Z86251
STARSIGHT DATABASE ENGINE

FEATURES

- **Part** Z86251 — **Package** 68-Pin PLCC — **Speed (MHz)** 24
- 4.5- to 5.5-Volt Operating Range
- 0°C to +70°C Temperature Range
- Low-Power Consumption
- Segmented Base Registers
- DRAM Memory Control and Refresh Logic
- Power-Down DRAM Data Retention
- Infrared Transmitter Circuits for TV and VCR Control
- CRC-32 Encoding and Decoding Logic
- Watch-Dog Timer (WDT) for Error Recovery
- I^2C Compatible Bus for External Communication
- Test Multiplexer for Chip Debug
- On-Chip Crystal Oscillator

GENERAL DESCRIPTION

Zilog's Z86251 StarSight Data Base Engine (DBE) is designed to process extracted data for the StarSight on-screen programming guide.

The Z86251 provides a number of important peripheral functions, such as the IR Blaster to send command signals to the VCR, and low-power management to avoid loss of data.

For fast memory data manipulation, the Z86251 offers segmented base registers. The device also features DRAM memory control and refresh logic.

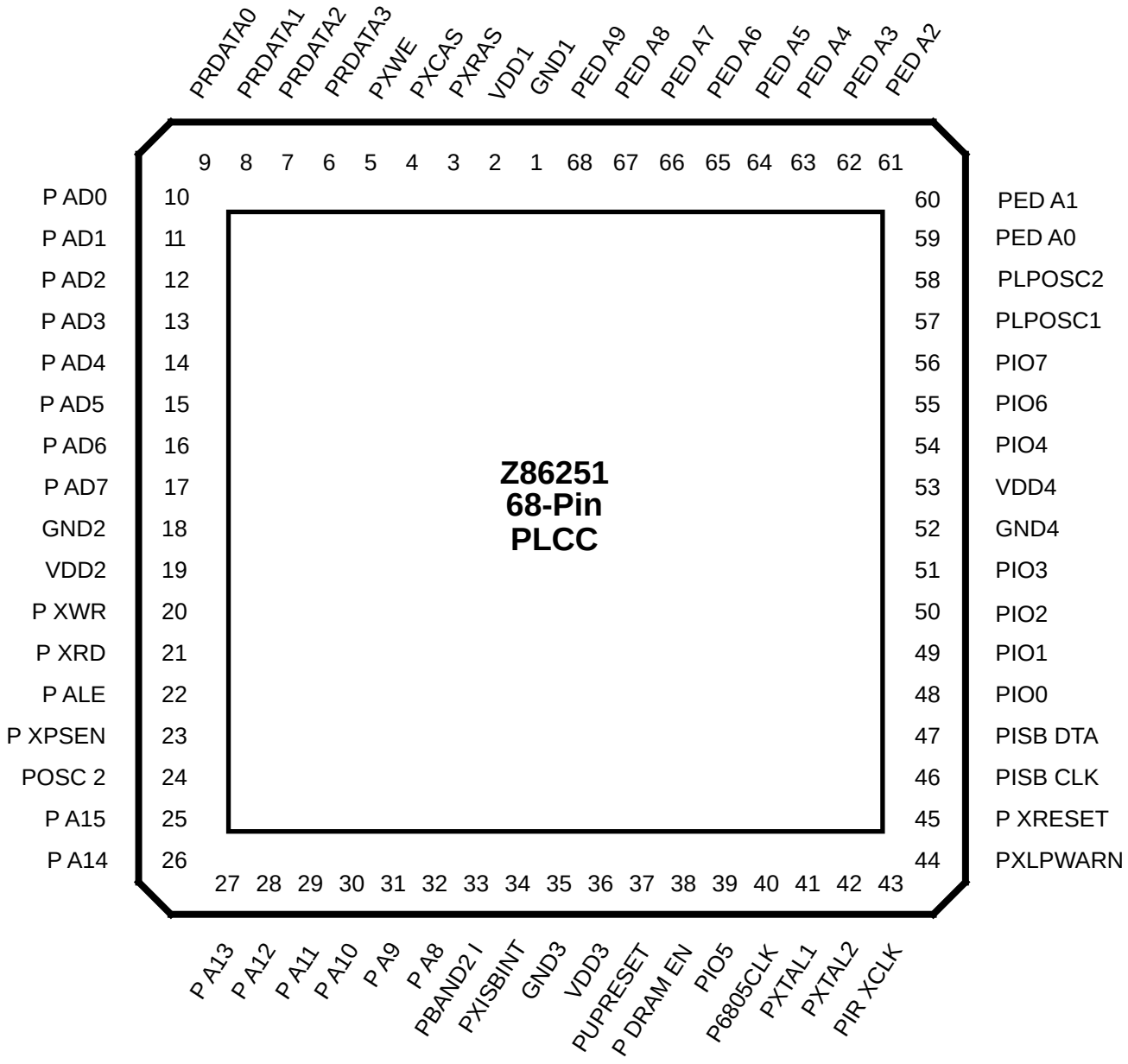
The DBE is optimized to work with Zilog's Z89300 series of TV controller devices to provide a cost-effective solution for StarSight programming-guide data extraction and display.

Notes:
All Signals with a preceding front slash, "/", are active Low, e.g.: B//W (WORD is active Low); /B/W (BYTE is active Low, only).

Power connections follow conventional descriptions below:

Connection	Circuit	Device
Power	V_{CC}	V_{DD}
Ground	GND	V_{SS}

PIN DESCRIPTION



Z86251 68-Pin PLCC
Pin Assignments

PIN DESCRIPTION (Continued)

PIN NO.	PIN NAME	PIN TYPE
1	GND1	POWER
2	VDD1	
3	PXRAS	DRAM -RAS
4	PXCAS	DRAM -CAS
5	PXWE	DRAM -WE
6	PRDATA3	XRAS2 also
7	PRDATA2	
8	PRDATA1	DRAM DATA
9	PRDATA0	LINES
10	P_AD0	
11	P_AD1	
12	P_AD2	80C32
13	P_AD3	DATA
14	P_AD4	BUS
15	P_AD5	
16	P_AD6	
17	P_AD7	
18	GND2	POWER
19	VDD2	
20	P_XWR	80C32 -WR
21	P_XRD	80C32 -RD
22	P_ALE	80C32 ALE
23	P_XPSEN	80C32 -PSEN
24	POSC_2	80C32 Clock
25	P_A15	
26	P_A14	
27	P_A13	80C32
28	P_A12	ADDRESS
29	P_A11	INPUT
30	P_A10	LINES
31	P_A9	
32	P_A8	
33	PBAND2_I	IR and LP INT
34	PXISBINT	ISB Interrupt

PIN NO.	PIN NAME	PIN TYPE
35	GND3	POWER
36	VDD3	
37	PUPRESET	+80C32 reset
38	P_DRAM_EN	
39	PIO5	-EN_BASE input
40	P6805CLK	Security Clock
41	PXTAL1	24M OSC IN
42	PXTAL2	24M OSC OUT
43	PIR_XCLK	IR Blaster Output
44	PXLPWARN	Low Power Warning
45	P_XRESET	Chip Reset
46	PISB_CLK	I/O_opendrain
47	PISB_DTA	I/O_opendrain
48	PIO0	
49	PIO1	
50	PIO2	Input Capture
51	PIO3	
52	GND4	POWER
53	VDD4	
54	PIO4	
55	PIO6	1shot ref req option
56	PIO7	
57	PLPOSC1	Low Power
58	PLPOSC2	Oscillator
59	PED_A0	
60	PED_A1	EPROM
61	PED_A2	and
62	PED_A3	DRAM
63	PED_A4	ADDRESS
64	PED_A5	LINES
65	PED_A6	
66	PED_A7	
67	PED_A8	Eprom Bank Sel
68	PED_A9	XCAS2 also

Note: The 'P' in front of the signal name indicates an IC "Pin".

Z86251 Pinouts

ABSOLUTE MAXIMUM RATINGS

Symbol	Parameter	Min	Max	Units	Conditions
V_{DD}	Power Supply Voltage	–0.3	7	V	All pins with respect to GND
T_A	Operating Ambient Temp.	0	70	°C	
T_S	Storage Temperature	–65	150	°C	

Stress greater than those listed under Absolute Maximum Ratings may cause permanent damage to the device. This is a stress rating only; operation of the device at any condition above those indicated in the operational sections of these specifications is not implied. Exposure to absolute maximum rating conditions for extended periods may affect device reliability.

DC CHARACTERISTICS

T_A = 0°C to + 70°C; V_{CC} = 4.5 V to + 5.5 V

Symbol	Parameter	Min	Max	Typical	Units	Conditions	Notes
V_{IL}	Input Voltage Low	0	0.2 V_{DD}	0.4	V	(except XTAL1)	
V_{IH}	Input Voltage High	0.5 V_{DD}	V_{DD}	3.6	V	(except XTAL1)	
V_{OL1}	Output Voltage Low		0.16	0.4	V	@ I_{OH1}	
V_{OH1}	Output Voltage High	V_{DD} –0.4	4.75	V_{DD}	V	@ I_{OH1}	
V_{OL2}	Output Voltage Low		0.16	0.4	V	@ I_{OH2}	
V_{OH2}	Output Voltage High	V_{DD} –0.4	4.75	V_{DD}	V	@ I_{OH2}	
VX_{IL1}	Input Voltage Low			0.2 V_{DD}	V	for XTAL1	
VX_{IH1}	Input Voltage High	0.7 V_{DD}			V	for XTAL1	
VX_{OL2}	Output Voltage Low		0.16	0.4	V	for XTAL2	@ 4.5 mA
VX_{OH2}	Output Voltage High	V_{DD} –0.4	4.75	V_{DD}	V	for XTAL2	@ 3.7 mA
I_{OL1}	Output Current Low	2.5			mA		
I_{OL1}	Output Current High	1.5			mA		
I_{OL2}	Output Current Low	10			mA		
I_{OL2}	Output Current High	6			mA		
V_{DD1}	Operating Supply Voltage	4.3	5.0	5.5	V		
I_{DD1}	Operating Supply Current			40	mA		
I_{DD2}	Operating Supply Current			10	µA		

AC CHARACTERISTICS

T_A = 0°C to + 70°C; V_{DD} = 4.5 V to + 5.5 V

Symbol	Parameter	Min	Max	Typical	Units	Conditions	Notes
fosc	Oscillator Frequency			24	MHz		
V_{IN}	Absolute Min/Max Input Voltage Range	–0.3	V_{DD} + 0.3		V		
V_{OUT}	Absolute Min/Max Output Voltage Range	–0.3	V_{DD} + 0.3		V		

I/O READ ADDRESS REGISTER SUMMARY

Read Address	Read Register Accessed	86251 Name
0400H	Read Test Multiplexer Register	XRD_MUX
0800H	Reserved	
0C00H	ISB Interrupt Status Register	XRD_STAT
1000H	Reserved	
1400H	Reserved	
1800H	I.M. Status and Chip I.D. Register	XSW_LO
1C00H	Reserved	
6000H	I.R. Blaster Status Register	XIRB_RD
6400H	Low Power Status Register	XLP_STAT
6800H	ISB Receive Data Register	XRRECREG
6C00H	ISB Status Register 2	XISB_ST2
7000H	CRC-32 Read Register 3	XRDCRC3
7400H	CRC-32 Read Register 2	XRDCRC2
7800H	CRC-32 Read Register 1	XRDCRC1
7C00H	CRC-32 Read Register 0	XRDCRC0
8000H	IRB T8 Control Register	
8001H	IRB T8 / T16 Common Control Reg	
8002H	IRB T16 Control Register	
8003H	Reserved	
8004H	IRB T8 Low Hold Register	
8005H	IRB T8 High Hold Register	
8006H	IRB T16 Low Hold Register	
8007H	IRB T16 High Hold Register	
8008H	IRB T16 Low Capture Register	
8009H	IRB T16 High Capture Register	
800AH	IRB T8 Low Capture Register	
800BH	IRB T8 High Capture Register	
C000W	I/O Pad Data Direction Register	
C400W	I/O Output Data Register	
C800W	Special I/O Pad Control Register	
CC00W	DRAM Control Register #1	
D000W	DRAM Control Register #2	
D400W	Low Power Oscillator Control Register	
D800W	DRAM Control Register #3	

I/O Read Address Register Summary Table

I/O WRITE ADDRESS REGISTER SUMMARY

Write Address	Write Register Accessed	86251 Name
80C32 PORT 1	Various Output Control BITS	
80C32 PORT 3	Various Control and I/O BITS	
0000H	Read_BASE_Register_LOW	XRBASELO
0400H	Read_BASE_Register_HIGH	XRBASEHI
0800H	Write_BASE_Register_LOW	XWBASELO
0C00H	Write_BASE_Register_HIGH	XWBASEHI
1000H	Reserved	
1400H	Reserved	
2000H	Reserved	
2400H	Reserved	
2800H	Reserved	
2C00H	Reserved	
3000H	I.M. BUS Control Register	XIM_CTRL
3400H	Low Power Control Register	XLP_CTRL
3600H	Sleep Start Register	XWRSLEEP
3C00H	Security Chip Clock Freq Register	XCLK_REG
6000H	Output Control Register	XCNTRL_1
6400H	Refresh Watchdog Register	XWDOG_CS
6800H	CRÇ-32 Data Register	XWR_CRC
6C00H	ISB Control Register	XISBCTRL
7000H	ISB Transmit Data Register	XISBXMIT
7400H	RAM Sequence *and* 86250 Test Register	XWR_TEST
7800H	I.R. Blaster Control Register 1	XIRB_WR1
7C00H	I.R. Blaster Control Register 2	XIRB_WR2
8000H	IRB T8 Control Register	
8001H	IRB T8 / T16 Common Control Reg	
8002H	IRB T16 Control Register	
8004H	IRB T8 Low Hold Register	
8005H	IRB T8 High Hold Register	
8006H	IRB T16 Low Hold Register	
8007H	IRB T16 High Hold Register	
C000R	I/O Pad Data Direction Register IMAGE	
C400R	I/O Output Data Register IMAGE	
C800R	I/O Pad Input Data	
CC00R	DRAM Control Register #1 IMAGE	
D000R	DRAM Sequence Status Register	
D800R	PCB ID Register	

I/O Write Address Register Summary Table

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