DT-X11 Series

Software Manual

(Version 1.01)

CASIO Computer Co., Ltd.

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Editorial Record

Manual Version no.	Date edited	Page	Content
0.90	February 2006		Tentative version
1.00	April 2006		Original version
1.01	September 2006	10	The content about the AC adaptor is added in Table 1.2 of Chapter 1.2.
		61 to 63	The "⌋" notations in Table 3.23 of Chapter 3.2.4 are changed to "T" notations.
		63 to 65	The explanation about "T" notation is added in Table 3.24 to 3.36 of Chapter 3.2.4.

Preface

This reference manual describes a product overview of the DT-X11 series handheld terminals.

1. Product Overview

CASIO has extended its product line-up by adding this successor model of DT-X10 series that is high-performance handheld terminal compatible with various industrial communication standards and with a built-in CMOS Imager or Laser Scanner (model dependant) aiming at the following challenges.

- Acquire new users and fulfill replacement demands from the transport industry.
- The successor to the DT-X10 series in meeting fulfill replacement demand for inventory search/ordering terminals and factory automation terminals that use wireless communication.
- Develop new market that may emerge as a result of incorporating the CMOS Imager and laser scanner.

The following models of the new series are available to meet various needs in the world's transport industry.

Table 1.1

Model	Scan Engine	Wireless Communication		PC Card slot	Remark
		Bluetooth	IEEE802.11b		
DT-X11M10E	Laser Scanner	Integrated	No	Integrated	Equivalent to DT-X10M10E
DT-X11M10RC (see note 1)	Laser Scanner	Integrated	Integrated	No	Equivalent to DT-X10M10RC
DT-X11M30E	CMOS Imager	Integrated	No	Integrated	Equivalent to DT-X10M30E
DT-X11M30U (see note 2)	CMOS Imager	Integrated	No	Integrated	Equivalent to DT-X10M30U
DT-X11M30RC (see note 1)	CMOS Imager	Integrated	Integrated	No	Equivalent to DT-X10M30RC

Notes:

1. The PC Card slot on the model comes with the WLAN card integrated in the factory.
2. The model is available in the USA and Canada.

1.1 Features

Incorporates .NET technology

- Uses WindowsCE 5.0 Operating System.
- Makes effective use of the .NET resources developed by other parties.
- Employment of Embedded OS makes it possible to build a flexible WindowsCE system.

Enhanced communicating functions

- Covers GPRS/WLAN, etc. by using various communication cards.
- Built in Bluetooth Ver 1.1 module.
- The target transfer rate of the WLAN is 5 Mbps, which is the maximum rate of communication for peer-to-peer connection with PC.
- The following protocol stacks are available for Bluetooth interface: GAP (Generic Access), SDP (Service Discovery), SPS (Serial Port), Dialup Network, File Transfer.
- Security function for WLAN
  WPA PSK, WPA EAP (EAP-TLS, PEAP-EAP-TLS, PEAP-MS-CHAP-V2, MD5)

Superb scanning capability (for DT-X11M10E/M10RC)

- With the integrated laser scanner it is possible to read industrial standard bar code symbologies.
- Scanning performance is compatible with the DT-X10 series handheld terminal.
- Multi-step bar code read function.

Superb scanning capability (for DT-X11M30E/M30U/M30RC)

- With the integrated CMOS imager it is possible to scan 2D code symbologies/1D bar code symbologies/OCR fonts and to capture images.
- Image capturing function (2 to 256 monochromatic tones).
- 1D bar code symbology scanning performance is compatible with the DT-X10 series handheld terminal.
- Multi-step bar code read function.

Support of outstanding development environment

Ample Microsoft development tools provided for easy application development and an advanced debug environment.

- Visual Studio 2005
- Visual Studio .NET 2003 (Windows® CE .NET Utilities v 1.1 for Visual Studio .NET 2003)
- eMbedded Visual C++ 4.0

High expandability

The standard PCMCIA slot makes it possible to use various standard peripheral cards.

Font

Simplified Chinese, Traditional Chinese, and Korean fonts as well as English fonts are preinstalled.

Aiming to a full compliance with the “Restriction of the use of certain Hazardous Substances in electronic equipment (RoHS)” set mandatory on July 1 2006

The following products have been assembled with devices, components and parts manufactured using Lead (Pb) free solder.

- DT-X11M10E
- DT-X11M10RC
- DT-X11M30E
- DT-X11M30U
- DT-X11M30RC

1.2 Available Options

The following dedicated options are available for the DT-X11 series.

Table 1.2

Option	Product	Model no.	Remark
Cradle	Bridge Satellite Cradle	DT-160IOE	
Battery	Battery pack (Standard)	HA-A20BAT	
	Large-capacity battery pack	DT-5025LBAT	
Battery charger	Dual battery charger	DT-5022CHG	Maximum 3 units of DT-5022CHG can be connected.
	Cradle-type battery charger	DT-169CHGE	
	Car Mounted Battery Charger	DT-167CHGE	
AC adaptor	AC adaptor	MPC-577ADP	See note.
		AD-S45150AU	For DT-5022CHG, input AC110V to 230V, with US power cord
		AD-S45150AE	For DT-5022CHG, input AC110V to 230V, with Europe power cord
		AD-S42120AE	For DT-160IOE/DT-169CHGE, input AC110V to 230V
Others	Car Power Cable	DT-827CAC	For DT-167CHGE
	Wall Mount Unit	DT-891WH	
	CF Card Extension Unit	DT-894CFU	
	Communication Card Cover	DT-892TCV	Standard size
		DT-893LTCV	Large size
	RS-232C Cable	DT-882RSC	For connection between cradle and PC.
		DT-883RSC	For connection between cradle and PC.
		DT-887AXA	For connection between cradle and PC.
	RS-422 Cable	DT-888RSC	For daisy chain connection.
	USB Cable	DT-380USB	For connection between cradle and PC.

Note:

The AC adaptor is phased out as of August 2006. The successor models are AD-S45150AE and AD-S45150AU.

2. Applications

This chapter describes some of the usage scenarios for the DT-X11 series handheld terminal.

2.1 System Configuration by Application

1. Terminal for automobile drivers

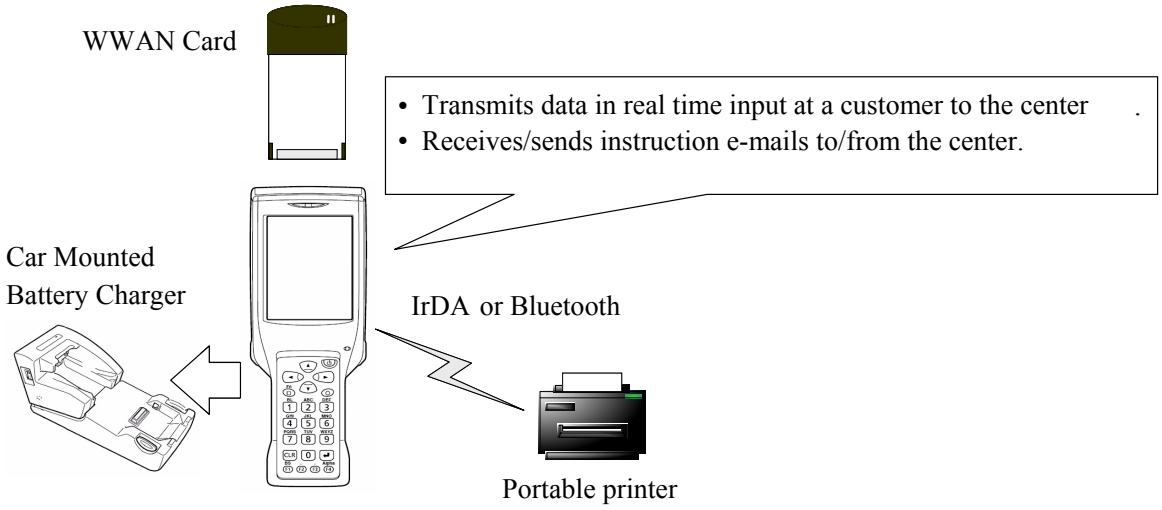


Fig. 2.1

2. Terminal for warehouse application

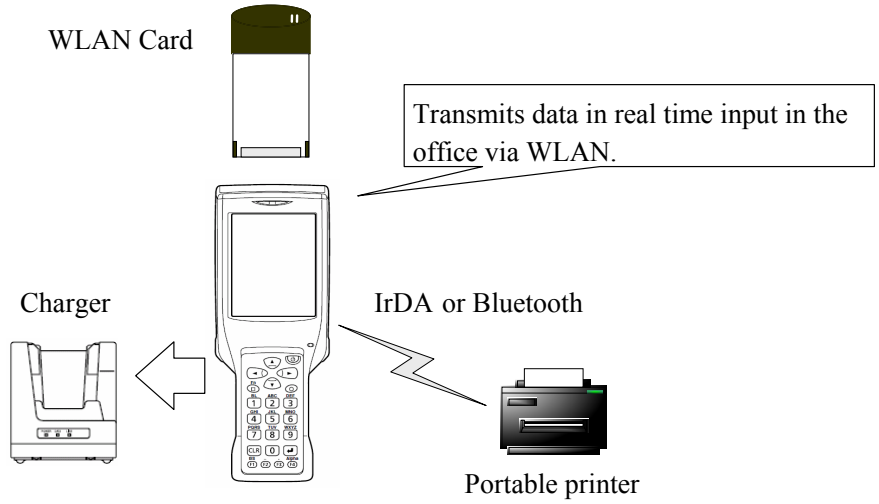


Fig. 2.2

3. Terminal in WAN and LAN configuration

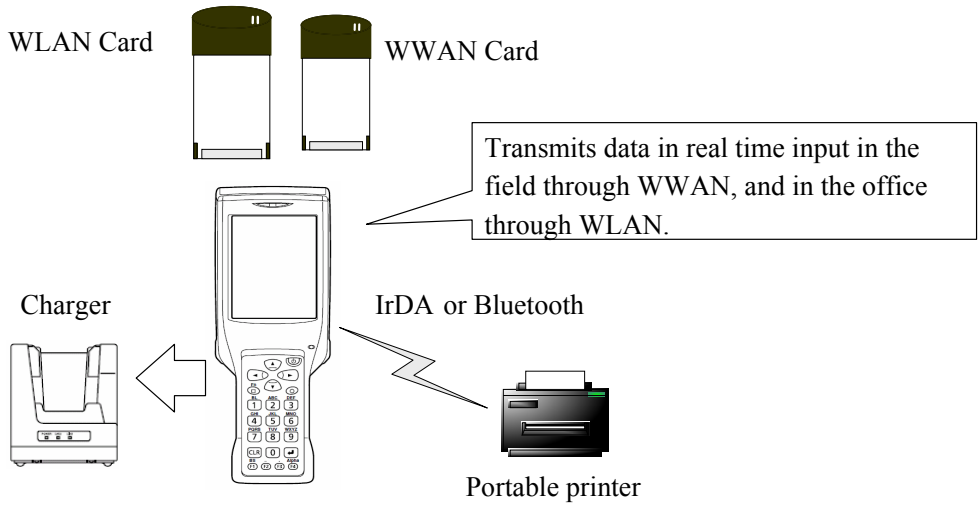


Fig. 2.3

4. Terminal in conventional configuration

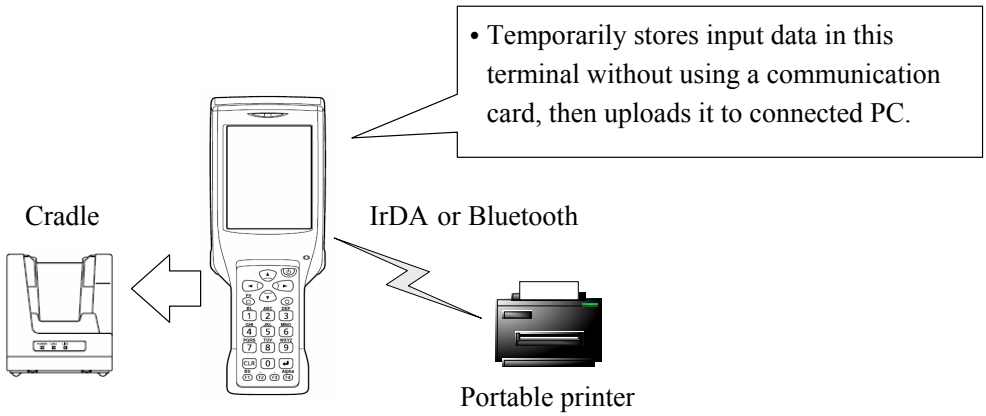


Fig. 2.4

2.2 Operation by User

Assuming actual operation is performed by the end user, this chapter describes the method of use and restrictions that apply to the terminal, including the optional devices.

2.2.1 Basic Operations

- For operating the touchpanel it is recommended to use the accompanied stylus, since direct operation with your fingers may cause a malfunction or soil the screen.
- The Trigger keys are designed and built so that the terminal can be held by single hand to scan symbols.
- The numeric keys should always be operated by fingers.
- When replacing the battery pack, first turn off the terminal power then open the battery compartment lid to perform battery replacement.
- Do not operate the RESET switch on the back of terminal unless the terminal freezes, etc.
- There is no guarantee that data currently held will be retained if the RESET switch is pressed during normal operation.

2.2.2 Operation with Multiple Options

Since many built-in devices and externally connected optional devices may co-exist, the user must observe some precautions and restrictions when using them concurrently.

Optional devices available for the DT-X11

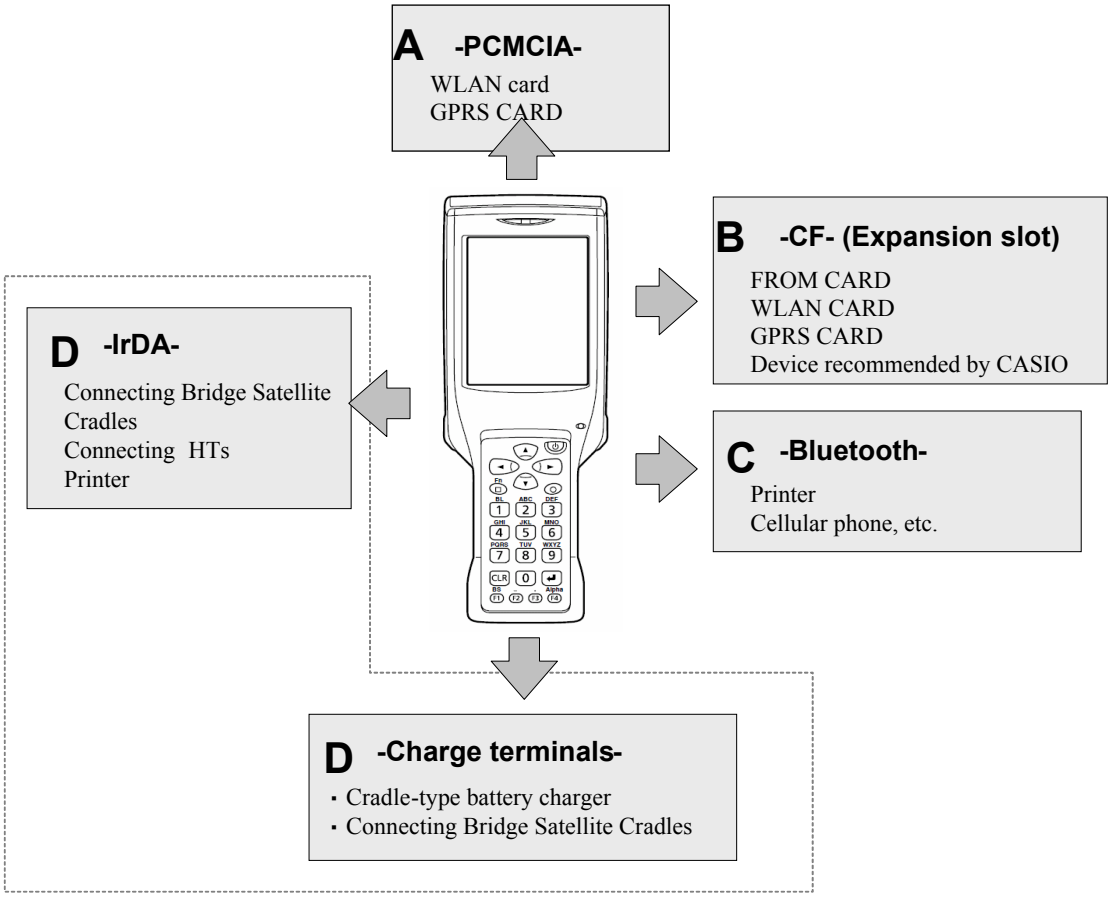


Fig. 2.5

A, B, C, and D can all be physically connected at the same time, since their connection ports are different from one another. Devices included in the same boxes A, B, C and D above cannot be used concurrently. The following describes the conditions that must be observed to use multiple devices at the same time.

Table 2.1 Possible concurrent connection with multiple devices

Application	PCMCIA		CF (Extension slot)			IrDA	Bluetooth	Charge terminal
	WLAN card	WWAN card	FROM card	WLAN card	WWAN card			
Terminal used by driver	-	Yes	-	-	-	Yes	Yes	Yes
	-	Yes	Yes	-	-	Yes	Yes	Yes
	-	Yes	-	Yes	-	Yes	Yes	Yes
Terminal used in warehouse	Yes	-	-	-	-	Yes	Yes	Yes
	Yes	-	Yes	-	-	Yes	Yes	Yes
	-	-	-	Yes	-	Yes	Yes	Yes
Terminal used for others	-	-	Yes	-	-	Yes	Yes	Yes
	-	-	-	-	-	Yes	Yes	Yes

Notes

- Due to power supply restrictions, concurrent connection with some devices may not be possible.
- "WWAN" denotes World Wide Area Network.

Switching over process for LAN devices

As shown in Table 2.1, multiple LAN devices can be installed (i.e. the drivers are loaded) at one time in the terminal. However, for actual communication, it is necessary to switch to the specific device as required. The following explains the switching procedure:

Table 2.2

Device	Slot	Feature/Protocol	Remark
WLAN card	CF slot	IEEE802.11b	
WLAN card	PCMCIA slot	IEEE802.11b	
LAN card	CF slot	LAN connection via 10BASE-T networking	
LAN card	PCMCIA slot	LAN connection via 10BASE-T networking	

Switching method

An API will be provided which enables the switch over of LAN devices from an application. This does not use registry settings and it is therefore possible to switch over instantly without performing a reset. For further details, refer to the Common Device Control Library Manual for **SysCardDetectDisable**, **SysCardDetectEnable** and **CLBCardDetectGet** functions.

Automatic switching between WWAN and WLAN (seamless roaming)

If both WWAN and WLAN are to be used, a function to change over is not supported by the OS. The application should use the method described above to switch over.

2.2.3 Intended Application by Device

Table 2.3

Device	PCMCIA	CF	Bluetooth	IrDA	Charge terminal
FROM card	-	Yes	-	-	-
Modem card	Yes	-	-	-	-
LAN card	Yes	Yes	-	-	-
WLAN card	Yes	Yes	-	-	-
Printer	-	-	Yes	Yes	-
Cellular phone	-	-	Yes	-	-
Battery charge on Cradle	-	-	-	-	Yes
Connecting to Bridge Satellite Cradle	-	-	-	Yes	Yes
Connecting HTs	-	-	Yes	Yes	-

FROM Card

Used as the storage memory. Since it has a memory configuration that does not require any backup battery, which differs from the RAM disk installed in the terminal, it can store data even when the terminal battery power has been consumed. In addition, it can easily be removed and replaced so that handling of data with the CF card can be easily performed.

- Real-time data storage (the access speed is lower than RAM disk.)
- Storage of large-volume data such as master file, etc., that is never updated
- Batch installation (with SETUP function)
- Self-execution on startup by reset (with SETUP function)
- Self-execution at power on (with AUTORUN function)
- Possible to plug/unplug while terminal power is on.
- Stops accessing to secure data when the back lid is opened.
- Power OFF is suspended until the recovery process is completed if the Power key is pressed during access.
- Improved speed for saving data into the card

Modem Card

Used to enable communication via a modem connected to telephone line.

- Modem card for connection via cable
- Modem Card with built-in fixed antenna
- Modem Card with built-in adjustable antenna
- Real-time upload/download of information
- Send and receive mail
- Call-in function (function to inform the user that mail is received)
- Security function (VPN (PPTP))
- To secure data, access is stopped when the battery pack cover is opened.
- Disables Power OFF if the Power key is pressed during communication.
- Sets up APO (disabled) to default to avoid interruption of in-progress communication.

LAN Card

Used to perform communication by connecting to the 10BASE-T Ethernet environment.

- Permanent LAN connection (operating the terminal as desktop unit)
- Independent LAN connection (connecting the LAN cable or LAN card as required)
- Real-time upload/download of information
- Send and receive mail
- Security function (VPN (PPTP))
- To secure data, access is stopped when the battery pack cover is opened.
- The application should implement the function to disable Power OFF when Power key is pressed during communication.
- Possible to automatically re-establish communication when the terminal is restored through the resume operation.
- Sets up APO (disabled) to default to avoid interruption of in-progress communication.

Integrated WLAN Card (applicable to DT-X11M10RC and DT-X11M30RC)

Used to communicate in WLAN that is compatible with IEEE802.11b.

- Real-time upload/download of information
- Send and receive mail
- Security function
  VPN (PPTP), WEP128/64bit, WPA PSK, WPA EAP (EAP-TLS, PEAP-EAP-TLS, PEAP-MS-CHAP-V2, MD5)
- To secure data, access is stopped when the battery pack cover is opened.
- The application should implement the function to disable Power OFF when the Power key is pressed during communication.
- Possible to automatically re-establish communication when the terminal is restored through the resume operation.
- Sets up APO (disabled) to default to avoid interruption of in-progress communication.
- Transmission rate speed is 5 Mbps.

Printer

It is possible to send print data to any IrDA-compatible printer or Bluetooth-compatible printer. The Bluetooth serial profile is supported by the terminal.

Cellular Phone

It is possible to dial-up any Bluetooth-compatible cellular phone without using a cable. The Bluetooth dial-up profile is supported by the terminal.

Cradle-type Battery Charger

This is the Cradle-type Battery Charger on which the terminal is mounted for charging the installed battery pack. It is possible to install it on a wall (in wall mount configuration) indoor.

Bridge Satellite Cradle

It features with two types of serial interface, RS-232C and USB, for connection with a PC. This cradle supplies power to the terminal as well as charging the battery pack. By connecting cradle-to-cradle via RS-422 interface it is possible to chain-connect a maximum of 8 handheld terminals.

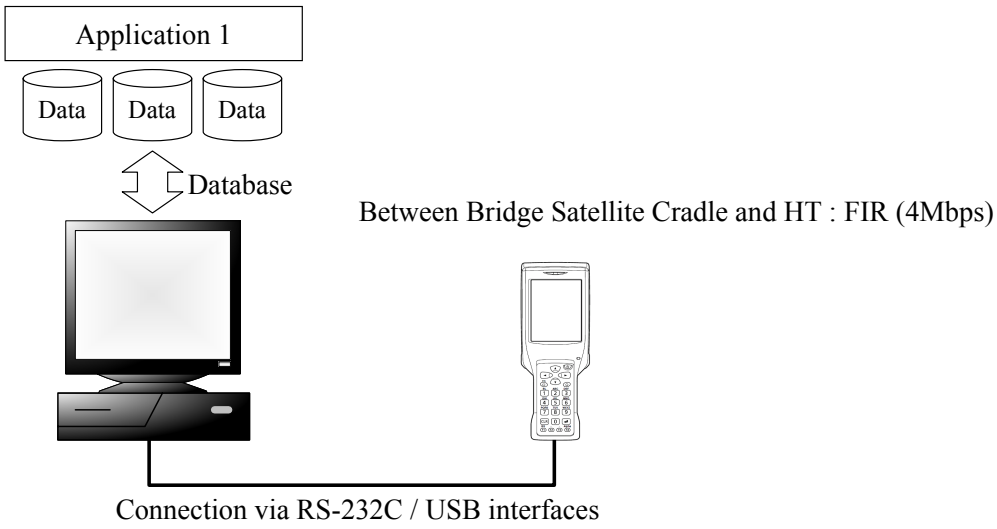


Fig. 2.4

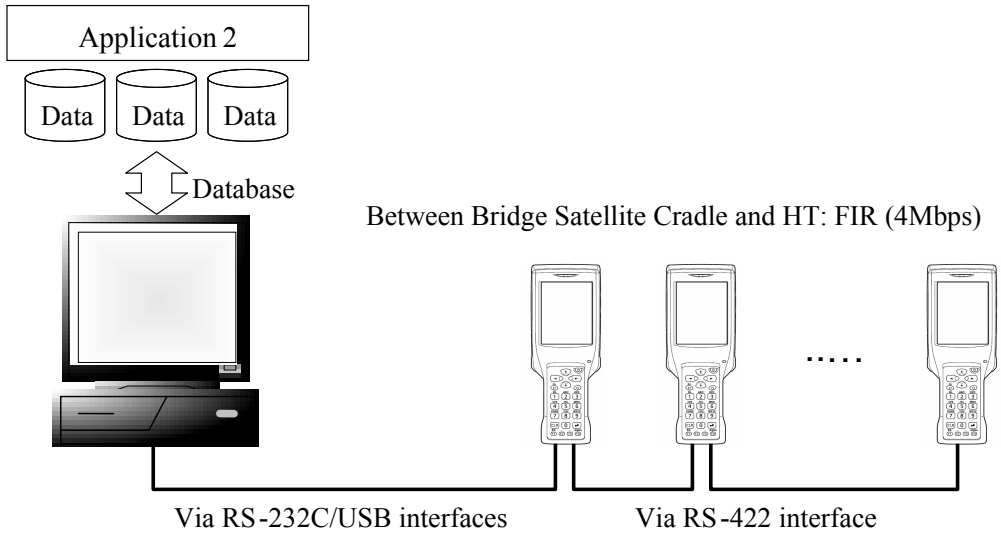


Fig. 2.5

Between Terminals

The use of HT-to-HT connection is assumed for maintenance and development. HT to HT connection via cable is not supported.

- Using the IrDA or Bluetooth capabilities, build a child terminal using a terminal as master terminal.

2.3 Application Development Environment

Development platform

- Microsoft Windows 2000 (SP2 or later release)
- Microsoft Windows XP

Development environment

- Visual Studio 2005
- Visual Studio .NET 2003+WindowsCE Utilities for Visual Studio .NET 2003 Add-on Pack 1
- eMbedded Visual C++ 4.0 +SP4

Development environment

- DT-X11 Export SDK

Visual Studio .NET 2003 and Visual Studio 2005

- VCC++ application development for the DT-X11 using Visual Studio 2005 is not supported. Always use eMbedded Visual C++ for VCC++ application development.
- Compact Framework 2.0 is implemented in the DT-X11. It is upper-compatible with Compact Framework 1.0 implemented in the CASIO DT-X10 and IT-500.
- The functions of the Common Device Control Library which control various individual devices integrated in the DT-X11 have different name spaces and names from those available for the previous CASIO handheld terminals. They are not compatible with the ones in the previous CASIO library.
- VB .NET application or C# application developed with Visual Studio .NET 2003, but not with the CASIO dedicated libraries will run on the DT-X11.
- Application developed with any functions of CASIO dedicated library must be rewritten by replacing the dedicated functions with the appropriate functions from the Common Device Control Library.
- New application for the DT-X11 can be developed using either VB .NET or C# in Visual Studio .NET 2003 or Visual Studio 2005.
- It is recommended that Visual Studio .NET 2003 is used to modify applications developed for other handheld terminals for the DT-X11.
- However, if Visual Studio 2005 is used to make modification, the solution/project of Visual Studio .NET 2003 is automatically changed by Visual Studio 2005. This may result in different configuration of the output folder according to the parameter settings for the project file. Process your application development with care focusing to this change.

3. Functions

This chapter describes about detailed specifications of the functions implemented in the terminal and the options.

3.1 Basic Functions

3.1.1 WindowsCE Version 5.0

The terminal integrates Microsoft WindowsCE Version 5.0 as its operating system.

Features at a glance

- Easy-to-use user interface
- .NET Compact Framework is supported
- High-speed multitask processing
- Large capacity memory support
- Abundant peripheral equipment
- Easy development thanks to open environment
- PPC application operation with AYGShell

Note:
Microsoft applications such as PocketWord and PocketExcel are not implemented.

Core Modules

Microsoft core modules integrated in the terminal are as follows.

Table 3.1

Core OS Modules					
Applications and Services Development	.NET Compact Framework	.NET Compact Framework 1.0			--
			SQL Server 2000 .NET Data Provider		--
			SQL Server CE 2.0 .NET Data Provider		--
		.NET Compact Framework 1.0 Related Matters			Yes
		Smart Device Authentication Utility			Yes
		.NET Compact Framework 2.0	.NET Compact Framework 2.0		Yes
			SQL Server CE 2.0 .NET Data Provider		Yes
	C library and Runtime	String Safe Utility Function			Yes
		Complete C runtime			Yes
		Standard Input/Output (STDIO)			Yes
		Standard Input/Output ASCII (STDIOA)			Yes
		Standard Character String Function - ASCII (corestra)			Yes
		C++ Runtime Support for Exception Processing and Runtime Type Information			Yes
	Exchange Client				Yes
	LDAP (Lightweight Directory Access Protocol) Client				Yes
	Microsoft Foundation Classes (MFC)				Yes
	Pocket Outlook Object Module (POOM) API				Yes
	SOAP Toolkit	Client			Yes
		Server			--
	SQL Server CE 2.0				--
	Standard SDK for WindowsCE				Yes
	XML	MSXML 3.0	XML Core Service and Document Object Model (DOM)		Yes
				XML HTTP	Yes
				XML SAX	Yes
				XML Error Character String	Yes
				XML Query Language (XQL)	Yes
				XML Style Sheet Language Transformation (XSLT)	Yes
			XML Minimum Passer		Yes
	Active Template Library (ATL)				Yes

Continue.

Applications and Services Development	Object Exchange Protocol (OBEX)	OBEX Client				Yes
		OBEX Server				Yes
				OBEX File Browser		Yes
				OBEX Receive Tray		Yes
	Message Queue (MSMQ)					Yes
		MSMQ ActiveX Wrapper				Yes
		SOAP Reliable Message Protocol (SRMP)				Yes
	Component Service (COM and DCOM)	Component Object Model	COM			Yes
				COM Storage Area		Yes
				CoCreateGuid Function for OLE32		Yes
			DCOM			Yes
				COM Storage Area		--
					DCOM Remote Access	--
			Minimum COM (OLE unsupported)			--
					COM Storage Area	--
					CoCreateGuid Function For OLE32	--
		Voice Interface	Speech API (SAPI) 5.0			--
Applications - End User	ActiveSync					Yes
		Pocket Outlook Database Sync				--
		File Sync				Yes
		Receive Tray Sync				Yes
	CAB File Installer/Uninstaller					Yes
	FLASH Update Sample Application					--
	Windows Messenger					--
	Game	Freecell				--
		Solitaire				--
	Terminal Emulator					Yes
	File Viewer	Microsoft Excel Viewer				--
		Microsoft Image Viewer				--
		Microsoft PDF Viewer				--
		Microsoft PowerPoint Viewer				--
		Microsoft Word Viewer				--
	Help					Yes

Continue.

Applications - End User	Remote Desktop Connection	Remote Desktop Protocol (RDP)			Yes
			Audio Playback Redirect		--
			Serial and Parallel Port Redirect		Yes
			Smart Card Redirect		--
			Printer Redirect		--
			User Interface Dialog Box		Yes
			Cut/Copy/Paste Clipboard Redirect		Yes
			File Storage Area Redirect		Yes
				Filtered File Storage Area Redirect	Yes
	Word Pad				Yes
	Receive Tray				Yes
Core OS Services	PNP Notification				Yes
	USB Host Support				Yes
		USB Human Input Device (HID) Class Driver			--
			USB HID Keyboard and Mouse		--
			USB HID Keyboard Only		--
			USB HID Mouse Only		--
		USB Printer Class Driver			--
		USB Remote NDIS Class Driver			--
		USB Memory Location Class Driver			--
	Internet Function (IABASE) Support				--
	Kernel Functions	FormatMessage API			Yes
			FormatMessage API - System Error Message		Yes
		Target Control Support (Shell.exe)			Yes
		Fiber API			Yes
		Message Queue - Point-To-Point			Yes
		Memory Map File			Yes
	Serial Port Support				Yes
	Display Support				Yes
	Device Manager				Yes

Continue.

Core OS Services	Debug tool	LMemDebug Memory Device Hook		--
		Keyboard Test Application		--
		Touch Driver Test Application		--
		Tool Hint API		Yes
		Remote Display Application		--
		Small Kernel Test Sample Application		--
	Battery Driver			Yes
	Parallel Port Support			--
	Notification (select one)	UI Base Notification		Yes
		Non-UI Base Notification		--
	Notification LED Support			Yes
	Power Control (select one)	Power Control (full)		Yes
		Power Control (minimum)		--
Communication Services and Networking	Server	FTP Server		Yes
		RAS Server/PPTP Server (receive)		--
		Simple Network Time Protocol (SNTP)	SNTP Client With DST	Yes
			SNTP Server	--
			SNTP Auto Update and Server Sync	--
		Telnet Server		Yes
		Web Server (HTTPD)		Yes
			Web Server Control ISAPI	--
			WebDAV Support	--
			Active Server Page (ASP) Support	--
			JScript 5.6	--
			VBScript 5.6	--
			Device Control ISAPI Extension	--
		Web Proxy		--
		Windows Peer-To-Peer Network	Peer Name Resolve Protocol (PNRP)	--
			Personal Information Control	--
		Core Server Support		Yes
		File Server		--
			File Server Customizable UI	--
		Print Server		--
		Guardian Implemented Restrictions		--

Continue.

Communication Services and Networking	Network - Local Area Network (LAN)	Native Wi-Fi WLAN Access Point Component			--
		Native Wi-Fi WLAN STA			Yes
		Wired Local Area Network (802.3, 802.5)			Yes
		Wireless LAN (802.11) STA - Auto Configuration and 802.1x			Yes
	Network - Personal Area Network (PAN)	Bluetooth	Bluetooth HID Device Support	Bluetooth HID - Keyboard	--
				Bluetooth HID - Mouse	--
			Bluetooth Profile Support	Bluetooth DUN - Gateway	--
				Bluetooth HS/HF and Audio Gateway Service	--
				Bluetooth LAP and Configuration Utility	--
				Bluetooth PAN	--
			Bluetooth Protocol Stack With Transport Driver Support	Bluetooth Stack With Universal Writable Driver	--
				Bluetooth Stack With Integrated CSR Chip Set Driver	--
				Bluetooth Stack With Integrated SDIO Driver	--
				Bluetooth Stack With Integrated UART Driver	--
				Bluetooth Stack With Integrated USB Driver	--
		IrDA			Yes
	Network - Wide Area Network (WAN)	Telephony API (TAPI 2.0)			Yes
			Unimodem Support		Yes
		Ethernet Point-To-Point Protocol (PPPoE)			Yes
		Dial Up Network (RAS/PPP)			Yes
			Standard Modem Support for Dial Up Network		Yes
			Auto Dial		Yes
		Virtual Private Network	L2TP/IPSec		Yes
			PPTP		Yes

Continue.

Communication Services and Networking	Network Functions	IPSec v4			Yes
		NDIS Packet Capture DLL			Yes
		NDIS User Mode I/O Driver			Yes
		TCP/IP			Yes
			IP Help API		Yes
		TCP/IPv6 Support			Yes
		USB Flash Configuration Tool			--
		Windows Network API/Redirect (SMB/CIFS)			Yes
		Winsock Support			Yes
		Internet Connection Share (ICS)			Yes
			Gateway Log		--
		Gateway User Interface Reference			--
		Domain Search			Yes
		Network Driver Configuration (NDIS)			Yes
		Network Bridge Function			Yes
		Network Utility (IpConfig, Ping, Route)			Yes
		Firewall			--
		Universal Plug and Play (UPnP)	UPnP Audio -Video DCP	AV Control Point API	--
				AV Device (API)	--
				AV Renderer Sample	--
			UPnP Tool		--
			Control Point API		--
			Sample UPnP IGD Schemer Mounting		--
			Device Host API		--
			Device Host API (minimum subset)		--
		Remote Configuration Framework			--
		Expansion DNS Query and Update (DNSAPI)			Yes
			Security Protected DDNS		--
		Expandable Authentication Protocol			Yes

Continue.

File Systems and Data Store	System Password		Yes
	Database Support		Yes
	File system - Internal (select one)	File System Applicable for RAM and ROM	Yes
		File System Only Applicable for ROM	--
	Duplication of File and Database (select one)	Count Base	--
		Bit Base	Yes
	Registry Storage Area (select one)	Hive Base Registry	Yes
		RAM Base Registry	--
	Compression		Yes
	Storage Area Manager		Yes
		CD/UDFS File System	--
		EDB Database Engine	Yes
		FAT File System	Yes
		Transaction Safe FAT File System (TFAT)	--
		Binary ROM Image File System	--
		Partition Driver	Yes
		Storage Area Manager Control Panel Applet	Yes
Fonts	Arial	Arial (Subset 1_30)	--
		Arial Black	--
		Arial Bold	--
		Arial Bold Italic	--
		Arial Italic	--
	Comic Sans MS	Comic Sans MS	--
		Comic Sans MS Bold	--
	Courier New	Courier New (Subset 1_30)	Yes
		Courier New Bold	--
		Courier New Bold Italic	--
		Courier New Italic	--
	Georgia	Georgia	--
		Georgia Bold	--
		Georgia Bold Italic	--
		Georgia Italic	--
	Impact		--
	Kino		--
	MSLogo		--

Continue.

Fonts	Tahoma			Tahoma (Subset 1_07)		Yes
				Tahoma Bold		--
	Times New Roman			Times New Roman (Subset 1_30)		Yes
				Times New Roman Bold		--
				Times New Roman Bold Italic		--
				Times New Roman Italic		--
	Trebuchet MS			Trebuchet MS		--
				Trebuchet MS Bold		--
				Trebuchet MS Bold Italic		--
				Trebuchet MS Italic		--
	Verdana			Verdana		--
				Verdana Bold		--
				Verdana Bold Italic		--
				Verdana Italic		--
	Webdings					--
	Wingding					Yes
	Symbol					Yes
International	Unicode Script Processor Supporting Complex Scripts					--
	Local Service (select one)			English (American) Only Support for Languages		--
				Support for Languages (NLS)		Yes
	Local Specific Support	Arabic		Keyboard	Arabic Keyboard (101)	--
				Font	Arial (Subset 1_08)	--
					Arial Bold (Subset 1_08)	--
					Courier New (Subset 1_08)	--
					Tahoma (Subset 1_08)	--
					Tahoma Bold (Subset 1_08)	--
		India	Kanarese	Keyboard	Kanarese Keyboard	--
				Font	Tunga	--
			Gujarati	Keyboard	Gujarati Keyboard	--
				Font	Shruti	--
			Tamil	Keyboard	Tamil Keyboard	--
				Font	Latha	--
			Telugu	Keyboard	Telugu Keyboard	--
				Font	Gautami	--

Continue.

International	Local Specific Support	India	Punjabi	Keyboard	Punjabi Keyboard	--
				Font	Raavi	--
			Hindi	Keyboard	Hindi Traditional Keyboard	--
				Font	Mangal	--
			Marathi	Keyboard	Marathi Keyboard	--
				Font	Mangal	--
		Thai		Keyboard	Thai Kedmanee Keyboard	--
				Font	Tahoma (Subset 1_08)	--
		German	Input System	Transcriber Handwriting Recognition Application		--
		French	Input System	Transcriber Handwriting Recognition Application		--
		Hebrew		Keyboard	Hebrew Keyboard	--
				Font	Arial (Subset 1_08)	--
					Arial Bold (Subset 1_08)	--
					Courier New (Subset 1_08)	--
					Tahoma (Subset 1_08)	--
					Tahoma Bold (Subset 1_08)	--
		English (Global)	Input System	Handwriting Recognition Engine (HWX)		Yes
		English (American)	Input System	Transcriber Handwriting Recognition Application		Yes

Continue.

International	Local Specific Support	Simplified Chinese	Agfa AC3 Font Compression			--
			GB18030 Data Conversion			--
			Font	SC_Song		--
				SimSun and NSimSun (select one)	SimSun and NSimSun	--
					SimSun and NSimSun (Subset 2_20)	--
					SimSun and NSimSun (Subset 2_50)	--
					SimSun and NSimSun (Subset 2_60)	Yes
					SimSun and NSimSun (Subset 2_70)	--
					SimSun and NSimSun (Subset 2_80)	--
					SimSun and NSimSun (Subset 2_90)	--
			Input System Editor (select one)	Pocket IME		--
					Double Spell Software Keyboard - Small	--
				MSPY 3.0 for Windows CE		--
					MSPY 3.0 Database for WindowsCE (select one)	1.1MB - Minimum Database	--
						1.3MB - Compact Database	--
						1.7MB - Standard Database	--
					Double Spell (Shuang Pin) Software Keyboard - Large		--
					Double Spell (Shuang Pin) Software Keyboard - Small		--

Continue.

International	Local Specific Support	Korean	Agfa AC3 font compression			--
			Font	Gulim (GL_CE)		--
				Gulim and GulimChe (select one)	Gulim and GulimChe (Subset 1_30)	--
					Gulim and GulimChe (Subset 1_40)	Yes
					Gulim and GulimChe (Subset 1_50)	--
					Gulim and GulimChe (Subset 1_60)	--
			Input System	Korean Software Keyboard Sample		--
				Handwriting Recognition Engine (HWX)		--
					MboxKOR HWX Sample UI	--
			Input System Editor	IME 97		--
		Japanese	Agfa AC3 Font Compression			--
			Font	MS Gothic (select one)	MS Gothic, MS P Gothic and MS UI Gothic	--
					MS Gothic, MS P Gothic and MS UI Gothic (Subset 1_50)	--
					MS Gothic, MS P Gothic and MS UI Gothic (Subset 1_60)	--
					MS Gothic, MS P Gothic and MS UI Gothic (Subset 1_70)	--
					MS Gothic, MS P Gothic and MS UI Gothic (Subset 1_80)	--
					MS Gothic, MS P Gothic and MS UI Gothic (Subset 1_90)	--
					MS Gothic and MS P Gothic (Subset 30)	--
					MS Gothic and MS P Gothic (Subset 30_1_19)	--
				MS Mincho and MS P Mincho		--

Continue.

International	Local Specific Support	Japanese	Input System	Kana Keyboard			--
				View of All Characters			--
				Alphanumeric/English Software Keyboard			--
				Stroke Count Search			--
				Handwriting Recognition Engine (HWX)			--
					Multibox HWX Sample UI		--
					Character Auto Complete - HWX Sample UI		--
				Radical Search			--
			Input System Editor (select one)	IME 3.1			--
					IME 3.1 Database (select one)	Compact Database	--
						Standard Database	--
					Optional UI Component	System Tray Icon Manager	--
						Property Dialog Box	--
						[Detail Settings] Dialog Box (transverse mode only)	--
						Dictionary Tool	--
				Pocket IME (select additional database)			--
						Personal-Local Name Dictionary	--
						Appended Dictionary	--
				Test IME			--
		Traditional Chinese	Agfa AC3 Font Compression				--
			Font	MingLiU and PMingLiU (select one)	MingLiU and PMingLiU		--
					MingLiU and PMingLiU (Subset 2_70)		--
					MingLiU and PMingLiU (Subset 2_80)		Yes
					MingLiU and PMingLiU (Subset 2_90)		--
				MS Ming			--

Continue.

International	Local Specific Support	Traditional Chinese	Input System	Handwriting Recognition Engine (HWX)		--
					MboxCHT HWX Sample UI	--
				Phonogramic Input (Bopomofo)		--
				Radical Input (Chang Jei)		--
			Input System Editor	Pocket IME		--
	Input System Manager (IMM)					Yes
	Multilingual User Interface (MUI)					--
Internet Client Services	Pocket Internet Explorer HTML View (WEBVIEW)					Yes
	Internet Explorer 6.0 Component for WindowsCE					Yes
			Internet Explorer HTML/DHTML API			Yes
				Internet Explorer HTML Application		Yes
				Internet Explorer Theme Library		Yes
				Internet Explorer Plug In Image Decoder API		Yes
					Internet Explorer PNG Image Decoder	Yes
				Filter and Translation		Yes
			Internet Explorer RPC Support			Yes
			Internet Explorer TV Style Navigation			Yes
				Customizable Font Range		Yes
				Fixed Width Layout		Yes
				Disable Vertical Scroll Bar and Event		Yes
				Direction Tab		Yes
			Internet Explorer Browser Control Host			Yes
			Basic API Supporting Multilingual Internet Explorer			Yes
				Full API Support for Multilingual Internet Explorer		Yes
				Character Set/Encode of Options in Registry		Yes
			URL Moniker Service			Yes
			Windows Internet Service			Yes
				P3P (Platform for Privacy Preferences)		Yes
				Passport SSI 1.4 Authentication		Yes
			XML MIME Viewer			--
			XML Data Island			--
	Control Panel's [Internet Option]					Yes

Continue.

Internet Client Services	Script	JScript 5.6			Yes
			Script Encode (Jscript)		Yes
			Script Authoring (Jscript)		Yes
		VBScript 5.6			Yes
			MagBox and InputBox Support		Yes
			Script Encode (VBScript)		Yes
			Script Authoring (VBScript)		Yes
	Browser Application	Pocket Internet Explorer			--
		Internet Explorer 6.0 for WindowsCE - Standard Component			Yes
			Internet Explorer 6.0 Sample Browser		Yes
			TV Style Navigation Component		Yes
Multimedia Technologies	Audio	Waveform Audio			Yes
		Audio Compression Manager			--
			GSM 6.10 Codec		--
			MSFilter Codec		--
	Graphics	Alphablend API (GDI Version)			--
		Direct3D Mobile			--
		DirectDraw			Yes
		V1 Font Compatibility			--
		Imaging	Static Image Codec Support (Encode and Decode)		Yes
			Static Image Encoder	BMP Encoder	Yes
				GIF Encoder	Yes
				JPG Encoder	Yes
				PNG Encoder	Yes
			Static Image Decoder	BMP Decoder	Yes
				GIF Decoder	Yes
				ICO Decoder	--
				JPG Decoder	Yes
				PNG Decoder	Yes
		Gradation Support			Yes
		Rasta Font Support			--
		Multiple Monitors Support			--

Continue.

Multimedia Technologies	Media	DirectShow	ACM Wrapper Filter		--
			DirectShow Error Message		--
			DirectShow Core		Yes
			DirectShow Display		--
			DMO Wrapper Filter		--
		DVD - Video	DVD - Video		--
			DVD - Video Sample		--
		Windows Media Player	Windows Media Player		--
			Windows Media Player OCX		--
			Windows Media Technology		--
				ASX v1 and M3U File Support	--
				ASX v2 File Support	--
				ASX v3 File Support	--
				HTTP Windows Media Streaming	--
				MMS Windows Media Streaming	--
				NSC File Support	--
				Windows Media Multi Cast and Multi Bit Rate	--
				Windows Media Streaming From Local Storage Area	--
		WMA and MP3 Streaming			--
		WMA and MP3 Local Playback			--
		Audio Codec and Renderer	G.711 Audio Codec		--
			GSM.6.10 Audio Codec		--
			IMA ADPCM Audio Codec		--
			MP3 Codec		--
			MPEG-1 layer 1 and 2 Audio Codec		--
			MS ADPCM Audio Codec		--
			Wave/AIIF/au/snd File Parser		Yes
			Waveform Audio Renderer		Yes
			WMA Codec		--
			WMA Voice Codec		--
		Streaming Media Playback			--
		Digital Copyright Management	Digital Rights Management (DRM)		--
			DRM License Acquisition OCX		--
			Portable Device DRM		--

Continue.

Multimedia Technologies	Media	Video Codec and Renderer	DirectShow Video Renderer	--
			MPEG-1 Video Codec	--
			MS RLE Video Codec	--
			WMV/MPEG-4 Video Codec	--
			Overlay Mixer	--
			Video/Image Compression Manager	--
		Media Format	AVI Filter	--
			MPEG-1 Passer/Splitter	--
Security	Microsoft Certificate Registration Tool Sample			Yes
	Local Authentication Subsystem			Yes
		Password Local Authentication Plug in		Yes
	Powerful Encrypting Provider's Encrypting Service (CryptoAPI 1.0)			Yes
		Diffie-Hellman/DSS Provider		Yes
		Smart Card Encryption Provider		--
		Certificate (CryptoAPI 2.0)		Yes
			Personal Information Exchange Standard (PKCS #12)	Yes
			Encryption Messaging (PKCS #7)	Yes
	Capability Information Manager			Yes
	Authentication Service (SSPI)			Yes
		Kerberos		Yes
		NTLM		Yes
		Schannel (SSL/TLS)		Yes
Shell and User Interface	Graphics, Windowing and Event	Minimum GDI Configuration		Yes
		Minimum GWES Configuration		Yes
		Minimum Window Manager Configuration		Yes
		Minimum Input Configuration		Yes
	Shell	AYGShell API Set		Yes
		Graphic Shell (select one)	Windows Thin Client Shell	--
			Standard Shell	Yes
		Command Shell	Command Processor	Yes
			Console Window	Yes

Continue.

-Shell and User Interface	User interface	Quarter VGA Resource Longitudinal Mode			Yes
		Overlap Menu			--
		Controls Option B			--
		Customizable UI	Sample Skin Resembling Windows XP screen		--
		Control Panel Applet			Yes
		Software Input Panel	Software Base Input Panel (SIP) (select one or more)	SIP for Small Screen	Yes
				SIP for Big Screen	--
		Software Base Input Panel Driver			Yes
		Touch Screen (stylus)			Yes
		Network User Interface			Yes
		Mouse			--
		Menu Hint			Yes
		User Aid			--
		Shared Control	Animation Control		--
			Shared Control		Yes
		Shared Dialog Support			Yes
Voip Service	PC Authentication				--
	VoIP Application Interface Layer (VAIL)				--
		Phone Provisioner			--
		VAIL Database Store			--
		Reference Media Manager			--
	Telephony User Interface				--
	Real Time Communication (RTC) Client API				--
		SIREN/G.722.1 Codec			--
	Phone IME				--
Device Manager	Device Management Client				--
	Simple Network Management Protocol (SNMP)				--
WCE Error Report	Error Report Control Panel				Yes
	Error Report Formation Program				Yes
	Error Report Transfer Driver				Yes
	Report Upload Client				--
		Report Upload Client User Interface			--

3.1.2 Displays

Basic Specifications

The QVGA (320 x 240 dots) mode is supported for the terminal.

Table 3.2

Display specification		65,536 colors 2-way TFT (16 bpp, Red: 5 bits, Green: 6 bits, Blue: 5 bits)
Display size	X direction	240 dots
	Y direction	320 dots

Contrast

- Can be set in the range of 1 to 9 (Default = 5).
- Can be set in application with **ExtEscape()API** function.
- Setup values can be modified in the Brightness properties.

Backlight brightness

A brightness of the backlight can be changed in the Control Panel.

- Setting can be made in one of nine grades for power source either when the power is provided by an external power supply (by the dedicated AC adaptor via cradle) or when the power is provided by the installed lithium-ion battery pack.
- Setting can be made in application by using **ExtEscape()API** function.
- If the brightness is set to 1 (minimum), the backlight is turned OFF.
- The default is 9 (maximum) when an external power source is used or 7 when lithium-ion battery pack is used.

Backlight Auto Dimmer (Only effect when the terminal is powered by battery pack.)

The Control Panel can be used to set up whether or not the auto dimming function is used and the waiting time until when dimming begins. Auto dimming is effect only when the power is provided by the lithium-ion battery pack. It will not function when an external power supply is used.

- If the terminal is left over in idle state - absolutely no key input or touching on the touch panel - while the power is turned on, the backlight will be automatically dimmed to save the power after a given period of time has been elapsed.
- When the terminal is in the auto dimmed state, a press of key or a touching on the touch panel will disable the auto dimming function to resume the brightness.
- While the auto dimming function has been set enabled, brightness can be set in one of eight grades. The default is 3.

During the auto dimming function being set enabled, brightness cannot be set any brighter than the brightness illuminated by the backlight. The defaults are “Enable the auto dimming function” and “1 minute” for waiting time period until when the auto dimming function activates.

Auto Backlight OFF (in both cases powered by battery pack and via Cradle/Battery charger)

The Control Panel can be used to set up whether or not the auto backlight off function is used and the waiting time until when the auto backlight off function activates. The auto backlight off function is effect for both when the power is provided by an external power source and when it is provided by lithium-ion battery pack.

- If the terminal is left over in idle state - absolutely no key or touch panel inputting - with the power being turned on, the backlight will be automatically turned off to save energy.
- When the terminal is in the auto backlight off state, a press of key or a touching on the touch panel will disable the auto backlight off function to resume the brightness.
- While the power is being provided by lithium-ion battery pack and both the auto dimming function and the auto backlight off function have been set enabled, either one of the functions with preset time period shorter than the other will have the priority. The default is "Enable the auto backlight off function" and "5 minutes for the waiting time" until when the auto backlight off function activates.

Backlight brightness control by thermal sensor (in both cases powered by battery pack and via Cradle/Battery charger)

When the thermal censer detects high temperature of the terminal, brightness of Backlight will be restricted automatically.

- There are two kinds of restrictions. The first one is to restrict steps of brightness control (9 steps) to up to 8 steps. The second one is to restrict steps of brightness control up to 6 steps.
- If the brightness of normal condition or dimmed brightness set by Automatic Backlight Dimmer (only battery operation) is set greater than brightness which is beyond the range of the restricted steps, brightness will be restricted automatically to the inside of the restricted range. However, when the temperature drops and restriction is released, brightness will recover to the normal setting level automatically.
- It is possible to confirm if the restriction is effective or not by checking the following registry.
  [HKEY_LOCAL_MACHINE\Drivers\Display\CM7200F1]
  DispSensorLevel : DWORD (0: Normal, 1, 2)

Rotating Display

The rotate display function for rotating the screen at 180 degree is supported. When the screen is rotated, the touch panel coordinates system rotates in unison.

- The Common Device Control Library can be used to set up this display rotation feature in application.
- **ChangeDisplaySettingEx() API** function can be used to set up this display rotation feature in application.

See Microsoft Help for details about **ExtEscape()** and **ChangeDisplaySettingEx() API** functions.

3.1.3 Keys

Keyboard Layout

The following is the keyboard layout employed in the DT-X11.

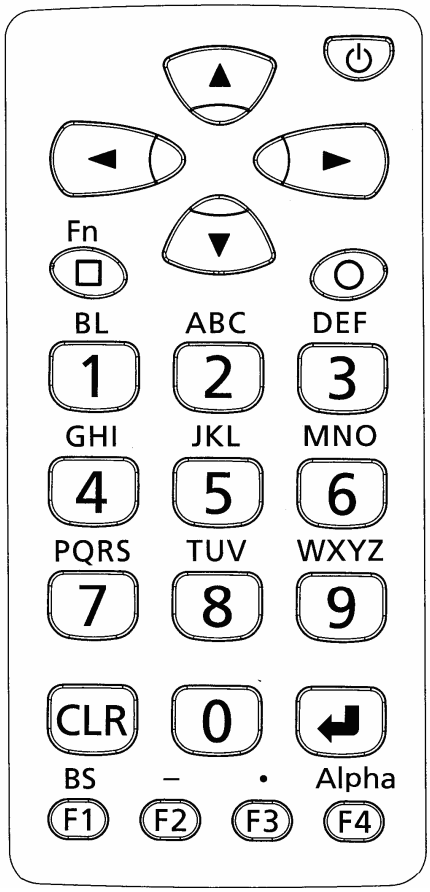


Fig. 3.1

Key Assignments

The following are the key codes and functions assignments.

Table 3.3 Control keys

KEY	Input mode		Operation	Remarks
Fn/□	----		Specialized key operation (toggle)	Fn mode is released when a key input is made.
Programmable (○)	----		Returns the VK code set in the registry (Default: VK_F25). [HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD] ProgKeyCode : DWORD	
CLR	Character input mode	1	Deletes 1 character..	
		A	Perform as "!@#$%~&*()"	
		a	Perform as "_~`+=|\:;"'"	
	Function mode	F	Perform as "ESC operation".	
ENT	Character input mode	1	Perform as "Enter key".	
		A	Perform as "Enter key".	
		a	Perform as "Enter key".	
	Function mode	F		No effect.
↑	Character input mode	1	Perform as "Cursor up key".	
		A	Perform as "Cursor up key".	
		a	Perform as "Cursor up key".	
	Function mode	F	Perform as "Cursor up key".	
←	During character input mode	1	Perform as "Cursor left key".	
		A	Perform as "Cursor left key".	
		a	Perform as "Cursor left key".	
	Function mode	F	Perform as "Cursor left key".	
→	Character input mode	1	Perform as "Cursor right key".	
		A	Perform as "Cursor right key".	
		a	Perform as "Cursor right key".	
	During Function mode	F	Perform as "Cursor right key".	
↓	Character input mode	1	Perform as "Cursor down key".	
		A	Perform as "Cursor down key".	
		a	Perform as "Cursor down key".	
	Function mode	F	Perform as "Cursor down key".	

Table 3.4 Function key

KEY	Input mode	Operation	Remarks
F1/BS	Character input mode	Deletes 1 character to left.	
	Function mode	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\Software\Microsoft\Shell\Keys\40C1] Default:sz (path of the application to be initiated)	
F2/-	Character input mode	Perform as “Hyphen”.	
	Function mode	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\Software\Microsoft\Shell\Keys\40C2] Default:sz (path of the application to be initiated)	
F3/.	Character input mode	Perform as “Period”.	
	Function mode	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\Software\Microsoft\Shell\Keys\40C3] Default:sz (path of the application to be initiated)	
F4/Alpha	Character input mode	Input mode switchover Numeric → Alphabet (U)→ Alphabet (L)	
	Function mode	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\Software\Microsoft\Shell\Keys\40C4] Default:sz (path of the application to be initiated)	

Table 3.5 Trigger key

KEY	Input mode	Operation	Remarks
T1/T2	----	Starts reading symbols. Can be set so that the user is informed of the fact the key is pressed.	
		Turns ON the power if the key is pressed longer than the specified period of time when the power is OFF.	

Setting turning ON the power with key

The Power key and Trigger keys can be assigned to turn on the power (turning on the power and then invoking application software). Application and function can be freely assigned to other keys on the keyboard.

Setting the prohibition on turning on the power with key

The function to turn on the power with Trigger keys after the power has been turned off can be disabled. Using the Common Device Control Library, turning on the power with Trigger keys can be set enabled or disabled. The default setting is “Disable turning on the power”.

Table 3.6 Ten key

KEY	Input mode		Operation	Remarks
0	Character input mode	1	Perform as “0”.	
		A	Perform as “ ‘<,>?/{[]}”.	
		a		No effect.
	Function mode	F	Display or not display SIP.	
1	Character input mode	1	Perform as “1”.	
		A		No effect.
		a		No effect.
	Function mode	F	Turn on or off the backlight.	
2	Character input mode	1	Perform as “2”.	
		A	Perform as “ABC”.	
		a	Perform as “abc”.	
	Function mode	F	Decreases the contrast.	
3	Character input mode	1	Perform as “3”.	
		A	Perform as “DEF”.	
		a	Perform as “def”.	
	Function mode	F	Increases the contrast.	
4	Character input mode	1	Perform as “4”.	
		A	Perform as “GHI”.	
		a	Perform as “ghi”.	
	Function mode	F	Initiate the calibration.	
5	Character input mode	1	Perform as “5”.	
		A	Perform as “JKL”.	
		a	Perform as “jkl”.	
	Function mode	F	Darken the backlight.	
6	Character input mode	1	Perform as “6”.	
		A	Perform as “MNO”.	
		a	Perform as “mno”.	
	Function mode	F	Brighten the backlight.	
7	Character input mode	1	Perform as “7”.	
		A	Perform as “PQRS”.	
		a	Perform as “pqrs”.	
	Function mode	F	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD] Fn7LaunchPath:sz (path of the application to be initiated)	

Continue.

KEY	Input mode		Operation	Remarks
8	Character input mode	1	Perform as “8”.	
		A	Perform as “TUV”.	
		a	Perform as “tuv”.	
	Function mode	F	Initiate application registered in the registry below. [HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD] Fn8LaunchPath:sz (path of the application to be initiated)	
9	Character input mode	1	Perform as “9”.	
		A	Perform as “WXYZ”.	
		a	Perform as “wxyz”.	
	Function mode	F	Initiate application registered in the registry below [HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD] F9LaunchPath :sz (path of the application to be initiated)	

Key Input Mode Switchover
The F4/Alpha Key on the keyboard can be used to change the key input mode.

Indication of Key Input Mode
Key input mode currently specified appears in the task tray. The modes that can be displayed are “L” as Lock, “F” as function, “1” as numeral, “A” as alphabets in uppercase, and “a” as alphabets in lowercase.

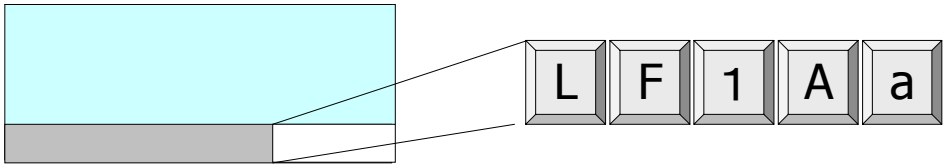


Fig. 3.2

Turnover Key Auto Confirmation
After inputting a turnover key, if the preset time period has been elapsed from the time when the turnover key is released, the turnover character input will be automatically made. The control panel can be used to set up “enable” or “disable” for the auto confirmation on the turnover character input and to set up the time period until when its confirmation is made.

Key Repeat
Continued pressing of any of “0” to “9” keys will repeat the key input.

Key Click Sound
The key click sound is generated when a key is pressed. However, it is not generated when the key is released or in mid-course of repeating the key input. The control panel can be used to set up the sound to mute, low or loud.

Enabling/Disabling Fn Key

For keys that perform specialized operations while the key input mode has been set to Function mode, “Enable” or “Disable” can be set on each individual key in the registry below to control the operations.

［HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD］

Table 3.7

Key	Setting Value	Meaning
DisableFn9	dword: 0/1	Enable/Disable
DisableFn8	dword: 0/1	Enable/Disable
DisableFn7	dword: 0/1	Enable/Disable
DisableFn6	dword: 0/1	Enable/Disable
DisableFn5	dword: 0/1	Enable/Disable
DisableFn4	dword: 0/1	Enable/Disable
DisableFn3	dword: 0/1	Enable/Disable
DisableFn2	dword: 0/1	Enable/Disable
DisableFn1	dword: 0/1	Enable/Disable
DisableFn0	dword: 0/1	Enable/Disable
DisableFnCLR	dword: 0/1	Enable/Disable
DisableFnF4	dword: 0/1	Enable/Disable
DisableFnF3	dword: 0/1	Enable/Disable
DisableFnF2	dword: 0/1	Enable/Disable
DisableFnF1	dword: 0/1	Enable/Disable

Note:

Perform a reset on the terminal to make the changes in the registry effect in the actual operations.

Function Mode Notification

When the Fn key is pressed, the WM_USER+0x502 message is issued to the application. This enables the application to detect whether the Function mode has been set up enabled or disabled.

Enable/Disable the Fn/□Key

The Common Device Control Library can be used to make the setting on “Enable” or “Disable” for switching over the key input mode in application.

F4/Alpha Key Notification

When the F4/Alpha key is pressed, the WM_USER+0x506 message is issued to the application. Using this notification, the application can detect whether the key input mode has been changed.

Permit/Prohibit Key Locks

The device library can be used to permit or prohibit the operations of keys except for the Power and Trigger keys.

User Settable Keys

- Initiating application

The following registry can be used to assign any application to the Fn+7, Fn+8 and Fn+9 keys.

[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD]

Table 3.8

Key	Setting Value
Fn7LaunchPath	sz: Target application in full path to initiate
Fn8LaunchPath	sz: Target application in full path to initiate
CardLaunchPath	sz: Target application in full path to initiate

The following registry can be used to assign any application to the F1, F2, F3 and F4 keys.

[HKEY_LOCAL_MACHINE\Software\Microsoft\Shell\Keys]

Table 3.9

Key	Setting Value
40C1	sz: Target application in full path to initiate
40C2	sz: Target application in full path to initiate
40C3	sz: Target application in full path to initiate
40C4	sz: Target application in full path to initiate

- Programmable key codes

Returns the VK code set in the registry (Default: VK_F25).
[HKEY_LOCAL_MACHINE\HARDWARE\DEVICEMAP\KEYBD]

Table 3.10

Key	Setting Value
ProgKeyCode	DWORD

- Setting key codes

The Common Device Control Library can be used to assign any key code to all the keys except the Fn key. Setting on “Enable” or “Disable” for assigning key code is possible either using the Common Device Control Library or at the control panel.

The key codes after setting are effect only when the numeral input mode is set enabled.

3.1.4 Touch Panel

An input can be made into any portion of the screen on the touch panel. The touch panel has the following resolutions.

Table 3.11

Resolution	X direction	240 dots
	Y direction	320 dots

- Capturing touch coordinates, X and Y directions, and controlling the pointing are possible by application.
- Prior to using the touch panel for the first time, calibrating the touch panel is required.

Tap Sound
The Control Panel can be used to set up the tap sound to mute, low or loud.

Tap and Hold
By tapping and holding onto a specific object on the screen, the related pop-up menu will appear.

Rotating Touch Panel Coordinates
When the screen is rotated, the coordinates of the touch panel will also rotate in unison.

Touch Panel Calibration
Calibration on the touch panel can be initiated either using the Welcome wizard appeared after full reset or by pressing simultaneously Fn and 4 keys.
The touch panel may require periodical calibration if it slipped off due to aged deterioration, voltage fluctuation and/or temperature change, etc. If it does, adjust the calibration using one of the methods.

3.1.5 Audio

Basic Specifications

WAV playback, and voice recording are supported.

Stereo data is converted into mono data and then output. By using the Microsoft **SoftwareMixer** function, output sounds from multiple applications can be mixed and output (in 44.1 KHz, 16-bit stereo mixing).

The terminal supports WAV standards.

Playback

Table 3.12

Sampling frequencies	KHz	8	11.025	12	16	22.05	24	32	44.1	48
	Mono	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Stereo	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Sampling frequencies other than those above are not supported.									
Stereo/Mono	8-bit or 16-bit In reality, mono speakers do not playback in stereo.									

Recording

Table 3.13

Sampling frequencies	KHz	8	11.025	12	16	22.05	24	32	44.1	48
	Mono	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Sampling frequencies other than those above are not supported.									
Stereo/Mono	8-bit or 16-bit Mono input only via microphone									

Setting Sound Volume

The Control Panel can be used to set up sound volume in six grades from loud to low and ON/OFF of mute. Note, however, that the shutter sound setting is not allowed to change. A sound volume also can be set up using **Win32 API** function in application.

3.1.6 Buzzer

Basic Specifications

The buzzer can be used to output various sounds such as scanning confirmation, key click, tapping, alarm, warning and any other available sounds.

The buzzer sounds are not output to the headphones. To output them to the headphones, instead of the buzzer sound, use **PlaySound() API** function which uses the audio driver. The sounds have the following six attributes and default values.

Table 3.14

Sound Type	Frequency (Hz)	Time (millisecond)	Individual Mute	Attribute
Tap sound	2200	25	ON/OFF	B_TAP
Key click sound	2600	50	ON/OFF	B_CLICK
Alarm sound	2800	150	ON/OFF	B_ALARM
Warning sound	3000	100	ON/OFF	B_WARNING
Scan end sound	3100	75	ON/OFF	B_SCANEND
User defined sound	--	--	ON/OFF	B_USERDEF

Setting Volume

The Control Panel can be used to set up volume in three grades from loud, medium and low and ON/OFF of mute. Setting the volume is also possible using the Common Device Control Library in application.

3.1.7 Memory Management

RAM

The integrated RAM has a total capacity of 64 Mbytes and is used for the following purposes.

- Program memory to be used by the OS and programs.
- Object store used for temporary file saving, etc.
- Other program and OS resident areas beyond the control by the OS
- Buffers for display and camera
- Driver work area

The user can make unrestricted use with the object store, but data stored in it may be lost due to battery exhaustion, etc. To avoid such incident it should be used just as a temporary storage area, and use FlashDisk to store important data files.

Table 3.15 Initial memory status

Memory	Initial Status	
Program memory capacity	Total capacity; 30.85 MB	5.2 MB used
Object store capacity	Total capacity; 30.85 MB	0.3 MB used

- Of the 64Mbytes of RAM, apart from the above, it is used for OS resident area, buffers for display and camera and driver work.
- In a situation where there is a small open area in the program memory capacity, but a large user application, the Control Panel can be used to reallocate the memory capacity. However, in this case, back up for the setting after the change made for allocating the memory capacity is not possible. If backup for the setting made on the Control Panel is required, use a “Backup Tool” available from CASIO.

FlashDisk

The Flash Disk has 128MB as its total capacity. The disk is released as user disk and can be accessed as FlashDisk folder. The user disk is available to freely read/write user data such as user application, master data, transaction data, etc.

The Flash Disk different from RAM does not require a power to back up data in the disk, so data is not lost even if the terminal's memory backup battery is exhausted. Be sure to back up important data files in the RAM to the Flash Disk.

The storage manager in the Control Panel is used for formatting and its management for the Flash Disk. It is approximately 120MB when the default settings are used to format on the disk. (The size may alter depending on the Flash Disk conditions.)

If the disk cannot be recognized, it is automatically formatted. This failure to recognize the disk may not mount the disk itself. The failure does not allow the storage manager in the Control Panel to perform formatting, and consequently there is no way of mounting the disk again.

To avoid this difficulty, the disk is automatically formatted if it cannot be recognized at time of resetting. Prior to starting the formatting, a message will appear to ask the user "Yes" or "No" to continue.

3.1.8 LED

Basic Specifications

There are two LEDs integrated in the terminal, one for the user notification on the right and the other for charging the battery complete on the left.

Table 3.16

LED	Color	Description
Right-side LED	Red	Charging battery pack
	Green	Charging battery pack complete
Left-side LED	Red	User notification (alarm)/Scanning a bar code
	Green	Scanning a bar code
	Orange	None

Notes:

- The user notification LED can be used to indicate various notifications by the OS and other notifications defined by the user.
- All colors available in the LEDs are indicated by using the Common Device Control Library.
- The charging battery complete LED cannot be controlled for its ON/OFF state with software.

User Notification (Alarm)

This indication mode is used for alarm notification, etc. The LED can be lit for a specific time using **CeSetUserNotification()API** function.

Table 3.17 Specifications

Operating mode	Specification
Blink interval	ON for 1 second in red, OFF for 2 seconds

Note:

Indication for scanning a bar code has the priority over other indications.

Scanning

This is used for notification of a scanning result which is controlled by use of the Common Device Control Library.

Table 3.18 Specifications

Operating mode	Specification	Attribute
Scanning complete	ON in green for a specified period of time, then OFF.	L_SCANOK
Scanning in error	ON in red for a specified period of time, then OFF.	L_SCANERR

User Definition

This indication mode is used for other notifications freely defined by the user. The ON/OFF state can be controlled by use of the Common Device Control Library.

Table 3.19 Specifications

Operation mode	Specification
User definition	Color selection from green, blue, or orange.
	Programmable for ON and OFF time periods

Note:

Indication for scanning a bar code has the priority over other indications.

3.2 Laser Scanner (DT-X11M10E/M10RC)

3.2.1 Basic Specifications

The following industrial standard bar code symbologies are supported by the laser scanner integrated in the terminal (model dependant).

Table 3.20 Supported symbologies

Symbology	Check Digit Sum	Min Digits	Max Digits
EAN, JAN,UPC-A/B	Enable/Disable	8 (fixed)	13 (fixed)
EAN, JAN,UPC-A/B Addon	Enable/Disable	10 (fixed)	18 (fixed)
UPC-E	Enable/Disable	7 (fixed)	7 (fixed)
UPC-E Addon	Enable/Disable	9 (fixed)	12 (fixed)
Code39	Enable/Disable	2 (note 3)	47
NW-7	-	2 (note 4)	62
Interleaved 2of5	Enable/Disable	4 (note 5)	92
Industrial 2of5	Enable/Disable	2	55
Code93	Enable/Disable	1	77
Code128	Enable/Disable	1	98
MSI	Enable/Disable (note 1)	1	67
IATA	Enable/Disable (note 2)	1 (note 6)	44 (note 6)
RSS-14	Enable	14 (fixed)	14 (fixed)
RSS Limited	Enable	14 (fixed)	14 (fixed)
RSS Expanded	Enable	1	74 (note 7)

Notes:

1. MSI check digit
   One of the three MSI check digit calculation methods can be selected.
   - 1 digit, mod10
   - 2 digit, mod10 and mode10
   - 2 digit, mod10 and mod10
2. IATA check digit
   One of the three IATA check digit calculation methods can be selected.
   - Calculate number other than end 1 digit
   - Calculate coupon number and numeric value segment
   - Calculate numeric value segment
3. Minimum digit on Code39 symbology
   The minimum no. of digits can be set to one only when scanning on Code39 symbology is enabled.
4. Minimum digit on NW-7 symbology
   The minimum no. of digits can be set to one only when scanning on NW-7 symbology is enabled.
5. Minimum digit on Interleaved 2of5
   The minimum no. of digits can be set to two only when scanning on Interleaved 2of5 symbology is enabled.

6. Minimum and maximum digits on IATA symbology
   The minimum no. of digits can be set to 15 or 17 for the maximum only when the IATA check digit calculation is set to “Coupon number and Calculate data segment” or “Calculate just data segment”.
7. Maximum digit on RSS Expanded symbology
   The maximum digit count for just numeric data is 74. The maximum digit count for just alphabet data is 41.

- The maximum no. of digits for each symbology in Table 3.20 is based on the optimum conditions of each relevant element such as the bar code print quality, resolution, PCS, brightness surrounded, and distance between the terminal and the bar code. Depending on these conditions, even if one of the maximum no. of digits in the table is set to a bar code symbology, an individual bar code of that symbology may not be scanned.
- If IATA symbology’s minimum no. of digits is set to one, the chance of misreading will increase. If there is no need to scan a bar code of the symbology with its minimum no. of digits set to one, do not change the default setting which is 4.

Check Digit Calculation

A bar code value is calculated in accordance with method, and then the calculation result and the check character at a specific position are compared. If they match, the scanning data is deemed correct. The calculation method differs according to each symbology.

Readable Digits

The actual readable digit on a bard code differs depending on the resolution and the scanning distance between the terminal and the bar code.

3.2.2 Scanning Method

The laser scanner has “scanning state” (emits laser beam to read a bar code) and “standby state” (scanning is halted and in standby state). These two states are controlled to start scanning bar code and stop the scanning.

Table 3.21 Scanning methods

Scan method	Description	Conditions for scanning to end	Timeout Yes/No
Single scan	Press the trigger key to start scanning. Scanning is stopped when either scanning is succeeded or one of the scan end conditions is met.	- Timeout time has elapsed. - **OBRClose** function is called.	Yes
Continuous scan (controlled with trigger key)	Press the trigger key to start scanning, and scanning will continue as long as the trigger key is pressed down. Scanning will stop when either scanning is completed for just preset no. of times for scanning or one of the scan end conditions is met.	- Timeout time has elapsed after scanning a bar code. - Scanning for the number of preset times is complete. - The trigger key is released. - **OBRClose** function is called.	Yes
Continuous scanning (controlled by program)	Scanner library functions are used to start and stop scanning. The previous scanning data and scanning data overlapped with other scanning data will be disregarded. Also, to save the power during scanning, emitting laser beam will be turned off between laser emissions. (see note)	- Timeout time has elapsed after scanning the precious scanning. - Scanning end function is called while scanning continues. - **OBRClose** function is called.	Yes

Note:
The scanning method set as default is with “Continuous scanning (controlled with trigger key)” and “No. of preset times for continuous scanning = 1”.

Step Scan
This method is for scanning a designated number of bar codes. Once scanning for the designated number of bar codes has been completed, the scanner will close and not scan again until reopened. Also, the same bar codes that have been scanned previously cannot be scanned again.

3.2.3 Scanning Parameters

Conditions that allow scanning a symbology in specific modes can be set for each readable symbology.

Readable Symbology
Bar code symbologies that are enabled or disabled for scanning can be specified.
If only specific symbologies are to be scanned, set “Enable” for scanning on these symbologies only and “Disable” on the other symbologies. This will reduce decode processing time and lower the error rate. The default is “Enable scanning on all the symbologies”.

Readable Digits
The no. of readable digits can be set for each symbology.
If only specific no. of digits is to be scanned, specify it for each readable symbology. This will reduce decode processing time and lower the error rate.

Enable/Disable Check Digit
Check digit can be set to “Enable” or “Disable” for each readable symbology. Setting the check digit will lower the error rate.

Table 3.22

Symbology	Check Digit Calculation	Default
EAN, JAN,UPC-A/B	Enable/Disable	Enable
EAN, JAN,UPC-A/B Addon	Enable/Disable	Enable
UPC-E	Enable/Disable	Enable
UPC-E Addon	Enable/Disable	Enable
Code39	Enable/Disable	Disable
NW-7	-	-
Interleaved 2of5	Enable/Disable	Enable
Industrial 2of5	Enable/Disable	Enable
Code93	Enable/Disable	Enable
Code128	Enable/Disable	Enable
MSI	Enable/Disable	Enable
IATA	Enable/Disable	Disable
RSS-14	Enable	Enable
RSS Limited	Enable	Enable
RSS Expanded	Enable	Enable

Validation
Validation is carried out for a specified number of times to check if scanned data is valid, and then the data is output only if it is valid. The number of validations can be set in the range of 1 to 9 either at the Control Panel or using the Common Device Control Library. The default is 3.

No. of Scanning Times

In “Continuous Scanning” mode, scanning continues for the preset number of scanning times and then it will stop in waiting mode. The number of times for scanning can be set in the range of 1 to 9 either at the Control Panel or using the Common Device Control Library. The default is 1.

Scanning Period

Valid time period of scanning after the trigger key is pressed down can be set in the range of 1 to 9 either at the Control Panel or using the Common Device Control Library. After the preset time has elapsed, the scanner will go into standby mode waiting for the trigger key to be pressed down again. The default is 3 seconds.

Double Scanning Prevention

This is used to prevent double scanning of the same bar code during the “Continuous Scanning” mode is being set. Scanning the same bar code again will be prohibited as long as the scanning continues for the preset number of times. However, it can be scanned when a new “Continuous Scanning” starts.

3.2.4 Scanning Output Format

Formats for outputting results of scanned bar codes can be set.

Table 3.23 Output Formats

Symbology	Standard	No. of digits	Output Format	Remark
WPC	JAN-13	13	FFMMMMMNNNNNCT	See Table 3.24 "WPC symbology" for meanings of the notations. Excluding UPC-B, check digit (mod 10) calculation is always performed
	EAN-13	13	FFMMMMMNNNNNCT	
	JAN-8	8	FFMMMNCT	
	EAN-8	8	FFMMMNCT	
	JAN-13 addon+2	15	FFMMMMMNNNNNCAAT	
	EAN-13 addon+2	15	FFMMMMMNNNNNCAAT	
	JAN-13 addon+5	18	FFMMMMMNNNNNCAAAAAT	
	EAN-13 addon+5	18	FFMMMMMNNNNNCAAAAAT	
	JAN-8 addon+2	10	FFMMMMNCAAT	
	EAN-8 addon+2	10	FFMMMMNCAAT	
	JAN-8 addon+5	13	FFMMMMNCAAAAAT	
	EAN-8 addon+5	13	FFMMMMNCAAAAAT	
	UPC-A	12	0SMMMMMNNNNNCT	
	UPC-B	12	0SMMMMMNNNNNNT	
	UPC-A addon+2	14	0SMMMMMNNNNNCAAT	
	UPC-B addon+2	14	0SMMMMMNNNNNNAAT	
	UPC-A addon+5	17	0SMMMMMNNNNNCAAAAAT	
	UPC-B addon+5	17	0SMMMMMNNNNNNAAAAAT	
	UPC-A	12	SMMMMMNNNNNCT	
	UPC-A addon+2	14	SMMMMMNNNNNCAAT	
	UPC-A addon+5	17	SMMMMMNNNNNCAAAAAT	
	JAN-13	14	0FFMMMMMNNNNNCT	GTIN
	EAN-13	14	0FFMMMMMNNNNNCT	GTIN
	JAN-8	14	0000000FFMMMNCT	GTIN
	EAN-8	14	0000000FFMMMNCT	GTIN
	UPC-A	14	00SMMMMMNNNNNCT	GTIN

Continue.

Symbology	Standard	No. of digits	Output Format	Remark
UPC-E (see note)	UPC-E	(7),8	0MMNNNMCT	Last M: 0 to 2
		(7),8	0MMMNN3CT	
		(7),8	0MMMMN4CT	
		(7),8	0MMMMMNCT	Last N: 5 to 9
		(6),7	MMNNNMCT	Last M: 0 to 2
		(6),7	MMMNN3CT	
		(6),7	MMMMN4CT	
		(6),7	MMMMMNCT	Last N: 5 to 9
	UPC-E	14	0000000MMNNNMCT	GTIN Last M: 0 to 2
		14	0000000MMMNN3CT	GTIN
		14	0000000MMMMN4CT	GTIN
		14	0000000MMMMMNCT	GTIN Last N: 5 to 9
	UPC-E addon+2	(9),10	0MMNNNMCAAT	Last M: 0 to 2
		(9),10	0MMMNN3CAAT	
		(9),10	0MMMMN4CAAT	
		(9),10	0MMMMMNCAAT	Last N: 5 to 9
		(8),9	MMNNNMCAAT	Last M: 0 to 2
		(8),9	MMMNN3CAAT	
		(8),9	MMMMN4CAAT	
		(8),9	MMMMMNCAAT	Last N: 5 to 9
	UPC-E addon+5	(12),13	0MMNNNMCAAAAAT	Last M: 0 to 2
		(12),13	0MMMNN3CAAAAAT	
		(12),13	0MMMMN4CAAAAAT	
		(12),13	0MMMMMNCAAAAAT	Last N: 5 to 9
		(11),12	MMNNNMCAAAAAT	Last M: 0 to 2
		(11),12	MMMNN3CAAAAAT	
		(11),12	MMMMN4CAAAAAT	
		(11),12	MMMMMNCAAAAAT	Last N: 5 to 9
Code39		3 to Max	SBBB ------- BBCST	See Table 3.25 "Code39 symbology" for meanings of the notations.
		3 to Max	SAAA ------- AACST	
		1 to Max	BBB ------- BBCT	
		1 to Max	AAA ------- AACT	
NW-7		3 to Max	SDDD ------- DDDST	See Table 3.26 "NW7 symbology" for meanings of the notations.
		1 to Max	DDD ------- DDDT	
Interleaved 2of5		2 to Max	DDD ------- DDDCT	See Table 3.27 "Interleaved 2of5 symbology" for meanings of the notations. Only the no. of digits in even number is allowed for readable digits.
Industrial 2of5		2 to Max	DDD ------- DDDCT	See Table 3.28 "Industrial 2of5 symbology" for meanings of the notations. Only the no. of digits in even number is allowed for readable digits.

Continue.

Code93		1 to Max	AAA ------- AAAT	See Table 3.29 "Code39 symbology" for meanings of the notations.
Code128	Code128	1 to Max	AAA ------- AAAT	
		1 to Max	SBBB ------- BBCST	See Table 3.30 "Code128 symbology" for meanings of the notations.
	EAN-128	1 to Max	AAA ------- AAAT	
		1 to Max	SBBB ------- BBCST	See Table 3.31 "EAN128 symbology" for meanings of the notations.
		1 to Max	FAAA ------- AAAT	
		1to Max	GAAA ------- AAAT	
MSI		1 to Max	DDD ------- DDCCT	See Table 3.32 "MSI symbology" for meanings of the notations.
IATA		1 to Max	DDDDDDDDDD ------- CT	See Table 3.33 "IATA symbology" for meanings of the notations.
			PADDDDDDDDDDDDDDCT	
RSS-14		16	01DDDDDDDDDDDDDCT	See Table 3.34 "RSS-14 symbology" for meanings of the notations.
		14	DDDDDDDDDDDDDCT	
RSS Limited		16	01DDDDDDDDDDDDDCT	See Table 3.35 "RSS Limited symbology" for meanings of the notations.
		14	DDDDDDDDDDDDDCT	
RSS Expanded		1 to74	DD ------- DDDT	See Table 3.36 "RSS Expanded symbology" for meanings of the notations.
		1 to 41	AAA ------- AAT	

Note:
If the no. of scanning digits described in parentheses, "C" will not be appended to the output.

Table 3.24 WPC symbology

F	Country flag
M	Manufacturer code
N	Product code
S	Number system character
A	Addon data
T	Termination code
C	Check digit (mod 10)

Table 3.25 Code39 symbology

A	ASCII conversion post data
B	ASCII conversion pre data
C	Check digit (mod 43) Becomes data if there is no check digit
S	Start/Stop character
T	Termination code

Table 3.26 NW7 symbology

S	Start/Stop character (any of a, b, c, d)
D	Data
T	Termination code

Table 3.27 Interleaved 2of5 symbology

D	Data
C	Check digit (mod 10) Becomes data if there is no check digit
T	Termination code

Table 3.28 Industrial 2of5 symbology

D	Data
C	Check digit (mod 10) Becomes data if there is no check digit
T	Termination code

Table 3.29 Code39 symbology

A	ASCII conversion post data
B	ASCII conversion pre data
C	Check digit (mod 47) Becomes data if there is no check digit
S	Start/Stop character
T	Termination code

Table 3.30 Code128 symbology

A	ASCII conversion post data
B	ASCII conversion pre data
T	Termination code

Table 3.31 EAN128 symbology

C	Check digit (mod 47)
S	Start/Stop character
F	Code ID (only “]C1”, EAN128)
G	GS (only 1Dh, EAN128)
T	Termination code

Table 3.32 MSI symbology

D	Data
C	Check digit (mod 10, mod 11) Becomes data when there is no check digit
T	Termination code

Table 3.33 IATA symbology

D	Data
C	Check digit (IATA) Becomes data when there is no check digit
P	Coupon No
A	Airline No
T	Termination code

Table 3.34 RSS-14 symbology

D	Numeric data
C	Check digit (mod 10)
T	Termination code

Table 3.35 RSS Limited symbology

D	Numeric data
C	Check digit (mod 10)
T	Termination code

Table 3.36 RSS Expanded symbology

D	Numeric data
A	Alphabet data
T	Termination code

Termination Codes

Select one of the following five termination codes to attach to the end of decoded data.

- CR
- LF
- CR+LF
- TAB
- No termination code

The default is “No termination code”.

Output Buffer

The scanner scans a bar code and outputs the scanned data using one of the following methods described in the table below.

Table 3.37

Output Method	Description
OBR buffer output (see note)	- Scanned data is output to memory in the laser scanner driver. - Scanned data already output to the memory can be captured using the Common Device Control Library.
Key message output	- Scanned data can be output with the window message to the specified window handle. - The window handle is specified using the Common Device Control Library.
Clipboard output	- Scanned result is copied to the clipboard and then output to the edit control focused by caret.
Keyboard output	- Scanned result is output as a keyboard event to the edit control focused by caret.

Note:

When a bar code is scanned, the decoded data including the symbology and data size are stored to the memory in the laser scanner driver. This output method has the following features.

- Can capture the bar code symbology and data size.
- Can capture the data at any timing the user prefers.
- One piece of data can be a maximum of 98 characters long and up to nine labels can be stored in the memory. If any new data scanned after exceeding over nine labels stored already in the memory will be disregarded.

Conditions for Terminating Scanning

Scanning will be terminated when any of the following conditions is met.

- Scanning is succeeded.
- Preset timeout period has elapsed.
- OBR buffer becomes a full.
- An abnormal condition is detected in the scan module.

Scan Completion Notification

When scanning is completed, a notification is issued to the application using one of the methods described in the table below. Each notification method can be set to “Enable” or “Disable”. The default is “Notification with window message”.

Table 3.38

Method	Description
Window message	A window message is issued to the specified window handle. Also, the conditions for scanning completion can be fetched by referring to wParam parameter of the window message.
Event	A predefined event in the registry is issued. The conditions of scanning completion can be fetched using the Common Device Control Library.
None	No message or event is issued when scanning is complete.

Event Name

The predefined event name which is issued for event notification can be changed in the registry described below. If there is no value set in the registry, the default event name **OBRScanningEvent** will be used.

[HKEY_LOCAL_MACHINE\Drivers\CASIO\Laser]

Table 3.39

Key Name	Setting Value
EventName	sz: Any name

Capturing Event Factors

When a notification for scanning completion is issued with “Event”, factors which made the scanning succeeded are automatically recorded. The recorded factors are also fetched using the Common Device Control Library.

3.2.5 Scan Result Notification

When scanning a bar code is completed, a notification about the scanning result can be indicated to the user with either LED or buzzer or vibration. Each indication method can be set to “Enable” or “Disable”.

Table 3.40

Indication method	Setting	When succeeded	When failed (see note 1)	Scanning interrupted (Trigger key released)	OBR buffer full (see note 2)	Default
LED	Mode 1	ON in green	None	None	ON in green	Mode 1
	Mode 2	ON in green	ON in red	None	ON in green	
	Mode 3 (disable)	None	None	None	None	
Buzzer	Enable	Scan completion sound	None	None	Warning sound	Enable
	Disable	None	None	None	None	
Vibration	Enable	Vibrate	None	None	None	Disable
	Disable	None	None	None	None	

Notes:

- Scanning will fail when one of the following errors occurs.
  - A bar code with the number of digits which exceeds over the specified range is scanned.
  - Check digit calculation error occurs.
  - Full ASCII conversion error occurs in scanning bar code of Code39 symbology or Code128 symbology.
- During the “OBR buffer output” method has been set as scanned data output method, this condition occurs if scanning takes place while nine labels worth of data are stored already in the memory buffer.

3.2.6 Expanded Features

Power ON with Trigger Key

If the Trigger key has been set to "Enable turning on the power with Trigger key", the power can be turned ON (while the power was being turned off) when it is pressed down. This function allows the user to achieve three-step operation with only one action, (1) turn on the power → (2) press the Trigger key → (3) scan a bar code. This feature is a perfect idea when the user wishes to resume scanning after the power has been turned off. The default is "Disable turning on the power with Trigger key".

Setting Trigger Key

4-way cursor key and side trigger keys can be set as the Trigger key. The default is only both left and right side keys are set as the Trigger key.

Noise Filter

If the background of a bar code is white color, a noise tends to be generated easily during scanning causing the error rate to increase. To reduce such the noise, the noise filter function is available with the terminal. Two methods are available to set the function operable.

Table 3.41

Filter	Description	Merit	Demerit
Software noise filter	A software process removes noise. In determining the blank at the leading edge of the bar code, if there is a bar width smaller than a certain value, it will be bonded to the fore and aft data, the noise eliminated and the determination made. Also, the time from scan start to "enable" of software filter can be set in the range of 1 to 8 seconds. The default is 3 seconds.	Effective when scanning leading edge blank of bar code using laser module noted for easily picking up noise.	If initial bar is extremely thin, it will be determined as noise and eliminated, which may mean that the bar code cannot be scanned.
Hardware noise filter	A noise is removed with the laser module process by narrowing the frequency band width of detecting bars of a bar code symbol. This process makes a noise to be generated less.	Effective for bar code symbol with poor resolution.	Not recommended for bar code symbol with high resolution.

Note:

The software noise filter is not effect with the DT-X11 series.

Configuration File

The various setting parameters related to scanning bar code symbols can be stored in a file (configuration file) and then resumed. The configuration file storage path and its file name are "\FlashDisk\System Settings\OBRDRV.ini". If there is no such the configuration file existed, the default values are used to initiate scanning.

Dual Decoder System

The dual decoder system integrated in the terminal initially decodes a scanned bar code data using the standard decoder, but if the decoding fails, it will use the additional decoder described below to decode the same bar code data. This dual decoders system supports the bar code symbologies listed below.

- Code39 symbology
- Code128 symbology
- EAN symbology

With the decoding system used for the previous CASIO handheld terminals, decoding is processed with a mean value of one module adding bar thickness of each black bar and white bar for one character when performing binaryzation or quardruplzation of bar thickness. However, this method does not accurately decode a bar code if it is formed with unbalanced bar thickness between white bars and black bars.

The dual decoder system can solve it by calculating separately each mean value of black bars and white bars for such a bar code with unbalanced thickness of white and black bars by changing the threshold level of decoding.

Customizing the Decoder

According to the scan environment and the bar code printed material's quality, the integrated decoder can be customized for efficient scanning performance. First, to maintain scanning performance with the ordinary decoding logic, perform decoding using the decoder and if it does not succeed, customize it by tuning the elements in the table below so that the decoding can be performed better.

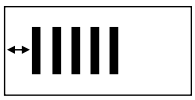
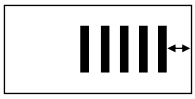
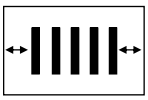
Table 3.42 Customizing the elements

Element	Description
Change margin of the right/left threshold values	Used to change the threshold values for right and left side marginal spaces of a bar code symbol printed inside quadrangle.
Change of compensation values of the thickness of bars of a bar code symbol.	Used to thicken or thin each bar of a bar code symbol for a specified value and then decode it.
	Value for thickening or thinning bars that form a bar code symbol can be changed.

Changing the threshold values for Right and Left space margins

When a bar code symbol is printed inside quadrangle, scanning may not be possible because there is not sufficient left side and/or right side marginal space (see Table 3.43). By making change on the left/right marginal threshold values, scanning a bar code symbol becomes possible.

Table 3.43

When the left marginal space is narrow.	
When the right marginal space is narrow.	
When both right and left marginal spaces are narrow.	

Changing the thickness of bars of bar code symbol

If bars of a bar code are printed thick because blurring or scratchy white bars (spaces between two bars) are printed thinly, the bar ratio will not be correct causing scanning incorrectly. By adjusting the thickness of these bars makes scanning the bar code possible. This method is applicable if all bars of a bar code are either too thick or too thin because the method is applied to the whole of a bar code.

Decoder learning function

This function is to automatically change parameters for criteria and threshold level used to judge on decoding bar code data so that scanning a bar code printed in poor quality can be improved. However, after changing the relevant parameters for the decoder learning function, the individual scanning characteristics of each terminal may be degraded. To avoid such degrade, the integrated decoding system starts decoding with the standard decoder and then changes with the customized decoder if decoding at the first stage fails. If the decoding at the end of the process does not succeed, the decoder learning function is used to ensure it to be succeeded. Setting either “Enable” or “Disable” for the function to be effect can be set. See the decoding process flow in Fig. 3.3.

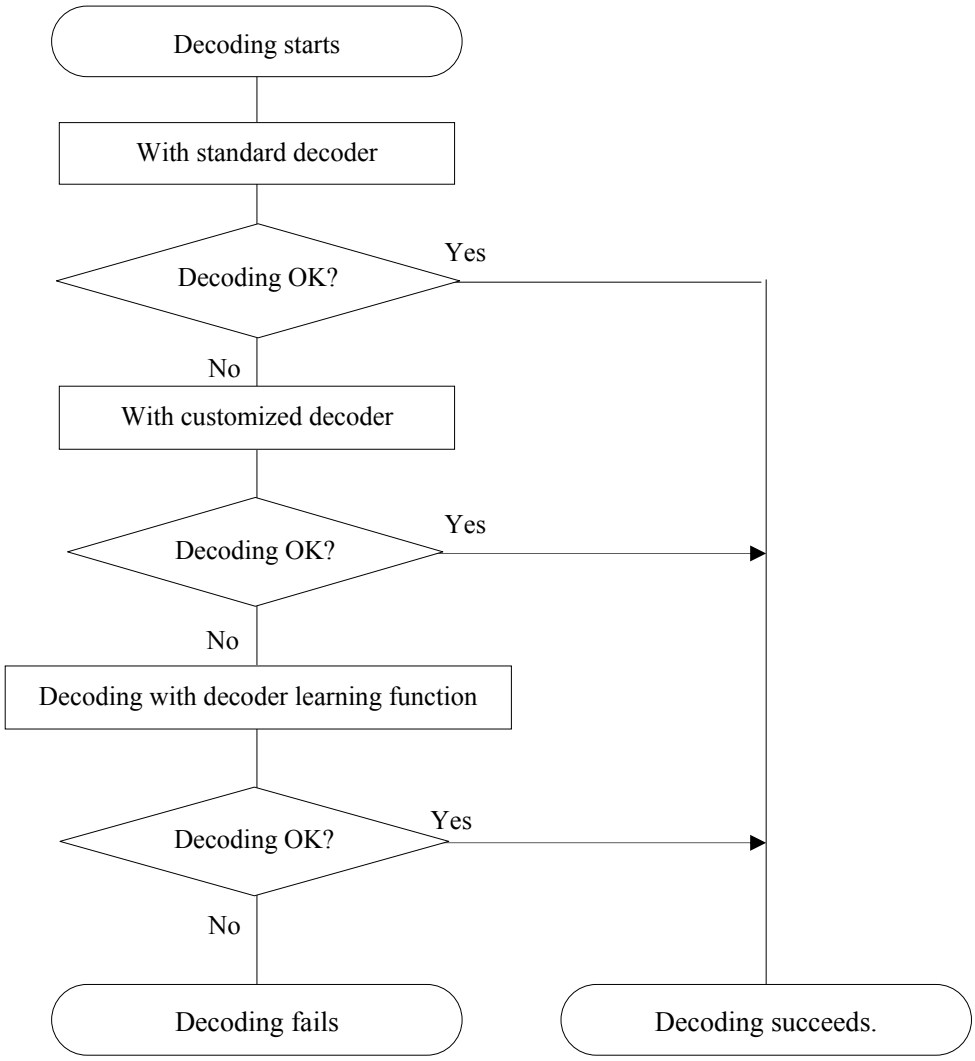


Fig. 3.3

Symbologies supported by the decoder learning function

Scanning performance can be improved with the decoder learning function for the following bar code symbologies.

- EAN, JAN,UPC-A/B
- EAN, JAN,UPC-A/B Add on
- UPC-E
- UPC-E Add on
- Code39
- NW-7
- Interleaved 2of5
- Industrial 2of5
- Code93
- Code128
- MSI
- IATA

Parameter Precedence Change function

The operating order of the relevant parameters used in success decoding bar code data with the decoder learning function can be advanced for precedence. This advance will result in quick response of continuously scanning multiple bar codes with similar quality. Since the precedence order will be stored in the RAM memory, it will be reset to the default order if RESET is performed on the terminal.

Erratic Scanning Avoidance function

This function fetches the bar code quality rank by calculating the decoder easiness when scanning a bar code. If the quality rank of scanned bar code is relatively low, the error rate will become high causing an erratic scanning to occur. To suppress the error rate, the function automatically makes judgment on scanning with such the bar code as “Failure”.

3.2.7 Power Control

In order to save the power, the power will not be supplied to the laser scan module and the ASIC module for laser beam control during the laser beam is not irradiating. It will be supplied to these modules when the laser beam is to be irradiated, and turned off again when the laser beam is not irradiated.

3.3 CMOS Imager (DT-X11M30E/M30U/M30RC)

3.3.1 Basic Functions

With a monochrome CMOS imager, decoding and capturing of 1D bar code symbologies and 2D code symbologies as well as images are supported. Not only a CMOS sensor, but also a red LED for illumination and green LED for aiming are integrated.

3.3.2 Readable Symbologies

Table 3.44 1D bar code symbologies

Symbology	Minimum digits	Maximum digits	Check character	Check character output	Output format/Add-on function
EAN8/JAN8	8 (+2/5)		Enable	Enable/Disable	2 digits/5 digits added-on
EAN13/JAN13	13 (+2/5)		Enable	Enable/Disable	2 digits/5 digits added-on
UPC-A	12 (+2/5)		Enable	Enable/Disable	NS output 2 digits/5 digits added-on
UPC-E	6 (+2/5)		Enable	Enable/Disable	NS output UPCA conversion 2 digits/5 digits added-on
Code39	1	22	Enable/Disable	Enable/Disable	Output of start/stop bit Full ASCII conversion Add-on code
Codabar(NW7)	2	26	Enable/Disable	Enable/Disable	Output of start/stop bit
Interleaved2of5 (ITF)	4	42	Enable/Disable	Enable/Disable	
Code93	1	35	Enable	Disable	
Code128/EAN128	1	28	Enable	Disable	Code A/B
	1	56	Enable	Disable	Code C
MSI(Plessey)	4	26	Enable	Enable/Disable	
IATA	4	24	Enable	Disable	
Code11	1	40	Enable(2)	Disable	
RSS-14 (Standard/Truncated)	14		Enable	Disable	
RSS Limited	14		Enable	Disable	
RSS Expanded (Standard)	1	40	Enable	Disable	
ISBT (see note)	1	28	Enable	Disable	

Note:
ISBT symbology is decoded as Code128 symbology.

Table 3.45 2D Stacked code symbologies

Symbology	Minimum digits	Maximum digits	Check character	Check character output	Output format / Add-on function
Code49	1	81	Enable	Disable	
PDF417	1	2,000	Enable	Disable	
MicroPDF	1	366	Enable	Disable	
Codablock F (see note)	0	200	Enable	Disable	
EAN8/13 Composite	1	300	Enable	Disable	
RSS Composite	1	135	Enable	Disable	
UCC/EAN128 Composite	1	300	Enable	Disable	
TLC39	-	279	Enable	Disable	
RSS-14 (Stacked type) included Standard Omni directional	14		Enable	Disable	
RSS Expanded (Stacked type)	1	20	Enable	Disable	

Note:
Since Codablock F is a stacked code of the Coda128 symbology, a part of symbol of the Code128 symbology may be read if the Code128 symbology is set to “Enable”.

Table 3.46 2D Matrix symbologies

Symbology	Minimum digits	Maximum digits	Check character	Check character output	Output format / Add-on function
Aztec	1	2,000	Enable	Disable	
QR Code	1	1,500	Enable	Disable	Model 2 only
Maxicode	1	138	Enable	Disable	
DataMatrix	1	1,000	Enable	Disable	ECC000/050/080/100/140/200

Note:
The maximum numbers of digits listed in the above table apply to cases where the entire symbology consists of numeric characters only. The maximum number will be reduced to 2/3 of each maximum no. of digits for alpha-numeric characters; and reduced to 1/3 for Kanji characters and binary numbers. These are merely reference, and the actual range of readable symbologies varies according to the conditions (resolution, PCS, etc.) of individual symbol and the surrounding environment.

3.3.3 Read Assisting Functions

Multi-step Read

This function is used to continuously perform decoding as long as one of the Trigger keys (R) and (L) is held down. Once bar codes are decoded they will not be read any more. This function is useful for reading all bar codes without repeating the same action when more than one bar code is printed on one slip.

Package Read

This function is used to output the read result obtained from more than one bar code in a package. With the multi-step read function, once bar codes are decoded they will not be read any more. This is useful for handling multiple pieces of bar code data. However, if any of the following unfavorable conditions occur, all the bar codes may not be read in one capture:

- The objective bar code of read is not contained in the captured image.
- The focus is not sharp enough.
- The exposure is not correct.

Table 3.47 Difference between Multi-step and Package Reads

Performance	Multi-step Read Mode	Package Read Mode
Maxi. no. of bar codes to read (Max. no. of read steps)	10	10
Max. no. of digits to read	4,095	4,095 (see note below.)
Total no. of digits to read	4,095 x 10 = 40,950	4,095
Read method	Continuously reads the specified number of bar codes as long as the Program key is held down. Different from Package read in which multiple bar codes are read at a single scan, a single kind of a symbol will be continuously read through multi read steps. If one bar code is read, the buzzer sounds and the LED turns on.	Multiple bar codes are read in a single scan. Neither the buzzer sounds nor the LED turns on until the specified no. of bar codes has been read.
Recommended method of use	This mode is suitable in the following cases: - If the bar code has many digits. - If the target bar codes are spaced. - To positively confirm a read.	This mode is suitable in the following case: - If multiple bar codes with small number of digits are adjacent to one another.

Note:
This terminal has been designed so that a maximum of 10 bar codes or 4,095 digits of bar codes can be read. However, it is not recommended for the user to use the package read mode for reading bar codes consisting of a large number of digits. If the number of bar codes is greater than 4, or if the total number of digits is greater than 100, use the multiple-step read mode as much as possible.

Decode Deliberation

The deliberation of decoding can be set up in five scales. If it is set up to “Very Quick” or “Quick”, the decoding speed becomes fast though the number of symbols to be decoded is limited instead. Or, if it is set up to “Deliberate” or “Very Deliberate”, the speed becomes slow though the number of symbols to be decoded is increased.

Table 3.48

Deliberation	Symbol to be read	Decoding speed
Very Quick	1D bar code with a good quality	Very fast
Quick	1D bar code with a bad quality PDF417 in 500 digits or less.	Fast
Normal	PDF417, DataMatrix, QR, Aztec Code, MicroPDF, Code49, Codablock F, Composite code and Maxicode in 1,000 digits or less,	Normal
Deliberate	PDF417, DataMatrix, QR, Aztec Code in 1,000 to 2,000 digits. TLC39 in 80 digits or less. RSS-14 Stacked /RSS Expanded Stacked	Slow
Very Deliberate	PDF417, DataMatrix, QR, Aztec Code in 2,000 digits or more TLC39 in 80 digits or more	Very slow

Automatic Combination

The terminal supports the automatic combination of symbols for certain symbologies. The supported symbologies are Code93, Code49 and QR Code. When the combination end symbol is read or all symbols of any of these symbologies are read, the data are saved in the buffer and then all the data are combined and then output.

Table 3.49

Symbology	Condition	Process to combine
Code93	A symbol with space at the forefront of data	- If a symbol with space at the forefront of data is read, the data is saved in the internal buffer. - And, other symbols with the space at the forefront are continued to be read. All the read data are saved in the buffer and then combined in order. The data are not output. - Lastly, if a symbol staring with non-space data at the forefront is read, the last symbol data is combined into other symbols in the buffer and then all the combined symbols are output
Code49	A symbol starting with the mode 1(M=1) at the forefront of data	The method of the process is the same with that of Code93 symbology. The difference is the forefront of data starting with “M=1”.
QR Code	A symbol with the combination identifier included	Each symbol of the combination QR Code symbology includes an identifier that can identify the number of separations and “n th” symbol for the symbol. The decoder will combine all the data in order by interpreting each identifier included in the symbols after reading all the symbols, and output.

Note:

The three symbologies in the table are read only in the normal read mode. Reading the combine symbologies in the multi-step read and package read modes is not possible.

Reading Binary data

Decoded data of scanned symbol can be output in binary data instead of character string data. This enables to scan ciphered data and image, voice sound in binary data, character string delimited with NULL character.

3.3.4 Image Capture Function

This function is used to capture image data and save it as a JPEG file.

Table 3.50

Reduction		1/1, 1/2, 1/4
Size	1/1 reduction	752 x 480 pixels
	1/2 reduction	376 x 240 pixels
	1/4 reduction	188 x 120 pixels
	Partial extraction is possible.	
Scale		2- or 256-gray scale

3.3.5 Signature Index Function

This function scans both symbol and signature at one time and outputs the symbol data and indexed signature at the same time. The position and size of a signature can be specified in the user application based on the position of the symbol. The applicable symbologies are Code39, Nw7 (Codabar), Code128, PDF417 and Aztec.

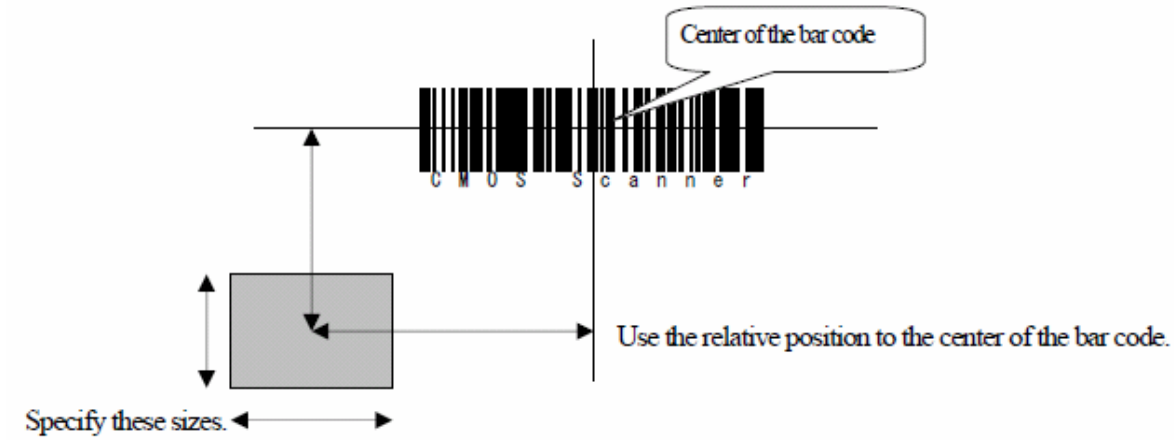


Fig. 3.3

As shown above, a rectangular area relative to the center of the symbol will be indexed and output as an image file.

3.3.6 Streaming Display Function

This function sequentially displays an image while continuously operating the CMOS Imager. With the image capturing function in Chapter 3.3.4 “Image Capture Function”, the streaming display function can be used to display image preview.

Table 3.51

Reduction		1/1, 1/2, 1/4
Size	1/1 reduction	188 x 120 pixels
	1/2 reduction	
	1/4 reduction	
	Partial extraction is possible.	
Scale		2- or 256-gray scale
Frame rate		30 fps or less

3.3.7 LED Intensity

The terminal integrates the illumination LED for lighting and the aimer LED for focusing a symbol to scan. Setting the intensity of the illumination LED to zero will turn off. This setting is useful when the terminal is used outdoor where the illumination LED is not needed, or when a stamp in red is to be read.

Table 3.51

Illumination	Type	LED in red
	ON, OFF	Possible
	Intensity adjustment	Not possible for fine tuning. Set to either “0” for turning off the LED or “100” for turning on.
Aimer	Type	LED in green
	ON, OFF	Possible
	Intensity adjustment	Not possible for fine tuning. Set to either “0” for turning off the LED or “100” for turning on.

3.3.8 Imager's APO

This function will shut down the power to the imager automatically if the imager has not been used for a while. After activating the APO (Automatic Power OFF) function, the imager's power can be turned on again if one of the following functions is invoked. The time period of the APO function can be set up in the range of 0 to 1,800 seconds. Specifying "0" will disable it. The power consumption by the imager can be curbed while the APO function is activating. However, note that it takes about 30 milliseconds to put the power back on.

- Scan a symbol.
- Assist scanning symbol.
- Scan an OCR font.
- Capture an image.
- Index a signature.
- Stream display.
- Adjust CMOS imager.

3.3.9 Scan Result Notification

The notification of the read completion of a symbol can be posted using one of the following two integrated devices. The buzzer sound level can be set up at the Control Panel.

Table 3.52

Device	Setting	Read succeeded	Read failed	Read terminated (release the Trigger key)	Remark
LED	Mode 1	Lit in green	Lit in red	None	Default
	Mode 2	Lit in green	None	None	
	Invalid	None	None	None	
Buzzer	Valid	Sound	None	None	Default
	Invalid	None	None	None	

3.4 USB

3.4.1 Basic Specifications

USB Client (USB Function)

- Supports the USB 1.1 full speed.
- Communication with PC can be established via "wceusbsh.dll".
- Communication with PC can be established via ActiveSync.
- Communication with PC can be established via **FLCE**/**LMWIN** (ActiveSync must be disabled.)

3.4.2 COM Port

COM port used via USB is as follows.

Table 3.52

USB Function	COM5

3.4.3 Product ID

The USB product ID is as follows.

Table 3.53

USB Client	0x3303

3.5 IrDA

3.5.1 Communication Speeds

The IrDA supports the following physical communication speeds.

Table 3.54

Via	SIR	FIR
IrDA protocol	9600, 19.2K, 38.4K, 57.6K, 115.2K bps	4M bps
RAW IR	9600, 19.2K, 38.4K, 57.6K, 115.2K bps	-

Notes:

- A speed of communication via IrDA protocol is automatically determined by negotiation with the partner device.
- The maximum communication speed supported commonly by both parties (the terminal and the partner device) will be determined as communication speed.
- Communication speed cannot be set in application.

3.5.2 COM Port

COM ports used via IrDA are as follows.

Table 3.55

IrDA protocol	COM3
RAW IR	COM4

3.6 Bluetooth

3.6.1 Basic Functions

Master
The terminal (“Master”) establishes a connection with a Bluetooth equipment in slave mode.

Slave
The terminal (“Slave”) is in waiting mode for communication to be established by the master.

Security/Encryption
Performs security (PassKey exchange) and encryption as laid down in the Bluetooth standard.

AFH
Automatically or manually limits and controls radio wave frequency band to be employed in Bluetooth communication.

Fast Connection
This is to convert radio frequency for Bluetooth communication into transmission pattern which allows connection establishment quickly.

3.6.2 Communication Profiles

The following are supported Bluetooth profiles.

Table 3.56

Function	Purpose
GAP (General Accessible Profile)	Used in the substructure segment of Bluetooth communications such as device discovery, link establishment and security.
SDP (Service Discovery Profile)	Used to search for currently usable services provided by the partner Bluetooth equipment.
Serial Profile (Client)	In Bluetooth serial communication, this is used for connection to other Bluetooth equipment.
Serial Profile (Server)	In Bluetooth serial communication, this is used for acceptance of connection request from other Bluetooth equipment.
DUN (Dial-Up Network)	This is used in dial up communication via Bluetooth mobile phone.
PAN (Personal Area Network)	This is used in network communication via Bluetooth PAN Access-Point.
OBEX Object Push Profile	This is used as easy file send/receive.
File Transfer Profile	This is used as file send/receive regulated by the Bluetooth standard.

Bluetooth communication application and communication method as well as profile relationships are as follows.

Table 3.57

Partner Bluetooth Equipment	Communication Application	Profile
Bluetooth mobile phone, Bluetooth modem, etc.	Dial up	DUN
Bluetooth access point (PAN Profile support)	LAN connection	PAN
Bluetooth printer	Printing to printer	Serial Profile
PC for Bluetooth + Active Sync	Connection with host PC	Serial Profile
Between handheld terminals, PDA that supports Bluetooth, PC that supports Bluetooth, etc.	File transfer between Bluetooth equipment	OBEX Object Push File Transfer

3.6.3 Security

This feature supports security functions laid down in the Bluetooth standard.
The Bluetooth security is divided into authentication and encryption. These are realized by the use of PassKey (otherwise known as PIN code). PassKey is a shared (common) authentication key used when forming a connection and trust relationship (bonding) with Bluetooth equipment. A maximum of 16 characters (in ASCII code) can be used, but there may be limitations on the no. of digits and usable characters due to the specifications of partner Bluetooth equipment. Also PassKey input must be done within 30 seconds from a time when PassKey input request is generated. Note that PassKey input is not required once "device trust" has been established with Bluetooth equipment in previous connection. However, the partner Bluetooth equipment must have also the trust relationship in memory.
Encryption is executed using a link key generated after PassKey exchange and a cipher key generated from a 128-bit random number. Here, the partner Bluetooth equipment also must support the encryption. PassKey exchange is required for Bluetooth connection when encryption is set enabled.

3.6.4 COM Port

The following are the COM ports used via Bluetooth.

Table 3.58

Serial Profile (Client)	COM6
Serial Profile (Server)	COM7
DUN (Dial-Up Network)	BTP1

Simultaneous Use of multiple Bluetooth COM Ports
Multiple Bluetooth COM ports cannot be opened simultaneously and used.

3.6.5 Communication Procedures

The following are the basic procedures for using Bluetooth to communicate.

Initializing Bluetooth
This function initializes the Bluetooth using either the Bluetooth tool or the Common Device Control Library. It will turn ON the power to the Bluetooth module integrated in the terminal and initialize the Bluetooth protocol stack.

1. Searching a Bluetooth equipment
   Searches a Bluetooth equipment using the Bluetooth tool or the Common Device Control Library. This sends out an equipment search radio wave and captures information from Bluetooth equipment operable in the vicinity.
2. Capturing service information
   Captures service information using either the Bluetooth tool or the Common Device Control Library. This captures the current usable service (profile) information of the partner Bluetooth equipment.
3. Security authentication with PassKey exchange
   The partner Bluetooth equipment may request a PassKey at a time of capturing service information and establishing Bluetooth connection.
   - In case the Bluetooth tool is used, the same PassKey is input for both Bluetooth equipments (the terminal and the partner Bluetooth equipment) when a dialogue window appears requesting PassKey input.
   - In case the Common Device Control Library is used, the PassKey must be set in advance by executing the relative functions for setting PassKey.
4. Establishing the connection
   Establishes a Bluetooth connection using either the Bluetooth tool or the Common Device Control Library. After the connection has been established, communication in Bluetooth can be continued using the selected profile until the connection is terminated.
5. Terminating the connection
   Terminates the connection using either the Bluetooth tool or the Common Device Control Library.
6. Closing the Bluetooth
   Closes the communication via Bluetooth either by ending use of the Bluetooth tool or by executing relative functions of the Common Device Control Library for closing the communication, and then turns off the power to the integrated Bluetooth module.

3.6.6 Communication Procedures by Profile

While Bluetooth communication takes place, there is a chance that the communication link may be interrupted due to the air condition, so the retry process is always recommended in application to verify the communication. In general, it is recommended also that the retry process should be carried out in any wireless communication including WLAN if it takes place within the vicinity by other equipment using the same frequency band ("ISM" band) such as microwave oven.

Serial Profile
Bluetooth connection can be managed using either the Bluetooth tool or the Common Device Control Library.

DUN (Dial-Up Network)
Bluetooth connection can be managed using either the Bluetooth tool or the Common Device Control Library. The communication will take place with RAS setting using "BTP1". After the connection has been established, communication via the TCP/IP protocol is possible.

PAN (Personal Area Network)
Once connection to Access-Point has been established using the Bluetooth tool, communication via the TCP/IP protocol is possible.

OBEX (Object Push Profile)
File transmission or reception using the Bluetooth tool is possible.

FTP (File Transfer Profile)
File transmission or reception using the Bluetooth tool is possible.

3.6.7 Process after Communication Interruption

With Bluetooth communication, there is a chance that the communication link may be interrupted due to the radio wave condition in air. An error occurred during the communication is detected by executing **WriteFile API** function or **ReadFile API** function, etc.
In case where the communication is interrupted, carry out the normal Bluetooth interruption process using the Bluetooth tool or in application and then retry to establish the same connection for communication.
If the normal Bluetooth interruption process is not made, unconformity in the Bluetooth stack will occur so that the lower layer is disconnected whereas the upper layer is still being connected causing the retry of establishing the connection is not possible.

3.6.8 Processing During Suspend/Resume

When the terminal goes into suspend mode while Bluetooth is being used, the power to the Bluetooth module integrated in the terminal will be automatically turned off. After that, when the terminal resumes operation mode, the power to the Bluetooth module also will be turned on automatically. Once the power is turned off, all the parameters related to Bluetooth communication return to their initial states. These parameters must be set again in the Bluetooth module by initializing the Bluetooth stack.
If the Bluetooth tool is used, it will automatically detect “suspend” and “resume” modes, and automatically initialize the Bluetooth stack. Note, however, that if WakeOn Bluetooth function has been set enabled, the power to the Bluetooth module will remain on even if suspend is executed. This will not initialize the Bluetooth stack.

3.6.9 Setting SR Mode Parameter

When executing Bluetooth communication, the connection will be established by transmitting radio waves by master Bluetooth equipment to slave Bluetooth equipment. Note that it may take time sometime to make the establishment depending on a type of the partner Bluetooth equipment. Here, by altering the SR mode parameter (used in Bluetooth connection), radio waves sent out when the master Bluetooth equipment makes the establishment will change, and may reduce the time required to establish the communication. The SR mode parameter can be set in the following registry.

［HKEY_CURRENT_USER\SOFTWARE\RXBT\HCI］

Table 3.59

Key	Setting Value	Meaning
DEFAULT_PAGE_SCAN_REP_MODE	dword:0/1/2	0:R0, 1:R1, 2:R2

Notes:

- Change the SR mode parameter prior to Bluetooth connection.
- Even if the SR mode parameter is changed, the time required to establish connection with the partner Bluetooth equipment may not be reduced.

3.7 WLAN

The IEEE802.11b WLAN is operable on the models, DT-X11M10RC and DT-X11M30RC. The IEEE802.11b standard utilizes unlicensed 2.4 GHz ISM (Industry, Science, and Medical) frequency band, which is used for close range wireless communication.

Device Name
On the terminal, the device name used to capture data for the WLAN driver with **DeviceIoControl** function is “GWCF1”.

3.7.1 Basic Specifications

Roaming
This function automatically switches Access-Point in environment where two or more Access-Points with identical SSID code exist.

Power Saving
This saves the power by automatically turning OFF the power to the integrated WLAN module in the terminal when communicating does not take place.

AdHoc
This operation mode provides a direct communication between wireless equipments without the use of Access-Point. Note, however, that the AdHoc mode is not recommended because connection problem may occur.

WEP
This is an encryption function that uses RC4 method for safe communication. It supports 40-bit (64-bit)/104-bit (128-bit).

TKIP
TKIP is supported to combat the weakness with WEP encryption.

IEEE802.1x Security
This can strengthen authentication and establish a safer WLAN. Usually, this is interlinked with TKIP. It supports WPA PSK and WPA EAP (PEAP-EAP-TLS, PEAP-MS-CHAP-V2, MD5, and EAP-TLS.

3.7.2 Expanded Features

Power ON/OFF Control
The power to the integrated WLAN module can be controlled in application. Turning OFF the power when the WLAN module is not in use can save power, prevent line congestion and allow the on-board use in aircraft (consult first with a flight attendant for the use in aircraft).

Operation Configuration File
The operation configuration file can be used to set each default value of the WLAN settings. However, if IEEE802.1x is set enabled, the configuration file cannot be used to set the default values.

Resume Operation
After the terminal went into suspend mode and then returned in resume mode during wireless operation, this will automatically establish connection again with the Access-Point to enable continuous wireless communication.

Out of Range/In Range
This will automatically establish connection again with the Access-Point to enable continuous wireless communication when the terminal returns within the range from out side of the range of the Access-Point during wireless operation.
This will automatically reconnect to the Access-Point if connection establishment with the Access-Point cannot be maintained due to noise or interference, or roaming is not possible for some reason.

3.7.3 Roaming

This feature automatically switches the Access-Point located in environment where multiple Access-Points with the identical SSID code exist.

1. Searches for Access-Points that can be communicated with the terminal, and lists up radio wave status of each Access-Point.
2. Compares radio wave status of the currently connected Access-Point with those for the listed Access-Points.
3. If the comparison proves that one of the listed Access-Points has a better radio wave status than the one currently being connected with the terminal, the terminal will make a request of roaming to that Access-Point.
4. If roaming permission comes from the Access-Point to the terminal, the roaming will complete. Note that if the roaming fails, the connection establishment will be disconnected and then connected again.

Notes:

- In some cases, the Access-Point may request the terminal for forcible roaming or reconnection with other Access-Point.
- If connection establishment of the Access-Point being connected with the terminal is terminated due to some reasons such as turning OFF the power on the Access-Point, the terminal may be forced to make a connection with other Access-Point.
- If it takes time for Access-Point to correspond for roaming request made by the terminal, the reconnection process may be initiated.
- If **DeAuthentication** or **DisAssociation** message issued by the Access-Point that is being connected with the terminal after roaming, the connection establishment between the Access-Point and the terminal may be interrupted temporarily and then connected again.

3.7.4 Zeroconfig

This feature coordinates with the module firmware and the WLAN driver to perform some of the WLAN link management and the Network management.

1. If multiple SSIDs are registered as prioritized connections, attempt to establish connection will be performed to each registered SSID. In this case, the interval of time period for reconnecting will become prolonged. If the reconnection time is considered to be as importance, register one SSID only as prioritized connection.
2. Reconnection loop process will initiate when a disconnection notification is issued by the module, or when Association fails.
3. The reconnection loop process will end when the terminal succeeds connection establishment with one of the multiple SSIDs registered as prioritized connections.

Connection Process

Zeroconfig will instruct the WLAN driver and the WLAN module to make connection when finding an Access-Point registered in the prioritized SSID list. Each firmware of the driver and the module both instructed initiates necessary process following the rules of IEEE802.11b standards to make connection with the Access-Point. If multiple SSIDs are registered as prioritized connections in the prioritized SSID list, attempt to establish connection with each SSID will be made.

Disconnection Process

In the following cases, the connection establishment with Access-Point will be disconnected. Firmware in the WLAN module judges on the disconnection and the roaming process.

1. When the quality of radio wave in air deteriorates because of interference from other WLAN equipment, noise, similar causes, or on-air communication by other WLAN devices.
2. When the Access-Point locates far from the terminal, or when radio waves are weakened due to obstacles.
3. When other Access-Point that can allow roaming to avoid the poor environment described in the situations 1 and 2 above cannot be found.

Resume Process

The following processes are performed when the terminal goes into resume mode.

- Unloading the driver
- Loading the driver
- Initializing
- Scanning Access-Point
- Creating the Access-Point list
- Establishing connection with Access-Point
- Changing the Task tray icon

3.7.5 Channels

The factory set default the no. of channels is set to “1CH-13CH” (13 channels).

3.7.6 WLAN Setting with Configuration File

The configuration file can be used to set the default values for the WLAN settings. By loading the configuration file into the terminal, settings required for WLAN operation can be easy.

- The path of the configuration file is “\FlashDisk\System Settings\WLANCFG.ini”.
- If no configuration file is available, WLAN operation is initiated with the default settings.
- When the IEEE802.1x standard is set enabled, the default values cannot be changed using the configuration file.

Timing to Load the File

The timing for incorporating the configuration file is when a reset or a full reset is performed on the terminal. When loading the configuration, if the file itself does not exist, its format is wrong, or the file has been specified as “Disable configuration file”, the default settings will not be made using the configuration file.

Creation Method

The net search utility can be used to set and change the default settings. Editor available generally also can be used to set the default settings. Note, however, that the WEP key has to be described as being in encryption status, so use the net search utility to create an encrypted character string in advance and copy it. The WLAN settings made using Microsoft’s “WLAN setting” will not be reflected in the configuration file.

File Format

File format of the configuration file is INI format with the specifications described below.

- The maximum size of the configuration file is 60Kbytes.
- A line starting with ";" is regarded as a comment. It is not regarded as a comment if it locates in the middle of a line.
- The separator for KEY and VALUE is "=". Space and tab, etc., also are included in KEY and VALUE. If a space is inserted after "=" in "SSID=□tunami", the SSID value is space + tunami.
- The end of a line is CR or CR/LF.
- The maximum length of a line is 256 bytes.
- Section name, KEY, and VALUE are case sensitive.

WLAN section

All WLAN settings are made here.

Table 3.60

Key	Setting Value
WLANPOWER	Specify turning on or off the power to the WLAN module. 1: Power on 0: Power off
POWERSAVE	Specify the WLAN power save setting. 1: Enable power save. 0: Disable the power save.
WLANCFG	Specify "Enable/Disable" on the configuration file itself. 1: Enable the file. 0: Disable the file.
RoamingRSSILevel	Specify roaming threshold value in the range of 0 to 154. This threshold value is used for the terminal to roam between Access-Points. As soon as the difference of radio wave strength exceeds over the specified threshold value, the terminal switches to another Access-Point located nearby to continue the communication.
RoamingAvailableTime	None (ignored)
RoamingRSSISpan	Specify intensity difference in the range of 0 to 154 for radio wave during roaming. The more high range of the span is specified, the more strong radio wave is requited to start roaming.
BandConfig	None (ignored)

The following are the default values and operations outside of the range.

Table 3.61

Key	Default Value	Operation Outside of Range
WLANPOWER	Not set	Not set
POWERSAVE	Not set	Sets just as it is Operation relies on the WLAN driver.
WLANCFG	"1": Enable	"1": Enable
RoamingRSSILevel	Not set	-
RoamingAvailableTime	Not set	-
RoamingRSSISpan	Not set	-
BandConfig	Not set	Sets just as it is Operation relies on the WLAN driver.

STATIC section

This is for specifying an Access-Point that the integrated WLAN module establishes the connection with.

Table 3.62

Key	Setting Value
SSID	Specify SSID.
ADHOC	Specify Infrastructure mode or AdHoc mode. 1: Infrastructure 0: AdHoc
WEP	Specify "With/Without" of WEP. 1: Without WEP 0: With WEP
KEYINDEX	Specify WEP key INDEX in the range of 0 to 3.
KEYDATA	Specify encrypted WEP key data. - 20bytes for 40-bit WEP - 52bytes for 108-bit WEP - Create using the Net Search utility.

The following is the default values and operations outside of the range.

Table 3.63

Key	Default Value	Operation Outside of Range
SSID	Ignore all of the STATIC section.	Ignore all of the STATIC section.
ADHOC	"1": Infrastructure mode	"1": Infrastructure mode
WEP	"1": Without WEP	"1": Without WEP
KEYINDEX	Ignore all of the STATIC section.	Ignore all of the STATIC section.
KEYDATA	Ignore all of the STATIC section.	Ignore all of the STATIC section.

TCIP section

This is for setting the integrated WLAN module's IP address.

Table 3.64

Key	Setting Value
DHCP	Specify "Enable/Disable" on the DHCP. 1: Enable DHCP. 0: Disable DHCP. The following settings are disabled if "Enable" is specified.
IPADDRESS	Specify IP address.
SUBNETMASK	Specify subnet mask.
DEFAULTGATEWAY	Specify default gateway.
DNS1	Specify primary DNS server address.
DNS2	Specify secondary DNS server address.
WINS1	Specify primary WINS server address.
WINS2	Specify secondary WINS server address.

The following are the default values and operations outside of the range.

Table 3.65

Key	Default Value	Operation Outside of Range
DHCP	"1": DHCP enabled	"1": DHCP enabled
IPADDRESS	Not set.	Set as it is.
SUBNETMASK	Not set.	Set as it is.
DEFAULTGATEWAY	Not set.	Set as it is.
DNS1	Not set.	Set as it is.
DNS2	Not set.	Set as it is.
WINS1	Not set.	Set as it is.
WINS2	Not set.	Set as it is.

Note:

IP address is set as it is without validity check carried out on it.

Example of Configuration File

The following is an example of what is described generally in configuration file.

```
[WLAN]
WLANPOWER=1
POWERSAVE=1
WLANCFG=1
RoamingRSSILevel=-78
RoamingRSSISpan=1
RoamingAvailableTime=60
BandConfig=1

[STATIC]
SSID=tunami
ADHOC=0
WEP=1
KEYINDEX=0
KEYDATA= 5C1E1455A2D504920483C59EA19AC2AB3F12821273BD2A17A9BE

[TCPIP]
DHCP=0
IPADDRESS=192.168.1.100
DEFAULTGATEWAY=192.168.1.100
SUBNETMASK=255.255.255.0
DNS1=192.168.1.101
DNS1=192.168.1.102
WINS1=192.168.1.103
WINS2=192.168.1.104
```

3.8 Power Control

3.8.1 Reset Controls

Power ON Reset

In the condition that the power on the terminal is not supplied by AC adaptor and the battery pack and the memory backup battery are not being installed (including the state that the capacity of the battery pack has been discharged), this occurs if the battery pack is installed and then the power is turned ON. All of memory - DRAM data storage memory (data saved by the user, database, applications installed in the DRAM, etc.), program execution memory and memory used by drivers - will be initialized (cleared). Data in the FROM will be maintained.

Reset

This occurs when the Reset switch is pressed while the terminal is operating (power ON status). Care must be taken before performing the reset because if it takes place while operation continues on the terminal, in-progress data and files being accessed may be corrupted.
If the Reset switch is pressed when the power is turned off, the power will be turned on and the terminal starts up. Memory for executing DRAM programs and unsaved in-progress data will be cleared, but data storage memory and data in the FROM will be maintained.

Full Reset

This occurs if the power key is held down at the same time and the Reset switch is pressed for a period of one second or more while the terminal is in operation.
For the full reset, the following two different messages will appear to confirm whether or not it is okay to continue the reset of operations.
To cancel the full reset operation, press the Trigger L key. Pressing the Trigger R key will cause the message in Fig. 3.4 to appear. Pressing the Trigger R key at the second time will clear all data in the memory (for data storage, working area for the OS and programs), and initialize the memory.

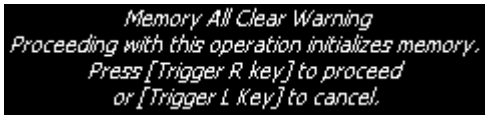


Fig. 3.3

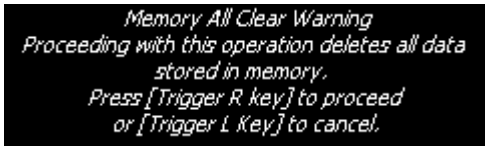


Fig. 3.4

3.8.2 Memory Corruption Check

At a time of reset under WindowsCE OS, RAM data corruption is detected if any. If a RAM data corruption is detected, the memory will be unconditionally initialized without issuing a warning message to the user.
To prevent this memory initialization without issuing a message, check the status of data used for memory check in the driver before the process for OS booting up. If a memory corruption is detected, the following message, asking for confirmation of whether it is okay to implement recovery (reset), will appear.

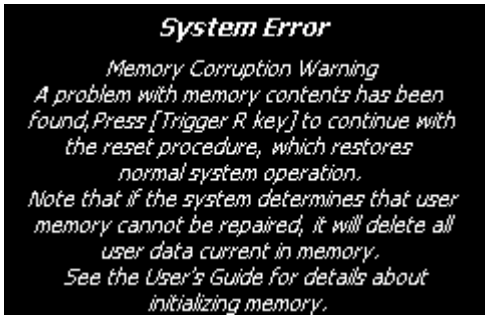


Fig. 3.5

The Trigger R key is pressed to continue the rest of operations (reset). Once the Trigger R key is pressed while the confirmation message is on the screen, the reset process will be executed and the recovery process is attempted.

3.8.3 Low Voltage Monitoring

Four levels of the low voltage monitor control are provided for the terminal.

Table 3.66

Level	Description	Action	Next Startup
VDET1	Warning against low voltage of the battery pack	Issues warning message for low voltage of the battery pack	-
VDET2	Turning off the power due to low voltage of the battery pack	Turns off the power.	Resume (with warning at time of startup)
VDET3	Emergency turning off the power due to low voltage of the battery pack	Forces the terminal to turn off the power.	Warm boot (with warning at time of startup)
VDETCF	Turning off the power due to low voltage of card	Turns off the power.	Resume (with warning at time of startup)

Battery Pack

The following shows statuses and levels available for the battery pack (HA-A20BAT or DT-5025LBAT). Normally the battery status is checked once every five seconds. However, it will be performed every second when the power management property is displayed. Taking last immediate ten data of the power voltage from the AD converter, its average is calculated to classify the status in three levels, either “Almost exhausted (10 % of the capacity or less)”, or “Low (30 % of the capacity or less)”, or “O.K. (30 % of the capacity or more)”. The level is 10 % of the capacity when VDET1 occurs.

Table 3.67

Status/Level		Notation	Description
Status	External	External	Power by AC adaptor is being supplied, and charging the battery pack is complete.
	Recharge	Charging	Power by AC adaptor is being supplied, and charging the battery pack continues.
	Normal	Main battery	Power by the battery pack is being supplied.
Level	1	Good	The battery pack has been fully charged or has a sufficient capacity.
	2	Low	The battery voltage level is half or less.
	3	Very low	“VDET1” has been detected.

User Notification Methods
When VDET1 status occurs, the PBT_APMBATTERYLOW is issued periodically by WM_POWERBROADCAST message to the application.
GetSystemPowerStatusEx2() API function is used to monitor voltage in application capturing values listed below. Detailed values can be fetched using the **WIN32 API**.

- ACLineStatus
- BatteryFlag
- BatteryLifePercent
- BatteryChemistry

3.8.4 Power ON Factors

The followings are the power ON factors. These factors can be set enabled or disabled using the Common Device Control Library.

- The Power key is pressed while the power is off.
- A time period set for the Alarm function has been elapsed.
- The terminal is mounted on the cradle while the power is being supplied by AC adaptor via the cradle.
- Trigger key has been pressed.

Note:
Turning ON the power with the Power key cannot be controlled using the Common Device Control Library.

Power ON Disable Factors
Factors that do not allow turning on the power are as follows.
- When the battery pack's voltage level is not sufficient enough to start up the terminal (VDET2 level or lower).
- The battery cover lock is open.

3.8.5 Power OFF Factors

The following are the power OFF factors.

- The Power key is pressed while the power is on.
- Neither key input, touching on the touch panel, disk access, card access, nor communication is performed within a preset time period.
- Output voltage from the battery pack is low (VDET2, VDET3) (see note).
- The battery cover lock is open. (BCVR) (see note)
- An excess of load on the CF card lowers voltage (VDETCF) (see note).

Note:
Warning message will appear a next time when the power is turned on.

Power OFF Time
When either VDET2, BCVR, VDETCF or VDET3 occurs, the power will be turned off after its time period listed in the following table elapses.

Table 3.68

VDET2	Turning off (resume OFF) the power after 200 milliseconds.
BCVR	
VDETCF	
VDET3	Forced to turn off the power after 500 microseconds.

3.8.6 Power Saving

Idle

The power consumption will be saved by putting the CPU into **idle state** when event standby status is detected by either the terminal or application running on the terminal. The peripheral devices will run while the CPU is in the idle state.

APO (Auto Power OFF)

The power is automatically turned OFF when the state of no key input, or no touching on the touch panel, is detected within a preset time period. Setting the **APO** function enabled or disabled, or a time period to activate the function can be performed using the Common Device Control Library.

Dimming and ABO (Auto Backlight OFF)

The backlight is automatically dimmed or turned off when a preset time period has elapsed if the state of no key input, or no touching on the touch panel, is detected within the period. Setting a time period before starting dimming and a time period before turning off the backlight (Auto backlight OFF), and setting “Enable/Disable” on the dimming and auto backlight OFF functions can be set using the Common Device Control Library.

CPU Clock Frequency Control

The method of moving to the Turbo mode can be set by each user, and the CPU clock frequency can be switched from 200 MHz to 400 MHz.

3.8.7 CPU Power State Control

The following shows the power states operable on the terminal.

Table 3.69

State	Contents
Discharge	State in that the battery pack has been discharged, and the super capacity has been also discharged. Neither RAM nor RTC will be backed up.
RTC backup	State in that only the RTC is being backed up. RAM is not backed up.
SLEEP mode	State in that the power on the terminal is turned OFF, and peripheral devices are also turned OFF. RTC and RAM are backed up.
RUN mode	State in that the terminal is running or application is running on the terminal. The CPU is running at 200MHz.
IDLE mode	State in that the terminal or application is waiting for an event to occur.
TURBO mode	The CPU is running at 400MHz.

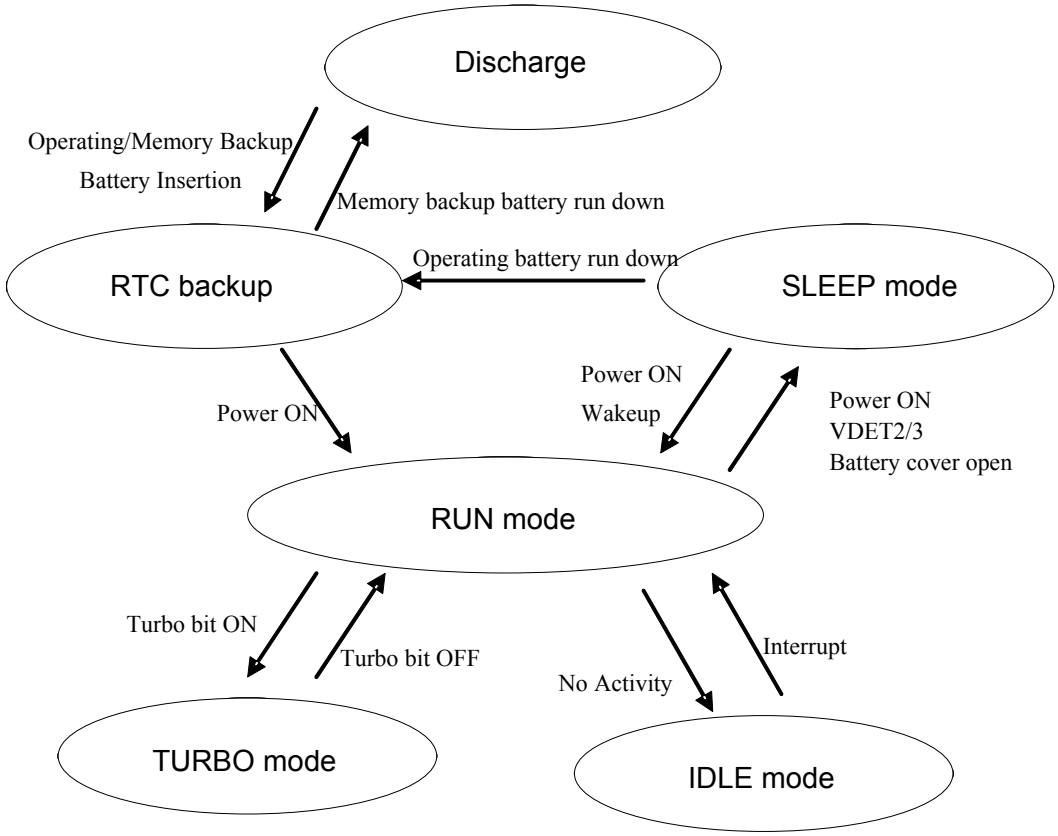


Fig. 3.6

3.8.8 Charging/Supplying the Power

The optional DT-5022CHG Dual Battery Charger can be used to charge battery packs (two at a time). Mounting the terminal on the DT-160IOE Bridge Satellite Cradle or on the DT-169CHGE Cradle-type Charger allows charging the battery pack installed in the terminal and supplying the power to the terminal.

3.9 Security

3.9.1 Setting Password for Terminal

This is the password setting implemented in the WindowsCE OS. A password can be set at the Control Panel.

3.9.2 Setting Password for Date/Time Properties

This is to enable setting a password for accessing the date and time setting in order to prevent the user from changing the settings of the terminal. Use **PASSTOOL** located under Windows folder to make the setting. Password registered will be saved in the FlashROM along with individual ID setting, etc.

3.9.3 Setting Individual ID

Individual ID is written into a predetermined area in the FlashROM at time of shipping the terminal from the factory. Distributor code (a code used to protect distributor developed software from illegal copying by unauthorized party) is saved in other area different from the individual ID. The individual ID incorporates the product code and serial number etc. and always becomes a unique code different from other units. The Common Device Control Library can be used to read the individual ID set on each unit of the terminal.

3.9.4 Setting Distributor ID

The individual ID and distributor ID can be used by the distributor and user to prevent illegal use of application by unauthorized party at a time of installing or executing the illegally copied application by checking these preset codes. The distributor code is saved in the FlashROM area, and read using the Common Device Control Library.

4. Application

This chapter explains about applications available in the terminal. They are classified into several groups described in the table below.

Table 4.1

Classification	Description
Control Panel Applets	Start up the applets at the Control Panel. The applets are used to set the parameters required for the terminal and integrated devices.
Application programs	Start up applications by accessing the menus in order of **Start** → **Program**. Operational screens of each application appear and then the related processes are executed.
Utilities	The utilities are executed as co-process or auxiliary program in user applications.
Host applications	Application programs used by host PC.

4.1 Control Panel Applets

The control panel applets are programs that display each content of the various parameters for the terminal itself and change the settings. The control panel applets are as follows.

Table 4.2

Applet	Description	Proprietary of	
		CASIO	MS
Bluetooth Connection	Executes connection establishment with Bluetooth device.	Yes	--
BuiltInWLanPower (note 1)	Sets up the powers for CF card and WLAN.	Yes	--
CPU Speed	Sets up the CPU's clock frequency.	Yes	--
Error Reporting	Sets up error report.	--	Yes
PC Connection	Changes the desktop settings of connection with PC.	--	Yes
Remove Programs	Deletes application program installed in the terminal.	--	Yes
Internet Options	Changes internet settings.	--	Yes
Keyboard	Changes the speed of key repeat input and the maximum waiting time.	--	Yes
System	Displays system information and changes memory settings.	--	Yes
Stylus	Calibrates the touch screen and adjusts double taps speed.	--	Yes
Terminal Server Client Licenses	Displays authentication license for registered terminal service client.	--	Yes
Dialing	Changes telephony settings.	--	Yes
Network and Dial-up Connections	Connects the terminal to other PC, network or internet.	--	Yes
Version Info	Displays the terminal version information.	--	Yes
Password	Changes owner password and security options.	--	Yes
Power	Changes the power management options.	--	Yes
Buzzer	Sets up buzzer sound volume.	Yes	--
Volume & Sounds	Sets up type and its sound volume.	--	Yes
Mouse	Adjusts double click speed.	--	Yes
Laser Setting (note 2)	Changes the scanner settings.	Yes	--
Imager Setting (note 1)	Changes the imager settings.	Yes	--
Display	Changes the desktop background.	--	Yes
Storage Manager	Manages storage location and its disk partition.	--	Yes
Owner	Changes owner's personal profile.	--	Yes
Certificates	Displays and changes the terminal's system and its digital certificate.	--	Yes
Regional Settings	Changes display methods of numeric value, currency, date and time.	--	Yes
Date/Time	Changes settings for data, time and time zone.	--	Yes
Input Panel	Changes the current input method and options.	--	Yes
Brightness	Changes the backlight brightness.	Yes	--

Notes:

1. Available on DT-X11M30E, DT-X11M30U and DT-X11M30RC only.
2. Available on DT-X11M10E and DT-X11M10RC only.

4.1.1 Bluetooth Connection

This applet executes connection establishment with other Bluetooth device. For detailed explanation on the Bluetooth settings, refer to “DT-X11 Series Bluetooth Setting Manual” separately available.

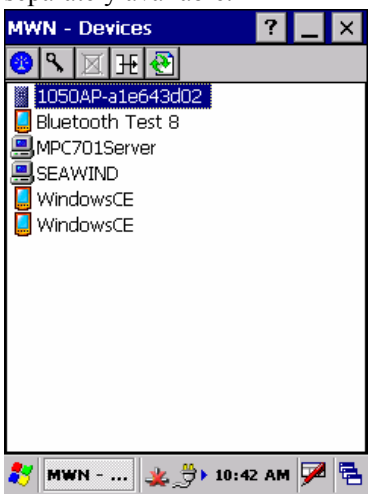


Fig. 4.1

4.1.2 BuiltInWLanPower

This applet is to set up the settings for power to the integrated WLAN module (applicable to DT-X11M10RC and DT-X11M30RC). Set up the checkbox of “Enable” effect for Power Save Mode to save the power to the integrated WLAN module. The power save mode will save the power consumed by the WLAN module and consequently prolong the battery life.

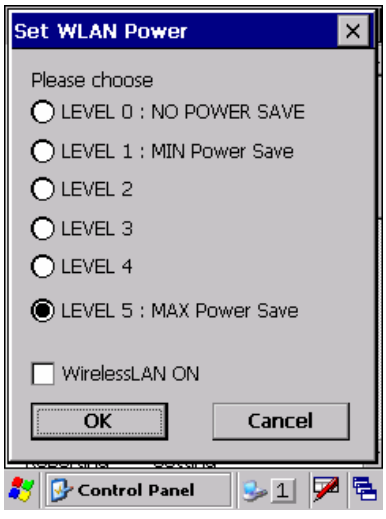


Fig. 4.2

4.1.3 WLAN Settings

This applet is to set up the parameters for WLAN connection.

Wireless Information tab

This tab displays a list of networks (SSID codes) connectable to the terminal and the current network being connected and the radio wave signal strength. See Fig. 4.3.

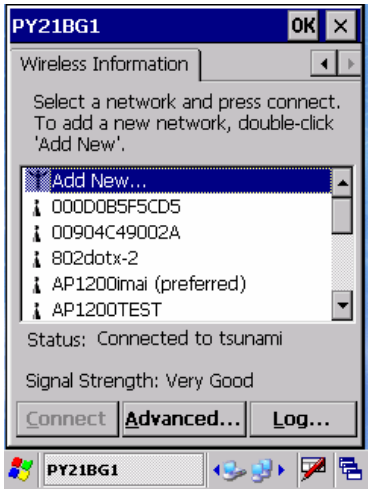


Fig. 4.3

Double tap a network on the screen you wish to display the Wireless Property screen.

Connect Button

This button displays the Connection Setting screen to set up the parameters required to connect the terminal with Access-Point.

Advanced... Button

This button displays Advanced Setting screen to set up the detailed parameters for WLAN connection.

Log... Button

This button displays operation logs for the WLAN operation.

Wireless Properties screen

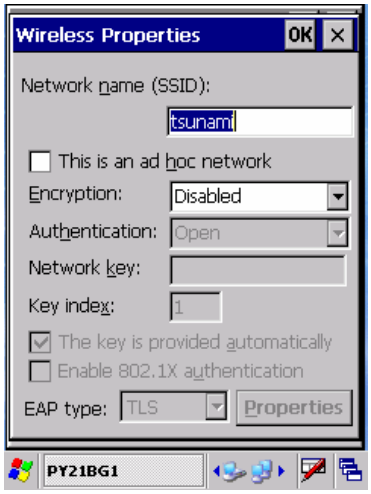


Fig. 4.4

Network name (SSID)

This field is to specify a network (SSID) name.

This is an ad hoc network

Set the checkbox enabled to communicate in AdHoc mode. Note, however, that the AdHoc mode is not recommended because a communication difficulty may occur.

Encryption

Using the pull-down menu, set **Encryption** to either “Disabled” or “WEP”. When “WEP” is selected, specify the subsequent parameters in the fields listed below and set the checkboxes enabled or disabled as needed. See Fig. 4.4.

- Authentication
- Network key
- Key index
- The key is provided automatically
- Enable 802.1x authentication
- EAP type

Connection Setting Screen

IP Address tab

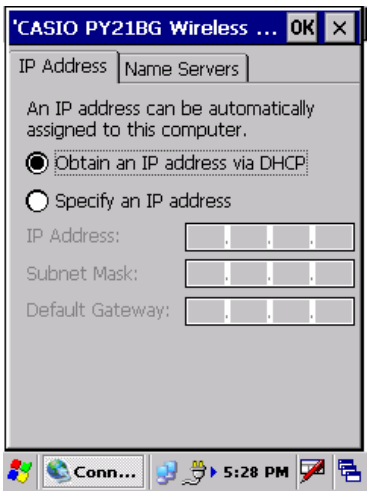


Fig. 4.5

Obtain an IP address via DHCP

Set this radio button enabled if the DHCP server is used.

Specify an IP address

Set this radio button if an IP address is specified directly without using the DHCP server. In this case, enter codes in each field of **IP Address**, **Sub Net Mask** and **Default Gateway**.

Name Servers tab

This tab is to specify **Primary DNS**, **Secondary DNS**, **Primary WINS** and **Secondary WINS** as required.

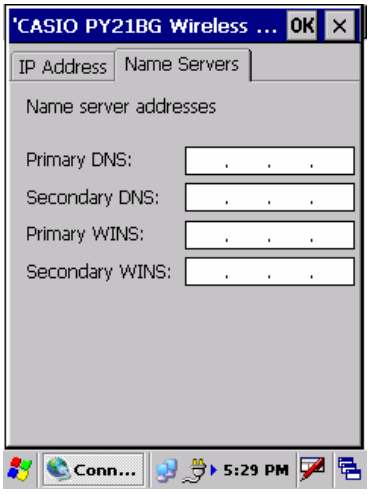


Fig. 4.6

Advanced Wireless Settings screen

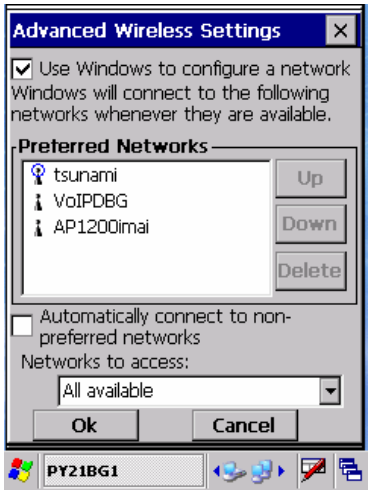


Fig. 4.7

Use Windows to configure a network

Set this checkbox enabled if Windows is used to configure the network parameters. In this case, specify the appropriate items in the fields listed below and set the checkbox enabled or disabled as needed. See Fig. 4.7.

- Preferred Networks
- Automatically connect to non-preferred networks
- Networks to access

4.1.4 CPU Speed

This applet is for setting the CPU operating mode.

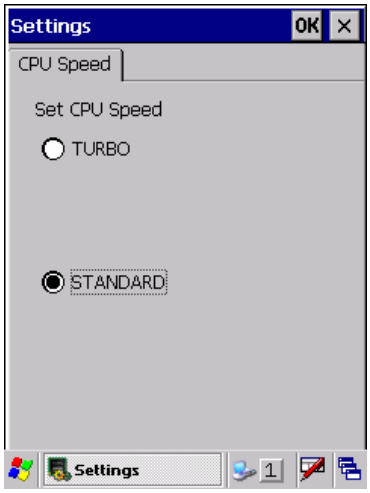


Fig. 4.8

TURBO

This mode sets the CPU's clock frequency to 400MHz.

STANDARD

This mode sets the CPU's clock frequency to 200MHz.

4.1.5 Error Reporting

Error information is recorded in the log file when an error occurs in the terminal or when an application is running.

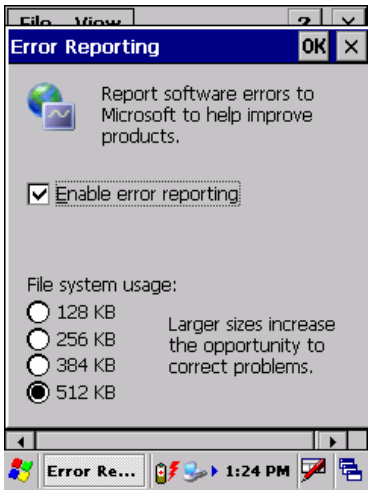


Fig. 4.9

Enable error reporting

Set the checkbox enabled to create an error log file.

File system usage

This parameter is to specify the maximum size of an error log file selecting one of the values listed in Fig. 4.9 by setting its radio button enabled.

4.1.6 PC Connection

This tab is to set connecting method with PC.

Fig. 4.10

Enable direct connections to the desktop computer

Set the checkbox enabled to establish a connection in **ActiveSync** with PC via USB Cradle.

Change Connection … Button

This button displays a window (Change Connection) to change the method of connection method with PC. To set the connection establishment with PC in **ActiveSync** via USB Cradle, select **USB Default** in the pull-down menu.

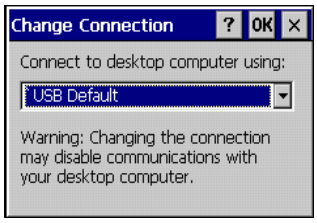


Fig. 4.11

4.1.7 Remove Programs

This applet is used to delete installed application programs in the terminal.
Select an application program in the list appeared in the tab to be deleted and then press **Remove.** button to delete it. Programs burnt in the ROM in the terminal cannot be deleted.

Fig. 4.12

4.1.8 Internet Options

This applet is to set up Internet Explorer options. Refer to the descriptions below about the fields and the buttons in the tab.

General tab

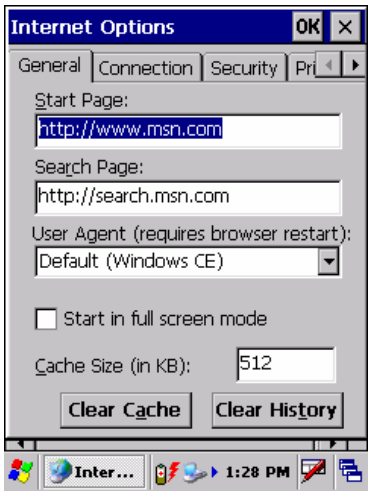


Fig. 4.13

Start Page

This field is to specify the start page of URL.

Search Page

This field is to specify URL used with search page.

User Agent

This field is for selecting user agent.

Start in full screen mode

Set the checkbox enabled to display the full screen when the Internet is initiated a next time.

Cache Size (in KB)

This field is to specify the cache size in Kbytes.

Clear Cache Button

Press this button to clear the cache memory.

Clear History Button

Press this button to clear the history.

Connection tab

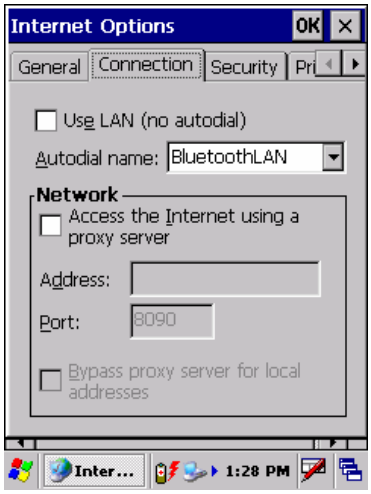


Fig. 4.14

Use LAN (no autodial)

Set the checkbox enabled to connect the terminal in LAN mode.

Autodial name

Select an autodial name in the pull-down menu when communication is made without the use of LAN.

Access the Internet using a proxy server

Set the checkbox enabled when a proxy server is used for accessing to Internet. In this case, specify the appropriate items and value in the fields below as needed.

- Address
- Port
- Bypass proxy server for local address

Security tab

This tab is to set up security by zone for **Internet**, **Local intranet**, **Trusted sites** and **Restricted sites**. See Fig. 4.15.

Fig. 4.15

Sites... Button

This button displays the site adding screen to enable adding the specified site specified in **Add this web to the zone** field to the selected zone.

Settings... Button

This button displays advanced setting screen for detail security setting by zone.

Privacy tab

Fig. 4.16

Privacy level

This pull-down menu is to select a privacy level.

Default Button

This button returns the setting contents to the default values.

Advanced Button

This button displays the advanced privacy settings screen to set advanced settings of the privacy.

Sites Button

This button displays the per site privacy actions screen to set privacy by site.

Advanced tab

This tab is for setting “Enabled” or “Disable” for each parameter of the Internet Options as required.

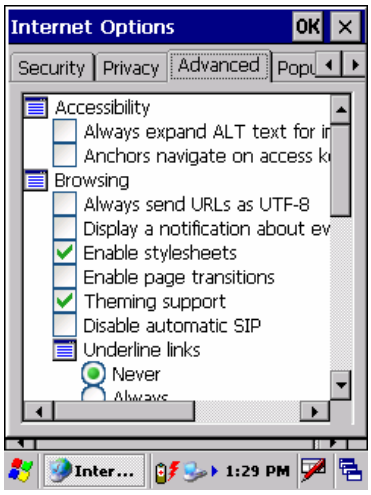


Fig. 4.17

Popups tab

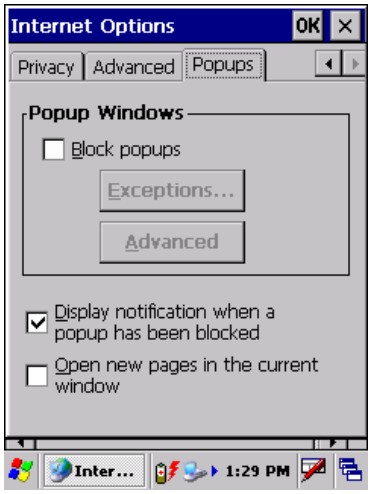


Fig. 4.18

Block popups

Set the checkbox enabled to disable popup windows.

Exceptions... Button

This button displays the popup exceptions screen to set up sites to be exempted from blocking popup windows.

Advanced Button

This button displays the popup filter screen to set up advanced settings of the popup block.

Display notification when a popup has been blocked

Set the checkbox enabled to display a notification when the popup has been blocked.

Open new pages in the current window

Set the checkbox enabled to display new pages in the current window.

4.1.9 Keyboard

This applet is for setting parameters concerned with operations by the keyboard.

Repeat tab

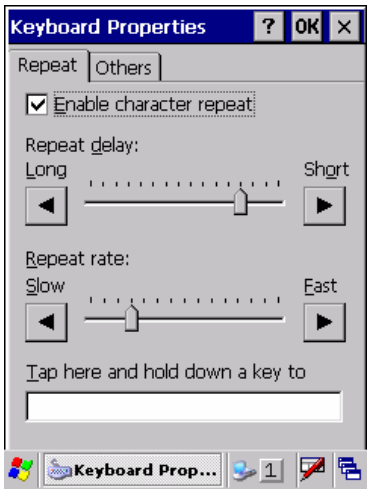


Fig. 4.19

Enable character repeat

Set the checkbox enabled to set repeating key entry.

Repeat delay

This adjustable slide is to set a waiting time period until when repeating key entry starts.

Repeat rate

This adjustable slide is to set an interval between repeating key entries.

Tap here and hold down a key to

The adjustments made in two parameters above with the adjustable slides can be checked by entering an actual key. First, tap any where in the field (the box) and then enter a key and hold it down to make entering the key repeated.

Others tab

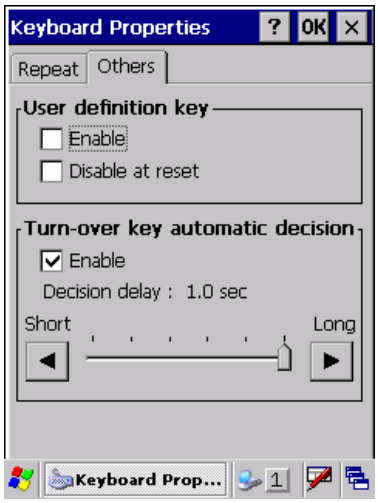


Fig. 4.20

User definition key

This field is to set the user definition keys enabled and to specify the same user definition keys to be used even if a reset is performed.

Turn-over key automatic decision

This is to set turn-over key to be confirmed after a given time period has been elapsed from when the key is input. If the checkbox is set enabled, specify a time period in the range of 6 grades using the slide in Fig. 4.20.

4.1.10 System

This applet is used for displaying and setting parameters concerned with the internal system of the terminal.

General tab

This tab displays OS version, integrated CPU name and available RAM size.

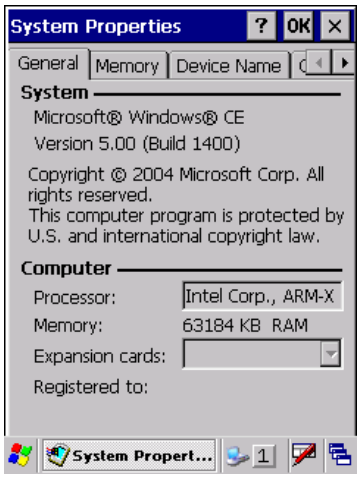


Fig. 4.21

Memory tab

This tab is for setting proportional memory allocation between “Storage memory” and “Program memory”.

Fig. 4.22

Device Name tab

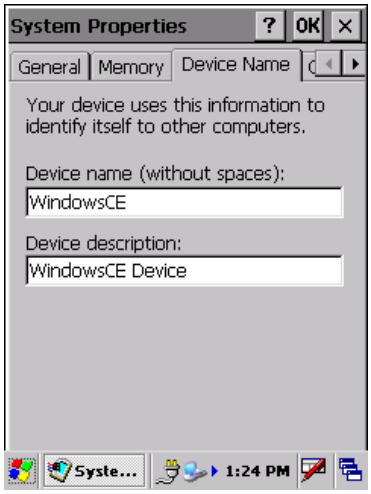


Fig. 4.23

Device name (without spaces)

This field is for setting device name for the terminal itself. Spaces within the device name entered in the field are not allowed.

Device description

This field is to enter text string for the device description.

Copyrights tab

This tab is for displaying the OS copyright information.

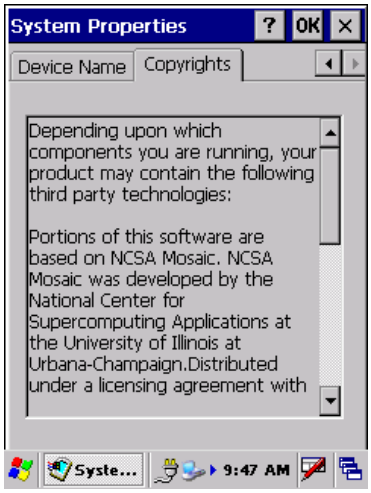


Fig. 4.24

4.1.11 Stylus

This applet is used to calibrate double tapping and touching on the screen.

Double-Tap tab

This tab is used to adjust the speed of double tapping and distance between points. Adjustment can be checked by tapping the icon at the lower half of the screen.

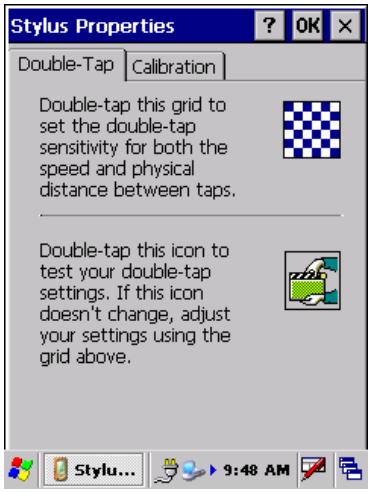


Fig. 4.25

Calibration tab

Press **Recalibrate** button (see Fig. 4.26) to calibrate the touch screen and then follow the operating guide appeared on the screen to complete the whole process.

Fig. 4.26

4.1.12 Terminal Server Client Licenses

This applet is used to display terminal server authentication licenses screen for client.

Fig. 4.27

Stored Licenses

This field is for specifying terminal server authentication licenses for client.

Delete Button

This button deletes a specified terminal server license.

Save... Button

This button saves a specified terminal server license.

4.1.13 Dialing

This applet is for setting telephony.

Fig. 4.28

Location

This pull-down menu is to select telephony information to be set.

New... Button

This button creates a new call location.

Remove Button

This button removes a call location.

Area code

This field is to specify an area code.

Country/Region

This field is to specify a country or regional code.

Tone dialing/Pulse dialing

These radio buttons are to select a line type.

Disable call waiting

Set the checkbox enabled to disable the call waiting function.

dial

This pull-down menu is for specifying dial that disables the call waiting function.

Edit... Button

This button displays the edit dialing patterns window to set up the following dialing patterns.

- For Local calls
- For Long distance calls
- For International calls

4.1.14 Network and Dial-up Connections

This applet is for setting connections used by dial up and LAN. The following connection types can be created.

Table 4.3

Type	Description
Dial up connection	Establishes network connection via phone line or ISDN line.
Cable connection	Establishes network connection with the terminal via cable (IrDA, Bluetooth included).
Virtual private network (PPTP)	This is a protocol provided by Microsoft for cipher communications. Information can be passed safely via the Internet because information is encrypted and sent/received between two PCs.
Virtual private network (L2TP)	This is a protocol that forms a virtual tunnel in the public line network (Internet, etc.), and establishes a PPP connection via the network to configure VPN. This protocol is the second layer (data link layer) of OSI basic reference model, and it can be used not only via IP network but also via various paths such as frame relay and ATM.
PPPoE (PPP over Ethernet)	This enables the use of PPP (needed for calls for phone and ISDN lines) in “constant connection” environment such as LAN.

A new connection is established following the steps (1 to 4) below.

1. Double tap **Make New Connection** icon shown in Fig. 4.29 to establish a new connection.

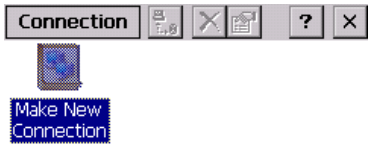


Fig. 4.29

2. Specify name in **Type a name for the connection** field and select a type of connection and then tap **Next >** button. See Fig. 4.30.

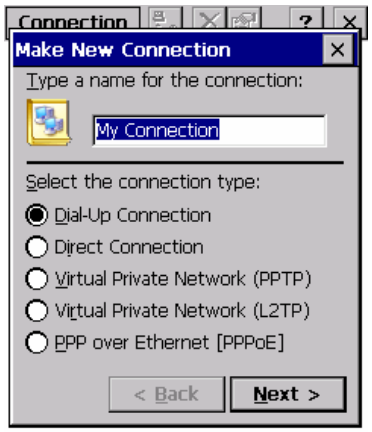


Fig. 4.30

3. Set the modem information in the modem screen and then tap **Next >** button.

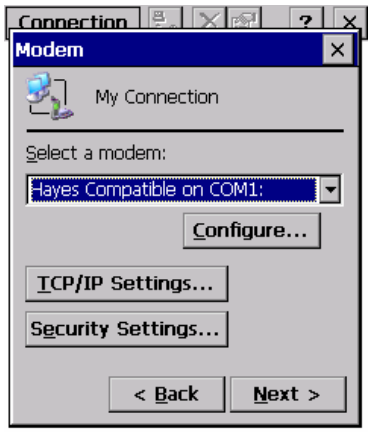


Fig. 4.31

4. Set all information about a phone number and then tap **Finish** button.

Fig. 4.32

4.1.15 Version Info

This applet is used to display each version number of the OS, boot section, loader and service pack.

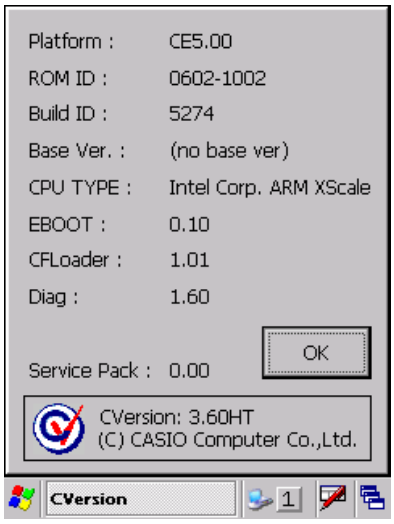


Fig. 4.33

4.1.16 Password

This applet is to set up a password that is used when the terminal starts up.

Fig. 4.34

Password

This field is for entering the password. Only numerals can be used for the password.

Confirm password

This field is for entering the same password again specified in **Password** field for confirmation purposes.

Enable password protection at power-on

Enable the checkbox if password input is required when the terminal starts up. The box and the parameter's name are grayed unless a password is entered in both **Password** and **Confirm password** fields.

4.1.17 Power

This applet is for setting the power management options.

Battery tab

This tab displays the current status of battery pack (HA-A20BAT or DT-5025LBAT) and memory backup battery (Backup battery).

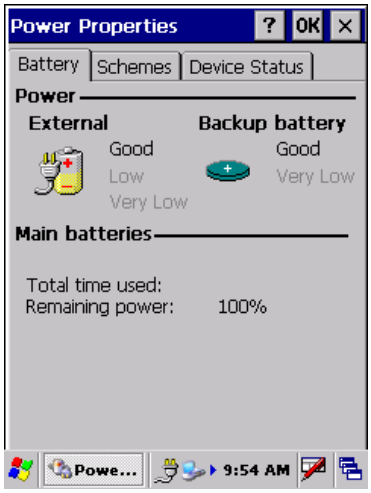


Fig. 4.35

Schemes tab

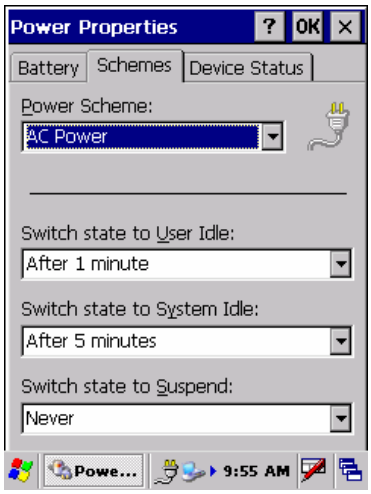


Fig. 4.36

Power Schemes

This pull-down menu is to select the power source from either “Battery Power” or “AC Power”.

Switch state to User Idle

This pull-down menu is to set up a time period until when the terminal changes its state to User idle.

Switch state to System Idle

This pull-down menu is to set up a time period until when the terminal changes its state to System idle.

Switch state to Suspend

This pull-down menu is to set up a time period until when the terminal changes its state to Suspend. The selection will be disabled if the power source is set to “AC Power”.
A time period until when the auto power OFF function is performed will be a sum of adding time periods of **Switch state to User Idle**, **Switch state to System Idle** and **Switch state to Suspend**. The minimum time period is 3 minutes.

Device Status tab

This tab displays device power levels for the integrated devices.

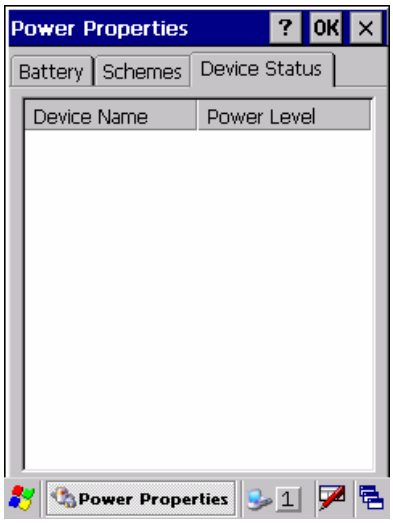


Fig. 4.37

4.1.18 Buzzer

This applet is to set up “Enable/Disable” for 4 buzzer sound types and the respective sound volumes in one of the three grades (minimum, medium, and maximum) for the events listed in Fig. 4.38. Setting each sound volume can be checked by tapping its triangle button in the right side of the screen.

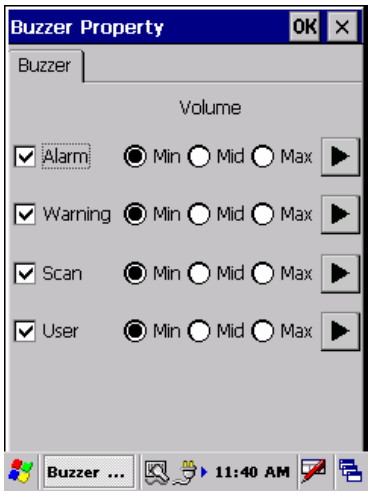


Fig. 4.38

4.1.19 Volume & Sounds

This applet is to set up “Enable/Disable” for sound types for each event listed in Fig. 4.40. Use the slide to adjust the sound volume for all the events. Enable the checkbox of event you wish to set up the sound effect. The radio buttons are to set up either “Soft” or “Loud” for the event sounds.

Volume tab

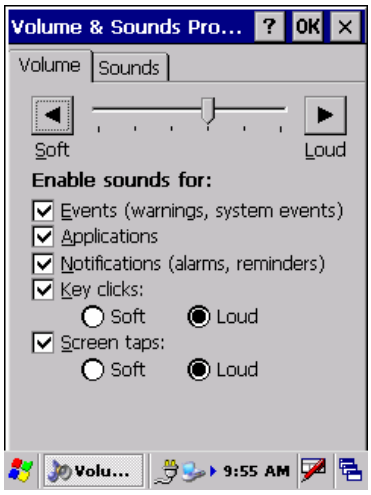


Fig. 4.39

Sounds tab

This tab is for setting the sound file that the terminal uses.

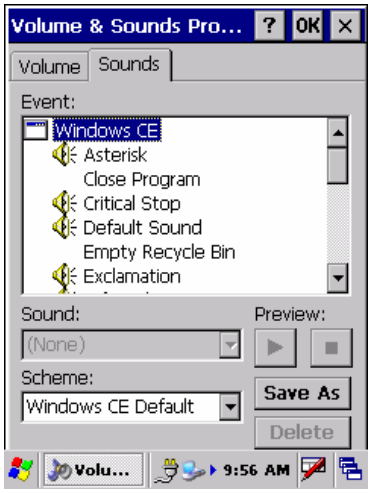


Fig. 4.40

4.1.20 Mouse

This applet is for calibrating the interval of double-tap on the screen with stylus.
Double tap the grid in the right side of the upper screen to calibrate the double tap speed and its interval. The set value can be checked by double tapping the icon in the right side of the lower screen. See Fig. 4.41.

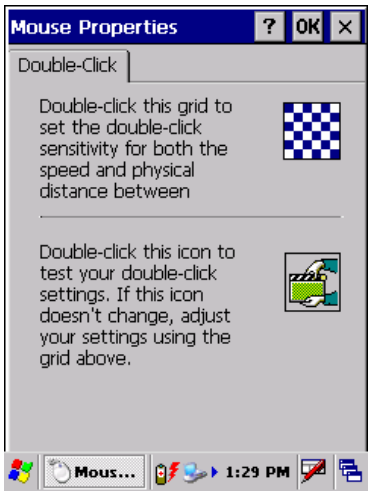


Fig. 4.41

4.1.21 Laser Setting

This applet is to change the settings for the integrated laser scanner (applicable to DT-X11M10E and DT-X11M10RC only). For detail about each parameter, refer to Chapter 3.2 “Laser Scanner”.

Read barcode tab

This tab is for specifying bar code symbologies to scan. Multiple symbologies can be specified.

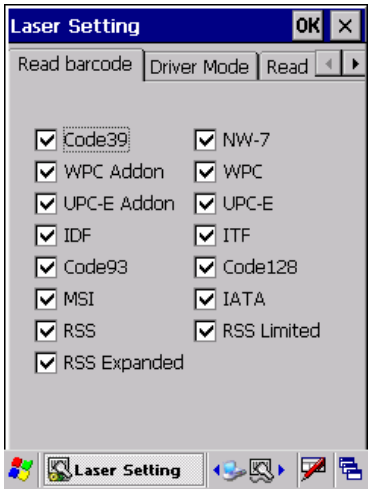


Fig. 4.42

Driver Mode tab

This tab is to set up “Enable/Disable” for scanning each symbology of the symbologies listed in **Read barcode** tab and its parameters listed below.

- Min (Minimum no. of read digits)
- Max (Maximum no. of read digits)
- Output format
- Check-digit
- Check-digit output

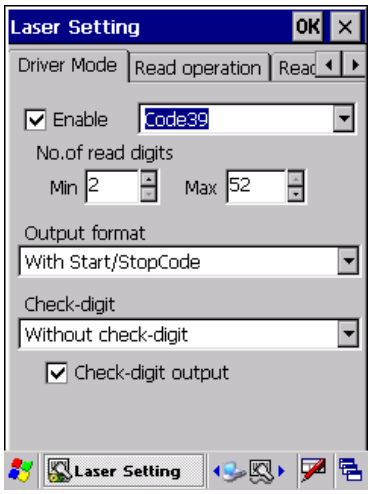


Fig. 4.43

Read operation/Read operation 2 tabs

These tabs are to set up the following parameters related to scanning bar code symbologies. Select a mode you wish to set up in each pull-down menu.

- Scanning mode
- Output buffer
- Termination code
- Decode level
- Scanning method
- Filter
- Verification
- Scanning
- Timeout
- Filter start time
- Learning Decode

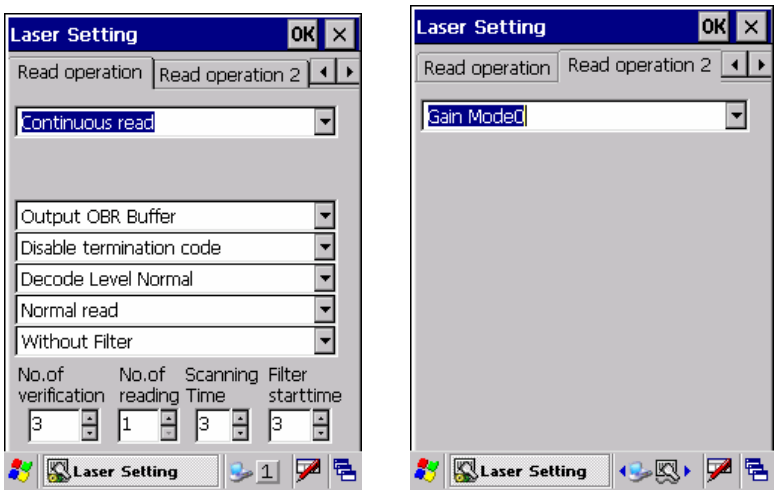


Fig. 4.44

Notification tab

This tab is to set up notification methods selecting from the listed methods below. The notification is issued when scanning a bar code is complete.

- LED light up
- Buzzer sound

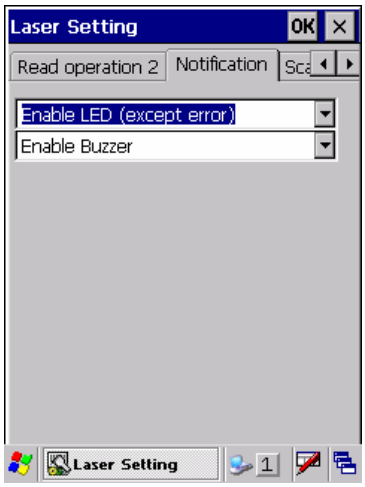


Fig. 4.45

Scanning Key tab

This tab is to set up “Enable/Disable” for each key of the keys listed below activating as scan trigger key.

- Left Trigger Key
- Right Trigger Key
- [L] Key
- [R] Key
- [U] Key
- [D] Key

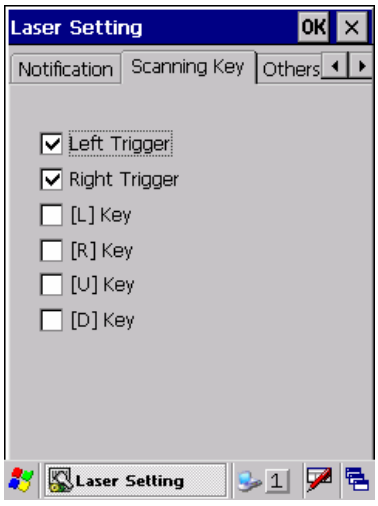


Fig. 4.46

Others tab

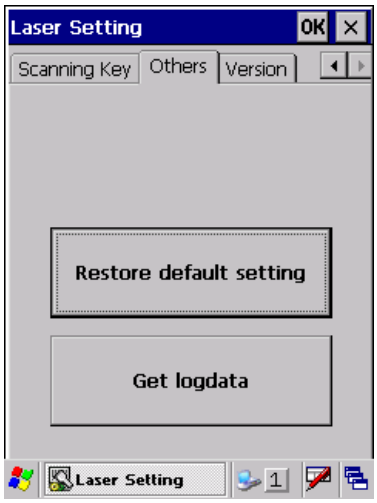


Fig. 4.47

Restore default setting Button

This button resets setting contents and restores all the settings to the default settings.

Get logdata Button

This button captures log information for both the scanner and decoder units. The following are the log file names.
Scanner unit: “\ObrLog.dat”
Decoder unit: “\DecodeLog.dat”

Version tab

This tab displays version information of the laser scanner setting tool.

Fig. 4.48

4.1.22 Imager Setting

This tool allows the user to change the parameters and operating modes required for reading 1D and 2D symbologies. The changed parameters and modes are saved in ini file and become effect automatically when the TDRead application invokes.

1D/2D tabs

These tabs are to set up the respective 1D bar code symbologies in 1D tab and 2D code symbologies in 2D tab. The checkboxes with check mark enable the symbologies to be read. Or, removing the check mark disables the symbology not to be read.

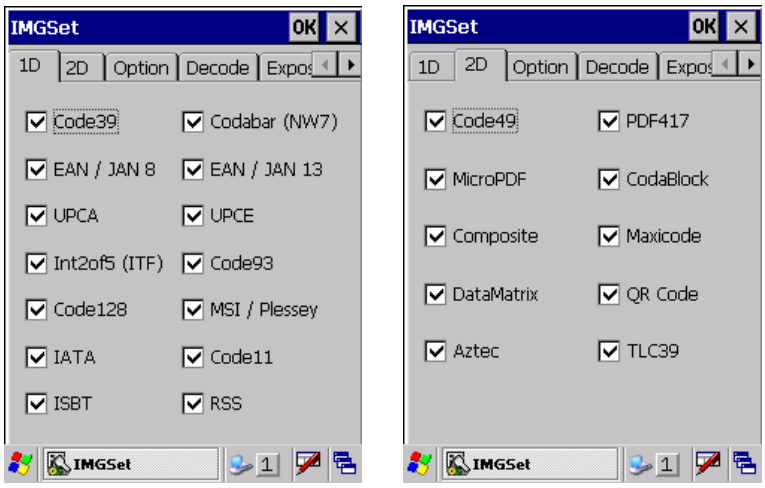


Fig. 4.49

Option tab

This tab is to set up relevant options for scanning a symbol of the specified symbology.

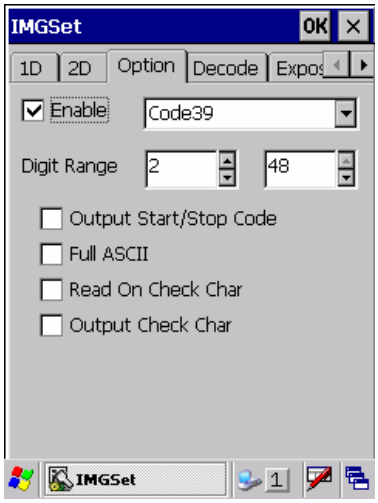


Fig. 4.51

Enable

With a check mark in the checkbox, it is possible to scan the symbology selected in the comb box.

Digit Range

This field is to set up the effective range of reading symbol of the selected symbology, the pull-down menu box on the left side is for the minimum number of digits and the box on the right side is for the maximum number of digits. A symbol of the selected symbology meeting these four options (see Fig. 4.51) can only be scanned and decoded.

Decode tab

This tab is to set up options for decoding scanned bar code data.

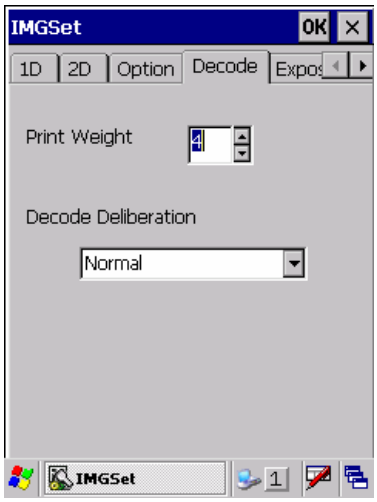


Fig. 4.52

Print Weight

This field is to set up the intensity in the range of 1 to 7 for target printed symbol. Setting a value higher will improve reading symbol printed in dark color, or lower will improve reading symbol printed in pale color.

Decode Deliberation

This field is to specify decode deliberation mode by selecting one in the modes listed below. If it is set up to “Very Quick” or “Quick”, the decoding speed becomes fast though the number of symbols to be decoded is limited instead. Or, if it is set up to “Deliberate” or “Very Deliberate”, the speed becomes slow though the number of symbols to be decoded is increased.

- Very Quick
- Quick
- Normal
- Deliberate
- Very Deliberate

Exposure/LED tab

This tab is to specify the intensity for both LEDs, Aimer and Illumination.

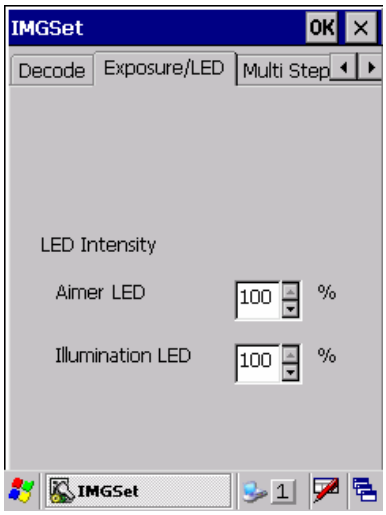


Fig. 4.53

Aimer LED

This field is to set up the intensity of Aimer LED to either “0” for turning OFF or “100” for turning ON.

Illumination LED

This field is to set up the intensity of Illumination LED to either “0” for turning OFF or “100” for turning ON.

Multi Step tab

This tab is to specify a reading mode by setting one of the radio buttons enabled in the table below.

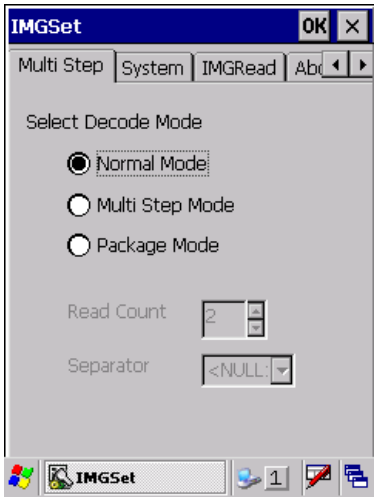


Fig. 4.54

Normal Mode

This radio button selects the normal read mode.

Multi Step Mode

This radio button selects the multi-step read mode which continuously reads multiple symbols until when the Trigger key is released.

Package Mode

This radio button selects the package read mode which continuously reads multiple symbols until when the Trigger key is released and then outputs a result of reading all the symbols.

Read Count

This field is to set up the number of symbols to read in the Multi-step and Package modes.

Separator

This field is to set up a character as the delimiter inserted in between decoded data of scanned bar codes in the Package mode.

System tab

This tab is to set up a time period of the APO (Automatic Power OFF) function to activate and "Enable/Disable" for turning ON the terminal with the Trigger key.

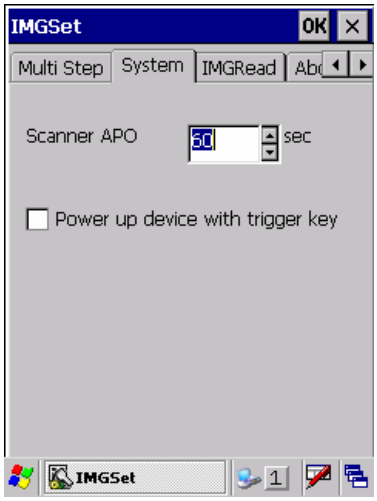


Fig. 4.55

Scanner APO

This filed is to set up a time period in the range of 0 to 1800 (in second) for the APO function to activate. Setting "0" will disable the function.

Power up device with trigger key

This checkbox is to set "Turning ON the terminal with the Trigger key" enabled. With a check mark in the checkbox, the power on the terminal can be turned on when one of the Trigger keys is pressed down.

IMGRead tab

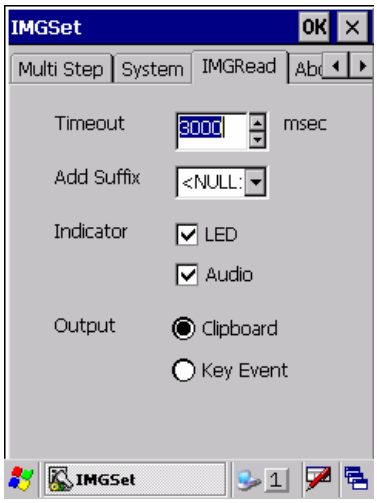


Fig. 4.56

Timeout

This field is to set up a time period for the Timeout to activate in scanning operation. Scanning will terminate either when the Trigger key is released or when the time period set in this field elapses.

Add Suffix

This field is to specify a suffix that is appended at the end of each decoded data.

Indicator

These two checkboxes are to set scanning completion notification method with either LED or sound or both. Notification method with a check mark in the checkbox will activate when scanning a symbol is complete.

Output

These two radio buttons are to specify an output method for decoded bar code data selecting either one of the buttons.

About tab

This tab displays current version information of the imager setting tool.

Fig. 4.57

4.1.23 Display

This applet is for setting color scheme for the background and desktop (appearance).

Background tab

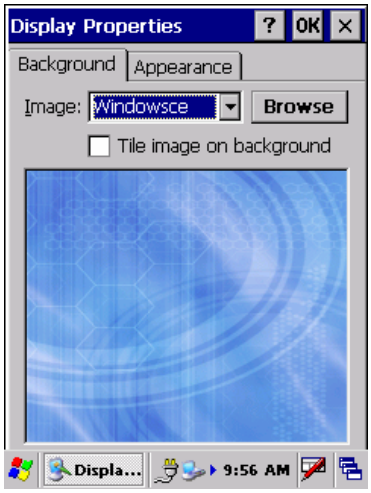


Fig. 4.49

Image

This field is to select an image that appears in the ground.

Browse Button

This button displays the file reference dialog window used to specify an image that appears in the background. In the dialog window, specify a file name in **Name** field and its file format in **Type** field.

Tile image on background

This checkbox is used to set the specified tile image in **Image** field effect on the background.

Appearance tab

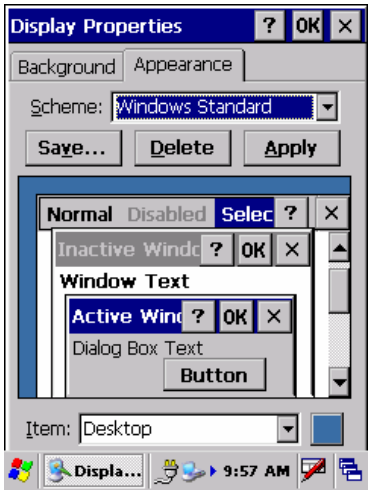


Fig. 4.50

Scheme

This pull-down menu is for selecting a color scheme of the desktop.

Save.... Button

This button saves the specified color scheme. After pressing the button, a dialogue window to confirm the specified color scheme appears. Tap **OK** button to save it.

Delete Button

This button deletes the specified color scheme in **Scheme** field.

Apply Button

This button applies the specified color scheme immediately.

4.1.24 Storage Manager

This applet displays the FlashDisk information.

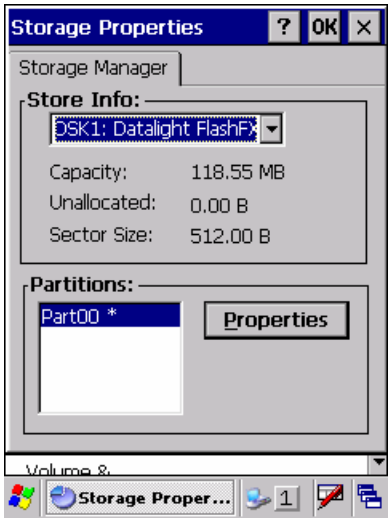


Fig. 4.51

Properties Button

This button displays the Partition properties window (see Fig. 4.52) used to enable formatting and management with the FlashDisk.

Partition Properties window

Fig. 4.52

Mount Button

This button mounts the partition.

Dismount Button

This button dismounts the partition.

Format Button

This button displays the Format window used to set up the relevant parameters for formatting on the partition. It is not possible if the partition is mounted. See also Fig. 4.52.

Scan Button

This button displays the Scan window used to set up the relevant parameters for verification check with the partition.

Defrag Button

This button displays the Defrag window to set up the relevant parameters for the partition.

Format screen

This screen is for specifying the relevant parameters for formatting on the partition.

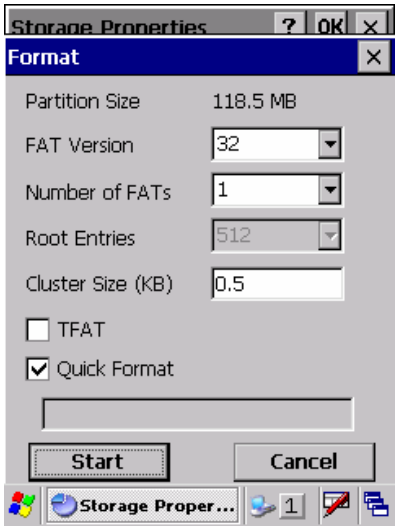


Fig. 4.53

Start Button

This button displays a confirmation dialog to confirm formatting on the partition.

Cancel Button

This button displays a confirmation dialog to confirm cancellation of the formatting.

Scan screen

This screen is to set up the relevant scan parameters for the partitions.

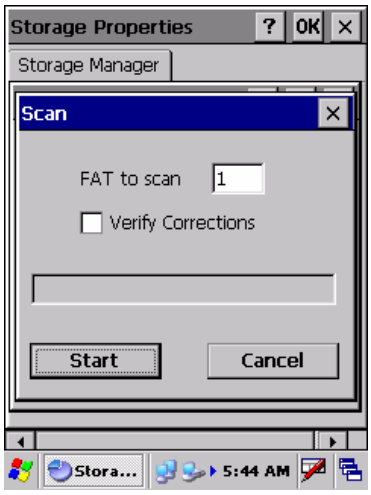


Fig. 4.54

Start Button

This button starts scan and then displays a result of the scanning.

Cancel Button

This button displays a confirmation dialog window to confirm cancellation of the scanning.

Defrag screen

This screen is to set up the relevant parameters for defrag.

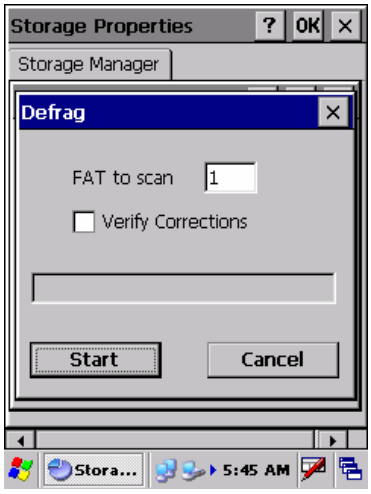


Fig. 4.55

Start Button

This button starts defrag for the partition and then displays a dialog message indicating its completion.

Cancel Button

This button displays a confirmation dialog window to confirm cancellation of the defrag.

4.1.25 Owner

This applet is for setting information related to the owner.

Identification tab

Fig. 4.56

Name

This field is for specifying the owner's name by inputting alphabets from the Input Panel appeared at the lower part on the screen.

Company

This field is for specifying company name of the owner.

Address

This field is for specifying company's address.

Work phone

This field is for specifying a phone number at his or her work.

Home phone

This field is for specifying a phone number at his or her home.

Display owner identification

Set the checkbox enabled to display the owner information at a time when the terminal starts up.

Notes tab

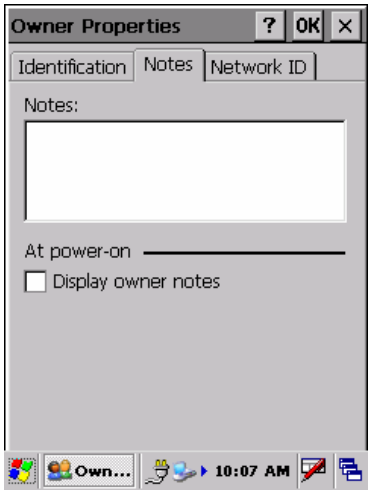


Fig. 4.57

Notes

In this field, a memo can be freely written.

Display owner notes

This checkbox is to display the note written in **Notes** field at a time when the terminal starts up.

Network ID tab

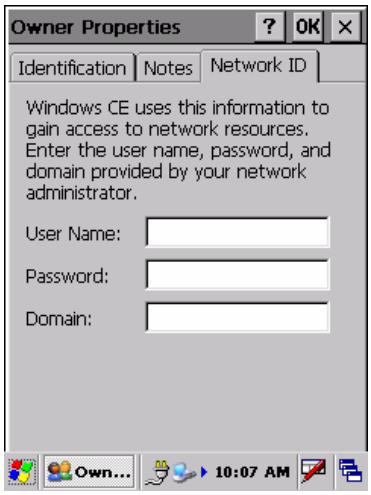


Fig. 4.58

User Name

This field is for entering a user name to be used when accessing to network source.

Password

This field is for entering a password to be used when accessing to network source.

Domain

This field is for entering a domain to be used when accessing to network source.

4.1.26 Certificates

This applet is used for editing certificates trusted by the user.
Select certificate type from either **Trusted Authorities**, **My Certificates**, or **Other Authorities** in the pull-down menu.

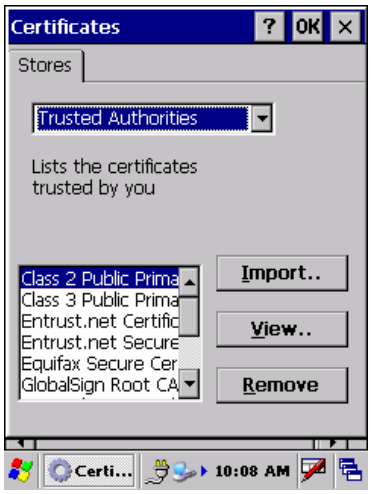


Fig. 4.59

Import... Button

This button displays the “Import Certificate or Key” window to set up the relevant parameters for importing certificate or key.

View... Button

This button displays the properties of certificate or key.

Remove Button

This button removes certificate or key highlighted in the field on the left side in Fig. 4.59.

4.1.27 Regional Settings

This applet is for setting display modes and format of region, numeric value, currency, date, and time.

Region tab

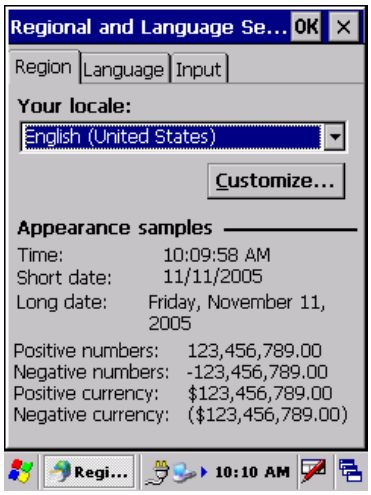


Fig. 4.60

Your local

This pull-down menu is to select your local region.

Customize… Button

This button displays **Number** tab to set up various options for regional settings such as number, currency, date and time, etc.

Language tab

This tab displays language for locale selected in **Region** tab. The language field in this tab is grayed.

Fig. 4.61

Input tab

Set the checkbox enabled in **Installed Input Languages** field for prescribed language to make selection.

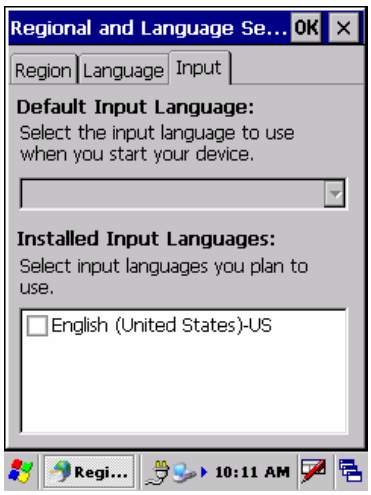


Fig. 4.62

4.1.28 Date/Time

This applet is for setting date, time and time zone. Input of password may be requested if it has been set with the password tool.

Date/Time tab

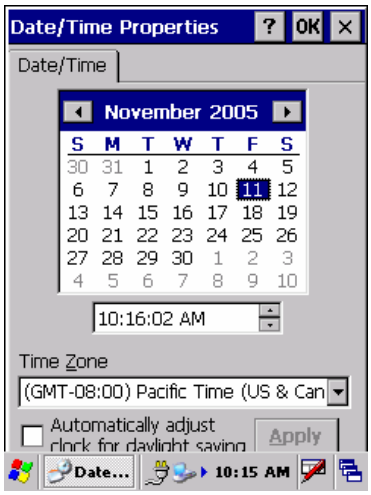


Fig. 4.63

Apply Button

This button applies all the settings made in this tab effect.

4.1.29 Input Panel

This applet is for changing the current input method and options.

Input Panel tab

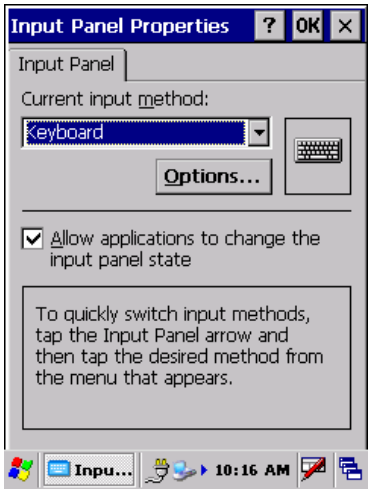


Fig. 4.64

Current input method

This pull-down menu is to select an input method. The input method selected in this pull-down menu will become the default for the input panel.

Options... Button

This button displays the soft keyboard options screen for the input method selected in **Current input method** pull-down menu.

Allow applications to change the input panel state

This checkbox is to allow changes of input panel state in applications.

4.1.30 Brightness

This applet is for setting brightness where the power source is provided by either installed battery pack or external power source via dedicated AC adaptor, the backlight auto dimming, and the backlight auto off.

Contrast tab

This tab is to set up contrast in the range of 1 to 9 using either the slide or one of the arrow buttons. (Default = 5). See Fig. 4.65.

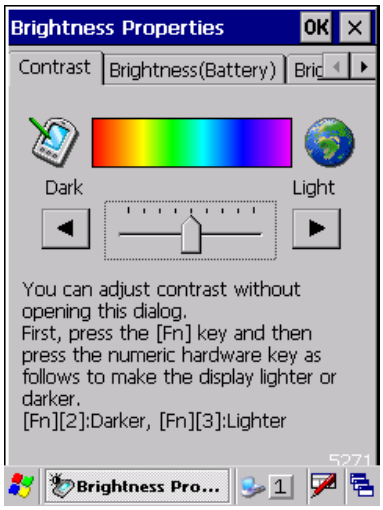


Fig. 4.65

Brightness (Battery) tab

This tab is to set up brightness of the screen and brightness set by the auto display dimming function where the power is provided by the installed battery pack.

Fig. 4.66

Battery Power Operation

This field to set up brightness of the display in the range of 1 to 9 using either the slide or one of the arrow buttons.

Auto display dimming

This field is to set up brightness in the range of 1 to 8 using either the slide or one of the arrow buttons. The brightness set in this field is effect when the auto display dimming function activates. The function is operable only where the power source is provided by the installed battery pack.

Brightness (External) tab

This tab is to set up brightness of the display in the range of 1 to 9 using either the slide or one of the arrow buttons. The brightness set in this field (**External Power Operation** in Fig. 4.67) is effect only where the power is provided by dedicated AC adaptor via cradle.

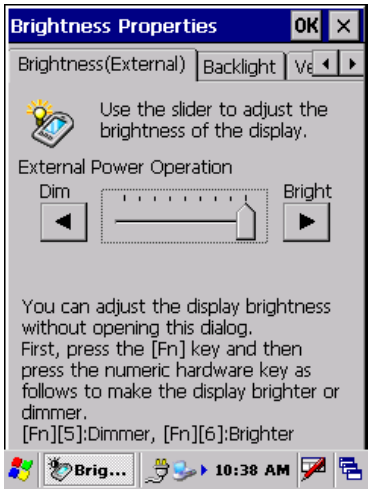


Fig. 4.67

Backlight tab

This tab is to set up time periods of the auto display dimming function to activate and the backlight to automatically turn off in case where the power is provided by either battery pack or dedicated AC adaptor.

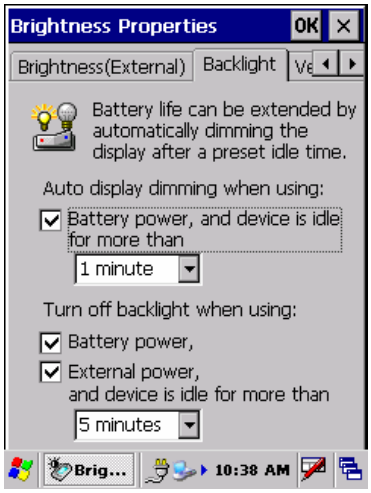


Fig. 4.68

Auto display dimming when using

The checkbox is to set the auto display dimming function effect where the power is provided by battery pack.
A time period selected in the pull-down menu is for idle span starting when no access is made via keyboard or via touch panel until when the auto display dimming function activates. The settings made in this field are effect only where the power is provided by battery pack.

Turn off backlight when using

Two checkboxes are to set “Automatically turning off the backlight” effect after a time period selected in the pull-down menu has elapsed where the power is provided by either battery pack or dedicated AC adaptor via cradle or both.
A time period selected in the pull-down menu is for idle span starting when no access is made via keyboard or via touch panel until when the backlight is automatically turned off.

Note:
When both “backlight auto display dimming” and “backlight auto turning off” are set effect, either one with shorter preset time period for idle span than the other will be precedent.

Version tab

This tab displays the current information about the Brightness Properties.

Fig. 4.69

4.2 Application Programs

Once application program implemented in the terminal is launched by accessing **Start** → **Programs** menus, its operation menu is displayed to guide the reset of processing. The following are the application programs implemented.

Table 4.4

Application	Description	CASIO	MS
Internet Explorer	Displays Web pages for Internet and Intranet.	Yes	--
Microsoft WordPad	Rich text editor	--	Yes
Voice Recorder	Records and playbacks voice sound.	Yes	--
Windows Explorer	File management program	--	Yes
Command Prompt	Operates the system with the DOS commands.	--	Yes
Remote Desktop Connection	Remote desktop client	--	Yes
Transcriber	Natural handwriting recognition	--	Yes
Inbox	Sends out and receives e-mails. POP3/IMAP4 are supported.	Yes	--
Calculator	Performs four arithmetical calculations in 12 digits maximum.	Yes	--
Notes	Creates and displays hand writing notes.	Yes	--
Backup Tool	Backs up and restores user data to/from FlashDisk.	Yes	--
Laser Scanner Demo (note 1)	Demonstrates the features of scanning bar codes.	Yes	--
Laser Scanner Read (note 1)	Scans bar codes.	Yes	--
Image Scanner Demo (note 2)	Demonstrates the features of scanning bar codes.	Yes	--
Image Scanner Read (note 2)	Scans bar codes.	Yes	--
Copy Devices	Copies user data between two terminals.	Yes	--
FLCE	Client for data upload/download	Yes	--
ActiveSync	ActiveSync client	--	Yes
LAN ActiveSync	ActiveSync client via WLAN	--	Yes
Terminal	TTY/VT-100 emulator	--	Yes
NetSearch (note 3)	Displays a list of partners via WLAN.	Yes	--

Notes:

1. Operable with DT-X11M10E and DT-X11M10RC.
2. Operable with DT-X11M30E, DT-X11M30U, and DT-X11M30RC.
3. Operable with DT-X11M10RC and DT-X11M30RC.

4.2.1 Internet Explorer

This application displays Web pages on the Internet and Intranet.

- The IE 6.0 module is integrated in the terminal.
- Kerberos, TLS Version 1.0, SSL Versions 2.0 and 3.0, and SGC are supported.
- JScipt 5.5 conforms to ECMA 262 language specification (ECMAScipt Edition 3).

Fig. 4.70

Table 4.5 Menus in the application

Menu	Description
Open	Display of HTML and JPEG files.
Save As …	Saves data in HTML, TEXT, GIF and BMP formats.
Edit	Edits text in a page.
Full Screen	Hides the main menu, toolbar, etc.
Fit to Screen	Changes the displayed page size to reduction mode.
Address Bar	Changes the address bar.
Text size	Specifies the displayed font size.
Encoding	Specifies the displayed font.
History …	Changes the display to a page listed in the history.
Find …	Searches text within page.
Options …	Sets up options for security, etc.
Properties	Displays the property of page.
Exit	Exits the browser.

Table 4.6 Toolbar Configuration

Function		Description
	Return	Returns to the previous.
	Advance	Changes the display to the previous page displayed prior to returning.
	Update	Updates the current page to the latest information.
	Homepage	Returns to the homepage.
	Favorites	Displays the Favorites menu.

4.2.2 Microsoft WordPad

This application is the Microsoft Word for WindowsCE edition. It displays and creates files in Word, WordPad and rich text, and text formats.

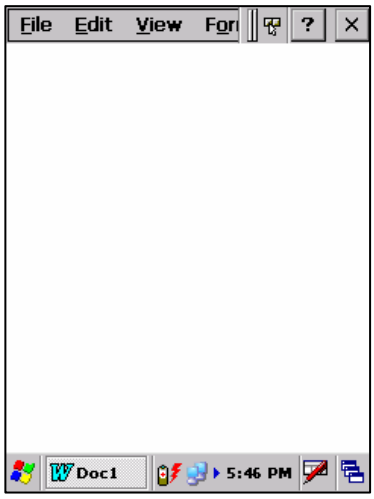


Fig. 4.71

Table 4.7 Menus in the application

Menu		Description
File		
	New	Creates new text.
	Open …	Displays existing document file.
	Save	Saves document file by overwritten.
	Save As …	Saves document file with a specified name.
	Password …	Attaches password to document.
	Print …	Prints document.
	Recent Files	Displays recently displayed document file names.
	Close	Ends the application.
Edit		
	Undo	Restores the previous operation.
	Redo	Repeats the operation.
	Cut	Cuts document in the selected range.
	Copy	Copies document in the selected range.
	Paste	Pastes document specified for cut or copy.
	Clear	Deletes document in the selected range.
	Select All	Selects the entire document.
	Find …	Displays search dialog.
	Find Next	Searches for a next item.
	Replace …	Displays character replacement dialog.

Continue.

View		
	Normal	Displays in standard mode.
	Outline	Displays outline.
	Wrap to Window	Displays document aligning its width with window's width.
	Full Screen	Displays document in full screen.
	Zoom	Displays document in a size of either 50 %, 75 %, 100 %, 125 %, 150 % or custom (50 to 200 %).
Format		
	Font …	Sets font type, font size, font style and color.
	Paragraph …	Sets alignment (left, Right, center), alignment style (none, bulleted, numbered) and indentation.
	Tabs …	Sets tab stop position (0 to 5.50").

4.2.3 Windows Explorer

This application is a file management program. It can copy, transfer and delete files, create folders and delete folders.

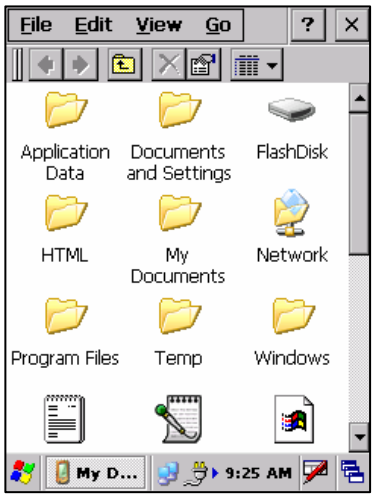


Fig. 4.72

Table 4.8 Menu in the application

Menu			Description
File			
	Open		Opens files and folders.
	New Folder		Creates new folders.
	Delete		Deletes specified file and folder.
	Rename		Changes specified file and folder names.
	Properties		Displays properties of specified file and folder.
	Send To		
		Desktop as Shortcut	Creates shortcut for specified file and folder on the desktop.
		My Documents	Copies selected file and folder to “My Documents”.
	Close		Closes the application.
Edit			
	Undo		Returns to the previous operation.
	Cut		Cuts selected file and folder.
	Copy		Copies selected file and folder.
	Paste		Pastes file and folder that are cut or copied.
	Paste Shortcut		Creates shortcuts for file and folder that are cut or copied.
	Select All		Selects all the files and folders that are displayed.
View			
	Large Icon		Displays with a large icon.
	Small Icon		Displays with a small icon.
	Details		Displays name, size, type and updated date/time.
	Arrange Icons		
		Name	Lines up icons in order of name.
		Type	Lines up icons in order of category.
		Size	Lines up icons in order of size.

Continue.

		Date	Lines up icons in order of date.
		Auto Arrange	Lines up icons in order of the method specified in "Arrange Icons".
	Refresh		Updates the list with latest information.
	Option …		Displays folder options screen.
	Address Bar		Switches between "Display" and "Hide" for the address bar,
	Status Bar		Switches between "Display" and "Hide" for the status bar.
Go			
	Favorites		
		Add To Favorites …	Registers URLs in Favorites folder.
		Organize Favorites …	Organizes files in Favorites folder.
	Back		Goes back to the previous screen.
	Forward		Goes to a next screen.
	My Documents		Opens My Documents folder.

4.2.4 Command Prompt

This application starts up the Pocket CMD to enable operating the terminal with DOS commands.

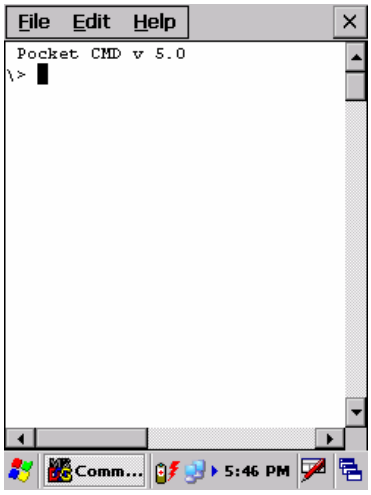


Fig. 4.73

Table 4.9 Menus in the application

Menu		Description
File		
	Close	Ends the application.
Edit		
	Copy	Copies text in selected range.
	Paste	Pastes text cut or copied.
	Clear Screen	Clears the screen.
	Set Screen Buffer …	Displays screen for setting the screen's buffer size.
Help		
	About Console …	Displays version information.

4.2.5 Remote Desktop Connection

This application is the RDP5.5 based remote desktop client. It can control a Windows PC remote from the terminal that is executing terminal service using the Microsoft remote disk top function. The following are the procedures.

1. Specify a Windows based PC remote from the terminal by inputting its computer name and IP address.

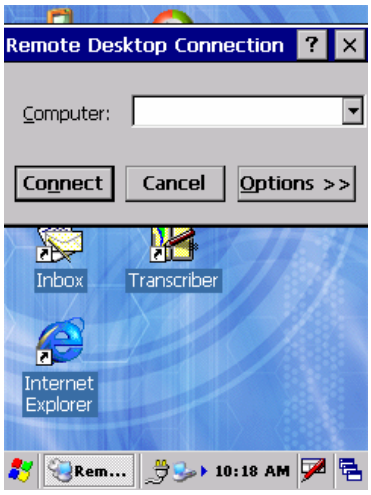


Fig. 4.74

2. Log in the remote PC by inputting remote user name and password. See Fig. 4.75.

Fig. 4.75

3. If the log in is complete, the display shows the desktop of remote PC.

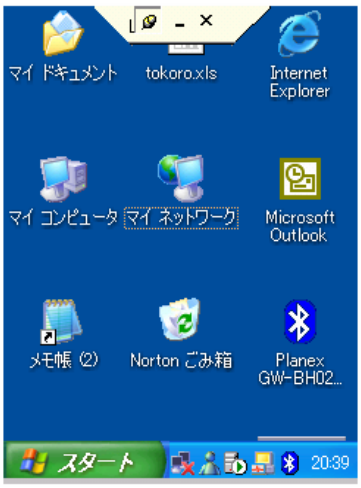


Fig. 4.76

4.2.6 Transcriber

Transcriber is the natural handwriting recognition solution for your handy terminal. It recognizes words from its integrated dictionary, and allows you to write in cursive, print, or mixed handwriting. Transcriber works transparently in the background of all applications, providing handwriting input without taking away precious screen space. When Transcriber is active, it interprets pen movement across the screen as handwriting input

IconBar

The Iconbar, a set of buttons that appears at the bottom of the screen when Transcriber is active, provides easy access to:

Table 4.10

Icon		Description
	Options	Opens the Options dialog box, where you can set options such as writing direction, inking, and shorthand.
	Letter Shape Selector	Allows you to adapt your personal writing style to maximize recognition.
	Mini Keyboard	Allows quick input of numbers, punctuation, and other symbols.
	Recognition Mode	a – Lowercase alpha mode. This is the default mode and usual method for optimum handwriting recognition.
		123 - Numeric mode. Numerals and some letters allowed and the Calculator is activated.
		A - Uppercase alpha mode. Transcriber automatically capitalizes all letters. If you are in Uppercase or Numeric mode, recognition returns automatically to Alpha mode once you lift stylus.
	Space	Inserts a space at the cursor position.
	Return	Inserts a paragraph return at the cursor position.
	Left Arrow	Moves the cursor one space to the left of the cursor position.
	Right Arrow	Moves the cursor one space to the right of the cursor position.
	Backspace	Moves the cursor one space back and erases any text.
	Help	Opens this help file.

4.2.7 Inbox

This application sends and receives emails. It can support the POP3/IMAP4 protocols.

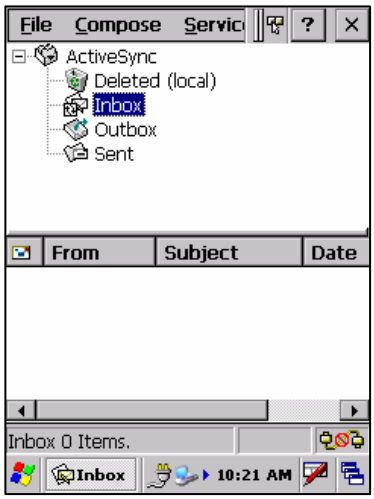


Fig. 4.77

Table 4.10 Menus in the application

Menu	Description
File	
Open	Displays mail files.
Move to …	Moves mail file.
Copy to …	Copies mail file.
Delete	Deletes mail file.
Folder	
New Folder …	Creates new folder.
Rename Folder	Changes folder name.
Empty Deleted (local)	Empties deleted items.
Address Book	Displays the address book.
Exit	Ends the application.
Compose	
New Message	Displays the compose screen to create a new message.
Reply to Sender	Displays the compose screen to return mail to its sender.
Reply to All	Displays the compose screen to return received mail to all initial receivers.
Forward	Displays the compose screen to transfer received mail to other person(s).
Status …	Displays the list of message statuses.
Services	
Connect	Connects to specified server.
No installed service.	Performs no service operation.
Offline Folder	Disconnects from server and goes into offline mode.
Send/Receive Mail	Sends and receives mail to/from server.
Synchronize Folders	Synchronizes with specified Outlook folder.
Clear All	Clears inside of specified folder.
Get Full Copy	Copies all mails in server.
Options ...	Displays the options screen for setting connections and other various processes.

Compose screen

This screen is for editing mail text.

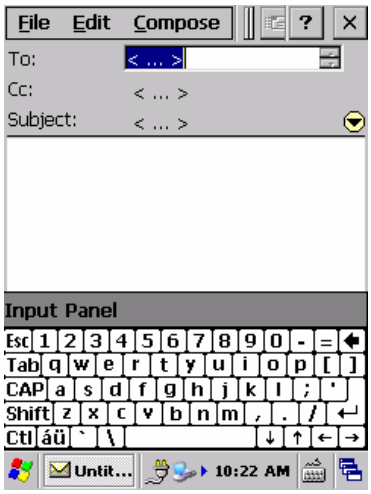


Fig. 4.78

Table 4.11 Menus in the Compose screen

Menu			Description
File			
	Send		Sends emails.
	Save		Saves email as file.
	Attachments		
		Open attachment	Opens attachment file.
		Add Attachment …	Adds attachment file to email.
		Show Attachments	Displays attachment file.
	Large Font		Enlarges font size.
	Close		Returns to the main menu screen.
Edit			
	Undo		Restores changes and corrections to their original states.
	Cut		Cuts selected character string.
	Copy		Copies selected character string.
	Paste		Pastes character strings that have been cut or copied.
	Select All		Selects all the displayed characters.
	Clear		Deletes selected character string.
	Language		Selects character codes.
Compose			
	Check Names		Moves focus to partner address input area.
	Address Book		Displays new address book.
	Show Full Header		Displays email header.
	Options …		Displays options screen.

4.2.8 Calculator

This application performs four arithmetic calculations in a maximum of 12 digits. It supports arithmetical calculation, constant calculation, inverse calculation, square root extraction calculation, percentage calculation and memory calculation which conform to the Casio's calculator specifications.

The upper zone of the display area (see Fig. 4.79) displays the memory content, and the lower zone displays calculation values including arithmetical operation signs and constant [K] when calculating.
Tap **COPY** button to copy calculation values into clipboard.
Tap **X** button at the top right corner of the screen to close the application.

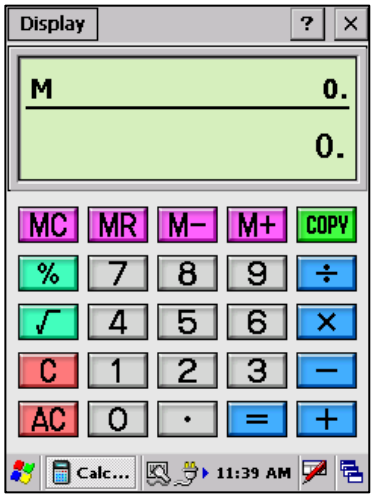


Fig. 4.79

Key Input

The number keys, decimal point ".", operators and all clear (AC) can be also input using the terminal's keys.

Table 4.12

Keys on the calculator	Keys on the terminal
0 to 9	0 to 9
Operator "÷×+-"	Up, down, left, right
=	Enter
. (decimal point)	- (F2)
AC	CLR

Basic Calculations

Table 4.13

Calculation example	Operation	On the window
52+123-63=113	53+ 123- 63=	+ 53. - 176. 113.
2.3×6×5.2=71.76	2.3×6×5.2=	71.76
(56×3-89)÷5.2+63=78.1923076923	56×3-89÷5.2+63=	78.1923076923
1234567890×741852= 915867892900170	1234567890×741853=	E 915.867892900

Constant Calculation

Table 4.14

Calculation example	Operation	On the window
12+23=35	23++12=	K+ 35.
45+23=68	45=	K+ 68.
7-5.6=1.4	5.6 - -7=	K- 1.4
2-5.6=3.6	2=	K- -3.6
2.3×12=	12××2.3=	K× 27.6
4.5×12=54	4.5=	K× 54.
45÷9.6=4.6875	9.6÷÷45=	K÷ 4.6875
78÷9.6=8.125	78=	K÷ 8.125
17+17+17+17=68	17++===	K+ 68.
(2.3)4 =27.9841	2.3××===	K× 27.9841

Inverse Calculation

Table 4.15

Calculation example	Operation	On the window
45÷9.6＝4.6875	9.6÷÷45＝	K÷ 4.6875

Square Root Calculation

Table 4.16

Calculation example	Operation	On the window
$\sqrt{5}$ =2.23606797749	$5\sqrt{}$	2.23606797749
$\sqrt[3]{81}$ =3	$81\sqrt{}\ \sqrt{}$	3.
$(\sqrt{2}+\sqrt{3})\times3=$	$2\sqrt{}+3\sqrt{}\ \times3=$	9.43879310979

Percentage Calculation

Table 4.17

Calculation example		Operation	On the window
Percentage	26% of ¥1500 is …	1500 × 26 %	390.
Increase	15% increase of ¥3620 is …	3620 ×15 %+	4163.
Decrease	4% decrease of ¥4750 is …	4750 × 4 % -	4560.
Proportion	What percentage is 75 items of 250 items ?	75 ÷ 250 %	30.
Ratio (Ratio of increase or decrease)	What is the increased percentage from ¥120,000 to ¥141,000 ?	141 - 120 %	17.5
	What is the decreased percentage from ¥300 to ¥240 ?	240 – 300 %	-20.
Setting selling price	When a 25% profit is expected from an article with a purchase price at ¥3540, what are the selling price and the profit?	3540 + 25 %	4720.
		(Continue by subtracting) "-"	1180.

Memory Calculation

Table 4.18

Calculation example	Operation	On the window	
80×9=720	AC MC 80×9 M+	M	720.
-) 50×6=300	50×6 M-	M	300.
20×3= 60	20×3 M+	M	60.
(Total) 480	MR	M	480.
(2*3)+(2*3)+4.5+4.5-4.5 =16.5	AC MC 2×3 M+ M+ 4.5 M+ M+ M- MR	M	16.5
193.2÷23=8.4	AC MC 193.2 M+ ÷ 23=	M	8.4
193.2÷28=6.9	MR ÷28=	M	6.9
123-193.2=-70.2	123-MR =	M	-70.2
9×6+3 8×(7-2)	AC MC 7-2×8 M+ 9×6+3÷ MR =	M	1425.

Error Calculation

Table 4.19

Calculation Example	Operation	On the window
1234567890 x 741852= 915867892900170	1234567890 x 741853=	E 915.867892900

Note:

"E" will appear on the window if an overflow occurs. The decimal point indicates 100 millionth digit. After "E" is displayed, press either **C** button to continue the calculation, or **AC** button to commence a new calculation.

4.2.9 Voice Recorder

This application records and playbacks voice sound.
Move the slide bar located lower portion in the screen (see Fig. 4.80) to any position to define a playback start up position.

Fig. 4.80

Table 4.20 Menus in the application

Menu			Description
Tool			
	Option		Sets recording/playing formats
		Voice Recorder	Sets up voice recorder settings.
View			
	About		Displays version information.

Table 4.21 Toolbar Configuration

Button		Description
	Record	Records voice sound.
	Stop	Stops recording/playback.
	Play	Playbacks recorded voice sound.
	Rewind/Fast Forward	Rewinds or forward the playback position.
	Volume	Changes playback sound volume.

4.2.10 Notes

This application creates a note file using the methods of either handwriting or inputting text. Observe the following restrictions.

- Text file size is up to 64KB.
- If a text file larger than 64KB is open, the character strings in that file exceeding over 64KB will not be displayed.
- If a text larger than 64KB is saved by overwritten, the character strings in that file exceeding over 64KB will be nullified.

Handwritten Input Screen

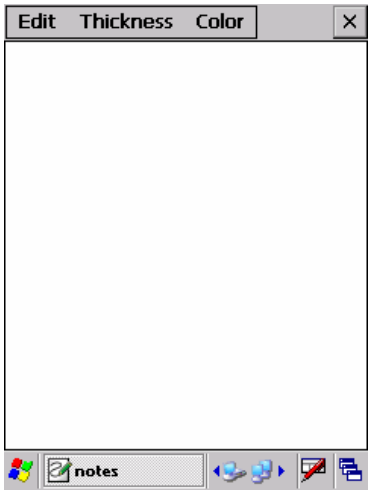


Fig. 4.81

Table 4.22 Menus in the application

Menu		Description
Edit		
	Undo	Restores correction to its original state.
	Cut	Cuts selected portion.
	Copy	Copies selected portion.
	Paste	Pastes portion cut or copied.
	All Clear	Clears the entire screen.
	Cancel	Cancels creating a note.
Thickness		
	Thin	Changes the line thickness to thin.
	Normal	Changes the line thickness to normal.
	Bold	Changes the line thickness to thick.
Color		
	Black	Changes the line color to black.
	Red	Changes the line color to red.
	Green	Changes the line color to green.
	Yellow	Changes the line color to yellow.
	Blue	Changes the line color to blue.
	Pink	Changes the line color to pink.
	LightBlue	Changes the line color to sky blue.
	White	Changes the line color to white.

Text Input Screen

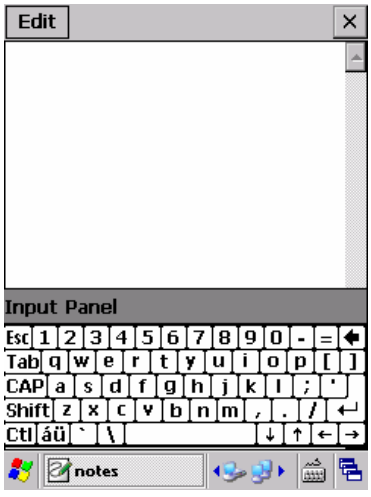


Fig. 4.82

4.2.11 Backup Tool

This application backups and restores user data to/from the FlashDisk.

Backup/Restore Objects

- Files in the RAM
- Registry (password, and information about stylus correction excluded)
- Received mails
- Browser's cookies and temporary files
- Certificates

Data Storage Destinations

FlashDisk or memory card

Backup Password

In order to ensure the security, a password must be input when start to backup data.
Data cannot be recovered at a time of its restoration unless the correct password is input.

Backup Procedures

The backup procedures are as follows.

1. Select backup destination in **Location** pull-down menu and then tap **Backup now** button.

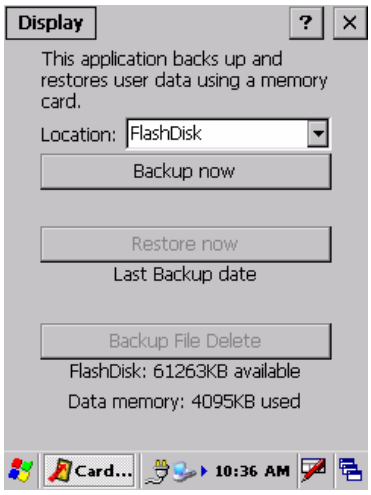


Fig. 4.83

2. Specify a password in **Password** field if necessary and then tap **Yes** button.

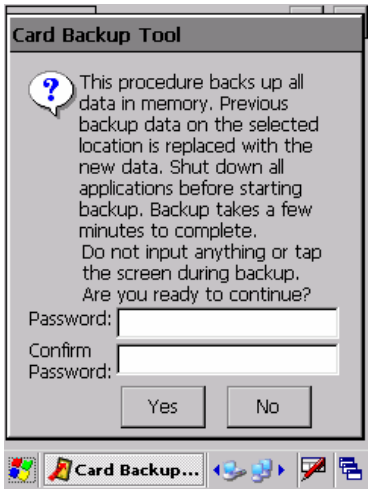


Fig. 4.84

3. As soon as **Yes** button is pressed, the progress window appears (see Fig.4.85) and the backup will be executed.

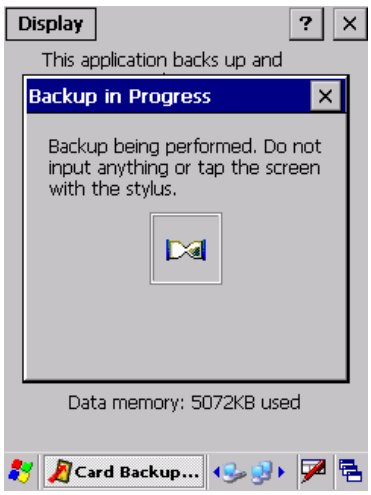


Fig. 4.85

4. The backup is complete when the window in Fig. 4.86 appears. Tap **OK** button to close the window.

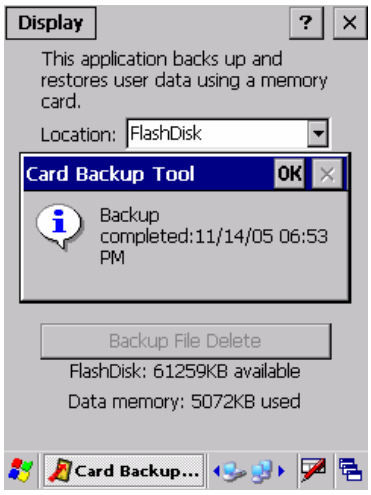


Fig. 4.86

Restore Procedures

The following are the restore procedures.

1. Specify the backup destination in **Location** field (see Fig.4.87) and tap **Restore now** button.

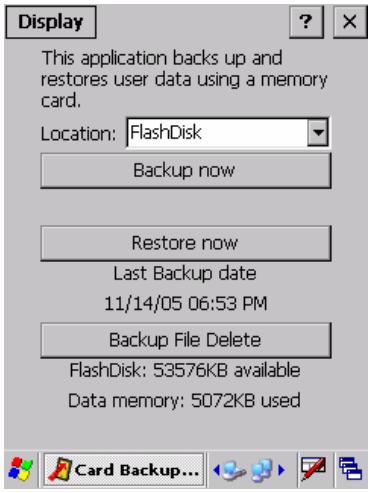


Fig. 4.87

2. Input the password in **Password** field if it has been specified, and then tap **Yes** button.

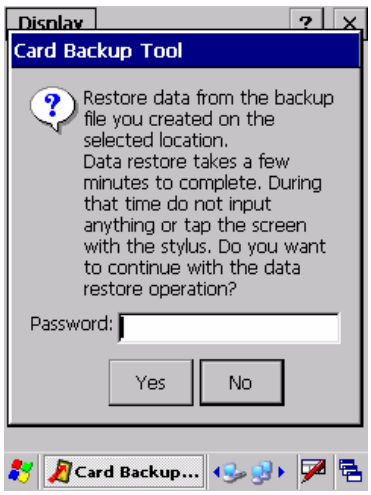


Fig. 4.88

3. As soon as **Yes** button is tapped, the restoration will take place with the progress window (see Fig.4.89) shown.

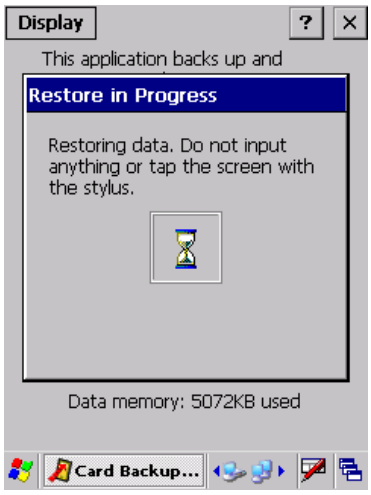


Fig. 4.89

4. When the restoration is complete, a confirmation window will appear. Tap **OK** button to close the window.

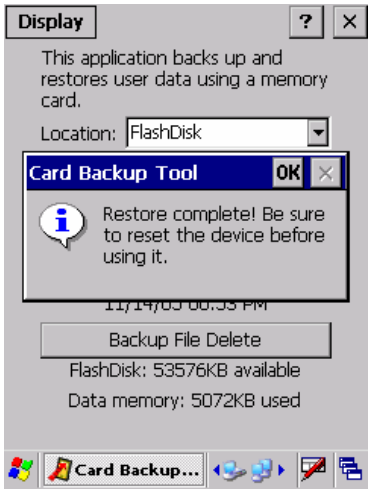


Fig. 4.90

Starting up Backup Tool as Command Line

The following shows a method to start up the backup tool as command line.

CF_Backup.exe *<option> <target> [<password>]*

Parameters

option

B: Specifies the Backup.
R: Specifies the Restoration.
- Set up either “B” or “R”. It is not case-sensitive.

target

Directory that saves the backup file.

password

Password that has been specified. Specify it if necessary.

Notes

- Depending on the amount of data, operations of the backup and restoration may take several tens of seconds to several minutes.
- Use dedicated AC adaptor to supply power to the terminal via cradle when performing the backup.

4.2.12 Laser Scanner Demo

This application demonstrates the following scanning functions with the integrated laser scanner (applicable to DT-X11M10E and DT-X11M10RC only).

- Automatic permission of setting readable bar code symbologies
- Scanning bar codes using one of the Trigger keys.
- Displaying scanning result in the screen (see Fig. 4.91).

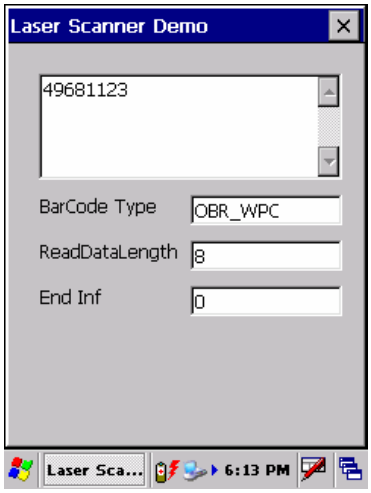


Fig. 4.91

4.2.13 Laser Scanner Read

After scanning a bar code by the integrated laser scanner, a result of the scanning is output. The output method for the scanning result will be defined by settings made in “Laser Setting”. To display the “Laser Setting” menu, tap the ( ) icon in the Taskbar and select **Setting**.

Operation Procedures

1. Start up laser scanning. The ( ) icon appeared in the Taskbar indicates that the scanning application is being started up.
2. Start up an application that receives a result of scanning bar code.
3. Scanning a bar code will take place when one of the Trigger keys is pressed.
4. The scanning will end when the Trigger key is released or when the preset timeout elapses. The scanning result will be output to the application.

Notes:

- To exit the laser scanning application, tap the ( ) icon in the Taskbar and then select **Exit**.
- The clipboard output method copies data of scanning bar code into the clipboard by pasting it (by executing the keyboard event (Ctrl and V keys)). Therefore, data of scanning cannot be output to application that does not support the paste operation (the keyboard event (Ctrl and V keys)).
- These laser scanning applications cannot run simultaneously with other application that occupies the integrated laser scanner.

4.2.14 Image Scanner Demo

This application demonstrates the performances of reading 1D bar code and 2D code symbologies with the integrated CMOS Imager (applicable to DT-X11M30E, DT-X11M30U and DT-X11M30RC only). The application consists of four menus;

- Single Decode
- Multi Decode
- Image Capture
- Sign Capture

Single Decode

This mode reads a single bar code symbol every time one of the Trigger keys is pressed and then displays scanned bar code, symbology and the no. of digits. To exit this mode, tap **Quit** button.

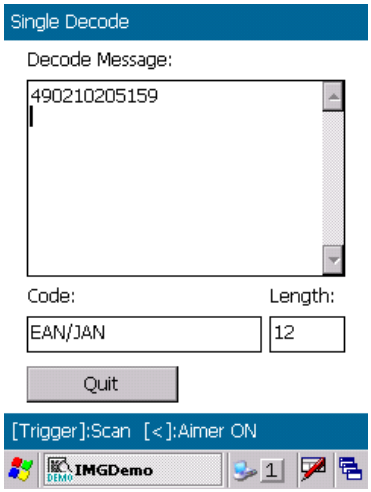


Fig. 4.92

Multi Decode

This mode reads specified no. of bar code symbols at a time and then displays each scanned bar code in the respective boxes in Fig. 4.93. The no. of symbols to continuously scan can be specified is either 2, 3 or 4.

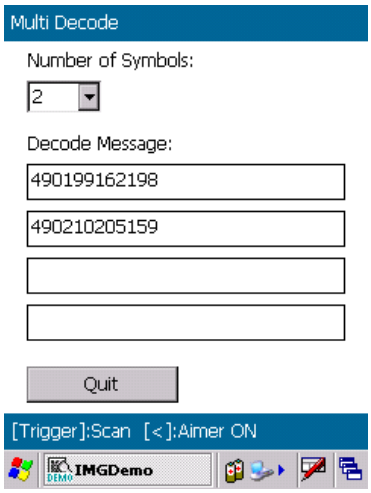


Fig. 4.93

Image Capture

This mode captures an image through the CMOS imager. Pressing the Trigger key first time will display preview of image and then capture the image when the key is pressed second time to save it in JPEG format in a storage area which is indicated at the lower part of the screen (see Fig. 4.94).

Fig. 4.94

Sign Capture

This mode reads bar code symbol and captures signature both located in the same vicinity and then displays its result and captured signature on the screen. See Fig. 4.95.

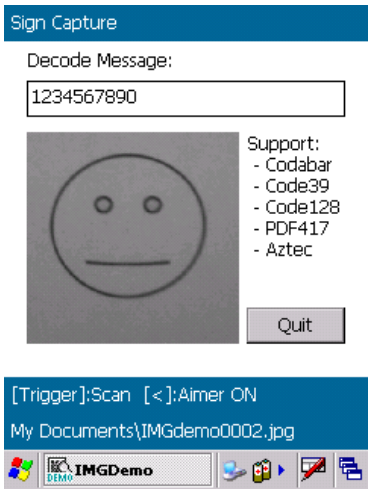


Fig. 4.95

4.2.15 Image Scanner Read

After scanning 1D bar code symbol or 2D code symbol by the integrated imager, a result of the scanning is output to application. The output method as well as other relevant parameters for scanning can be determined by the settings made in “Settings”. To display the “Settings” menu, tap the () icon in the Taskbar and then select **Settings**.

Operation Procedures

1. Tap **Image Scanner Read** icon in the Utility folder. As soon as the icon is tapped, it appears in the Taskbar indicating that the application is being started up.
2. Start up an application that receives a result of scanning 1D bar code or 2D code symbol.
3. Scanning 1D bar code or 2D code symbol will take place when one of the Trigger keys is pressed.
4. The scanning will end when the Trigger key is released or when the preset timeout elapses.
5. The scanning result will be output to the application.

Notes:

- To exit the image scanning application, tap the () icon in the Taskbar and then select **Exit** menu.
- The clipboard output method copies data of scanning 1D bar code or 2D code symbol into the clipboard by pasting it (by executing the keyboard event (Ctrl and V keys)). Therefore, data of scanning cannot be output to application that does not support the paste operation (the keyboard event (Ctrl and V keys)).
- These image scanning applications cannot run simultaneously with other application that occupies the integrated imager.

4.2.16 Copy Devices

This application copies various settings and applications installed in one terminal (master terminal) to other multiple terminals (child terminals).

Contents to be copied

Table 4.23

Target	Contents	Remarks
RAM Disk	All files in the RAM.	
FlashDisk	All files in the FlashDisk.	
Registry	Select from “All”, “User” and “Display”.	Calibration data and OS build information are excluded.
Database	Inbox mail info, etc.	
Date/Time	Date/time set on the master terminal.	Time difference of a several seconds may occur depending on the surrounding communication condition.

Note:
Each target (in the table above) can also be specified for copying its content to other terminals.

Procedures for copying

The following is the procedure for copying data between master terminal and child terminal(s).

On master terminal

1. Set all checkboxes of storage areas and contents enabled you wish to copy to other terminals, and then tap **Send Start** button.

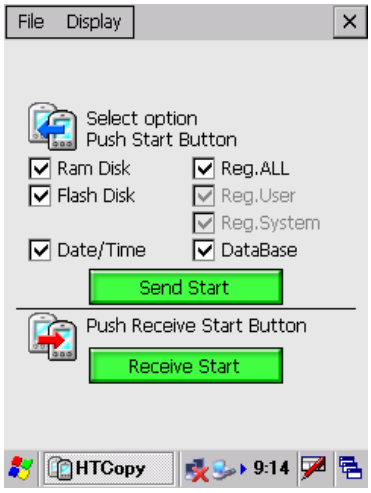


Fig. 4.92

2. As soon as pressing **Send Start** button, a progress window appears flowed by the screen below.

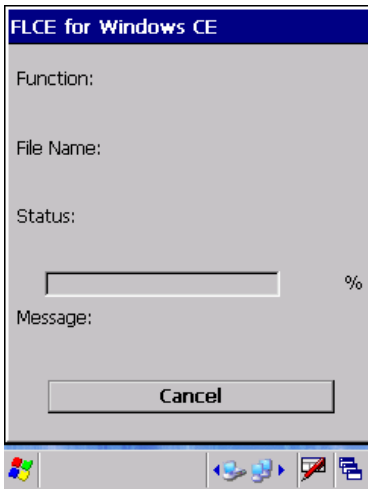


Fig. 4.93

On child terminals

1. Tap **Receive Start** button on each child terminal (if multiple terminals exist). See Fig. 4.94.

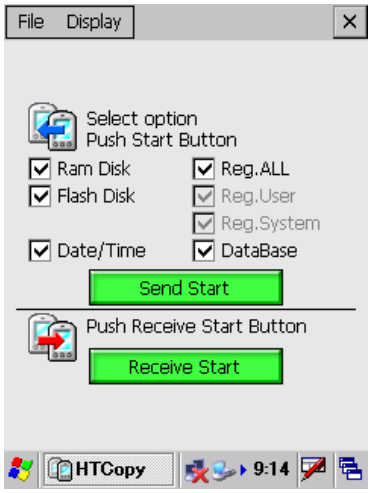


Fig. 4.94

2. As soon as the button is pressed on the child terminal, the following screen will appear indicating the reception of data.

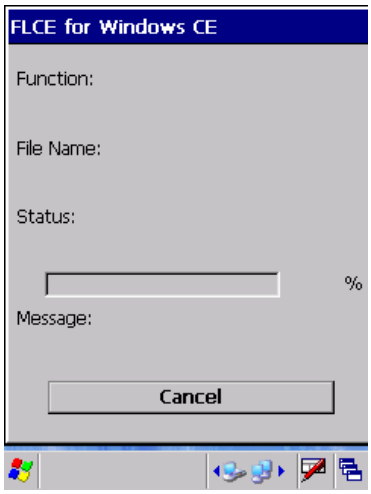


Fig. 4.95

4.2.17 FLCE

This application enables the terminal to communicate with PC in where the LMWIN is running. The communication between two devices is established via cradle.

Input Command Line Screen

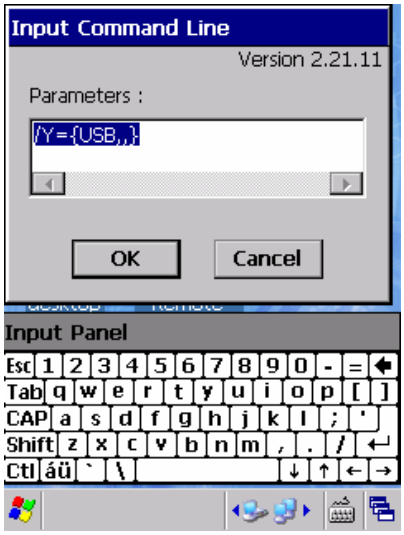


Fig. 4.92

Screen During Transfer

While the communication continues, the following screen will appear. Refer to Upload/Download Manual available separately for detail of the operations.

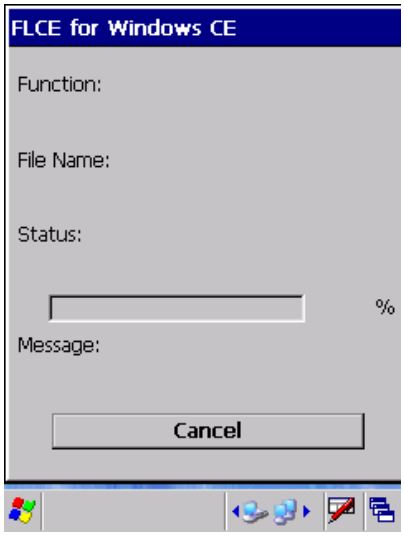


Fig. 4.93

4.2.18 ActiveSync

This application is ActiveSync client program for communicating with a PC.

4.2.19 LAN ActiveSync

This application is ActiveSync client program that uses WLAN.

4.2.20 Terminal

This application is TTY and VT-100 terminal emulator. It is used for on-line service or communication with business server that requires the TTY terminal emulation or the VT-100 terminal emulation.

Double tap **Make New Session** icon in Fig. 4.98 to create a new session.

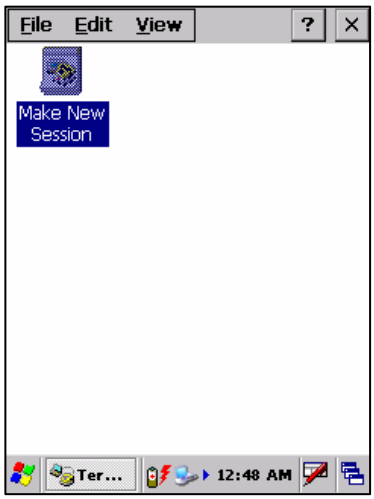


Fig. 4.94

Communications tab

In this tab, set session name, modem and phone number in each field and then tap **Configure …** button if required to set up parameters in **Port Settings** and **Call Options** tabs. See Fig. 4.95.

Fig. 4.95

Emulation Tab

This tab is to set up emulation type, code page and display settings. See Fig. 4.96.

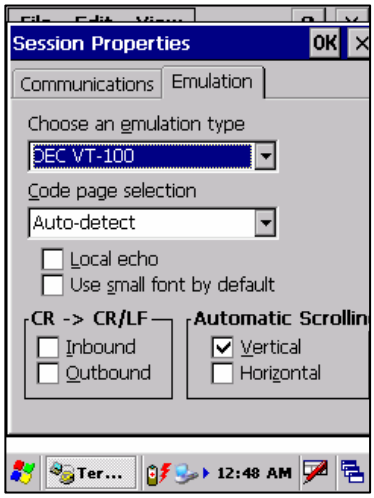


Fig. 4.96

4.2.21 NetSearch

This application displays a list of partner stations communicable with the terminal via WLAN.

- Partner stations on the list can be sorted in the order of field intensity, station name and channel.
- Field intensity for the partner station currently being established with the terminal will be displayed in green.
- The information appeared in the screen is updated every five seconds.
- The remote station's WLAN standard IEEE802.11b or IEEE802.11g icon is displayed at the head of the station name.
- A key symbol icon is displayed for stations that use encrypted communication.

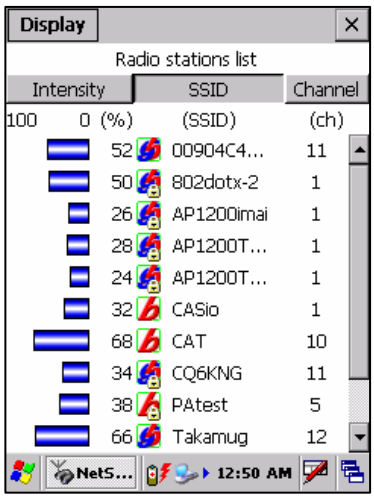


Fig. 4.97

Table 4.24 Menus in the application

Menu		Description
Display		
	List	Displays a list of partner stations.
	Detail	Displays screen showing information in detail about the partner station.
	New Connection	Displays the new connection screen and sets up connection related parameters.
	Edit Connection	Displays the new connection screen and edits connection related parameters.
	Options	Displays a screen for setting partner station parameters for searching.
	About	Displays version information.

Detail Information about Partner Station

The screen displays following details about the partner station.

- SSID
- WLAN standard
- No. of channels
- RF intensity
- Radio quality
- Encryption
- MAC address
- IP address
- Subnet Mask

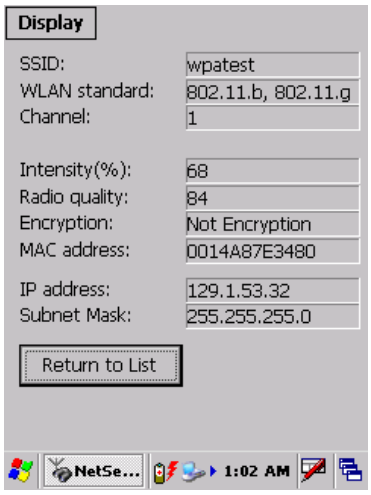


Fig. 4.98

New Connection screen

This screen is for setting connection related parameters in each tab and for creating configuration file. See Chapter 3.7.6 “WLAN Setting with Configuration File” for details concerning the parameters.

Basic tab

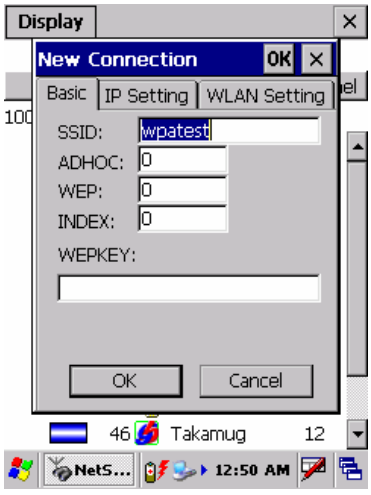


Fig. 4.99

IP Setting tab

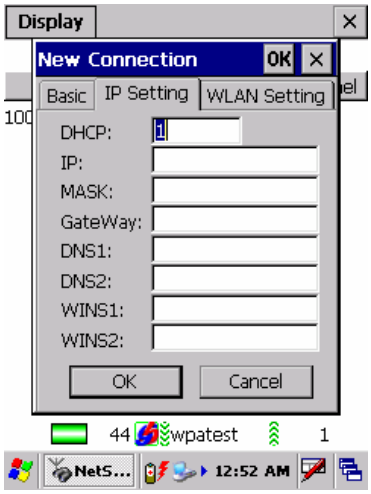


Fig. 4.100

WLAN Setting tab

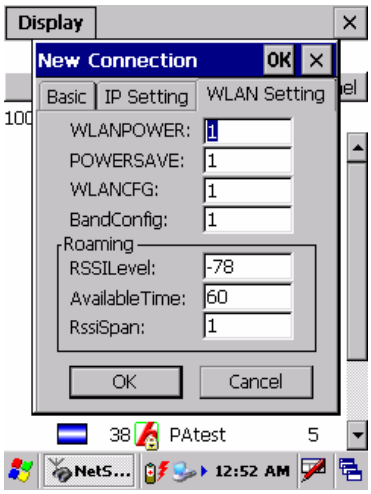


Fig. 4.101

Partner Station Search Conditions Setting screen

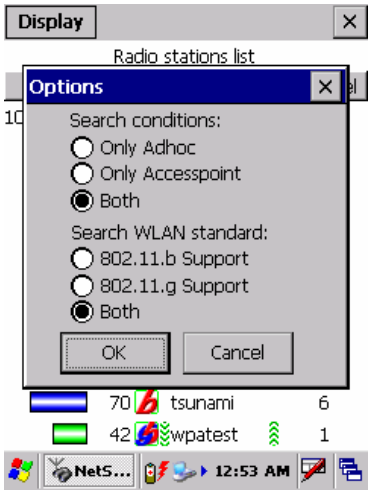


Fig. 4.102

Search conditions

This field is to select a way to search partner station via either **Only Adhoc**, **Only Accesspoint** or **Both**.

Search WLAN Standard

This field is to select WLAN standard to search partner station via either **802.11.b Support**, **802.11.g Support** or **Both**.

4.3 Utilities

The utilities listed in the table below are mainly used as a co-process or auxiliary program in user applications.

Table 4.25

Utility	Description	Available from	
		CASIO	MS
FCHKCE	Confirms a result of data upload/download.	Yes	--
Auto Setup	Executes automatically application at time of reset on the terminal.	Yes	--
Auto Recovery Tool	Performs automatic recovery at a time of full reset on the terminal.	Yes	--
Welcome Wizard	Calibrates the touch panel, sets up date/time and owner information.	Yes	--
HandWriting	Performs hand writing on the touch panel.	--	Yes
Input Panel (SIP)	Software keyboard.	--	Yes

MS; Microsoft

4.3.1 FCHKCE

This utility checks a result of data upload/download. See “Upload/Download Manual” for its details.

4.3.2 Auto Setup

This utility automatically sets up a specified application.

Execution timing

The timing for executing "Auto Setup" is as follows.

- When the terminal is reset;
  The utility executes **Setup.exe**, **Restore.exe** in FlashDisk or in the card directory.
- When PCMCIA or CF card is loaded;
  The utility executes **AutoRun.exe** in the card directory.

Location of application for Auto Setup

Locations of applications to be automatically set up by this utility are as follows.

- FlashDisk
- CF card
- PCMCIA

The locations are in each **CE\ARM** folder of the locations.

Customizing in the registry

Performances of the "Auto Setup" can be automatically customized by changing the parameters in the following registry.
[HKEY_LOCAL_MACHINE\Drivers\CASIO\UTIL]

Table 4.26

Key	Setting Value	Description
AUTORUN	sz:"1"	Executes **AutoRun.exe** when an Storage Card2 is loaded.
	sz:"2"	Executes **AutoRun.exe** when a Storage Card is loaded
SETUP	sz:"1"	Executes **Setup.exe** for the Storage Card at a time of reset on the terminal.
	sz:"2"	Executes **Restore.exe** for the Storage Card at a time of reset on the terminal.
	sz:"3"	Executes **Restore.exe** for the Storage Card2 at a time of reset on the terminal.
	sz:"4"	Executes **Setup.exe** for the Storage Card2at a time of reset on the terminal.
FLSETUP	sz:"1"	Executes **Setup.exe** for the FlashDisk at a time of reset on the terminal.
	sz:"2"	Executes **Restore.exe** for the FlashDisk at a time of reset on the terminal.

Notes:

- Once the registry is deleted, the applicable application will not be automatically started up.
- The registry will be initialized to its factory setting by performing a full reset on the terminal.
- Since automatic startup of applications by the utility will be performed every time when a reset is performed on the terminal or when a card is loaded, it should be avoided by controlling the automatic startup for each applicable application.

Canceling Auto Setup on FlashDisk

If **SetCancel.dat** file resides in \FlashDisk\CE\ARM, the setup keys in FlashDisk can be cancelled by pressing CLR key while the key input mode is Function mode.

4.3.3 Auto Recovery Tool

This utility uses the backup tool to back up system data, restore system data and automatically execute user designated applications.
For data backup, data will be backed up by the backup tool. For data restoration, data will be restored by automatically executing the backup tool at a time of the terminal's start up after a full reset has been performed.

Backup

The following is the backup procedure.

1. Starts up \Windows\Restore.exe.
2. When the program is complete, an end message appears. Tap **OK** button to close the program.

Restore

The following is the restore procedure.

1. **\FlashDisk\CE\ARM\restore.exe** will be started up after about 10 seconds when the welcome screen appeared by a full reset on the terminal. The screen will automatically close.
2. If **\FlashDisk\Calibrate.dat** does not exist, a screen for setting the calibration's parameters will appear.
3. A screen for setting date and time will automatically appear. Set the correct date and time.
4. Data will be automatically restored from the backup data.
5. The terminal will be automatically reset after about 5 seconds when the restoration of data in the step 4 is complete.

Execution Log

Execution log of the Auto Recovery is stored in **\FlashDisk\CE\ARM\Restore.log**.

Notes:

- The execution log file can maintain a maximum of 30 logs combined for the backup and restore operations.
- If the log file exceeds over 30 logs, records older than others in the file will be deleted.

Skipping Restore

When the auto restoration about takes place, pressing 5 key on the terminal will output a warning sound and skips the imminent restoration process.

Error Conditions

The following are the conditions under which an error occurs when the auto restore is taking place.

- The backup or restore operation is executed when the battery capacity is low.
- The backup operation is executed when the FlashDisk has insufficient capacity.
- The backup or restore operation is executed when the memory has insufficient capacity.

4.3.4 Welcome Wizard

The Welcome Wizard sets up the following. However, each of the settings can be skipped if necessary.

- Touch panel calibration
- Owner information
- Date and time

Notes:

- Setting date and time can be avoided by setting a password even if a full reset takes place on the terminal.
- Setting date and time must be performed when the RTC is cleared by a full reset on the terminal.

Customizing Startup Screen

An optional bitmap can be displayed as the Welcome Wizard startup screen. Save an optional bitmap file as **FirstDisp.bmp** in the "\FlashDisk" folder. The screen size of the file must be set in 240 x 320 dots.

4.3.5 HandWriting

This utility recognizes characters that have been directly handwritten by stylus onto the touch panel. The recognized characters are sent to an active input area.

4.3.6 Input Panel (SIP)

This utility is a software keyboard. It supports QVGA display modes.

4.4 Applications

The following are applications used by host PC linked with the terminal.

Table 4.27

Application	Description	Proprietary of	
		CASIO	MS
ActiveSync	Executes data link with the terminal.	--	Yes
LMWIN	Executes data upload/download.	Yes	--
FCHK	Checks and confirms a result data upload/download.	Yes	--

MS; Microsoft

4.4.1 ActiveSync

By linking with the ActiveSync client installed in the terminal, this utility makes communication with the terminal possible. It is available from the following site.
http://www.Microsoft.com/windowsmobile/downloads/activesync38.mspx

4.4.2 LMWIN

This utility links with the FLCE tool installed in the terminal to perform data upload and download. It is an option available separately. See “Upload/Download Manual” for its details.

4.4.3 FCHK

This utility checks and confirms results of data upload/download. See “Upload/Download Manual” for its details.

5. Precautions on Using CMOS Imager

The DT-X11M30E, M30U, and M30RC provide with capabilities for not only simply reading conventional 1D bar code symbols but also for reading 2D code symbols with the integrated CMOS Imager, which has replaced the conventional laser scanner. In addition, the improved camera function has added a new aspect of operation including image capturing and streaming, etc. In association with these features, the read and operation methods have also changed from those of conventional laser scanners.

This chapter describes the performance and functions of the CMOS Imager as well as operating precautions and suggestions. Note that this chapter contains only supplement information for the imager, so please refer to Common Device Control Library manual or relevant chapters in this manual for detailed information about each function.

The imager is explained by focusing on the following three points:

- Imaging performance by camera's optical operability
- Imaging performance by print quality
- Imaging performance by read settings.

5.1 Imaging Performance by Camera's Optical Operability

Soiled camera filter

If the camera filter inside the case is soiled or scratched, the captured image will lose its sharpness, making the symbols difficult to read. If the filter is soiled with oil, finger prints, etc., wipe the filter with a soft, damp cloth to avoid damaging the filter surface.

Focal plane and depth of field

As with a fixed-focus camera this imager has a limited range in which it can produce a sharp image. The subject plane in which the camera can produce a sharp image is called the focal plane, the distance from the camera's device surface to the focal plane is called the focal distance, and the range within which the subject remains sharp and in focus is called the depth of field.
The focal distance of the imager incorporated into the terminal, is 18 cm (or 7 inches), and the size of the focal plane is 8 cm x 11 cm.
The depth of field is generally formed by two distances, one of which (near side) is calculated as one third of the focal distance in the outward direction and the other (far side) is calculated as two thirds of the focal distance in the inward direction. Accordingly, the depth of field of the camera is:

Near side : 18 x (1-1/3) = 12 cm
Far side : 18 x (1+2/3) = 30 cm

However, this range varies with the ambient brightness - it becomes smaller than that calculated above if the image is captured in a dark place.

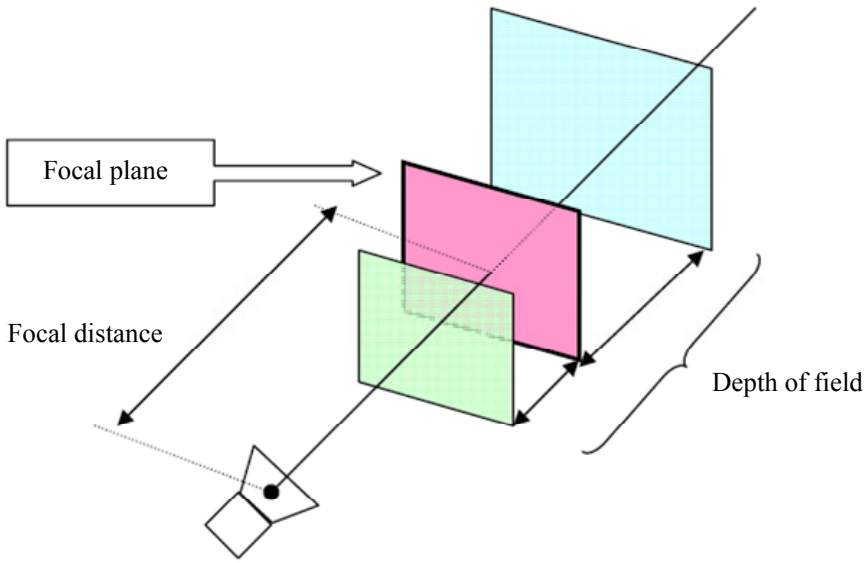


Fig. 5.1

Variation of ambient light

This imager will detect the ambient brightness from the obtained image and calculate the optimum exposure time or sensitivity (gain) to prepare for the next image capture. Therefore, if a new capture is made in an environment different from the previous capture, it may be required to repeat the capture several times until the optimum value can be calculated. In addition, the imager is affected by various light-related conditions, such as a location by a window, overcast weather, sun and shade, morning and evening settings, etc., which generally are not a conscious consideration for humans (and are handled without conscious thought).

Reflected light from the illumination LED, backlight

In addition to direct light from the light source (producing the effect of backlight), reflected light of the illumination LED, re-reflected light on the lens in an excessively bright environment, etc., may cause part of the symbol to disappear into the white background or hamper the correct exposure calculation, resulting in decoding no longer being possible. Such a detrimental effect of the illumination LED can be avoided by the “LED Light Intensity Adjustment Function”, described later.

Position of the Imager

The Imager is oriented at a 45-degree downward angle, if the terminal is held horizontally. Thus, the Imager faces obliquely upward if the terminal is held vertically as shown below, and faces obliquely downward if the terminal is held horizontally. And, if the terminal is inclined 45 degrees, the Imager will now be held horizontally, so it will face straight towards the object.
In order to avoid a mirror reflection (occurs within ±5 degrees from the shooting direction of the Imager), it is recommended to hold the Imager at a 30 degree inward inclination so that image capturing can be performed under a condition where the target symbol is slightly above the top edge of the terminal.

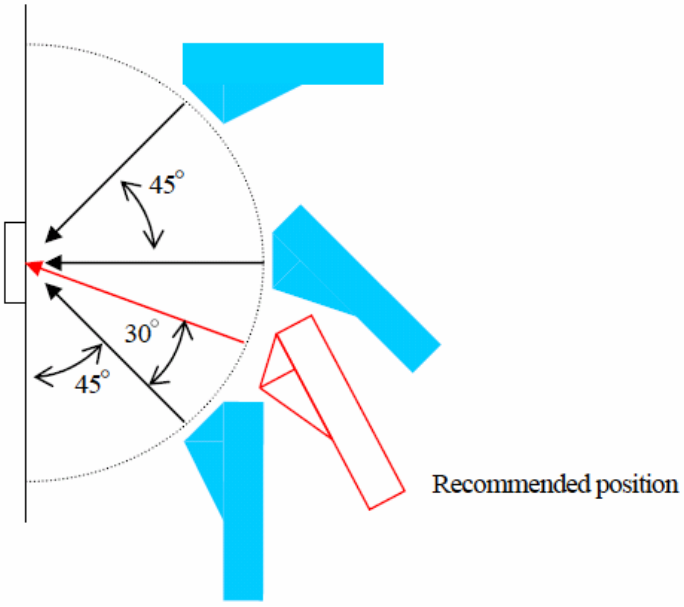


Fig. 5.2

Moving object, hand blurring

The Imager requires a certain amount of exposure time for image capturing. This means that if the subject is moving during this interval, the resultant image will be blurred. Therefore, if you need to capture a symbol while looking for its location, it is advised to adjust the Imager to the location of the symbol with the aimer LED, then perform reading with the Imager held still so that the objective symbol, as well as the resulting image of the symbol, is also still relative to the Imager.

Sensitivity and noise

Due to the nature of CMOS sensor, it has poor sensitivity and the image is easily affected by noise. In particular, this is significant when image capturing is attempted in a dark place or the subject is far from the Imager.

Tips to optimum image capturing

- Always keep the Imager filter clean.
- Remember that the optimum image capturing distance is around 18 cm.
- As much as possible, capture a symbol in a location where the variation in ambient light is small.
- Hold the terminal so it is inclined 30 degrees inward and so that the symbol can be seen in a position slightly above the terminal.
- To read a symbol, first adjust the Imager position with the aiming LED and then begin capturing by holding the terminal still (fixed).
- In a dark location it is advisable to capture within the effective coverage of the illumination LED while ensuring sufficient illumination for the distance area.

5.2 Readable Ranges

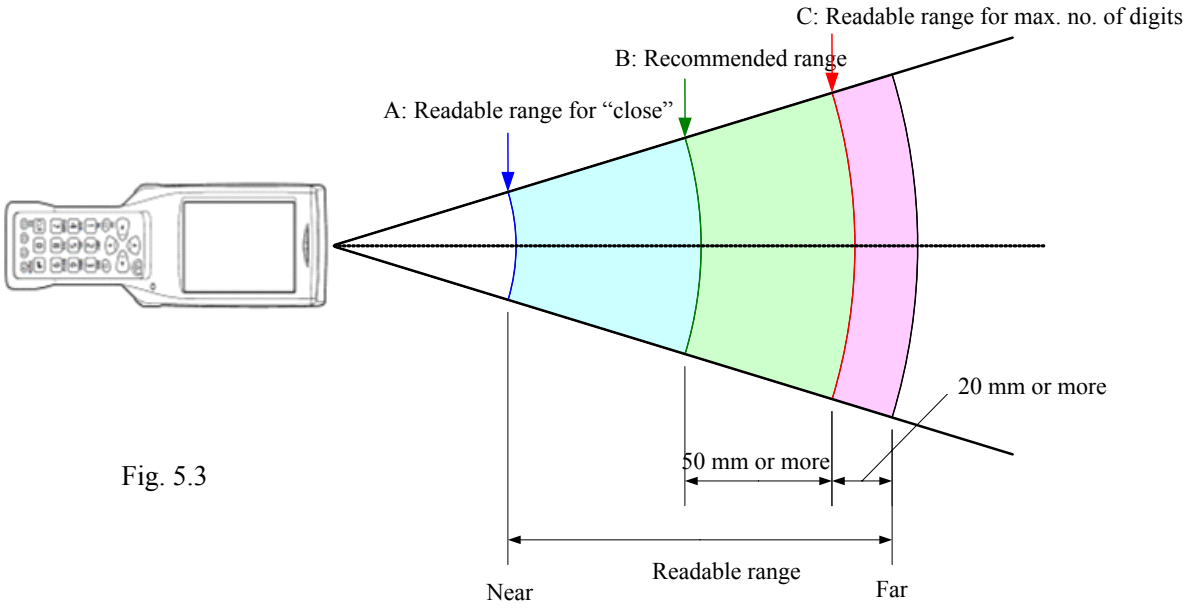


Fig. 5.3

Table 5.1 Readable digits by symbology

Symbology		Resolution	Range	Readable digits			Remark
				A: Close	B: Recommended	C: Maximum	
1D							
	Code39	6mil (0.15mm)	70 to 105mm	12	12	21	
		8mil (0.20mm)	60 to 135mm	5	12	22	
		10mil (0.254mm)	50 to 165mm	5	10	20	
		13mil (0.33mm)	60 to 200mm	5	10	19	
		15mil (0.38mm)	40 to 210mm	2	8	17	
		20mil (0.5mm)	70 to 260mm	2	8	16	
		40mil (1.0mm)	90 to 410mm	2	5	12	
	UPC	13mil (0.33mm)	60 to 200mm	11	11	11	
2D Stacked							
	PDF417	6.6mil (0.168mm)	60 to 115mm	97	100	2,000	ECL4
		8mil (0.20mm)	60 to 135mm	95	100	2,500	ECL4
		10mil (0.254mm)	50 to 165mm	100	100	2,500	ECL4
		15mil (0.38mm)	70 to 210mm	52	50	1,800	ECL4
		20mil (0.5mm)	80 to 250mm	50	50	1,500	ECL4
2D Matrix							
	DataMatrix	13mil (0.33mm)	60 to 105mm	100	100	1,152	Note 1
		15mil (0.38mm)	60 to 125mm	97	100	1152	
		20mil (0.5mm)	80 to 155mm	95	100	1152	
	QR	13mil (0.33mm)	60 to 105mm	100	100	1,600	Note 2
		15mil (0.38mm)	60 to 130mm	97	100	1,600	
		20mil (0.5mm)	60 to 145mm	95	100	1,600	
	Maxicode	35mil (0.889mm)	50 to 210mm	52	50	138	ECC

Notes:

1. ECC200 88 x 88 sell (maximum)
2. Model 2 M version 20 (maximum)

Table 5.2 Angles

Angle (at distance of 120 mm away from the CMOS Imager)		
Pitch	1D (Code39 10mil (0.25mm))	±35°
	2D Stacked (PDF417 10mil (0.25mm))	±35°
	2D Matrix (Aztec 20mil (0.5mm))	±35°
Skew	1D (Code39 10mil (0.25mm))	±40°
	2D Stacked (PDF417 10mil (0.25mm))	±40°
	2D Matrix (Aztec 20mil (0.5mm))	±35°
Dead zone		±5°(pitch, Skew)
Tilt	1D (Code39 10mil (0.25mm))	360°
	2D Stacked (PDF417 10mil (0.25mm))	360°
	2D Matrix (Aztec 20mil (0.5mm))	360°

Table 5.3 Environment performances

Environment illumination	100 to 80,000lux		
PCS	1D (Code39 10mil (0.25mm))	0.45 or more	5 digits
	2D Stacked (PDF417 10mil (0.25mm))	0.45 or more	100 digits
	2D Matrix (MaxiCode 35mil (0.889mm))	0.45 or more	52 digits
Angle	V_Angle	26°	
	H_Angle	35°	
Operating temperature (for the Imager sensor)	High Temperature	50 ºC	
	Low Temperature	-20 ºC	

Notes:

- All the specifications described in this chapter are assessed and defined under the basic scanning conditions described in Table 5.3.
- The readable ranges described in Table 5.1 may fluctuate according to a kind of symbology.
- All the numbers of digits in Table 5.1 are defined with numeric only, not with alphanumeric characters or ASCII characters which require different print utility software and software parameter settings.
- Both recommended readable digits and maximum numbers of readable digits in Table 5.1 are just reference. Note that print quality of the symbology and the surrounding environment affect each no. of digits.

Readable ranges for 1D bar code symbologies

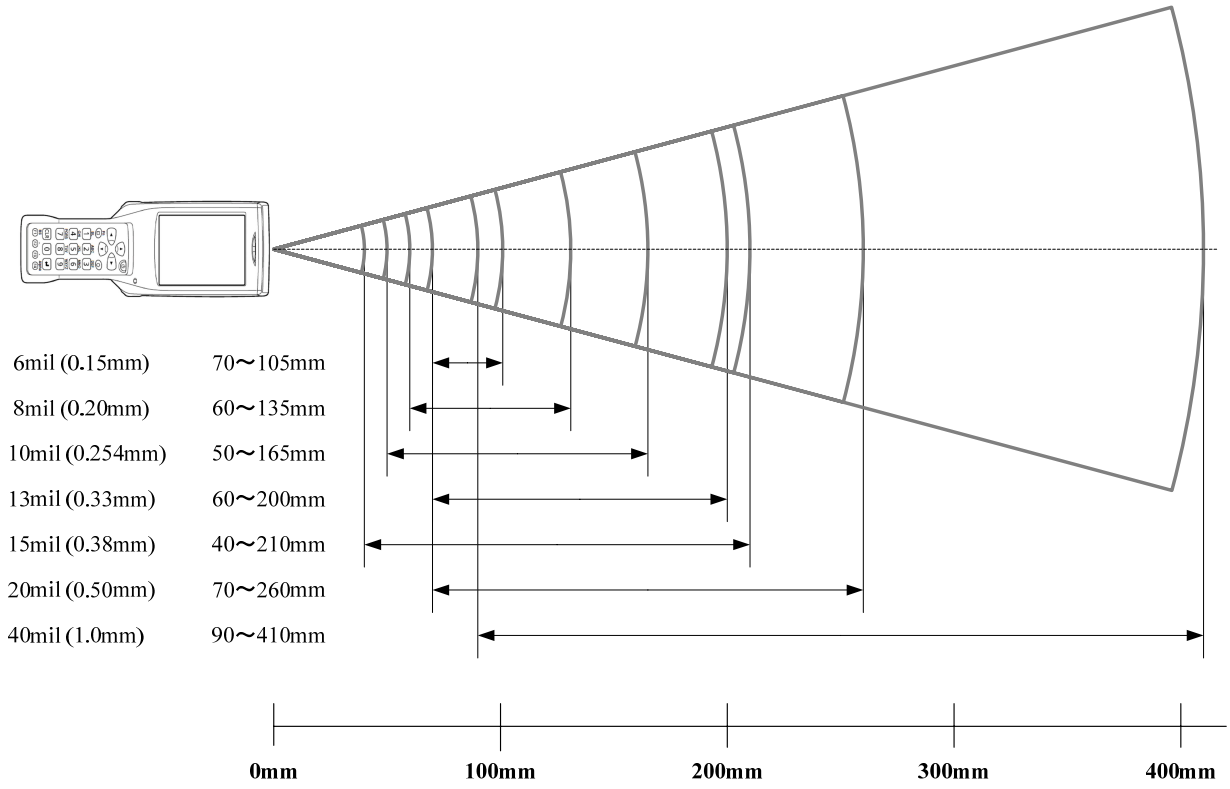


Fig. 5.4

Readable ranges for 2D Stacked code symbologies

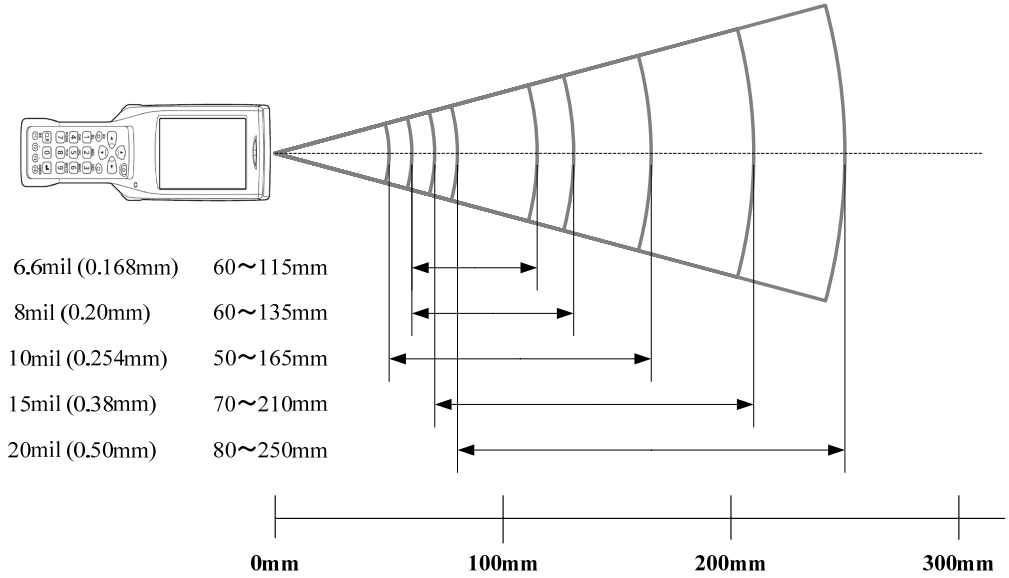


Fig. 5.5

Readable ranges for 2D Matrix code symbologies

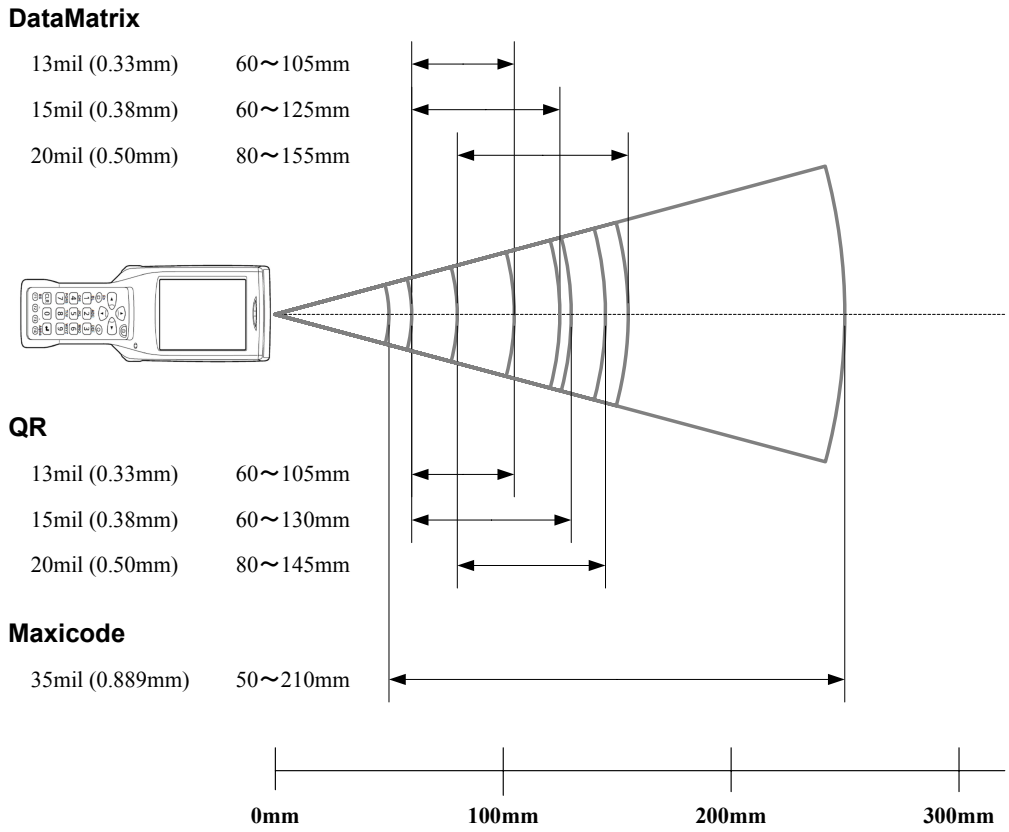


Fig. 5.6

5.3 Imaging Performance by Print Quality

Print quality

Generally, a printer that has a resolution higher than 400 dpi is considered as capable of printing symbols at a dot size smaller than 0.125 mm. In an actual application it is preferable to perform printing so that one fine bar (cell) consists of 3 to 5 dots, and in that case, the resulting dot size will be between 0.18 to 0.38 mm.
Some printers have the capability to emphasize fine lines, which may produce a difference in the width of black/white bars (cells) from that produced with other printers, even if these two black/white bars (cells) indicate an identical value. In this case, increase the width of the fine bars (size per cell) of each symbol to relatively reduce the difference.
Also, if a symbol is duplicated by a copy machine or sent through a facsimile, the print quality of the entire symbol is reduced. The readability becomes less than the original. Also, in this case it is possible to restrict the relative error by printing the symbol so that it becomes larger in size than the original. However, an enlarged copy is useless, since the printing error must also be relatively enlarged. Even with the given print quality it is sometimes possible to improve readability by specifying “Print Weight”, as described..

Margins around a symbol, character, figure, peripheral object

A CMOS Imager is different from a laser scanner and will capture a symbol in terms of the area. Therefore, the resulting image may contain characters, figures, and objects other than the target symbol and may require an extended period of time to detect the symbol and increase the frequency of read errors, if a complex picture is captured. To avoid this problem it is recommended to provide a sufficient margin around the symbol and to refrain from printing unnecessary characters and figures.

1D symbol:

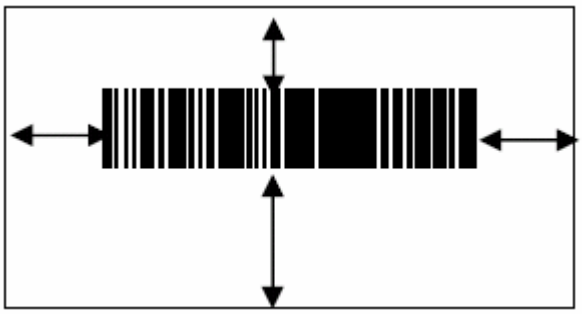


Fig. 5.7

10 times of fine bar or 2.5 mm whichever is larger.

2D symbol:

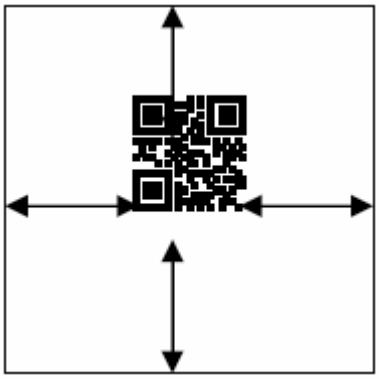


Fig. 5.8

4 times larger than one cell.

Error correction for 2D symbols

The CMOS Imager is provided with an error correction function that can handle various types of damage to symbols, such as that caused by dirt and dust, scratches, faintness, etc. However, this function can only handle damage that appears locally in the symbol area, and is not effective if the entire symbol is soiled or faint.
Furthermore, it is not possible for the Imager to read symbols if a cutout mark required for detecting the symbol position is obscured.

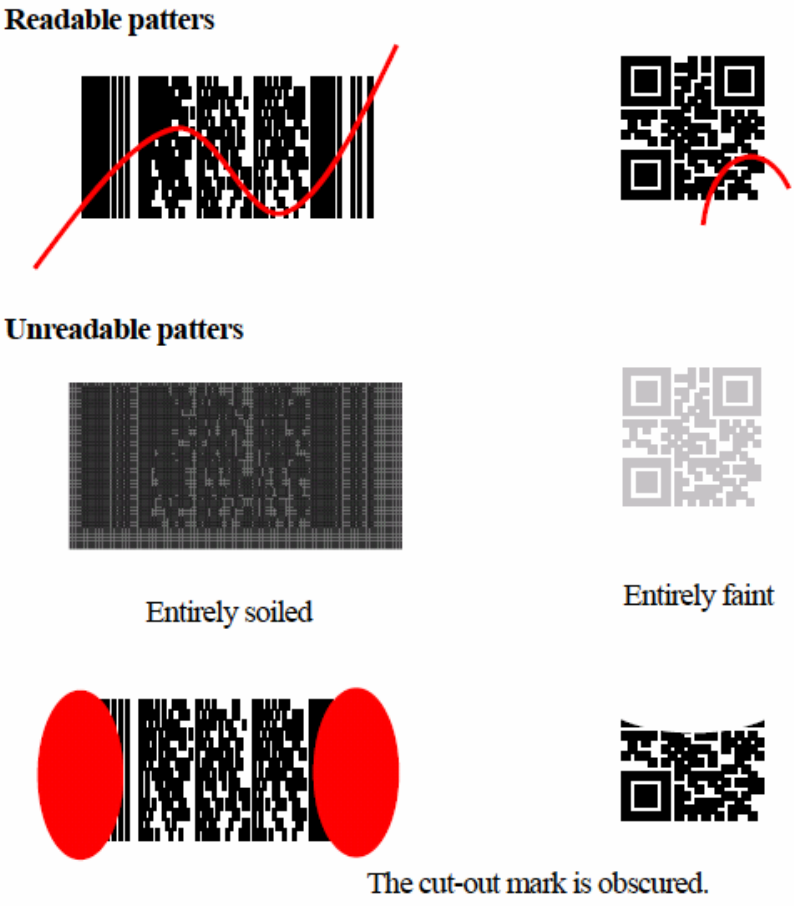


Fig. 5.9

Symbols on glossy paper or under a film window

With the CMOS Imager, the illumination LED will irradiate the target surface for reading symbols. This may sometimes cause the objective symbol to fade into the background due to the adverse effect of the reflected light of the LED when the symbol is printed on a glossy paper or covered by a film window.
In order to read symbols under such conditions, either reduce the LED illumination using the "Adjusting LED illumination intensity", as described, or turn off the LED so that the reading is made under the ambient light only.

Mobile symbols (for a reference)
Mobile symbols (displayed on LCDs of cellular phones) can be read easily if you turn off the illumination LED and turn on the backlight. However, the terminal does not formally support the mobile symbol read function.

Tips to optimum image capturing

- The printed bar width for 1D symbols and 2D symbols should be 0.2 mm or greater and 0.38 mm or greater, respectively.
- Be aware of the number of digits the symbol represents.
- Check the resolution of the printer with regard to whether a fine bar consists of 3 to 5 dots.
- Remember that a symbol copied or transmitted through a facsimile machine results in poor printed quality.
- Do not overestimate the 2D symbol correction function.
- Do not print extra characters and figures around the symbol.
- Exercise care with the reflected light of the LED when reading a symbol on a glossy paper or behind a film.

5.4 Imaging Performance by Settings

Selecting only the symbol to capture

The CMOS Imager can read various kinds of symbols. However, in general, symbols that the user must read during actual daily operation are very limited only to several kinds. If the image capturing permission is set in such a way that even unnecessary symbols are included, the search range for decoding will be widened, the time to complete the capturing will be prolonged, and the frequency of read errors will increase, unnecessarily. It is strongly recommended to limit the number of symbols to be given capture permission in accordance with user's daily application.

Specifying the limited number of digits

In addition to the above mentioned restriction that applies to the selected symbols, each of the symbols available for the user has a specific number of digits that can be captured. Specifying the number of digits for which to exceed the given range may cause errors (in particular, an abbreviated capture). To avoid this, as with the objective symbols specification, specify an appropriate range of digits for the actual operation.

Check digit calculation

Some symbols contain a check digit (or check character) used to validate the contained data. The check digit calculation function is essential for these symbols, however, it is recommended to also apply it to other symbols that allow the selection of this function.

Specifying the print density ("Print Weight")

Suppose that two sets of black/white bars (cells), both indicating an identical value, are printed on different surfaces, one of which is normal and the other of which is prone to be affected by the print intensity of the printer or the reflection from a metallic surface. If these two printed results have a difference in appearance, it may be possible to improve the capture accuracy with this function. Use a smaller value if the printed section (dark bar/cell) looks

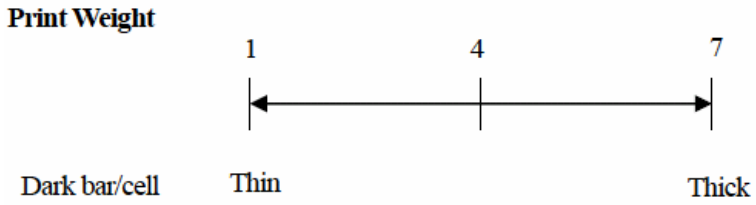


Fig. 5.10

Adjusting LED illumination intensity

If the target symbol is printed on a glossy paper or behind a film that readily reflects incident light, or where the scanning environment is bright enough to eliminate the use of illumination LED, it is possible to restrict reflected light by modifying the illumination intensity of the LED itself. This is also useful for extending the battery life.

Tips to optimum image capturing

- Depending on your application, adjust the following settings to each optimum value:
  - Symbols permitted for capture
  - Number of digits to capture
  - Check digit calculation
- For OCR fonts capture, specify the most appropriate template and checksum.
- Depending on your application, use the following functions.
  - Print density
  - Capture range
  - LED illumination intensity

5.5 Troubleshooting

Table 5.4

Check item	Remedies	Reference page
Symbol cannot be captured.		
Is the Imager filter soiled ?	Wipe off the dirt with a soft cloth.	214
Is the filter damaged ?	Replace the filter.	214
Is the symbol resolution too fine or too rough?	Printing should be made at a resolution of 0.2 to 1 mm for 1D symbols, and 0.38 to 1 mm for 2D symbols.	220
Is the symbol too large?	If the full data is not contained in one symbol, divide it into two or more symbols.	224
Are symbols printed with a sufficient contrast? In addition, does the printed surface look white or have light-warm color, or is the symbol printed in black or in a dark-cool color?	Print the symbol so that the contrast of the symbol is significant. Also, print the symbol in black on a white background.	225
Does the symbol have a sufficient margin around it?	Do not print extra characters or figures around the symbol. Allow a sufficient margin around the symbol.	221
Is the paper on which the symbol is printed glossy? Is it covered by a film, etc.?	Symbols must be printed on paper with less gloss. Do not overlap film, etc., on the symbol.	223
	Reduce the LED illumination intensity of the Imager.	225
Is the objective symbol enabled by the setup for capturing?	Set the symbol to be enabled for capturing.	224
Is the parameter setting for the symbol to be captured correct?	Set the parameters correctly for the symbol. - Check if the number of characters derived from the symbol is within the specified range. - Check if the check digit calculation is specified for symbols that do not require the check digit calculation.	224
Is the green LED irradiating the symbol?	Turn on the green LED so as to irradiate the center of the target symbol.	--
Is the Imager too close to or too far from the symbol?	Try to change the distance between the Imager and the symbol.	214
Is the symbol or Imager fixed for capturing?	Fix the symbol or Imager for capturing.	215
Is the environment for capturing symbol dark?	Sufficiently illuminate the symbol to be captured.	225
Is the symbol directly irradiated by the illumination? In addition, is the illumination beam an incident beam or a reflected beam into the Imager?	Prevent the symbol and Imager from being directly irradiated by intense light.	215

Continue.

Check item	Remedies	Reference page
The captured result is incorrect.		
Are unnecessary symbols set to be captured?	Set only necessary symbols to enable for capture.	224
Is the setup of the parameters for the symbol correct?	Make the correct settings for symbol parameters. - Check if the setup for capture output is correct. (Check the check digit output, start/stop character output, and system number output.)	224
Are symbols close together or are extra characters or figures printed around the symbol?	Print the symbols so as to allow sufficient space between symbols and distance from other characters.	221
	Use the specification of the capture range (Decode Centering Mode).	217
Is the symbol distorted or warped?	Print symbols on a flat surface.	222
Does the symbol data contain elements other than the character code?	Control characters, extra characters, and special characters may not be correctly displayed because they do not have corresponding fonts. In order to display these characters it is necessary to use a specific application to make the necessary conversion. - Control characters (Tab, CR, LF, etc.) - Fnc1 (GS) of EAN 128 - Special characters (encircled numerals, roman numerals, etc.) - Pictogram	--