminal (RT) logic. The device is constructed using Aeroflex advanced VLSI custom chip and hybrid technology. It functions as a complete dual redundant MIL-STD-1553B RT Unit supporting all 13 mode codes for dual redundant operation. The CT2512 is a pin-for-pin functional equivalent of the DDC BUS-65112/117 and performs parallel data transfers with a DMA type handshake. Multiple error flag outputs and host access to many of the RT Status Word bits are just some of the features that make this part ideal for many RT applications. The unit has an operating range of -55°C to $+125^{\circ}\text{C}$. Aeroflex is a MIL-PRF-38534 Certified Manufacturer. See "Ordering Information" (last sheet) for CT2513 / CT2510 / CT2511.

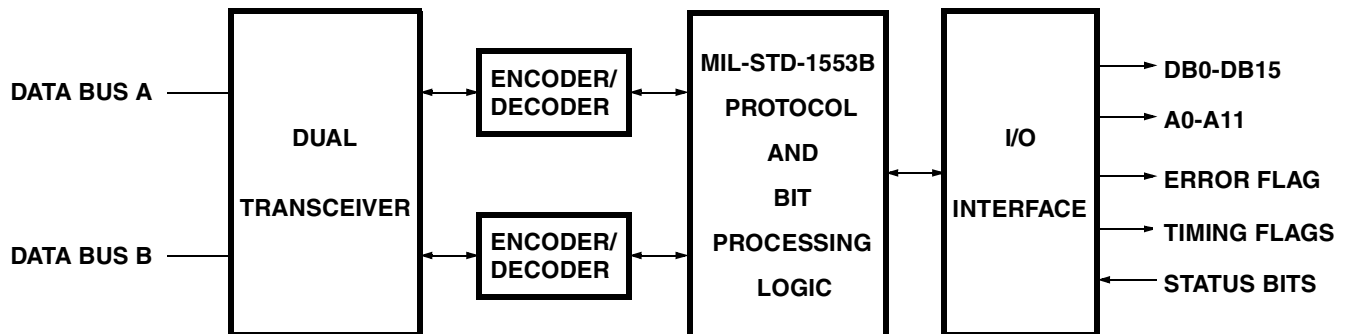


Figure 1 – Functional Block Diagram

Absolute Maximum Ratings

Parameter	Limits	Units
Power Supply Voltage (V _{CC}) (Pins 18, 76)	-0.3 to +18.0	Volts
Power Supply Voltage (V _{EE}) (Pins 38, 57)	+0.3 to -18.0	Volts
Power Supply Voltage (V _{CCL}) (Pins 37, 58 / 51)	-0.3 to +7.0	Volts
Receiver Differential Input (Pins 20, 59 / 74, 36)	±20 (40Vp-p)	Volts
Receiver Input Voltage (Pins 20, 59 / 74, 36)	±15	Volts
Driver Output Current (Pins 56, 17 / 39, 77)	+200	mA
Transmission Duty Cycle at T _C = 125°C	100	%
Operating Case Temperature Range (T _C)	-55 to +125	°C

Power and Thermal Data (Transceiver and Logic Section)

Parameter/Conditions	Symbol	Min	Typ	Max	Units
Power Supply Voltage	V _{CC}	14.25	15	15.75	V
	V _{EE}	-14.25	-15	-15.75	V
	V _{CCL}	4.5	5	5.5	V
Power Dissipation of most critical (hottest) device in hybrid during continuous transmission (100% Duty Cycle)	P _C	Note 1	350		mW
Thermal Resistance, most critical device	θ _{JC}		60		°C/W
Junction to case temperature rise of most critical device at 100% duty cycle	T _{JC}		60	80	°C
Total supply current standby mode, or transmitting at less than 1% duty cycle (e.g. 20µs of transmission every 2ms or longer interval)	I _{CC}		30	44	mA
	I _{EE}	Note 2	50	70	mA
	I _{CC1}	Note 2	90	130	mA
Total supply current transmitting at 1Mhz into a 35-ohm load at point A in Figure 2	ICC @ 25%	Note 3	70	100	mA
	ICC @ 100%	Note 3	200	260	mA

Note 1: Decreases linearly to zero at zero duty cycle.

Note 2: I_{EE} limit does not change with mode of operation or duty cycle.

Note 3: Decreases linearly to applicable "standby" values at zero duty cycle.

Electrical Characteristics (Receiver Section)

Parameter/Conditions	Symbol	Min	Typ	Max	Units
Differential input impedance DC to 1MHz	Z_{IN}	9K			V
Differential voltage range	V_{DIR}	$\pm 20V$			Vpeak
Input common mode voltage range	V_{ICR}	$\pm 10V$			Vpeak
Common mode rejection ratio (from point A, Figure 1)	CMMR	40			dB
Threshold characteristics (Sine wave at 1MHz) Note: Threshold voltages refer to point A, Figure 2.	V_{th}	0.8		1.1	Vp-p

Electrical Characteristics (Transmitter Section)

Parameter/Conditions	Symbol	Min	Typ	Max	Units
Differential output level at point B, Figure 1 (145 ohm load)	V_O	26	28	35	Vp-p
Rise and Fall times (10% to 90% of p-p output)	T_r	100	160	300	nS
Output offset at point A in Figure 2 (35-ohm load) 2.5us after mid-bit crossing of parity bit of last word of a 660us message	V_{OS}		± 20	± 90	mV Vpeak
Differential output noise	V_{NOI}			10	mV pp

Logic Characteristics

Symbol	Parameter	Min	Typ	Max	Units	Conditions
V_{IH}	Input "1"	2.4			VDC	
V_{IL}	Input "0"			0.7	VDC	
I_{IL}	Input I	-100		-650	μ A	Note 1A
I_{IH}	Input I			-650	μ A	Note 1B
I_{IL}	Input I	-20		+20	μ A	Note 2A
I_{IH}	Input I	-20		+20	μ A	Note 1B
V_{OH}	Output "1"	2.7			VDC	Note 3A/4A
V_{OL}	Output "0"			0.4	VDC	Note 3B/4B

Note 1: For INPUT pins 12,13,14,15, 53, 54, 55.
VCC= 5.5V
A. @ $V_{IL} = 0.4V$
B. @ $V_{IH} = 2.4V$

Note 2: All remaining INPUTS other than in Note 1.
VCC= 5.5V
A. @ $V_{IL} = 0.4V$
B. @ $V_{IH} = 2.4V$

Note 3: For OUTPUT pins 4 through 11 and 43 through 50.
A. @ VCC = 4.5V and $I_{OH} = 3mA$
B. @ VCC = 2.4V and $I_{OL} = 6mA$

Note 4: All remaining OUTPUTS other than in Note 3.
A. @ VCC = 4.5V and $I_{OH} = 2mA$
B. @ VCC = 5.5V and $I_{OL} = 4mA$

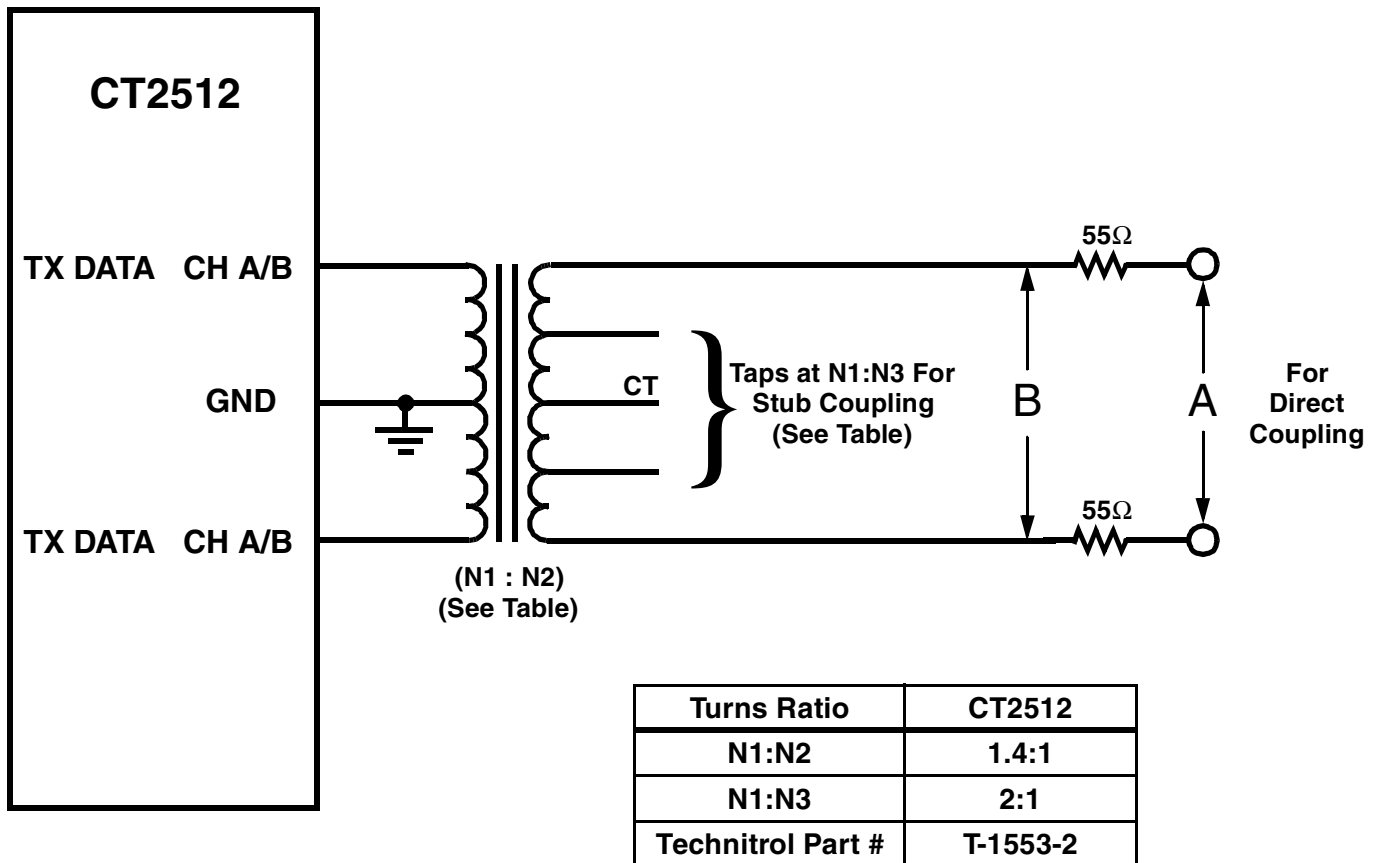


Figure 2 – Typical Direct Coupled Configuration

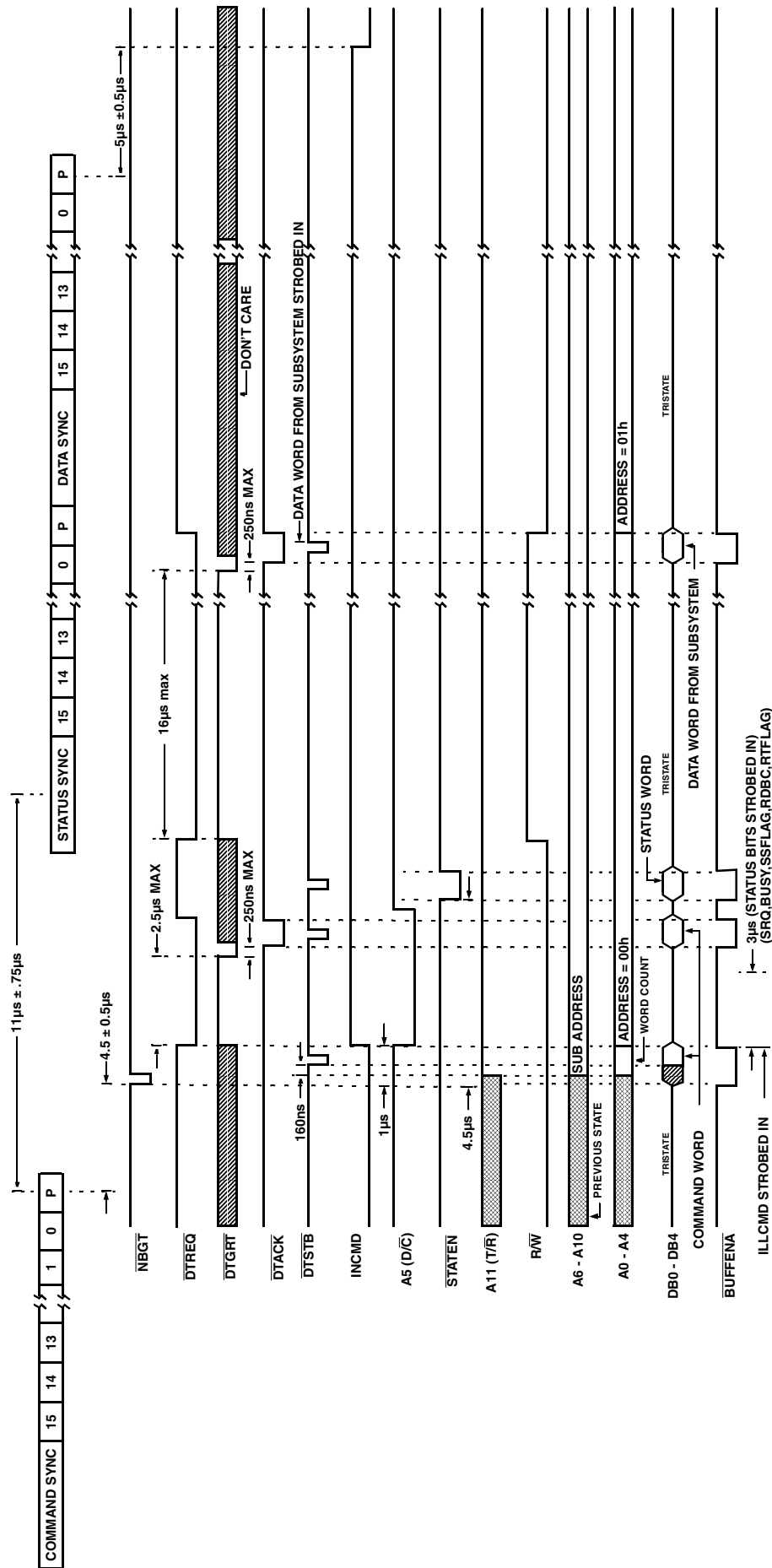


Figure 3 – Timing Diagram, Transmit One Word

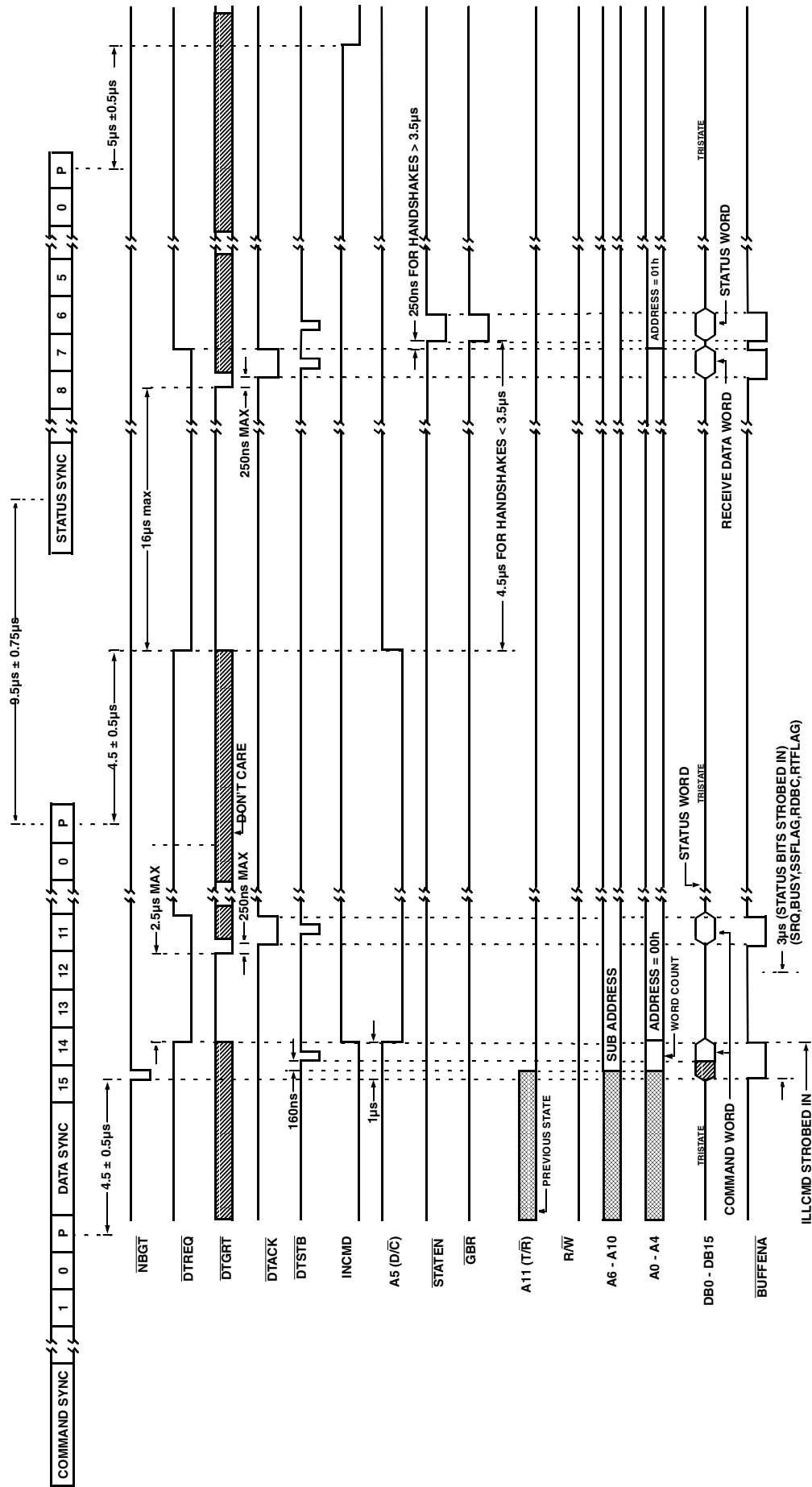


Figure 4 – Timing Diagram, Receive One Word

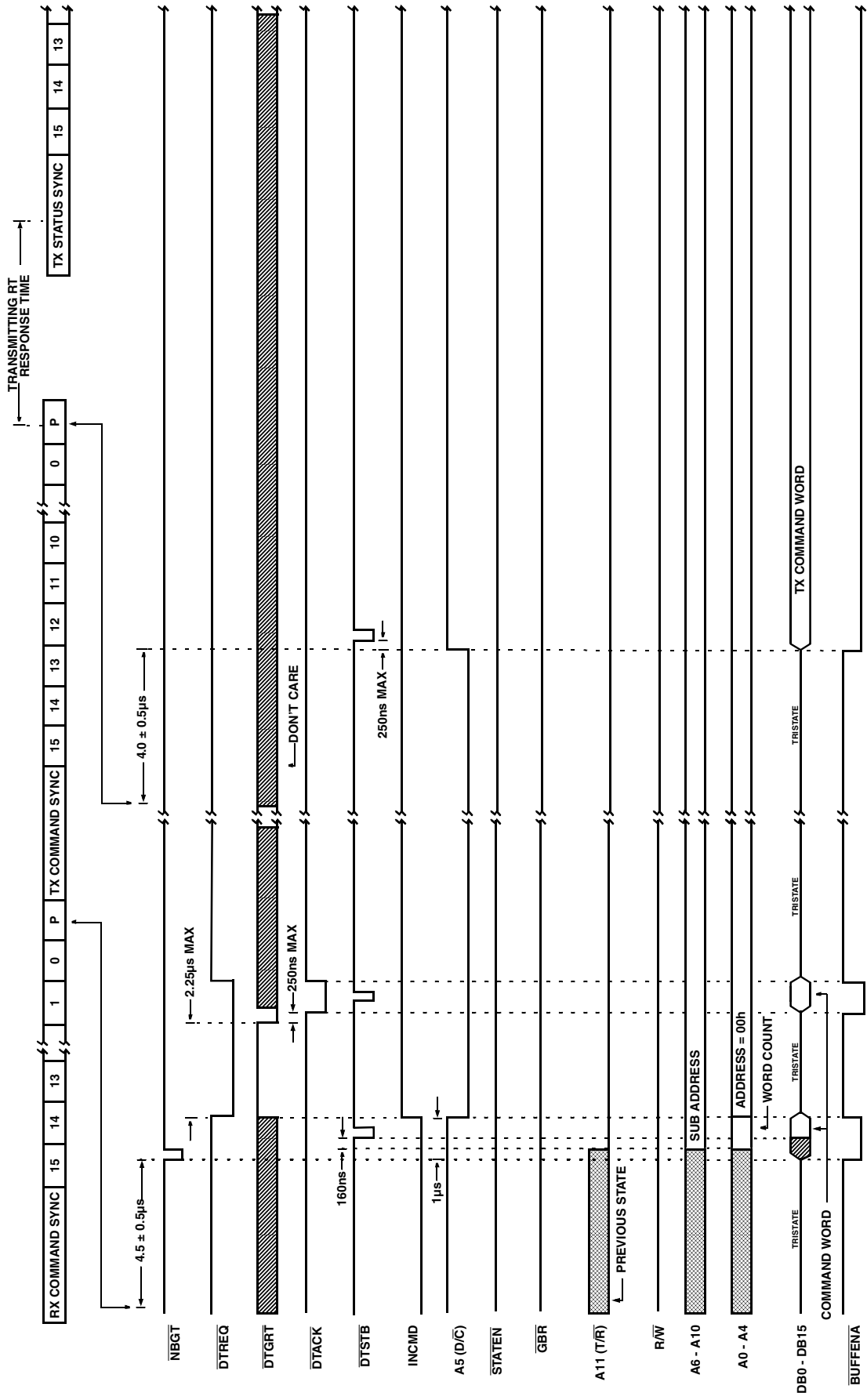


Figure 5 – Timing Diagram, RT to RT Receive One Word (Part A)

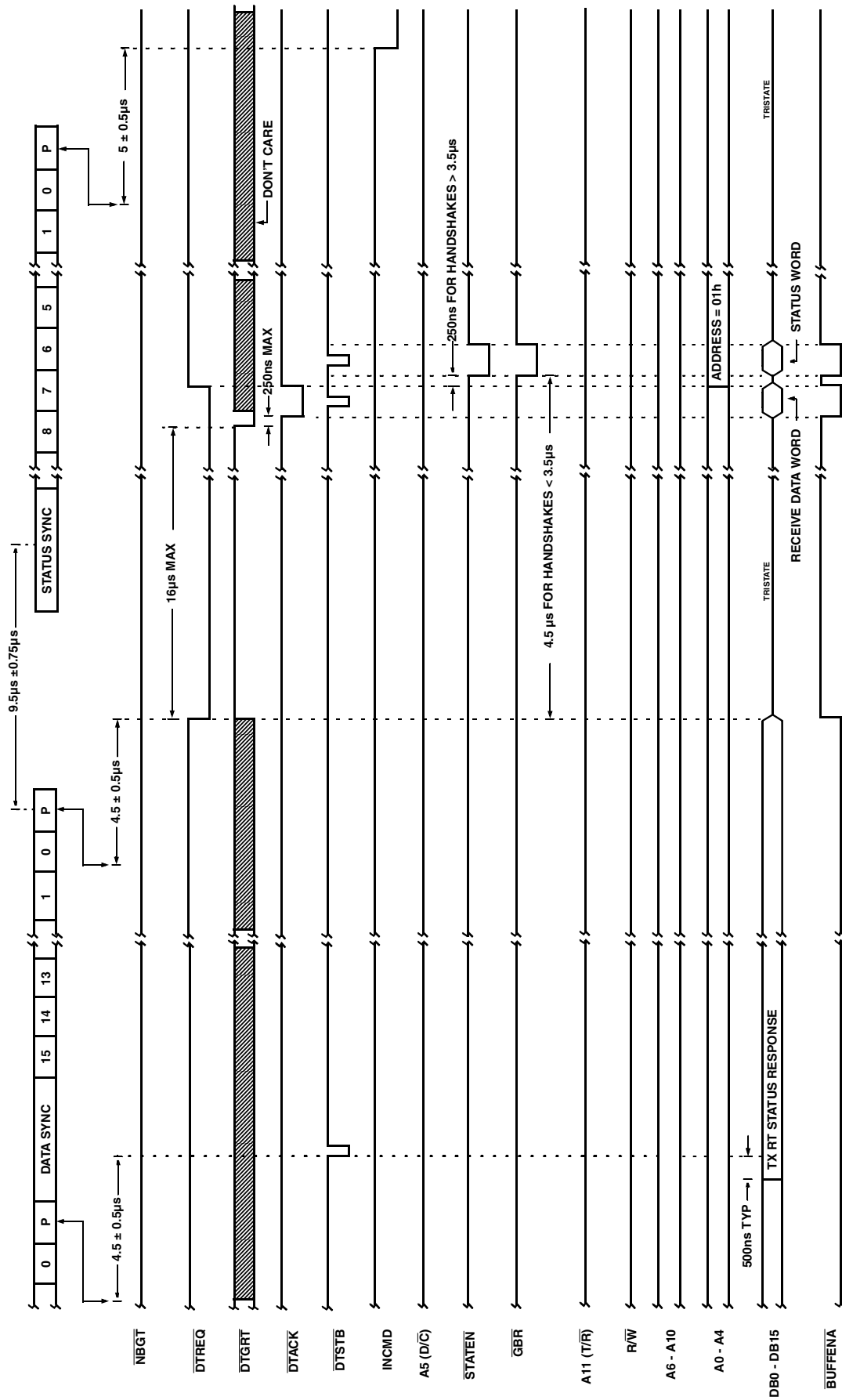


Figure 5 – Timing Diagram, RT to RT Receive One Word (Part B)

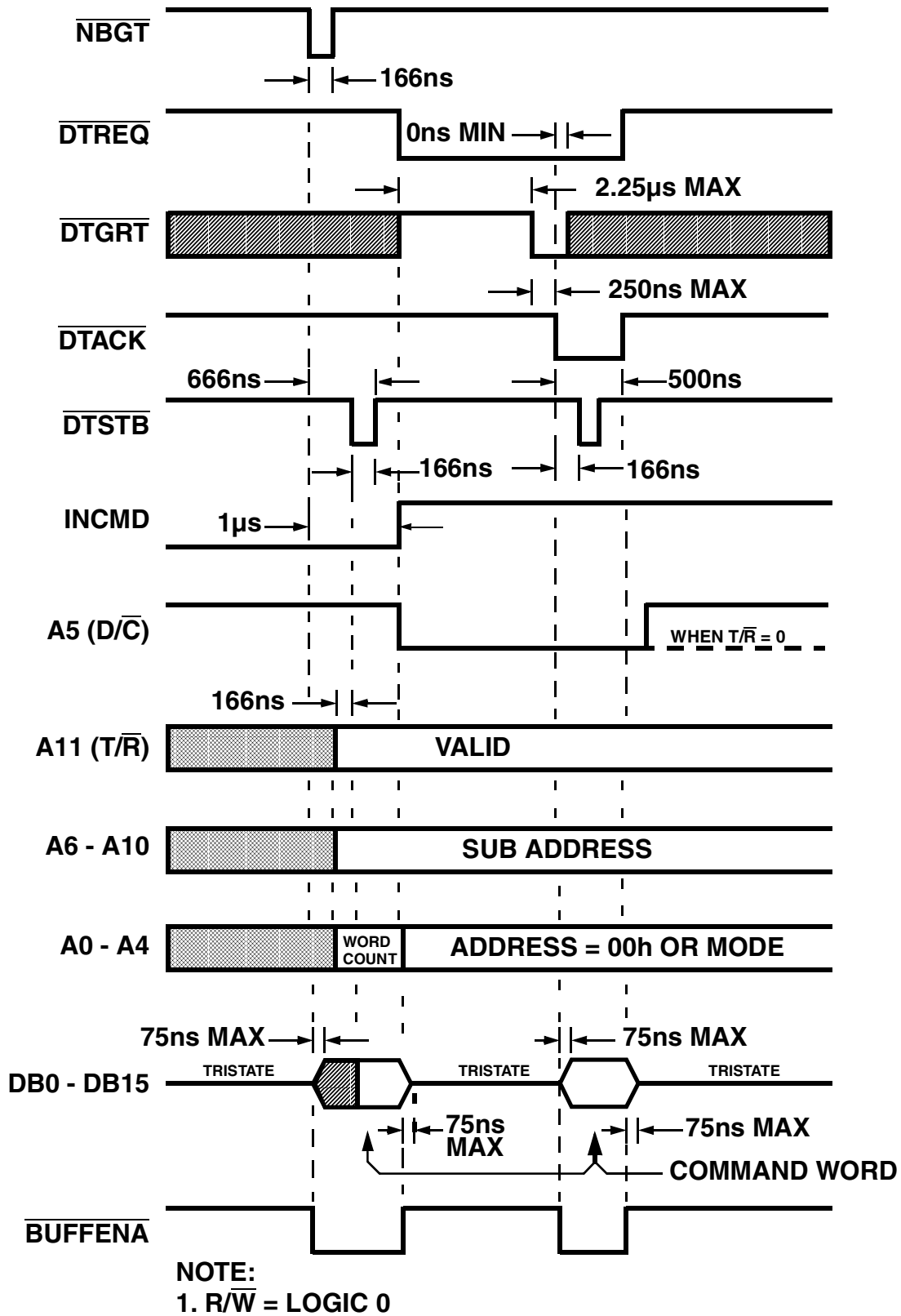
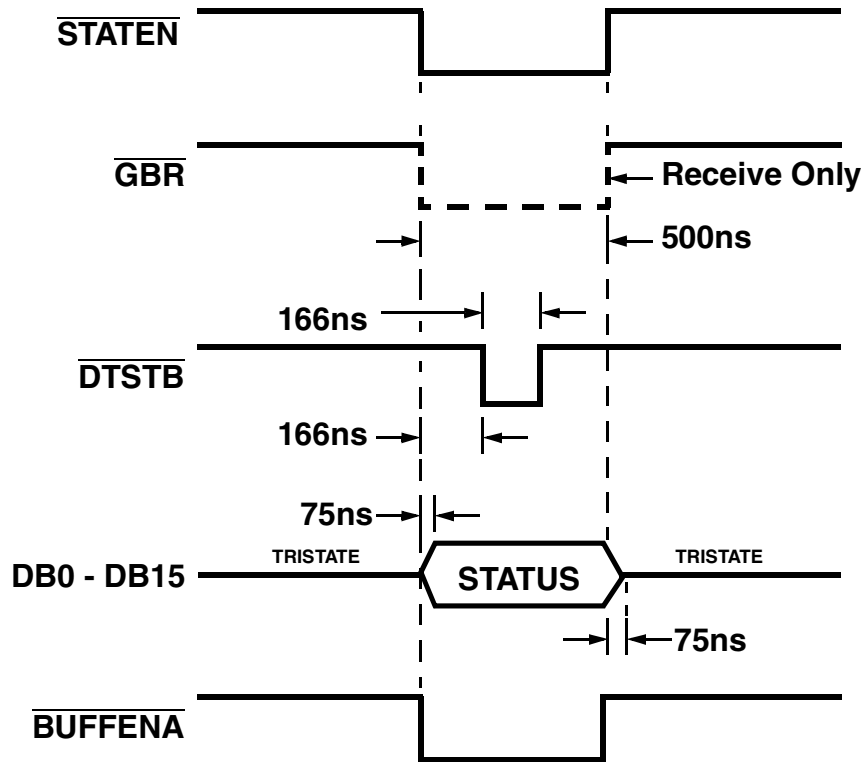
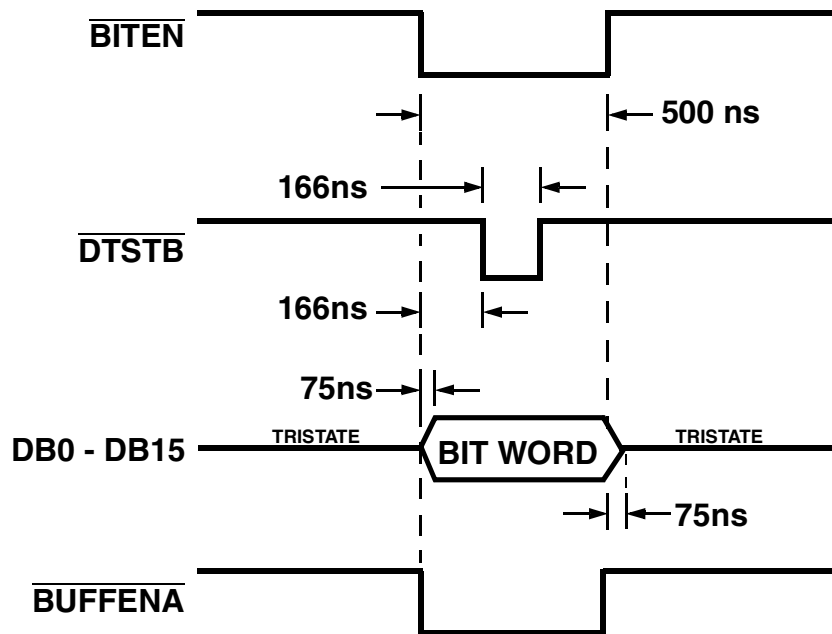


Figure 6 – TIMING DIAGRAM, COMMAND WORD TRANSFER



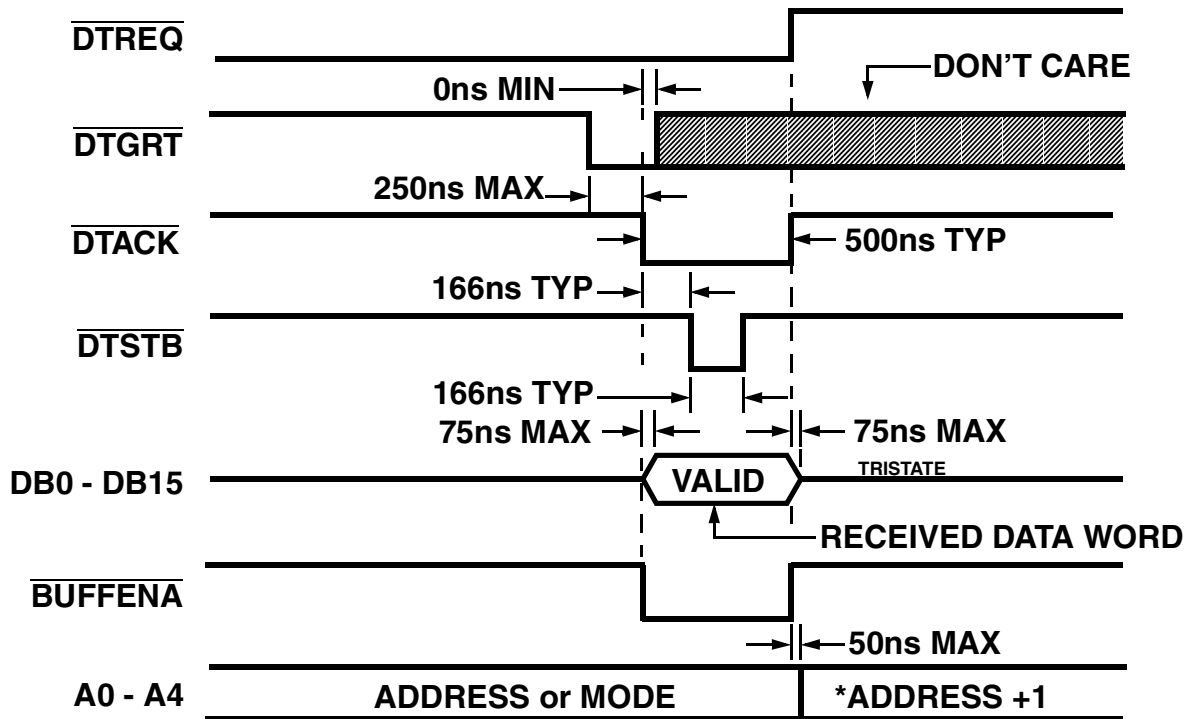
NOTE:
1. R/W = 0

Figure 7 – Timing Diagram, Status Word Transfer



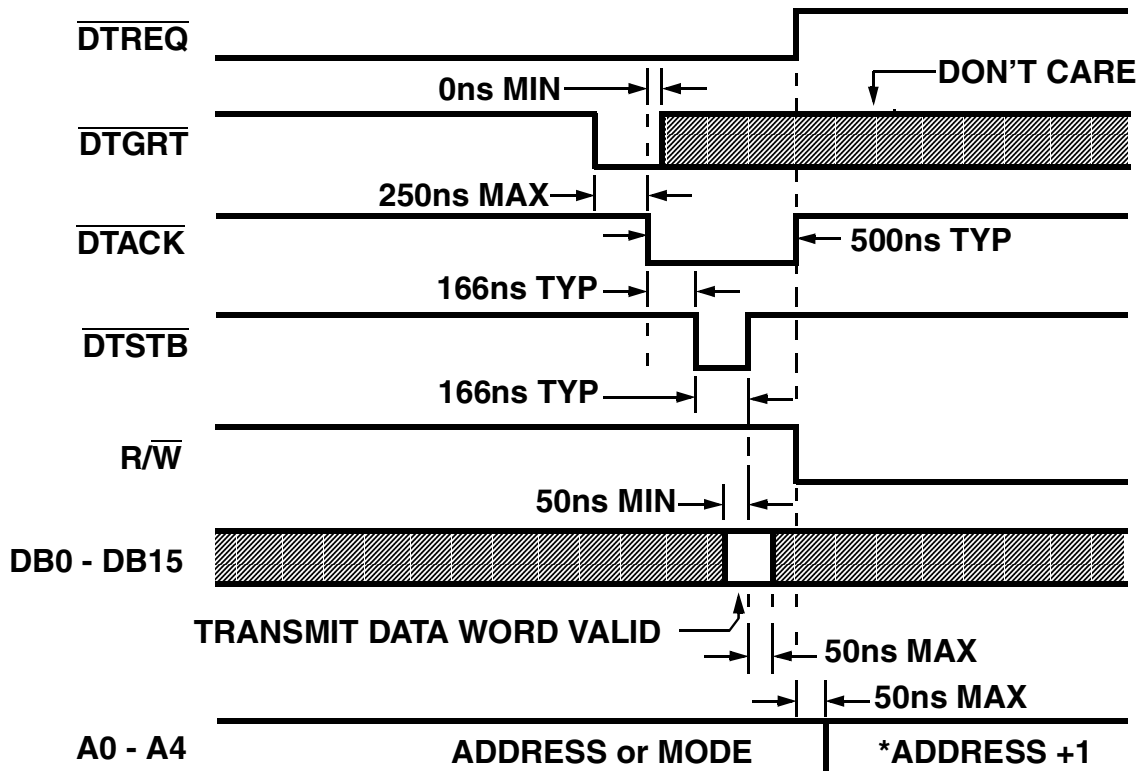
NOTE:
1. R/W = 0

Figure 8 – Timing Diagram, Bit Word Transfer



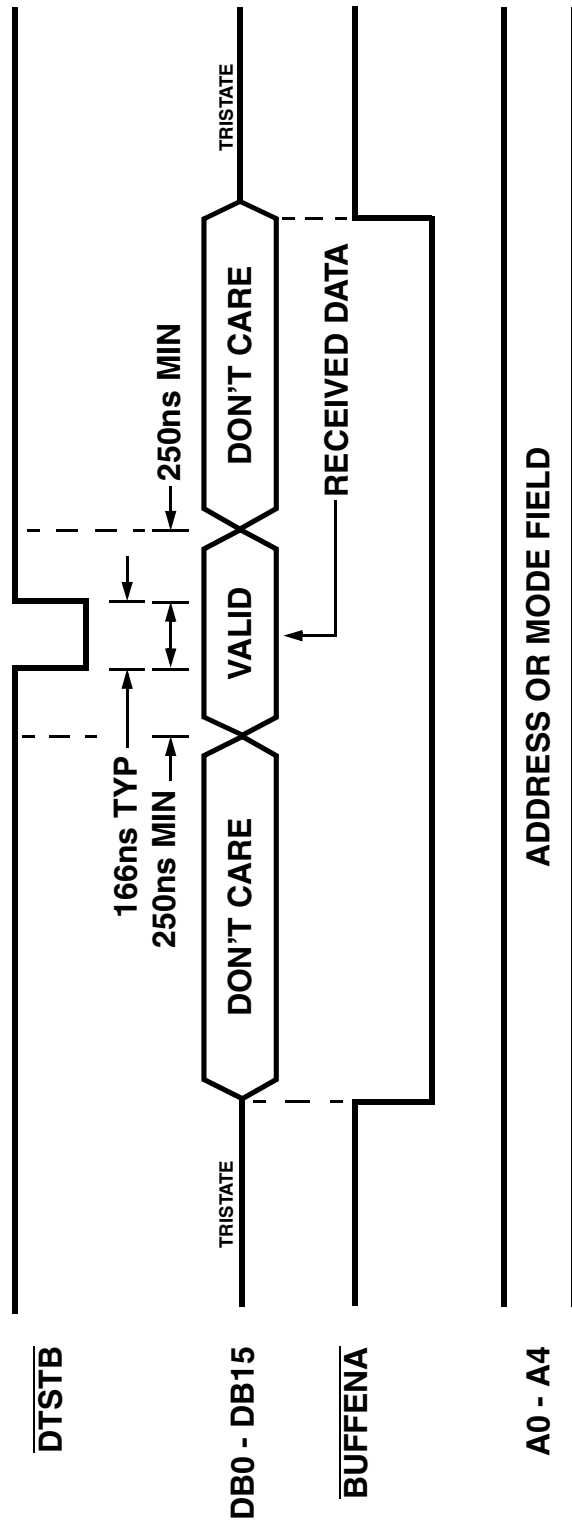
1. R/W = Logic 0
2. (*) = Non-Mode Only
3. BUFFENA = DTACK

Figure 9 – Timing Diagram, Data to Subsystem



1. (*) = Non-Mode Only
2. Word Count for Mode Code
3. BUFFENA = Don't Care

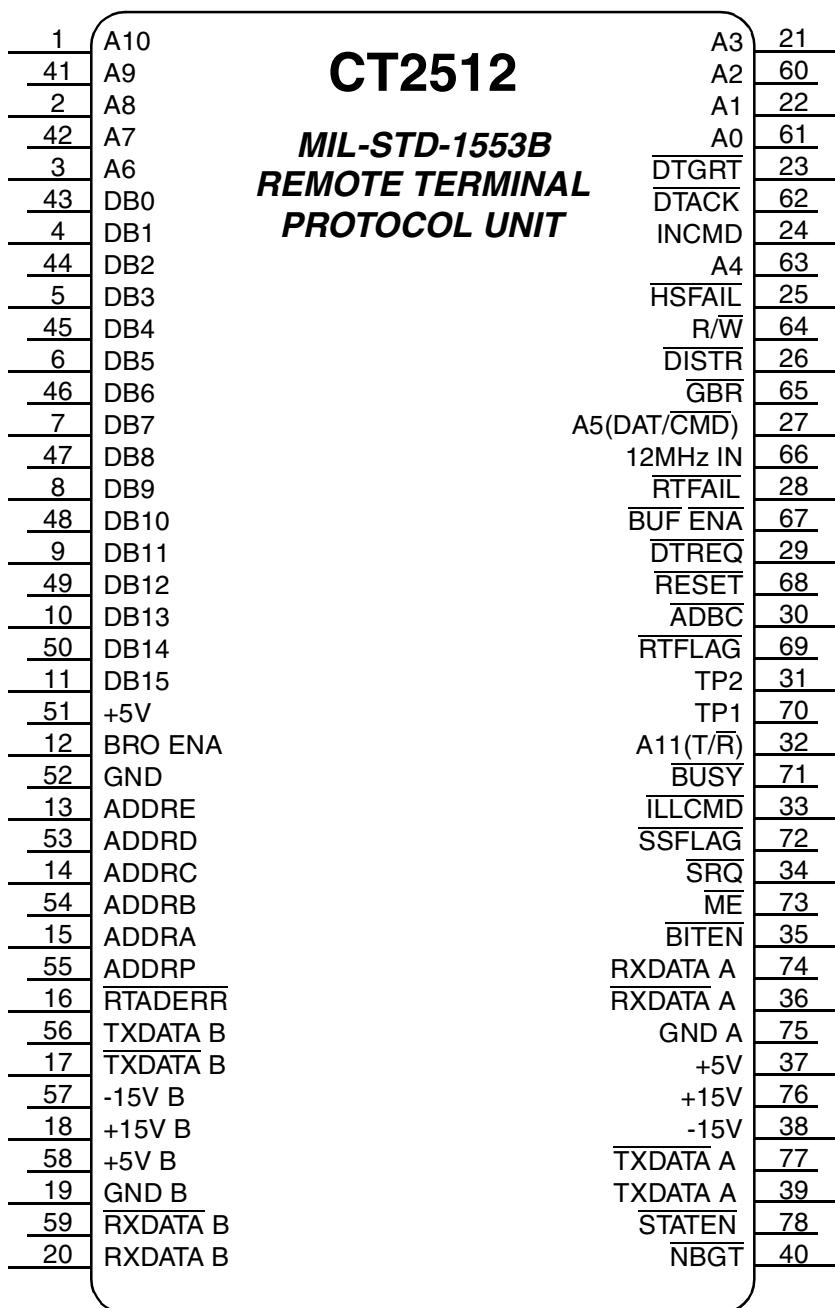
Figure 10 – Timing Diagram, Data from Subsystem



- NOTES:**
1. $\overline{R/W} = \text{LOGIC 0}$
 2. $\text{DTGRT} = \text{DTREQ} = \text{LOGIC 1}$
 3. $\text{INCMD} = \text{DAT/CMD ARE LOGIC 1}$

Figure 11 – Timing Diagram, Data Transfers to Subsystem (No Handshake)

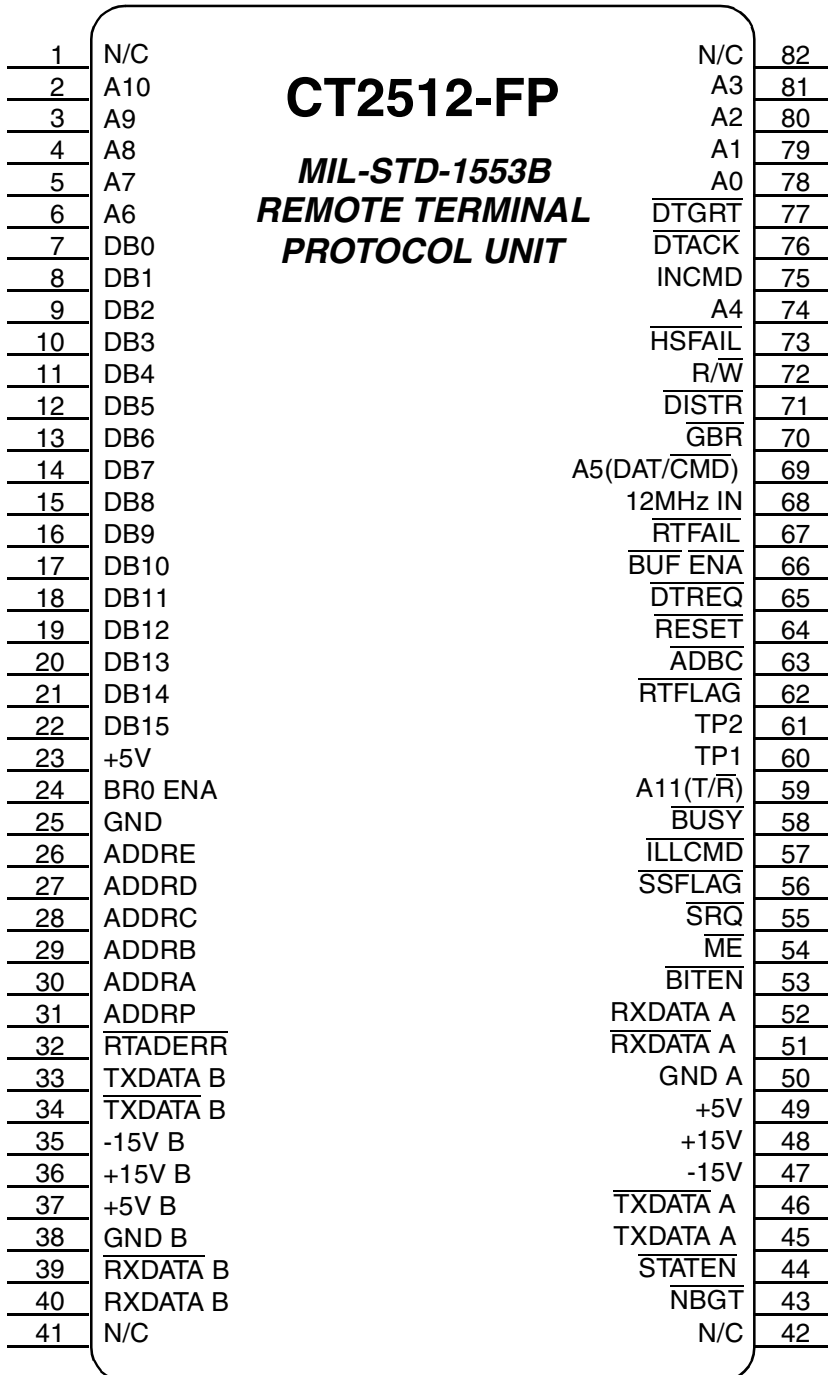
CT2512 Pin Out Description (DDIP)



Pin #	Function	Pin #	Function
1	A10	40	$\overline{\text{NBGT}}$
2	A8	41	A9
3	A6	42	A7
4	DB1	43	DB0
5	DB3	44	DB2
6	DB5	45	DB4
7	DB7	46	DB6
8	DB9	47	DB8
9	DB11	48	DB10
10	DB13	49	DB12
11	DB15	50	DB14
12	BRO ENA	51	+5V
13	ADDRE	52	GND
14	ADDRC	53	ADDRD
15	ADDRA	54	ADDRB
16	$\overline{\text{RTADERR}}$	55	ADDRP
17	$\overline{\text{TXDATA}} \text{ B}$	56	TXDATA B
18	+15V B	57	-15V B
19	GND B	58	+5V B
20	RXDATA B	59	$\overline{\text{RXDATA}} \text{ B}$
21	A3	60	A2
22	A1	61	A0
23	$\overline{\text{DTGRT}}$	62	$\overline{\text{DTACK}}$
24	INCMD	63	A4
25	$\overline{\text{HSFAIL}}$	64	$\overline{\text{R/W}}$
26	$\overline{\text{DTSTR}}$	65	$\overline{\text{GBR}}$
27	A5 (DAT/CMD)	66	12MHz IN
28	$\overline{\text{RTFAIL}}$	67	$\overline{\text{BUF ENA}}$
29	$\overline{\text{DTREQ}}$	68	$\overline{\text{RESET}}$
30	$\overline{\text{ADBC}}$	69	$\overline{\text{RTFLAG}}$
31	TP2 (NC)	70	TP1 (NC)
32	A11 (T/R)	71	$\overline{\text{BUSY}}$
33	$\overline{\text{ILLCMD}}$	72	$\overline{\text{SSFLAG}}$
34	$\overline{\text{SRQ}}$	73	$\overline{\text{ME}}$
35	$\overline{\text{BITEN}}$	74	RXDATA A
36	$\overline{\text{RXDATA}} \text{ A}$	75	GND A
37	+5V A	76	+15V A
38	-15V A	77	$\overline{\text{TXDATA}} \text{ A}$
39	TXDATA A	78	$\overline{\text{STATEN}}$

Figure 12 – DDIP Pin Connection Diagram, CT2512 and Pinout Table

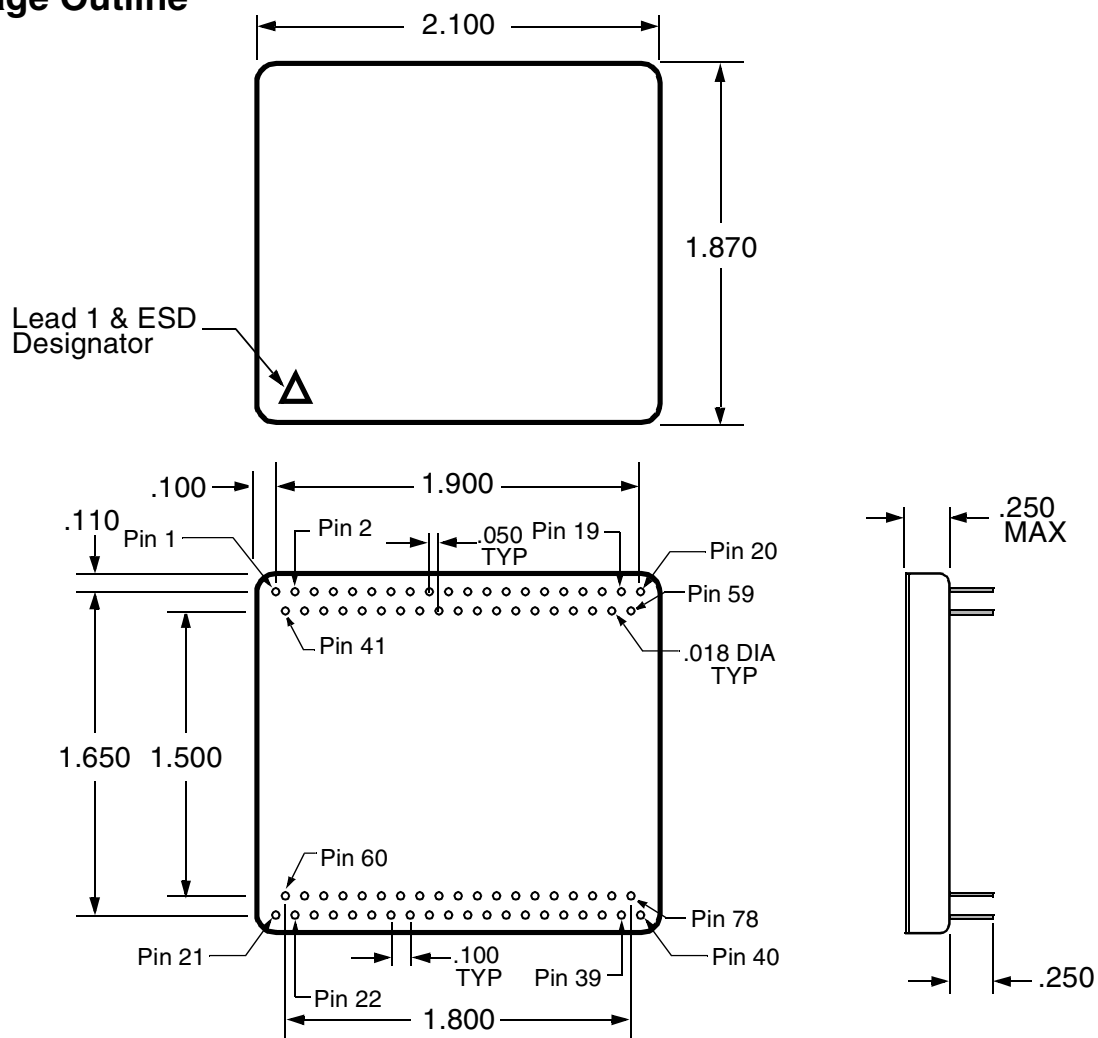
CT2512 Pin Out Description (FP)



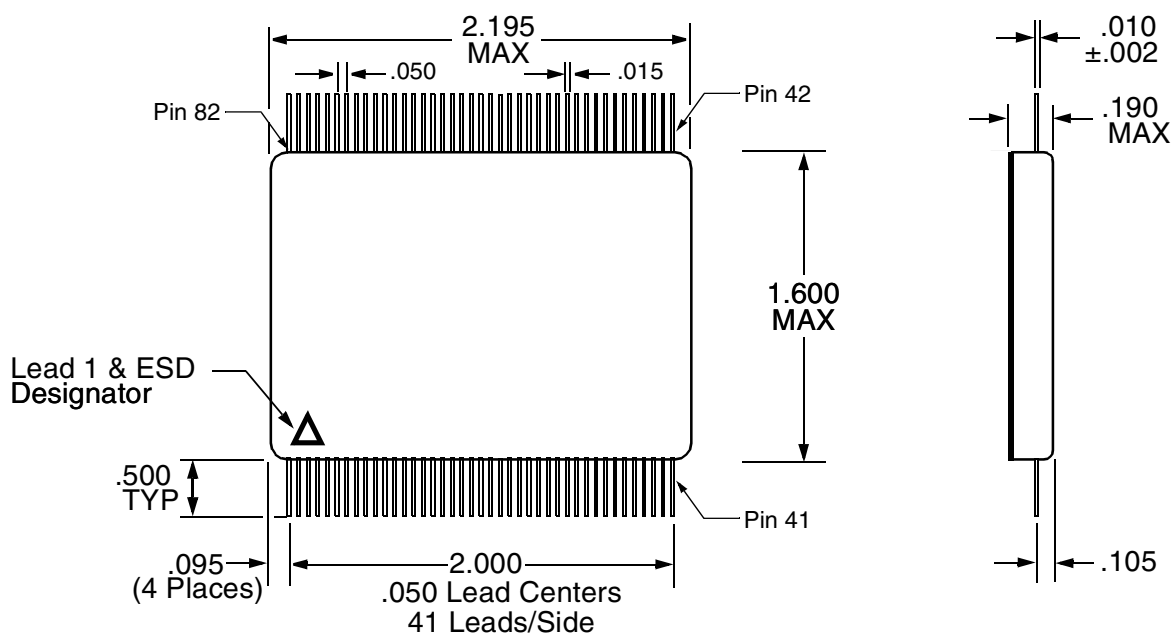
Pin #	Function	Pin #	Function
1	NC	42	NC
2	A10	43	NBGT
3	A9	44	STATEN
4	A8	45	TXDATA A
5	A7	46	TXDATA A
6	A6	47	-15V A
7	DB0	48	+15V A
8	DB1	49	+5V A
9	DB2	50	GND A
10	DB3	51	RXDATA A
11	DB4	52	RXDATA A
12	DB5	53	BITEN
13	DB6	54	ME
14	DB7	55	SRQ
15	DB8	56	SSFLAG
16	DB9	57	ILLCMD
17	DB10	58	BUSY
18	DB11	59	A11 (T/R)
19	DB12	60	TP1
20	DB13	61	TP2
21	DB14	62	RTFLAG
22	DB15	63	ADBC
23	+5V	64	RESET
24	BRO ENA	65	DTREQ
25	GND	66	BUF ENA
26	ADDRE	67	RTFAIL
27	ADDRD	68	12MHz IN
28	ADDRC	69	A5 (DAT/CMD)
29	ADDRB	70	GBR
30	ADDRA	71	DTSTR
31	ADDRP	72	R/W
32	RTADERR	73	HSFAIL
33	TXDATA B	74	A4
34	TXDATA B	75	INCMD
35	-15V B	76	DTACK
36	+15V B	77	DTGRT
37	+5V B	78	A0
38	GND B	79	A1
39	RXDATA B	80	A2
40	RXDATA B	81	A3
41	NC	82	NC

Figure 13 – Flat package Pin Connection Diagram, CT2512 and Pinout Table

Plug In Package Outline



Flat Package Outline





Ordering Information

Model Number	Screening	DESC SMD	Power Supply	Package
CT2512	Military Temperature, -55°C to +125°C, Screened to the individual test methods of MIL-STD-883	5962-8753503X_	+5V, ±15V	Plug in
CT2512-FP		5962-8753503Z_		Flat Package
* CT2513		-	+5V, ±12V	Plug in
* CT2513-FP		-		Flat Package
* CT2510		-	+5V, -15V	Plug in
* CT2510-FP		-		Flat Package
* CT2511		-	+5V, -12V	Plug in
* CT2511-FP		-		Flat Package

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Specifications subject to change without notice.