PhaseLink Corporation

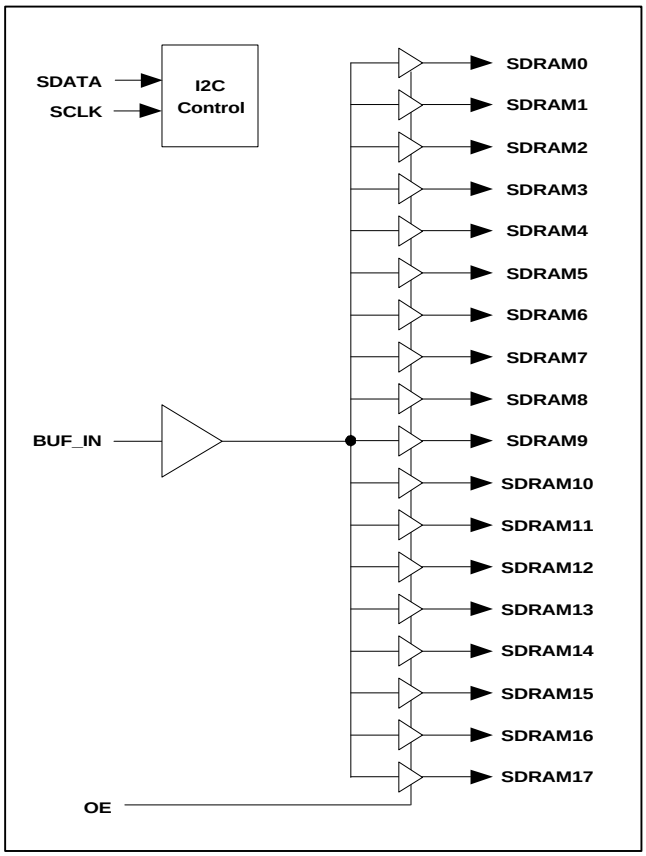
PLL103-01

Low Skew Buffers

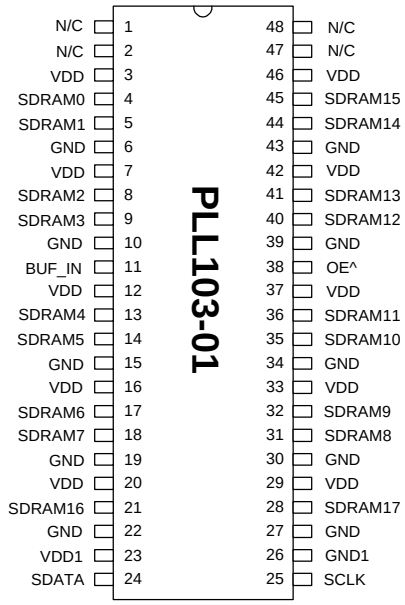
FEATURES

- Generate 18 copies of High-speed clock inputs.
- Supports up to four SDRAM DIMMS synchronous clocks.
- Supports 2-wire I2C serial bus interface with readback.
- 50% duty cycle with low jitter.
- Less than 5ns delay.
- Skew between any outputs is less than 250 ps.
- Tri-state pin for testing.
- Frequency up to 133 MHZ.
- 3.0V-3.7V Supply range.
- 48-pin SSOP package.

BLOCK DIAGRAM



PIN CONFIGURATION



Note: ^: pull up

POWER GROUP

- VDD: SDRAM(0:17)
- VDD1: I2C Circuitry

GROUND GROUP

- GND: SDRAM(0:17)
- GND1: I2C Circuitry

KEY SPECIFICATIONS

- BUFIN to SDRAM outputs Delay: 1 ~ 5 ns.
- Output Slew: ≥1.5 V/ns.
- Output Skew: ±250 ps.
- Output Duty Cycle: 50% ± 5%.

PIN DESCRIPTIONS

Name	Number	Type	Description
SDRAM (0:3)	4,5,8,9	O	SDRAM Byte0 Clock outputs.
SDRAM (4:7)	13,14,17,18	O	SDRAM Byte1 Clock outputs.
SDRAM (8:11)	31,32,35,36	O	SDRAM Byte2 Clock outputs.
SDRAM (12:15)	40,41,44,45	O	SDRAM Byte3 Clock outputs.
SDRAM (16:17)	21,28	O	SDRAM Byte4 Clock outputs.
OE	38	I	Tristates all outputs, active low. Has internal pull-up.
BUF_IN	11	I	Input for fanout buffers SDRAM (0:17).
SDATA	24	B	Serial data inputs for serial interface port.
SCLK	25	I	
VDD	3,7,12,16,20,29,33,37,42,46	P	3.3V Power supply for SDRAM buffer.
VDD1	23	P	3.3V Power supply for I2C circuitry.
GND	6,10,15,19,22,27,30,34,39,43	P	Ground for SDRAM buffer.
GND1	26	P	Power supply for I2C circuitry.
N/C	1,2,47,48	-	Pins are internally disconnected.

I2C BUS CONFIGURATION SETTING

Address Assignment	A6	A5	A4	A3	A2	A1	A0	R/W
	1	1	0	1	0	0	1	_
Slave Receiver/Transmitter	Provides both slave write and readback functionality							
Data Transfer Rate	Standard mode at 100kbits/s							
Data Protocol	This serial protocol is designed to allow both blocks write and read from the controller. The bytes must be accessed in sequential order from lowest to highest byte. Each byte transferred must be followed by 1 acknowledge bit. A byte transferred without acknowledged bit will terminate the transfer. The write or read block both begins with the master sending a slave address and a write condition (0xD2) or a read condition (0xD3). Following the acknowledge of this address byte, in **Write Mode:** the **Command Byte** and **Byte Count Byte must be sent by the master** but ignored by the slave, in **Read Mode:** the **Byte Count Byte** will be **read by the master** then all other **Data Byte**. **Byte Count Byte** default at power-up is = (0x09).							

I2C CONTROL REGISTERS

1. BYTE 0: SDRAM(0:7) Clock Register (1=Enable, 0=Disable)

Bit	Pin#	Default	Description
Bit 7	18	1	SDRAM7 (Active/Inactive)
Bit 6	17	1	SDRAM6 (Active/Inactive)
Bit 5	14	1	SDRAM5 (Active/Inactive)
Bit 4	13	1	SDRAM4 (Active/Inactive)
Bit 3	9	1	SDRAM3 (Active/Inactive)
Bit 2	8	1	SDRAM2 (Active/Inactive)
Bit 1	5	1	SDRAM1 (Active/Inactive)
Bit 0	4	1	SDRAM0 (Active/Inactive)

2. BYTE 1: SDRAM(8:15) Clock Register (1=Enable, 0=Disable)

Bit	Pin#	Default	Description
Bit 7	45	1	SDRAM15 (Active/Inactive)
Bit 6	44	1	SDRAM14 (Active/Inactive)
Bit 5	41	1	SDRAM13 (Active/Inactive)
Bit 4	40	1	SDRAM12 (Active/Inactive)
Bit 3	36	1	SDRAM11 (Active/Inactive)
Bit 2	35	1	SDRAM10 (Active/Inactive)
Bit 1	32	1	SDRAM9 (Active/Inactive)
Bit 0	31	1	SDRAM8 (Active/Inactive)

3. BYTE 2: SDRAM(16:17) Clock Register (1=Enable, 0=Disable)

Bit	Pin#	Default	Description
Bit 7	28	1	SDRAM17 (Active/Inactive)
Bit 6	21	1	SDRAM16 (Active/Inactive)
Bit 5	-	1	Reserved
Bit 4	-	1	Reserved
Bit 3	-	1	Reserved
Bit 2	-	1	Reserved
Bit 1	-	1	Reserved
Bit 0	-	1	Reserved

ELECTRICAL SPECIFICATIONS

1. Absolute Maximum Ratings

PARAMETERS	SYMBOL	MIN.	MAX.	UNITS
Supply Voltage	V_{DD}	V_{SS}-0.5	7.0	V
Input Voltage, dc	V_I	V_{SS}-0.5	V_{DD}+0.5	V
Output Voltage, dc	V_O	V_{SS}-0.5	V_{DD}+0.5	V
Storage Temperature	T_S	-65	150	°C
Ambient Operating Temperature	T_A	0	70	°C

Exposure of the device under conditions beyond the limits specified by Maximum Ratings for extended periods may cause permanent damage to the device and affect product reliability. These conditions represent a stress rating only, and functional operations of the device at these or any other conditions above the operational limits noted in this specification is not implied.

2. AC/DC Electrical Specifications

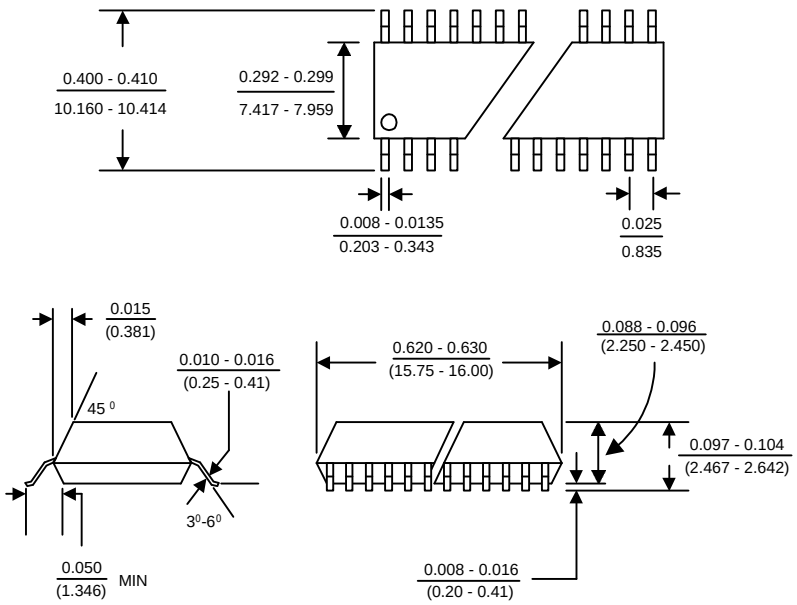
PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Input High Current	I_{IH}	$V_{IN} = V_{DD}$			5	uA
Input Low Current	I_{IL}	V_{IN}=0V; with no pull-up resistors				uA
	I_{IL}	V_{IN}=0V; with 100k pull-up resistors				uA
Input High Voltage	V_{IH}		2		V_{DD}+0.3	V
Input Low Voltage	V_{IL}		V_{SS}–0.3		0.8	V
Input Frequency	F_{IN}	V_{DD}=3.3V; All outputs loaded	10		150	Mhz
Input Capacitance	C_{IN}	Logic Inputs			5	PF
Operating Supply Current	I_{DD1}	C_L= 0pf @ 66MHz		80	120	mA
	I_{DD2}	C_L= 0pf @ 100MHz		120	180	mA
	I_{DD3}	C_L= 30pf; RS= 33Ω @ 66MHz		180	260	mA
	I_{DD4}	C_L= 30pf; RS= 33Ω @ 100MHz		240	360	mA
	I_{DD5}	Stopped, input at 0 or VDD			500	uA

2. Output Buffer Electrical Specifications

Unless otherwise stated, all power supplies = 3.3V±5%, and ambient temperature range T_A= 0°C to 70°C

PARAMETERS	SYMBOL	CONDITIONS	MIN.	TYP.	MAX.	UNITS
Output High Voltage	V_{OH}	I_{OH} = –36 mA	2.4	3		V
Output Low Voltage	V_{OL}	I_{OH} = 23 mA		0.27	0.4	V
Output High Current	I_{OH}	V_{OH} = 2.0 V		-115	-54	mA
Output Low Current	I_{OL}	V_{OL} = 0.8 V	40	57		mA
Output Impedance	R_{DSP}	V_O = (0.5) * V_{DD}	10		24	ohm
Output Impedance	R_{DSN}	V_O = (0.5) * V_{DD}	10		24	ohm
Rise Time	T_r	V_{OL} = 0.4 V, V_{OH} = 2.4V		0.95	1.33	ns
Fall Time	T_f	V_{OH} = 2.4 V, V_{OL} = 0.4V		0.95	1.33	ns
Skew	T_{skew}	V_T = 1.5 V		110	250	ps
Duty Cycle	D_T	V_T = 1.5 V	45	50	55	%
Propagation	T_{PROP}	V_T = 1.5 V	1	5	6	ns
	T_{PROPEN}	V_T = 1.5 V	1		8	ns
	$T_{PROPDIS}$	V_T = 1.5 V	1		8	ns

PACKAGE INFORMATION



48PIN SSOP

ORDERING INFORMATION

For part ordering, please contact our Sales Department:

47745 Fremont Blvd., Fremont, CA 94538, USA
Tel: (510) 492-0990 Fax: (510) 492-0991

PART NUMBER

The order number for this device is a combination of the following:
Device number, Package type and Operating temperature range

PLL103-01 X C

PART NUMBER

TEMPERATURATURE
C=COMMERCIAL
M=MILITARY
I=INDUSTRAL

PACKAGE TYPE
X=SSOP