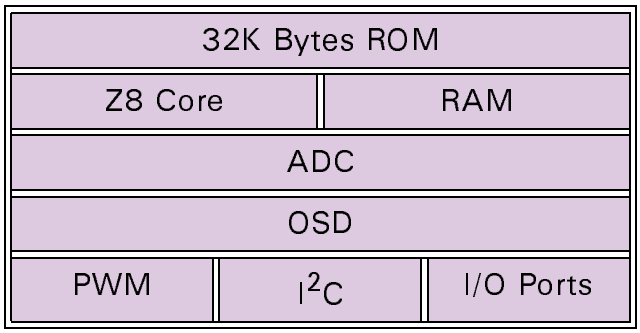
Z90255 and Z90251

Television Controller with On-Screen Display

PB000203-0601

Product Block Diagram



On-Screen Display (OSD) Features

- Displays of up to 10 Rows by 24 Columns with 512 Characters
- Provides character Cell Resolution of 14 Pixels by 18 Scan Lines
- Offers variable Inter-Row Spacing from 0–15 Horizontal Scan Lines
- Uses Color Palette Table to Program Foreground and Background of Character

Microcontroller Features

- Incorporates Z8® MCU Core at 6 MHz
- Z90255 has 32KB Masked ROM
- Provides 300 Bytes of System RAM
- Offers Nine 6-bit Pulse Width Modulators
- Offers Two 14-bit Pulse Width Modulators
- Provides On-Chip Infrared (IR) Capture Registers
- Supports 4 Channels of 4-bit Analog-to-Digital Converter
- Supports up to 27 General Purpose I/O Pins
- Provides I^2C Master Serial Communication Port
- Comes in 42-Pin SDIP Package
- Can be emulated with124-Pin PGA Package (Z90259)

General Description

The Z90255 and Z90251 are the ROM and OTP versions of a Television Controller with On-Screen Display (OSD). Based on ZiLOG's powerful Z8 architecture, the Z90255 and Z90251 contain 32KB of program memory. Enhanced features include:

- Larger System RAM and ROM
- New Color Palette System
- Flexible Inter-Row Spacing
- Higher-Character Cell Resolution
- Background Mesh Effect
- Dedicated Infrared Capture Registers
- On-Chip Analog-to-Digital Converter
- Hardware Master Mode I^2C Interface.

The familiar Z8 architecture, in combination with these advanced features, makes the Z90255 an ideal choice for mid-range televisions in both PAL and NTSC markets.

The Z9025x family consists of three basic device types:

- The Z90255 Masked ROM
- The Z90251 OTP
- The Z90259 In-Circuit Emulator (ICE) Chip

The OTP supports a field programmable 32KB system ROM. The ICE Chip is used in the Z90259 Emulator and Protopak. The Z90255 masked ROM supports a 32-KB system ROM (selectable through a mask option).

The Z9025x family takes full advantage of the Z8 microcontroller's expanded register file space to offer greater flexibility in On-Screen Display creations such as bitmap-simulated graphics, icons, and animation.

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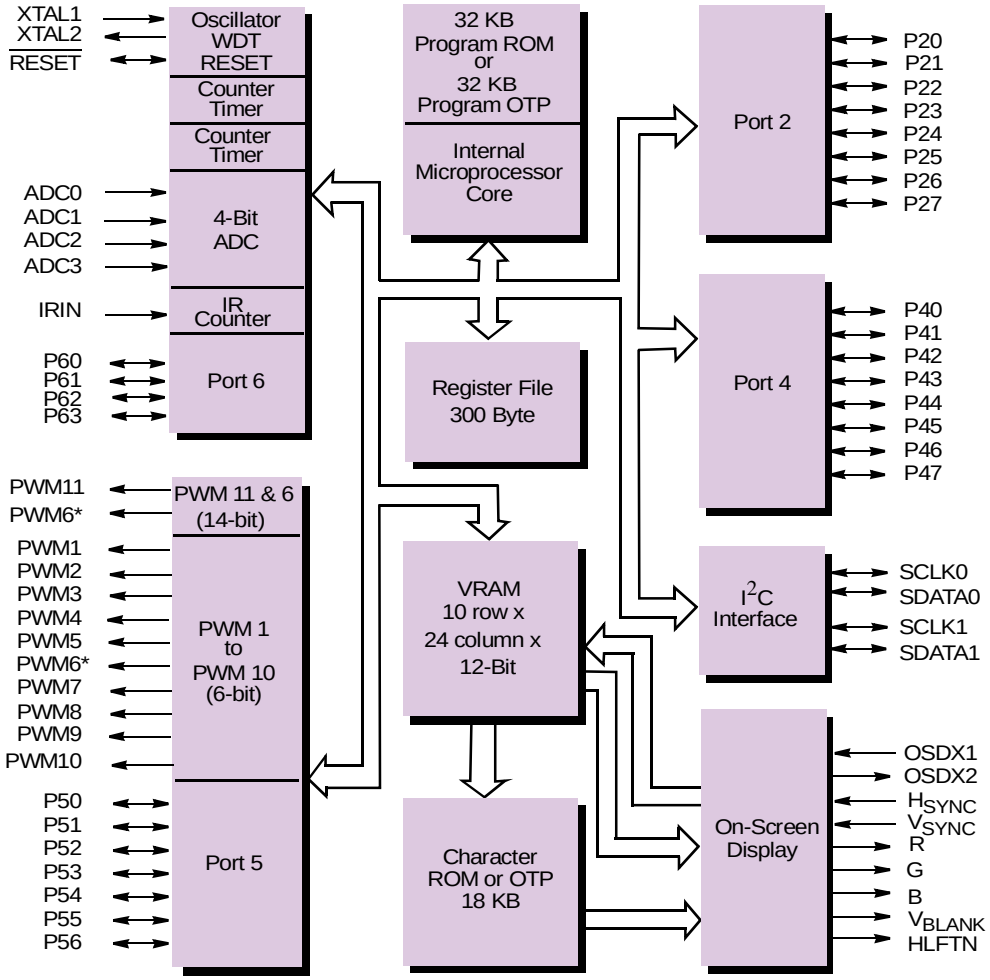
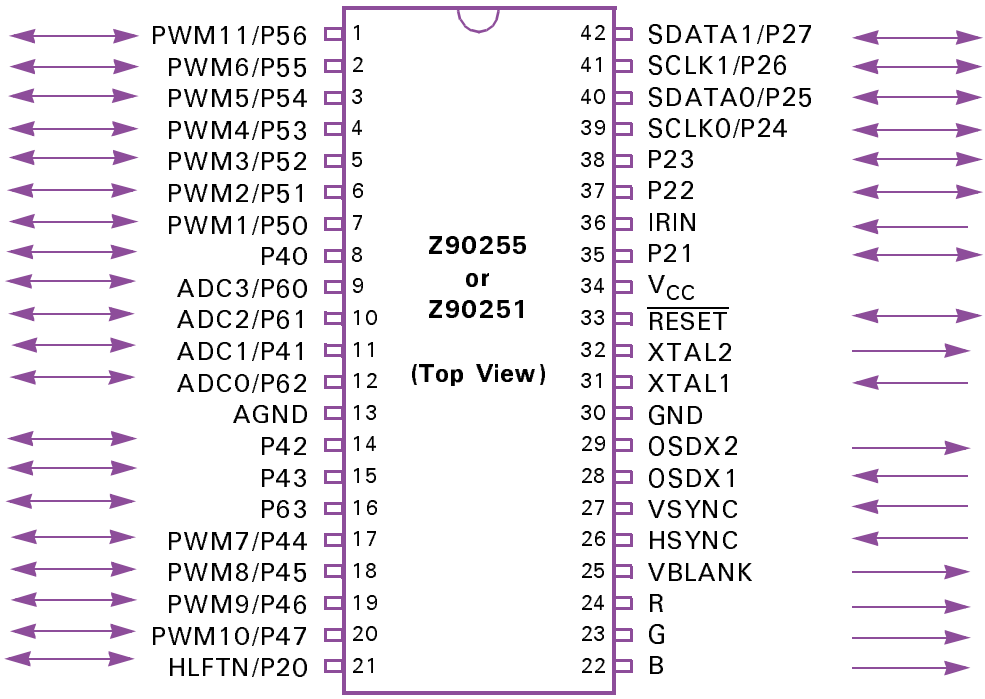
Block Diagram of Z90255 and Z90251



Note: *PWM6 can be either a 6-bit or 14-bit output.

Pin-Outs and Pin Direction



Pin Number	Pin Function	Direction	Reset State	Name	Note
34	+5 Volts	PWR	PWR	V_{CC}	
30,13	0 Volts	PWR	PWR	GND, AGND	
36	Infra Red remote capture input	I	I	IRIN	
1	14-bit Pulse Width Modulator Output	O	I	PWM11	1
20,19,18,17,2,3,4,5,6,7	6-bit Pulse Width Modulator Output	O	I	PWM10–PWM1	1
7,6,5,4,3,2,1	Bit-Programmable Input/ Output Ports	I/O	I	P56–P50	
42,41,40,39,38,37,35,21	Bit-Programmable Input/ Output Ports	I/O	I	P27–P20	
21	Half Tone Output	O	I	HLFTN	
40,42	I^2C Data	I/O	I	SDATA0,1	
39,41	I^2C Clock	I/O	I	SCLK0,1	
16,12,10,9	Bit-Programmable Input/ Output Ports	I/O	I	P63–P60	
20,19,18,17,15,14,11,8	Bit-Programmable Input/ Output Ports	I/O	I	P47–P40	
31	Crystal Oscillator Input	I	I	XTAL1	
32	Crystal Oscillator Output	O	O	XTAL2	
28	Dot Clock Oscillator Input	I	I	OSDX1	
29	Dot Clock Oscillator Output	O	O	OSDX2	
26	Horizontal Sync	I	I	HSYNC	
27	Vertical Sync	I	I	VSYNC	
25	Video Blank	O	O	VBLANK	
24,23,22	Video R,G,B	O	O	R,G,B	
9,10,11,12	4-bit Analog-to-Digital Converter Input	AI	I	ADC3–ADC0	
33	Device Reset	I/O	I	$\overline{\text{RESET}}$	

Note: It is Input on POR. It must be configured to be output ports for PWM applications

Development Tools & Support

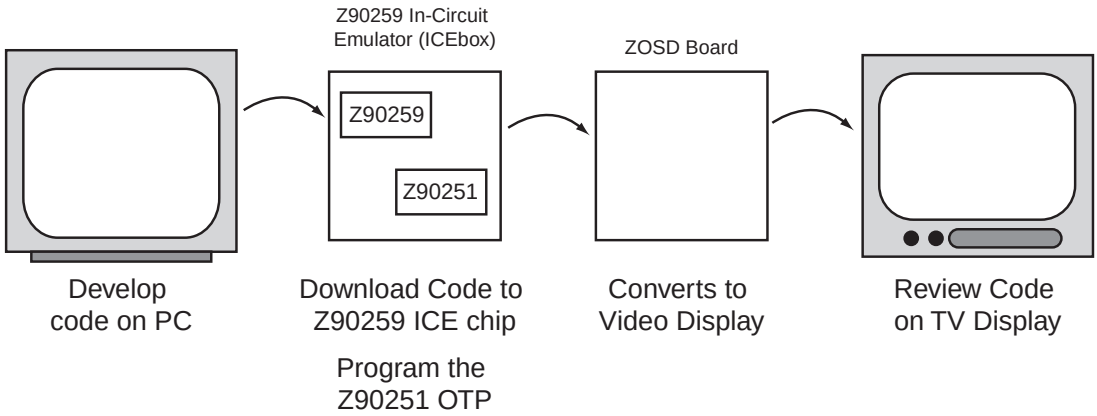
Available in One-Time Programmable (OTP) and MASK ROM Versions, the Z90255 and Z90251 fulfill Prototype and Production Requirements.

The Z90251 uses an ICEbox™ (In-Circuit Emulator) tools (Z9025900ZEM) to make Programming and Debug applications easy and convenient.

For code development, ZiLOG offers its specialized Application Program Interface (API) for OSD. API deals directly with proper sequencing and timing when interfacing with hardware, shielding the user application program from tedious and error prone details.

The ZOSD Board is used to synchonize the emulator with a video display. Refer to the diagram below for a suggested code development environment.

Zilog also offers the Z9020900TSC Protopak to verify code on a television.



Related Products

TV controllers and VBI (Vertical Blanking Interval) decoders include

Z9037x	Dual Scan TV controller for Progressive/Double Scan
Z9035x	16-Bit Advanced TV controller with 64K Words of ROM, Programmable Palette, and Cursor
Z9036x	16-Bit Advanced TV controller with 32K Words of ROM
Z86129	Closed Caption Decoder (CCD)
Z86229	Closed Caption Decoder (CCD) with Second I^2C Address Select
Z86131	Auto Time Set
Z86130	Smart V-Chip
Z86230	Smart V-Chip with Second I^2C Address Select

Electrical Features Summary

- 40 mA Maximum Supply Current
- 4.50 V to 5.50 V Operating Range

Z9025X Device Selection

Device	Application	ROM (Bytes)	RAM (Bytes)	Pkg.	I^2C	IR Capture	ADC	Bit I/O (max)	PWM (6-bit/14-bit)
Z90255	TV Receiver Controller	32K	300	42-Pin SDIP	Yes	Yes	4 Ch	27	10/2
Z90251	TV Receiver Controller	32K OTP	300	42-Pin SDIP	Yes	Yes	4 Ch	27	10/2

Ordering Information

Part	PSI	Description
Z90251	Z9025106PSC	OTP TV Controller
Z90255	Z9025506PSC Rxxxx*	Masked ROM TV Controller
Z9025900ZEM	Z9025900ZEM	Emulator/Programmer
Z9020900TSC	Z9020900TSC	Protopak
Z8933200ZCO	Z8933200ZCO	OSD Board

* xxxx is a unique ROM number assigned to each customer code