TADAO TECHNOLOGIES TENGU USB INTERFACE

Tengu Graphical Pixel Editor by Tadao Technologies LLC, pat. pend.

Introduction

The Tengu USB interface is a PC application that allows you to interact directly with your Yakuza USB board. It provides the capability to update the firmware on the board, customize the boot screen graphics, and load/modify/save settings. As with other Tadao products, additional features will be continually added to correspond with new releases of board firmware.

Requirements

- 'Mini-B' to 'A' USB Cable
- Computer with a USB port running Microsoft Windows XP or Windows Vista
- XP users will need the Microsoft .NET Framework, available from: <u>http://msdn.microsoft.com/en-us/netframework/default.aspx</u>. Specifically, download and install .NET Framework 3.5 Service Pack 1 (approx. 2.8 MB). Windows Vista includes the .NET Framework by default; nothing else is needed to utilize Tengu.

Tengu Installation

Download the latest version of the Tengu USB interface from <u>http://www.tadaotechnologies.com/productcart/pc/viewContent.asp?idpage=15</u>. The executable can be placed anywhere on your computer, and does not require an installation routine or any drivers if you already have the .NET Framework.

WARNING: Only download Tengu directly from the Tadao website. If you download the Tengu executable from any other source, it may be compromised and contain a virus or malware.

Yakuza Series USB Board Installation

- 1. Power off the Yakuza USB board.
- 2. Remove/disconnect the battery.
- 3. Use a mini-B USB cable to connect the board to the computer.
- 4. The board will automatically be recognized as an HID USB device. Wait patiently while Windows finds and installs the necessary drivers.
- 5. Windows may notify you that a reboot is required to finish installation.

How It Works

The new Yakuza USB boards are designed around the Microchip PIC18F2550, which is a special microcontroller that has full-speed USB 2.0 support, and can directly interface with a PC as a human interface device (HID). It is a true USB implementation and not just a USB-to-serial converter found on competing products. Since it is recognized as an HID, the drivers are built into Windows, which makes it very easy to install.

There are 2 sides to Tengu. One side is in the microcontroller on your Yakuza USB board and is called the bootloader. The other side is the user interface that you see when you run the Tengu application on your computer.

The bootloader is a permanent program that occupies a small portion of the memory on the microcontroller, and is able to rewrite the code that runs your paintball marker. It communicates over the USB bus to the Tengu interface. The Tengu interface is thus able to send updated firmware to the board or modify the boot screen and settings.

The firmware files are encrypted using 192 bit AES, which is the current encryption standard for the U.S. government. The files are sent in encrypted form over the USB bus to the microcontroller, where they are decrypted before being written to program memory. Encryption protects the intellectual property of Tadao Technologies,. It also prevents abuse of the USB interface (i.e. players trying to write their own cheater software).

The Tengu Interface

Start the Tengu executable. The main window is shown, displaying the About tab, firmware update section, and USB status message box. The tabs along the top of the window will display specific customization features of Tengu. The firmware update box and USB status message box are always displayed, regardless of the selected tab.

礕 Tadao Technologies Tengu	
About Boot Screen Editor Settings Support	http://www.tadaotechnologies.com
	Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com to make sure you have the latest version.
	This application is designed as a firmware update utility for Yakuza OLED series boards with USB, but also includes the ability to modify the boot screen graphics and board settings.
	Located at the bottom of the window is the firmware update control. Once a board is properly connected, you may open and then download the encrypted files to your board.
心子	The tabs along the top of the window allow access to the other features of Tengu. The Boot Screen Edio trabs uses an enlaged 590% foile representation of the OLES occess so you can reset a cutom image. To use it, cick on any pixel to turn it off or on, or use the controls along the top of the tab window to save/load from the board, turn all the pixels on/ off, or load the default image. You can alise save or load the images to and from files, allowing you to distribute unique boot screens amongst finends and tearmates.
Firmware Update	USB Status Messages
OpenFile	Board attached.
Program	

Updating Your Board's Firmware

- 1. Turn off your board.
- 2. Connect the board to the PC with the mini-B USB cable.
- 3. The USB status message box will display that a board has been connected.
- 4. Click the "Open File" button. An open file dialog window will appear.
- 5. Navigate to the location of the new firmware file (.aes file extension) you want to download to your board. Select it.
- 6. Click the "Program" button. The update will begin, with the USB status message box showing the various steps of the programming sequence.
- 7. When finished you may unplug the board from the computer or use other Tengu features.

About tab, file open dialog for firmware

Tadao Technologies Tengu About Boot Screen Editor Settings Support Multip://www.tadaotechnologies.com Open Look in: Downloads Multip://www.tadaotechnologies.com Open Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Use in the USB, but also include on the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Use in the USB, but also include on the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open Use in the USB, but also include on the Tengu USB utility. Tengu is regularly updated, so please to the USB, but also include on the Tengu USB utility. Tengu is regularly updated, so please to the Tengu USB. utility on the USB. Interview of the Tengu USB utility. Tengu is regularly updated, so please to the Tengu USB. Interview of the Tengu USB utility. Tengu is regularly updated, so please to the Tengu USB. Interview of the Tengu USB. Inte	nologies.com
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Welcome to the Tengu USB utility. Tengu is regularly updated, so please visit http://www.tadaotechnologies.com Open	
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Program Secrets Mr. Computer	
File name: ViceY3R120608.aes 🗸 Open	
My Network Files of type: AES files (".aes)	

About tab, firmware update completed (USB status message box):



Using The Boot Screen Editor

The boot screen editor lets you create a customized boot screen, which is displayed every time you turn on your board. The boot screen editor tab displays an enlarged 96x16 pixel representation of the OLED screen. The buttons along the top allow you to:

- 1. Save the current image displayed in Tengu to your board.
- 2. Load the current image stored on the board to Tengu.
- 3. Load the default kanji/Tadao image.
- 4. Turn all pixels on.
- 5. Turn all pixels off.
- 6. Mirror the pixels (every pixel lit is turned off, and vice versa).
- 7. Save the current image displayed in Tengu to a bitmap image file on your computer.
- 8. Load an image into Tengu from a bitmap image file on your computer.

File formats supported:

Tengu will load any type of bitmap image that is exactly 96 pixels wide and 16 pixels in height. The OLED screen is monochromatic, so when you design images in applications such as Photoshop, you should create 1 bpp bitmaps, or only use absolute black and white.

Tengu will reject bitmaps that are not 96x16 pixels. Images that contain colors other than absolute black and white may not load correctly.

Do not use image editing tools to resize an image down to 96x16 pixels. You will lose image quality, and the pixel colors may change, resulting in poor translation when loaded into Tengu.

Boot screen editor tab with default boot screen loaded:

🖷 Tadao Technologies Tengu			
About Boot Screen Editor Settings Sup	port		http://www.tadaotechnologies.com
Save To Board Load From Board	Load Default All Pixels On	All Pixels Off Mirror Pixels	Save To File Load From File
Firmware Update		USB Status Messages	
Open File		Board attached.	
Program			
<u>8</u>)	//N:	

Boot screen editor tab, file open dialog box:

🖷 Tadao Technologies Tengu							
About Boot Screen Editor Settings Support						ht	p://www.tadaotechnologies.com
Save To Board Load From Board	Save As	<u> </u>			_	? 🔀	To File Load From File
	Save in:	🚞 Downloads		~ (3) 🗊 📂 🛄 -		
	My Recent Documents	default.bsi					
	Desktop						
Open File	Secrets						lo USB.
Program	Mr. Computer						
	My Network	File name: Save as type:	mycustombootscreen.bsi Boot Screen Files (*.bsi)		~	Save Cancel	

Modifying Board Settings With Tengu

The settings tab lets you adjust settings on the board. The buttons along the left side allow you to:

- 1. Select the location on the board from which to read or save settings.
- 2. Load settings from the selected location to Tengu.
- 3. Save the current settings displayed in Tengu to the selected location on the board.
- 4. Load the default settings into Tengu.
- 5. Load settings into Tengu from a file on your computer.
- 6. Save the current settings displayed in Tengu to a file on your computer.

Note: Each version of Tengu supports specific firmware for all of the Yakuza USB boards. As new features and their corresponding settings are added to the firmware, Tengu must also be updated so that these settings can be manipulated from within its interface.

Every release of Tengu is capable of updating the firmware on any of the Yakuza USB boards. However, only specific versions of Tengu will be able to correctly load, save, and modify the settings for each revision of firmware. The Tengu page at <u>www.tadaotechnologies.com</u> contains a list of compatible firmware and Tengu versions. You should always update Tengu when you update your board firmware.

Settings tab, displaying a tooltip after loading the settings from the board:

P Tadao Technolog About Boot Screen E	Fire modes: 1. Semi-autor 2. Semi-autor 3. PSP rampin 4. PSP burst - 5. NXL full-aut 6. Millennium r 7. Custom ram 8. Auto-respo 9. Burst - thre 10. Full-auto - ditor	natic un natic ad g - 123 sh to - 123 amping - nse - fi te roun 1 shot	imited - ignores max rate ustable - uses max rate shots semi, on 4th shot fire shots semi, on 4th shot - 123 shots semi, on 4th shot - 123 shots semi, on 4th ser adjustable ramping, es on each pull and relea I burst. semi, on 2nd shot fires fu	e of fi of fir ramp: es 3-r fires fires shot selec ase. ull-au	ire setting. e setting. s at 5 pulls per second, reset ound burst, resets after 1 sec ramps at 6 pulls per second t your own ramp start, ramp to, resets after 1 second.	s after 1 second. cond. nd. ignores ramp start if set bel percentage, and max rate c	sw 6. f fire, hi	tp://www.tadaotechro	- D
-	Firemode	_	Max rate of fire	_	Fine rate adjust	Game timer	Debounce	Anti mechanical bo	unce
Active Settings 🐱	Semi unlimited	~	13	~	0.0	Off 🗸 🗸	5.0 👻	1	~
Load From Board	Cycle percentage fill	ter	Solenoid Dwell		Anti-bolt stick	Ball-in-place delay	Bolt delay	Eye mode	
	10%	~	6.0	~	Off 🖌	1 🗸	14 💌	Forced	~
Save To Board	Save To Board Ramping start		Ramping percentage		G-mode breakout	Rate of fire display	Screen brightness	Power down timer	
Default Settings	5	~	500%	~	Off 🖌	Average 🔽	5 🗸	30 minutes	~
Save To File					USB St	alus Messages			
Firmware Update									-
Firmware Update					Sett:	ings retrieval from 1	oard successful.		

Settings tab, modifying the Solenoid Dwell setting using the drop down menu:

🖳 Tadao Technologi	es Tengu									
About Boot Screen Ed	itor Settings Support							http	p://www.tadaotechn	ologies.co
	Firemode	Max rate of fire	Fine rate adjust	_	Game timer	_	Debounce	_	Anti mechanical bo	unce
Active Settings 🛩	Semi unlimited 🖌 🖌	13 🗸	0.0	~	Off	~	5.0	~	1	~
Load From Board	Cycle percentage filter	Solenoid Dwell	Anti-bolt stick		Ball-in-place delay	_	Bolt delay		Eye mode	
	10%	6.0 🗸	Off	~	1	*	14	~	Forced	~
Save To Board	Ramping start	5.0	G-mode breakou	t	Rate of fire display	_	Screen brightness	-	Power down timer	-
Default Settings	5 🖌	6.0	Off	~	Average	~	5	~	30 minutes	~
Save To File		7.5 8.0 8.5	1	USB Sta	itus Messages					
Open File				Setti	ngs retrieval fro	m bo	bard successful			
Program										

Settings tab, save file dialog box:

	Firemode	May rate of fire	Fine rate	adiust f	Game timer	Debourc	e	Anti mechanical bo	unce
Active Settings 🔽	Semi unlimited 💌	Save As					? 🗙	1	~
Load From Board	Cycle percentage filter	Save in:	C Downloads		~	G 🗊 📂 🛄-		Eye mode	
Save To Board Default Settings	Ramping start	My Recent	default.set					Power down timer 30 minutes	~
Load From File Save To File		Documents Documents Desktop							
Firmware Update Open File		Secrets							
Program		Mr. Computer							
			File name:	mycustomsettings.s	set	~	Save		

The Support Tab The support tab lists the Tengu version, build date, and contact information. The End User Licensing Agreement is also displayed.

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About Boot Screen Editor Settings Support	http://www.tadaotechnologies.com
Tengu version 0.8a Build date: 12.06.2008 Compabile with board firmware versions: Angel A1: Y3 R 12.07.08 Ego 7/78 & Geo: Y3 R 12.07.08 Ego 7.07.86 Ego 9: Y3 R 12.07.08 Marq & Vice: Marq & Vice: Y3 R 12.07.08 Marq & Vice: Mirkko Ultraite: Y3 R 12.07.08 Marq & Vice:	The latest version of Tengu and board firmware are available from http://www.tadautechnologies.com. ONLY download the Tengu application and board firmware directly from the Tadao website. If you download Tengu or new firmware from anywhere else you may subject your computer to viruses or malware. Questions? Concerns? Please check the Tengu manual or email will@tadaotechnologies.com.
- Firmware Update	USB Status Messages
Open File	Settings retrieval from board successful.

Additional Information

Versions – Due to the addition of new settings or features in either program, a specific version of Tengu must be used with each firmware release for a board. Firmware compatible with Tengu versions are listed on the website.

Power on/off – The board must be turned off before connecting to the PC or it will not be properly recognized. While plugged into the USB cable, the board cannot be manually turned on. Input from the power switch will be ignored until it is removed from the USB cable. The battery can be left plugged in while using the USB as long as the board is first turned off.

If you accidentally flash the wrong firmware to your board (i.e. putting the Ego board firmware on your Ultralite board), remove the battery and flash the correct firmware.

End User License Agreement (EULA)

- 1. Under this End User License Agreement (the Agreement), Tadao Technologies (the Vendor) grants to user (the Licensee) a non-exclusive and non-transferable license (the License) to use the Tengu USB interface (the Software).
- 2. "Software" includes the executable computer programs, encrypted firmware files, and any related printed, electronic, or online documentation and files.
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