# SHARP Service Manual



No.CZ-134 ★

X68000 Personal Computer

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

Distribution: SHARP Engineering Co., Ltd. SS,SB.

Issued In April 1991

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8-4. MFP 32					

- Rapid, Prosperity Of The Shop To Build A Reliable Service
- Warranty Connecting The Shops & Customers

#### 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  $768 \times 512$ ,  $512 \times 512$ ,  $256 \times 256$ .
  - · 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.
  - $16 \times 16$  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 iX1775CE1Z
  - 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, ex-
		change correspondence about the
		board
FD Connector Board Unit		<i>"</i>
Control Board Unit		<i>"</i>
I/O Board Unit		<i>"</i>
Power·LED Board Unit		<i>"</i>
FD·LED Board Unit		<i>"</i>
Eject Board Unit		<i>"</i>
Analog Board Unit		<i>"</i>
Keyboard Unit		<i>"</i>
SCSI Control Board Unit		(CZ-644C) "
SCSI Control Board Unit		(CZ-634C) "



## 1-2. Specifications

<<u>Hardware></u>

Item	Class	Name · Type	Details	Notes
CPU	MPU Sub CPU (Keyboard)	MC68HC000 MSM80C51	16-bit MPU (16.67MHz) Keyboard Scan	
	DMAC	HD63450	4-Channel DMAC	
	FPU	MC68881	Floating-Point Coprocessor (16.67MHz)	Optional
	MFP	MC68901	Multi-Function Peripheral Receives KEY Data, Various Interrupts	
Periph.	CRTC	IX1093CEZZ (VICON)	Text, Graphics, Control for the CRTC Dual-Port DRAM Control Scrolling Feature	
LSI Sprite Controll FDC Video Controll SCSI	Controller FDC Video Controller SCSI Controller	(CYNTHIA) μPD72065	Sprite Function  Built-In 5" 2HD/2DD Controls the FDD Palette Priority Function Special Mode Function  SCSI Control Serial Communication Controller Serial 2-Channel (RS-232C, Mouse)	
	RTC FM Sound Voice Synth PPI I/O Other	iX1748CEZZ iX1749CEZZ	Real-Time Clock 8 Possible Channels of FM Sound Adaptive Differential PCM Joystick 2 Ports, Voice Synthesis Switching Control Floppy Disk, Peripheral IC Decoder Memory Controller (ASA) System Controller (DOSA) Video Data Selector	

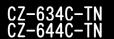
Item	Class	Name · Type	Details	Notes			
	ROM	1/4 Square					
	RAM	Main Memory	2MBytes (Standard) 6MBytes (Can be Added to Integrated Slots 2MBytes Units	12MBytes Max			
Memory		Text VRAM	Bitmap System				
rremor y			1024×1024 Pixels 4 Planes 512KBytes	Dual Port DRAM Adopted			
		Graphics V • RAM	Bitmap 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	5" Hard Disk 80MBytes (CZ-634C is Options	al)			
	Floppy Disk For Floppy Disk Drive Expansion						
	Interfa	ice					
	SCSI						
Built-In	-	rd Connector	Dedicated Keyboard Analog RGB Output				
I/F·		crol Connector		Control			
Connector		Interface	1 Channel RS-232C				
		Interface Interface	Attaches the Track Mouse Centronics Standard Comp	liant			
		ck Interface	Atari, Inc. Compliant (2				
		Input & Output Input Interfac		Line Input & Output, Headphone Output Option for Color Image Unit			
Other Co Expansion			EXPWON, VHT 2 Slots				
Rating Voltage	AC100V						
Frequency		Z					
Power Use	CZ-6440	C·····46₩,	CZ-634C·····41W				

<Features>

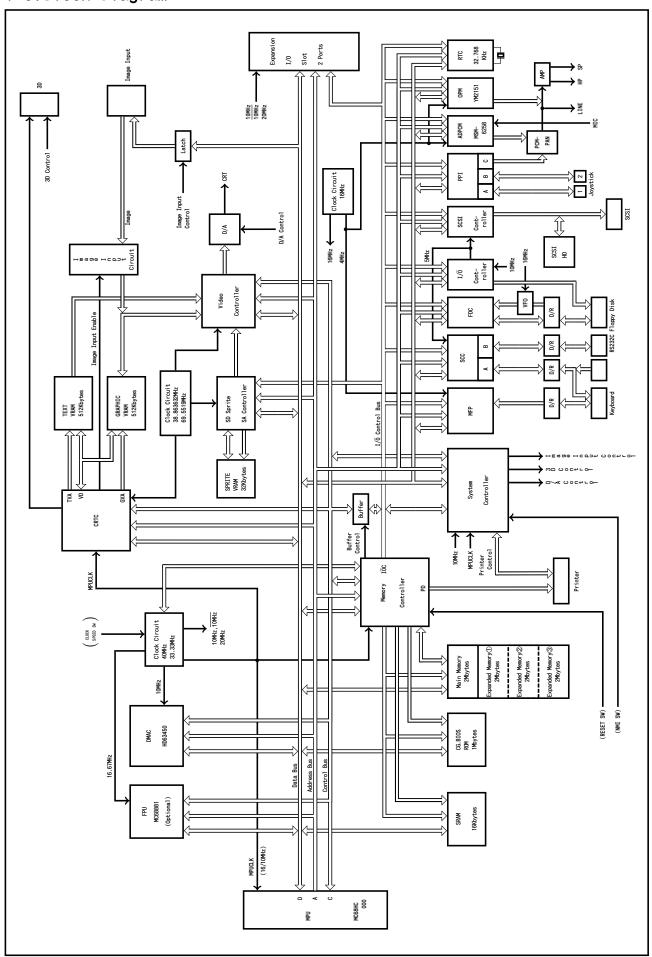
Item	Class	Nai	те • Туре	Details	Notes
D	Real Screen			1024×1024 Pixels 4 Planes	Bitmap System
i	Size	Graphics		1024×1024 Pixels 4 Planes	Bitmap System
S		Sc	reen	(512×512 Pixels 16 Planes)	
p				High-Res Mode 768×512 Pixels	
$\begin{bmatrix} 1 \\ a \end{bmatrix}$				$512 \times 512$	
y y	Text Screen			256×256 (2 Read)	
				Low-Res Mode	Real Display Screen
C		İ		(0verscan) 256×256	Area is Cropped to
a				512×512	a Smaller Size
p				(Interlaced)	
a b					
i				High-Res Mode 768×512 Pixels	For Each Pixel Any
ì				512×512	16 Colors Chosen
i			$1024 \times 1024$	512×256 (2 Read)	from 65536 Colors
t		_		256×256 (2 Read)	
У	Image Screen	G			
	Mode	$\mathbf{r}$		Low-Res Mode 512×256	
	High-Res	a		(0verscan) 256×256	
	31.5kHz	p			$512 \times 512$
	Low-Res	h		(Interlaced)	
	15.98kHz	i		High-Res Mode 512×512 Pixels	For Each Pixel Any
		c			16 Colors Chosen
		S			from 65536 Colors
		_			(256 Colors can be
		S			Chosen from 65536 Using Both Planes
		r			Per Pixel(2-Plane)
		e		256×256 (2 Read)	
		e			
		n	$512 \times 512$		
					For Each Pixel Any 16 Colors Chosen
					from 65536 Colors
					Possible (4-Plane)
				Low-Res Mode 512×256	Real Display Screen
				(0verscan) 256×256	Area is Cropped to
				$512 \times 512$	a Smaller Size
				(Interlaced)	

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)			

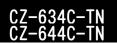
Item	Class	Name · Type	Details	
S				
p	Sprite	Pattern Table	Size	16×16 Pixels/Pattern
r			Number	128 Patterns (BGO,1 Not Used
i				Maximum of 256 Patterns)
t			Color	Per Pattern 16 Colors/65536 Colors
e				(Pixel Units)
s				The Entire Screen 256/65536 Colors
		Display	Coordinate System	1024×1024 Pixels
			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



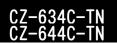
- 2.Part Names
- 2-1.Computer Body Front

### 2-2.Computer Body Rear



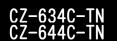
- 3.Computer Hardware
- 3-1.Memory Map

### $3-2.\,\mathrm{I/0}$ Port Address List



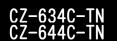
3-3. Engineering Rear Set

3-4.System Port



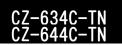
3-5. Interrupts

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



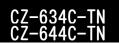
4-5.Superimpose & Overscan

## 5.Additional Switches



# 6.Keyboard & Mouse

## 7. Sound Functions



7-1.FM Tone Generator

### 7-2. Voice Synthesis



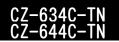
# 8.Peripheral LSI

8-1.DMAC



8-2.Floating-point Arithmetic Coprocessor

8-3.Additional Main Memory



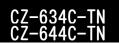
8-4.MFP

8-5.SCC



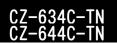
8-6.RTC

# 9.Peripheral I/0



9-1.Disk

9-2.Printer



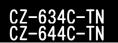
9-3. Joystick

9-4. Expansion I/O Slot



9-5. Various Connectors

#### 10.Main Circuit Board



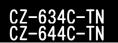
11. Main Basic Wiring Diagram (1)

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.Control Basic Wiring Diagram



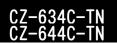
#### 17. Control Circuit Board

18.I/0, FD Connector, SCSI Connector, LED Basic Wiring Diagram



19.FD, I/O, SCSI Connector, Power LED, Eject, FD-LED Board

# 20. Analog Basic Wiring Diagram



# 21.Analog Circuit Board

22. Power Supply Unit Basic Wiring Diagram



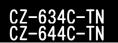
### 23. Power Supply Circuit Board

### 24. Keyboard Basic Wiring Diagram



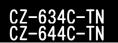
# 25.Keyboard Circuit Board

26.IC Terminal Signal (1)



IC Terminal Signal (2)

### 27. Set Way of Packing



28.Disassembly Of The Printed Circuit Board