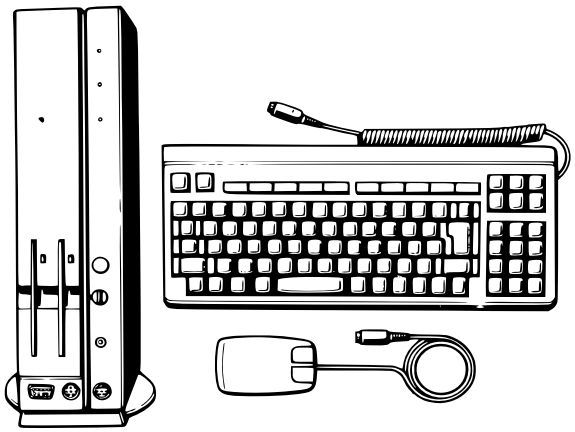
SHARP

Service Manual



No.CZ-147

X68030
Personal Computer

CZ-300C-B
CZ-310C-B

Standard Price:CZ-300C-B 388,000Yen(Ex.Tax)
CZ-310C-B 478,000Yen(Ex.Tax)

Distribution:Sharp System Services Co., Ltd.

Issued In April 1993

Contents

1.Hardware Configuration

1-1.Special Features

1)CPU Peripheral

- 32-bit MPU adopting a MC68EC030 (25MHz).
- The address space of 16MBytes can be directly addressed.

Note) MC68EC030 has an accessible address space of 4GBytes, address bus is 32-bit, but the upper 8 bits of the address bus in this unit does not decode. Therefore, you can only address the first 16MBytes. However, given the future expansion, software manner is to set an address of the upper 8 bits of a register to "00", please use as "00xxxxxx".

- FPU adopted is MC68882 (25MHz). It is possible to control directly by using the MC68EC030 MPU built-in interface.
- Memory-mapped I/O system. (Main memory 4MBytes as standard)
- DMAC is HD63450(12.5MHz), MFP adopted is MC68901.
- Uses a large number of custom IC's.

2)Text VRAM, using the bitmap method to display graphics in VRAM.

- Actual screen of 1024×1024 pixels. (Also supports 512×512 pixels for graphic screen)
- Display screen can be selected from 768×512, 512×512, 256×256.
- Screen display mode, supports high resolution (31.5kHz), low resolution (15.98kHz).

3)Graphic screen, each pixel can be any color designated from 65536 colors. (512×512 mode)

- In 768×512 graphics mode, any 16 colors can be chosen from 65536 colors for each pixel.

4)There is smooth scrolling in pixel units.
5)Equipped with its own sprite IC.

- 16×16 pixels / per sprite, 128 can be defined. (Up to 256)
- Can display up to 32 simultaneous sprites on one horizontal line.
- Can display up to 128 simultaneous sprites on a single screen.

6)Features a palette to change colors instantaneously.
7)Text, graphics, features per-sprite priority.
8)Semi-transparent colors can be specified, and special priority is possible.
9)Low resolution over scan superimpose function. (Also pseudo high resolution using the interlace method supported)
10)CGROM contains the standard implementation of ANK characters, JIS 1st & 2nd level Kanji.
11)FM sound, voice synthesis is featured.
12)Magneto-optical disks, SCSI interface built-in corresponding to next-gen media such as CDROM, also equipped with various analog I/F's such as RGB, RS-232C, printer, joystick, & mouse.
13)Adopts an ergonomic keyboard with an extendable spiral lead.
14)3.5″ Floppy Disk Drive (2HD/2DD combined type) to 2 groups. Also comes equipped with a mouse.
15)How to initialize the SRAM
Is equipped with a function to easily initialize the SRAM.. This allows you to initialize SRAM without starting the OS. For situations such as if a virus program is uploaded to SRAM, it will be eliminated easily. To initialize, reset while pressing the CLR key, you will see a message indicating the initialization of the SRAM on the screen, press key Y if you want to initialize, or key N if you do not want to. The SRAM will return to the initial state.
16)Built-in 2.5″ 80MByte SCSI hard disk drive (CZ-300C option availability built-in)

Main Changes Associated with the 32-bit Architecture

- Changed MPU from the conventional 16-bit MC68HC000 to the 32-bit MC68EC030, at the same time operating clock frequency was also up from 16MHz to 25MHz. Thus, it has become even more able to provide a comfortable operating environment at high speed.
- We have adopted the MC68882 (25MHz) for the FPU. As well as the peripheral I/O devices which are conventional, interaction with the MPU and the FPU internal registers can be carried out in software using the program, directly control the FPU using a built-in interface MC68EC030 MPU on this unit. For this reason, good refresh-speed processing is available.
- We developed a 2-gate array, extending functionality, replaced with conventional products.
  Memory Controller iX1748CE(ASA)→iX2136CE(YUKI)
  System Controller iX1749CE(DOSA)→iX2137CE(SAKI)
- We changed the 8-bit 4M mask ROM2 pieces to ROM2 or 16-bit 8M mask.
  iX1775CE(EVEN) → iX2138CE(EVEN)
  iX1776CE(ODD) → iX2139CE(ODD)

Other Major Changes (Comparison: CZ-500C)

- ROM switching IC socket for 2 and TV control connector for 1 was abolished.

Services Corresponding to the Method of the Circuit Board Assembly

Electronic control circuit, is composed of the following printed circuit board assembly products, please do each repair by the method in the following table.

Part Name	Distribution Code	Service How To Respond
Main Board Unit	007 684 0358	Single item parts repair, exchange correspondence in the base
I/O Board Unit	007 684 0361	〃
Rear Board Unit	007 684 0360	〃
Front Board Unit	007 684 0359	〃

1-2.Specifications

Item	Class	Name・Type	Details	Notes
CPU	MPU Sub CPU (Keyboard)	MC68EC030 MSM80C51	32-bit MPU (25MHz) Keyboard Scan	
FPU		MC68882	Floating-Point Coprocessor (25MHz)	Optional
Periph. LSI	DMAC	HD63450	4-Channel DMAC (12.5MHz)	
	MFP	MC68901	Multi-Function Peripheral Receives KEY Data, Various Interrupts	
	CRTC	IX1093CEZZ (VICON)	Text, Graphics, Control for the CRTC Dual-Port DRAM Control Scrolling Feature	
	Sprite Controller	iX0906CEZZ (CYNTHIA)	Sprite Function	
	FDC	μPD72065B	Built-In 3.5″ 2HD/2DD FDD & Expansion Controls the FDD	
	Video Controller	iX1095CEZZ (VIPS)	Palette Priority Function Special Mode Function	
	SCSI Controller	MB89352	SCSI Control	
	SCC	Z8530	Serial Communication Controller Serial 2-Channel (RS-232C, Mouse)	
	RTC	RF5C15	Real-Time Clock	
	FM Sound	YM2151	8 Possible Channels of FM Sound	
	Voice Synth	MSM6258	Adaptive Differential PCM	
	PPI	MSM82C55	Joystick 2 Ports, Voice Synthesis Switching Control	
	I/O	iX1804CEZZ	Floppy Disk, Peripheral IC Decoder (PEDEC)	
	Other	iX2136CEZZ	Memory Controller (YUKI)	
		iX2137CEZZ	System Controller (SAKI)	
		iX1094CEZZ	Video Data Selector (CATHY)	
		iX1856CEZZ	Video Clock Controller (OSCIANII)	

※Please note parts of the specification & appearance are subject to change without prior notice.

<Hardware>

Item	Class	Name・Type	Details	Notes
Memory	ROM	CG ROM (IPL ROM Integrated)	1MByte (JIS 1st Level, 2nd Level Kanji) Half-Width:8×16,12×24 Pixel, 1/4 Square:8×8,12×12 Full-Width:16×16 Pixel,24×24 Pixel (IPL,BIOS)	
	RAM	Main Memory	4MBytes (Standard) 4MBytes (Can be Added to Integrated Slots)	12MBytes Max Expandable
		Text VRAM	Bitmap System 512KBytes 1024×1024 Pixels 4 Planes	Dual Port DRAM Adopted
		Graphics VRAM	Bitmap System 512KBytes 1024×1024 Pixels 4 Planes (512×512 Pixels 16 Planes)	Dual Port DRAM Adopted
		Sprite VRAM	32KBytes	
		SRAM	16KBytes	
Built-In I/F・Connector	Disk		3.5″ Size Floppy Disk 2HD Type & 2DD Type Combined Drive 2 Groups Built-In	
	Floppy Disk Interface		For Floppy Disk Drive Expansion	
	SCSI Interface		For SCSI Specification Equipment Expansion	
	Keyboard Connector		Dedicated Keyboard	
	CRT Interface		Analog RGB Output	
	RS-232C Interface		1 Channel RS-232C	
	Mouse Interface		Attaches the Mouse	
	Printer Interface		Centronics Standard Compliant	
	Joystick Interface		Atari, Inc. Compliant (2 Ports)	
	Audio Input & Output Connectors		Line Input & Output, Headphone Output	
	Image Input Interface		Option for Color Image Unit (Planned)	
Expansion I/O Slot			2 Slots	
Rating Voltage Frequency Power Use	AC100V 50/60Hz CZ-300C-B…28W/CZ-310C-B…30W			

<Features>

Item	Class	Name・Type		Details	Notes
Display Capability	Real Screen Size	Text Screen		1024×1024 Pixels 4 Planes	Bitmap System
		Graphics Screen		1024×1024 Pixels 4 Planes (512×512 Pixels 16 Planes)	Bitmap System
	Text Screen			High-Res Mode 768×512 Pixels 512×512 256×256 (2 Read) Low-Res Mode (Overscan) 256×240 512×480 (Interlaced)	Real Display Screen Area is Cropped to a Smaller Size
	Image Screen Mode High-Res 31.5kHz Low-Res 15.98kHz	Graphics Screen	1024×1024	High-Res Mode 768×512 Pixels 512×512 512×256 (2 Read) 256×256 (2 Read) Low-Res Mode 512×240・ (Overscan) 256×240 (Interlaced)	For Each Pixel Any 16 Colors Chosen from 65536 Colors 512×512
			512×512	High-Res Mode 512×512 Pixels 256×256 (2 Read) Low-Res Mode 512×240 (Overscan) 256×240 512×480 (Interlaced)	For Each Pixel Any 16 Colors Chosen from 65536 Colors (256 Colors can be Chosen from 65536 Using Both Planes Per Pixel(2-Plane)) For Each Pixel Any 16 Colors Chosen from 65536 Colors Possible (4-Plane) Real Display Screen Area is Cropped to a Smaller Size

Item	Details
Smooth Scroll Functions	Text screen can cylindrical scroll in pixel units, graphic screen can spherical scroll in pixel units.
Special Screen Control	Image input function to graphics VRAM, text raster copy function, graphics fast clear, text bit mask function
Priority Functions	・Text, graphics, can have specific priorities between sprites. ・2-planes graphics screen 512×512 pixel mode, or the priority between each graphics screen using 4-planes can be specified.
Palette Function	Is instantly switchable to any color.
Semi-Transparency	Semi-Transparent color table possible.
Special Priority	・Can function the priority of any part of the graphics screen in the display screen area.
Superimpose Function	・Low resolution overscan which can be superimposed. (Also supports pseudo high resolution using the interlace method)

Item	Class	Name・Type	Details	
S p r i t e s	Sprite	Pattern Table	Size	16×16 Pixels/Pattern
			Number	128 Patterns (BG0,1 Not Used Maximum of 256 Patterns)
			Color	Per Pattern 16 Colors/65536 Colors (Pixel Units) The Entire Screen 256/65536 Colors
		Display	Coordinate System	1024×1024 Pixels
			Screen Image	Horizontal 512 Pixels or 256 Pixels Vertical 512 Lines or 256 Lines
			Display Limit	128 Sprites/Screen 32 Sprites/Line

1-3.Block Diagram

1-4.System Configuration

2.Part Names

2-1.Computer Body Front

2-2.Computer Body Rear

3.Computer Hardware

3-1.Memory Map

3-2.I/O Port Address List

3-3.Engineering Rear Set

3-4.System Port

3-5.Interrupts

3-6.IPL

4.Screen Configuration & Control

4-1.Screen Configuration

4-2.Control of Text & Graphics Display (CRTC)

4-3.Sprites

4-4.Video Controller

4-5.Superimpose & Overscan

5.Additional Switches

6.Keyboard & Mouse

7.Sound Functions

7-1.FM Tone Generator

7-2.Voice Synthesis

8.Peripheral LSI

8-1.DMAC

8-2.Floating-point Arithmetic Coprocessor

8-3.Additional Main Memory

8-4.MFP

8-5.SCC

8-6.RTC

9.Peripheral I/O

9-1.Disk

9-2.Printer

9-3.Joystick

9-4.Expansion I/O Slot

9-5.Various Connectors

10.Main Circuit Board

11.Main Basic Wiring Diagram (1)

12.Main Basic Wiring Diagram (2)

13.Main Basic Wiring Diagram (3)

14.Main Basic Wiring Diagram (4)

15.Main Basic Wiring Diagram (5)

16.Main Basic Wiring Diagram (6)

17.Main Basic Wiring Diagram (7)

18.Main Basic Wiring Diagram (8)

19.I/O, FD Connector, SCSI Connector, LED Basic Wiring Diagram

20.I/O, FD Connector, Front Circuit Board

21.Power Supply Unit Basic Wiring Diagram

22.Power Supply Circuit Board

23.Keyboard Section Basic Wiring Diagram

24.Keyboard Circuit Board

25.IC Terminal Signal (1)

IC Terminal Signal (2)

IC Terminal Signal (3)

IC Terminal Signal (4)

26.Set Way of Packing

27.Removing The Main Parts (Disassembly)