SHARP

Service Manual

No.CZ-134 ★

X68000
Personal Computer

CZ-634C-TN
CZ-644C-TN

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1.Hardware Configuration

1-1.Special Features

1)CPU Peripheral

- 16-bit MPU adopting a 68000 (16.67MHz).
- The address space of 16MBytes (8MWord) can be directly addressed.
- Memory-mapped I/O system. (Main memory 2MBytes as standard)
- DMAC is 63450, MFP adopted is 68901.
- 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)Equipped with a 5″ floppy disk drive (2HD) to 2 groups. Draggable mouse is included.
15)3.5″ ・80MByte hard disk (CZ-634C option availability built-in.)
16)How to initialize the SRAM
For safety we added 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.
※Please note parts of the specification & appearance are subject to change without prior notice.

Main Changes from the CZ-623C

- Gate Array iX1197CE(OHM-2) .... Changed to iX1748CE(ASA)
  iX1099CE(MESSIAH) .. Changed to iX1749CE(DOSA)
- Main Memory Expansion Connector added
- MPU HD68HC000PS10 ..... Changed to MC68HC000B16
- FPU IC Socket added
- MPU Clock has 2 Modes which can be set from 10MHz 16.67MHz/10MHz.
- 4M Mask ROM iX1614CE(EVEN) .... Changed to iX1775CEに
  iX1615CE(ODD) ..... Changed to iX1776CEに
- BIOS ROM Switching IC Socket can be collected on attached 2MB RAM Expansion Board (CZ-6BE2A).
- SCSI can not be connected to other SCSI specification equipment. (CZ620H etc. No connection)
- For overcurrent protection, power supply terminal of SCSI connectors contains a 1A fuse.

Please do not use any fuse other than those specified.

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		Single item parts repair, exchange correspondence about the board
FD Connector Board Unit		〃
Control Board Unit		〃
I/O Board Unit		〃
Power・LED Board Unit		〃
FD・LED Board Unit		〃
Eject Board Unit		〃
Analog Board Unit		〃
Keyboard Unit		〃
SCSI Control Board Unit		(CZ-644C) 〃
SCSI Control Board Unit		(CZ-634C) 〃

1-2.Specifications

<Hardware>

Item	Class	Name・Type	Details	Notes
CPU	MPU Sub CPU (Keyboard)	MC68HC000 MSM80C51	16-bit MPU (16.67MHz) Keyboard Scan	
Periph. LSI	DMAC	HD63450	4-Channel DMAC	
	FPU	MC68881	Floating-Point Coprocessor (16.67MHz)	Optional
	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	μPD72065	Built-In 5″ 2HD/2DD 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	RP5C15	Real-Time Clock	
	FM Sound	YM2151	8 Possible Channels of FM Sound	
	Voice Synth	MSM6258	Adaptive Differential PCM	
	PPI	μPD8255	Joystick 2 Ports, Voice Synthesis Switching Control	
	I/O	iX1604CEZZ	Floppy Disk, Peripheral IC Decoder	
	Other	iX1748CEZZ	Memory Controller (ASA)	
		iX1749CEZZ	System Controller (DOSA)	
		iX1094CEZZ	Video Data Selector	
		iX1096CEZZ	Video Clock Controller	

Item	Class	Name・Type	Details	Notes
Memory	ROM	CG ROM (IPL ROM Integrated)	1MByte (JIS 1st Level, 2nd Level Kanji) 8×16,12×24 …Half-Width 8×8,12×12…1/4 Square 16×16 Pixel,24×24 Pixel…Full-Width (IPL,BIOS)	
	RAM	Main Memory	2MBytes (Standard) 6MBytes (Can be Added to Integrated Slots) 2MBytes Units	12MBytes Max
		Text VRAM	Bitmap System 1024×1024 Pixels 4 Planes 512KBytes	Dual Port DRAM Adopted
		Graphics V・RAM	Bitmap System 512KBytes 1024×1024 Pixels 4 Planes (512×512 Pixels 16 Planes)	Dual Port DRAM Adopted
		Sprite V・RAM	32KBytes	
		S・RAM	16KBytes	

	Disk Built-In 5″ Floppy Disk Double-Sided High Density (2HD) 2 Groups Built-In 3.5″ Hard Disk 80MBytes (CZ-634C is Optional)	
	Floppy Disk For Floppy Disk Drive Expansion Interface SCSI	
Built-In I/F・Connector	Keyboard Connector	Dedicated Keyboard
	CRT Interface	Analog RGB Output
	TV Control Connector	Dedicated Display of TV Control
	RS-232C Interface	1 Channel RS-232C
	Mouse Interface	Attaches the Track 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

Other Connector	EXPWON,VHT
Expansion I/O Slot	2 Slots

Rating	
Voltage	AC100V
Frequency	50/60Hz
Power Use	CZ-644C……46W, CZ-634C……41W

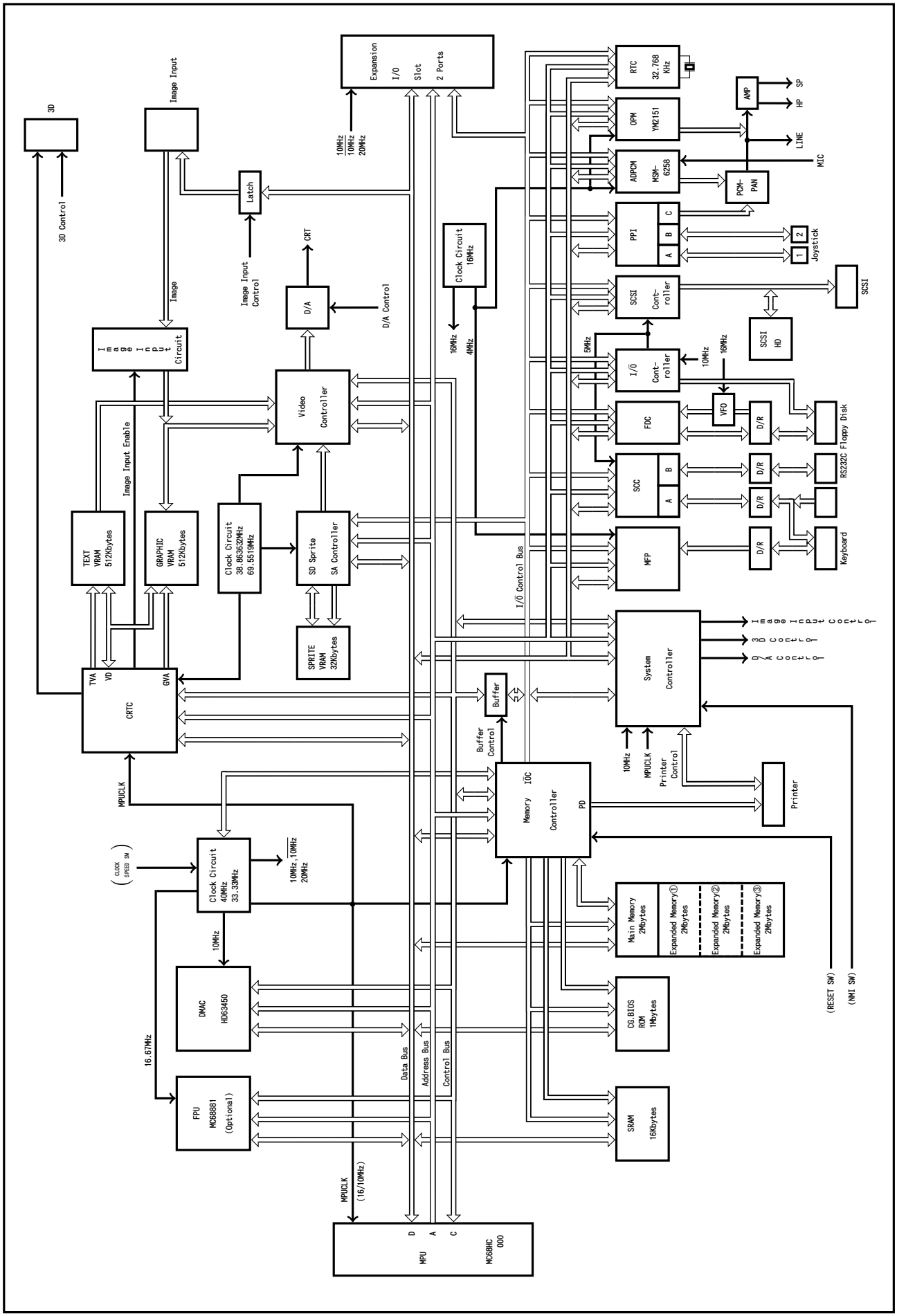
<Features>

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) 256×256 512×512 (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 512×256 (Overscan) 256×256 (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 512×256 (Overscan) 256×256 512×512 (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

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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)

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22.Power Supply Unit Basic Wiring Diagram

23.Power Supply Circuit Board

24.Keyboard Basic Wiring Diagram

25.Keyboard Circuit Board

26.IC Terminal Signal (1)

IC Terminal Signal (2)

27.Set Way of Packing

28.Disassembly Of The Printed Circuit Board