



## **YAKUZA OLED SERIES E2/E1 Autococker Board**

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### **1. FEATURES**

- Fully functional in the Planet Eclipse E-Blade E1 and E2 autococker frames, and Worrblade autococker frames
- Yakuza OLED graphical display system shows eye status, battery life, current fire mode and max rate of fire, game timer, and menu system
- Advanced microcontroller runs at 16 Mhz
- Utilizes an optical trigger switch like the stock E-blade board
- Extended dwell ranges allow use with MQ valve
- Fully legal in the NPPL, PSP, and Millennium tournament series
- Anti-breech bounce software to reduce chopping when a loader runs low on paint
- RF socket and wiring harness included to support Magna, Pulse, and other RF transmitters
- Multiple modes of fire: unlimited semi-automatic, adjustable semi-automatic, PSP ramping, PSP 3-round burst, NXL full-automatic, Millennium, custom ramping, auto-response, 3-round burst, and full-automatic
- Tadao trigger logic asynchronously monitors the trigger switch, using an interrupt-based scan at 4 million times per second for the quickest response time and fastest semi-automatic
- Tadao dynamic eye logic watches the bolt movement and paintballs load during each shot, cycling the marker as fast as possible
- Rate of fire adjustable from 5 to 30 bps, plus unlimited rate of fire, and a 0.5 ms fine-tuning setting
- Adjustable ABS programming eliminates first shot drop-off with MQ valves
- CPF (cycle percentage filter), and analog optical trigger switch algorithms help to prevent mechanical and switch bounce without missing real trigger pulls
- G-mode setting allows 3 different breakout options for every fire mode
- More than 1 billion unique ways to adjust settings
- Extremely easy to use graphical and text-based menu system allows changes to nearly any variable, including debounce, dwell, loader delay, anti-bolt stick, fire mode, max rate of fire, fine rate of fire adjustment, eye mode, CPF, g-mode breakout, ramp start, ramp percentage, screen settings, settings profiles, and more
- All settings are stored in non-volatile memory so they are not lost when the battery is disconnected
- Power-efficient software and hardware lengthen battery life
- Adjustable idle power-down saves batteries
- One-touch startup enables the marker to fire almost instantly
- Uses spring battery contacts so there's no wiring harness to break or wear out
- Lifetime warranty against manufacturing defects
- Free Yakuza software updates

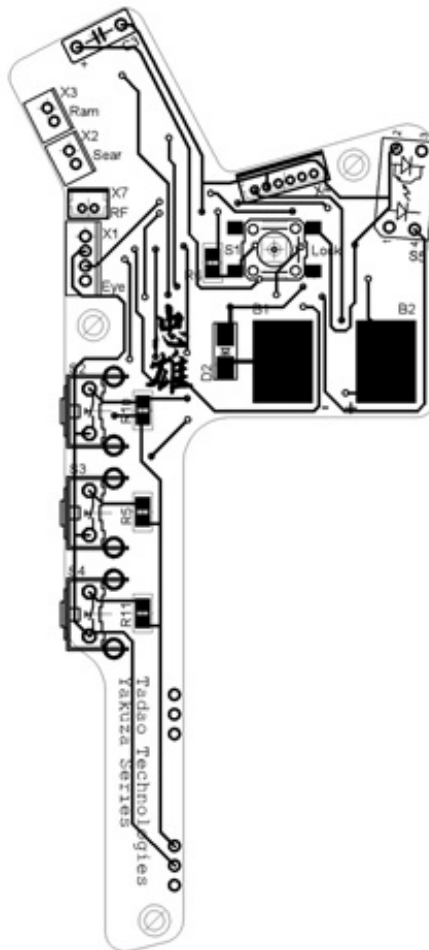
## 2. INSTALLATION

Installation of the Yakuza board must be carefully done to avoid damaging the electronics or wiring harnesses.

1. Remove the grip panel from the right side of the grip frame, exposing the battery and circuit board.
2. Remove the battery and unplug the eye and solenoid harnesses.
3. Remove the 3 mounting screws.
4. Gently pull the stock board out of the frame.
5. Be sure to keep track of the 3 switch contacts.
6. Insert the Yakuza board into the grip frame.
7. Replace the 3 mounting screws, making sure the 3 switches sit snugly against the rear of the frame.
8. Plug the eye and solenoid harnesses back into the appropriate sockets.
9. Replace the battery. The positive terminal is towards the front of the frame, as shown by the + and - marks on the surface of the board.
10. Replace the grip panel.

### Sockets:

1. Ram -
2. Sear -
3. RF -
4. Eye -



## 3. BOARD OPERATION

Turn on the board by pushing the middle button. The OLED display will show the boot screen, followed by the main screen with the current fire mode, rate of fire, battery, and eye status visible.

Turn off the board by pressing and holding the middle button for at least 1 second. The OLED display will turn off to indicate the board has shut down.

The eye system is toggled on and off by pressing and holding the top button. The OLED display will reflect the eye status by changing the eye indicator and maximum rate of fire value.

If used, the eye system cycles the marker as fast as possible. During each shot the eyes watch for the bolt to open, a paintball to load, and the bolt to close. The eye system times the autococker for you to some extent, and will fire as quickly as the pneumatics and your loader allow.

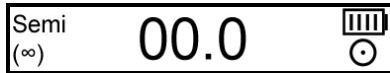
The programming menu system is activated by holding down the trigger while pressing the middle button. The OLED display will show “Menu system initiated...” Further details regarding the menu system can be found below.

If selected in the menu system, the game timer will replace the current rate of fire indicator on the OLED display. The game timer can be started by pressing the bottom button while the timer is displayed.

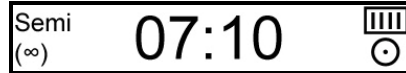
#### 4. OLED DIAGRAMS

The OLED display built into the Yakuza series board shows a variety of information via text and icons. The software is written with performance in mind, and will not update the screen until you stop shooting for just a fraction of a second. This ensures that screen updates do not interfere with the timings of the marker.

**Main screen showing rate of fire:**



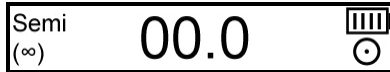
**Main screen showing game timer (when enabled):**



The battery indicator shows battery life by displaying bars within the icon. The more bars, the higher the battery level. A low battery (0 bars) is reached at approximately 7.5 volts, but if quality alkaline batteries are used, the remaining power should be adequate for at least 1 more case of paint.

The eye indicator is displayed as a circular icon, showing the eye status.

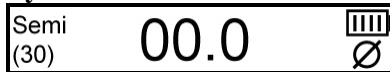
**Empty breach:**



**Eyes blocked:**



**Eyes off:**



#### 5. MENU SYSTEM

The Yakuza menu system allows you to quickly and easily change a variety of settings. The text-based menu is much faster and easier to understand than LED-based programming modes.

**Tournament lock:** The tournament lock can be toggled on and off by pressing the small switch located above the battery contacts on the surface of the board while the marker is turned off. Each press will disable or enable the tournament lock and display the lock status on the OLED screen.

**Programming mode:** To boot into programming mode the tournament lock must be off. You can then hold down the trigger while pressing the power switch to boot into programming mode. After the menu boot message, the displayed setting will be the last one that was modified. If this is the first time the board has been booted into the menu system, it will show the fire mode.

Scroll forward or backward through the settings by pressing and releasing the top or bottom buttons. The menu will wrap around to the beginning when the last setting is reached.

To change a setting, quickly press and release the middle switch. The OLED screen will reflect this by displaying “set” in front of the current value. The setting can be modified at this point by pressing either the top or bottom buttons to increment or decrement the current value. After the desired value is

displayed, save the setting by pressing the power switch. The “set” designation next to the value will disappear.

Example to change the maximum rate of fire from 15 to 20:

1. Boot into programming mode by holding the trigger while pressing the power switch.
2. The first setting is fire mode:  

Fire Mode Semi-Auto ∞
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3. Press the bottom button 1 time to advance to the next setting, which is the maximum rate of fire:  

Max Rate of Fire 15 bps
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4. Press and release the power button quickly. The OLED screen will display the “set” designation next to the current value for maximum rate of fire:  

Max Rate of Fire Set: 15 bps
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5. Press the top button 5 times to increment the value from 15 to 20:  

Max Rate of Fire Set: 20 bps
---------------------------------
6. Press and release the power button quickly. The OLED screen will remove the “set” designation from view and save the setting:  

Max Rate of Fire 20 bps
----------------------------
7. Cycle through additional settings using the top and bottom buttons, or exit programming mode by holding the power switch for 1 second, until the OLED screen turns off.

## 6. SETTINGS

### Fire mode (default semi-automatic unlimited)

1. Semi-automatic unlimited
2. Semi-automatic adjustable
3. PSP ramping – 123 shots semi, on 4<sup>th</sup> shot ramps at 5 pulls per second, resets after 1 second
4. PSP burst – 123 shots semi, on 4<sup>th</sup> shot fires 3-round burst, resets after 1 second
5. NXL full-automatic – 123 shots semi, on 4<sup>th</sup> shot fires full-automatic, resets after 1 second
6. Millennium ramping – 123 shots semi, on 4<sup>th</sup> shot ramps at 6 pulls per second, ignores ramp start setting if less than 6 pulls per second, resets after 1 second
7. Custom ramping – user adjustable ramping, select custom ramp start and ramp percentage
8. Auto response – fires on each pull and release
9. Burst – 3-round burst
10. Full-automatic – 1 shot semi, on 2<sup>nd</sup> shot fires full-automatic, resets after 1 second

### Eyes on maximum rate of fire (default 13 bps, range 5-30 and infinity)

Sets the maximum rate of fire while using the eye system. The semi-automatic unlimited fire mode ignores this value, making it easy to switch back and forth between NPPL and PSP gun rules without modifying more than 1 setting. Adjustable from 5 to 30, with an unlimited option designated by the infinity symbol.

### Eyes off maximum rate of fire (default 8 bps, range 5-30)

Sets the maximum rate of fire while the eye system is turned off. It is recommended that you keep this setting below 10 bps unless you use a very fast loader. This setting will be ignored if set higher than the eyes on maximum rate of fire.

### Fine rate of fire timing (default 0.0, range -2.5 to +2.5)

Allows fine adjustment of the maximum rate of fire in 0.5 millisecond increments, from -2.5 to +2.5 milliseconds.

**Game timer (default off, range 1-20)**

Enables and sets the game timer, which replaces the rate of fire indicator on the OLED display when turned on. The game timer is adjustable from 1 to 20 minutes, and automatically adds the 10-second countdown prior to game start. The game timer can be started by pressing the bottom button.

**Debounce (default 10 ms, range 1-25)**

The amount of time the trigger must be released for the microcontroller to allow the next trigger pull. The Yakuza series uses an asynchronous interrupt-based scan at 4 million times per second that is run independently from code execution. This ensures that every trigger pull is registered. Higher values reduce bounce. Lower values cause more bounce.

**A2D Buffer (default 25, range 10-125)**

The use of an optical switch makes it possible to detect how far the trigger actually blocks the sensor during each pull. The A2D buffer setting allows you to lengthen or shorten the approximate distance that the trigger must be moved to determine that the trigger has been released. This setting replaces the AMB setting found on Yakuza series boards that have a normal microswitch. Higher values will allow more bounce, while lower values should reduce it.

**Cycle percentage filter (default 2, range 1-10)**

Secondary debounce filter which adjusts how far into the firing cycle additional buffered shots are allowed. A setting of 1 turns this filter off, while settings 2 through 10 set the percentage of the cycle that must pass before shots may be buffered. Higher settings will reduce bounce.

**Sear pulse dwell (default 3.0 ms, range 1.0-10.0)**

The sear dwell time consists of 2 phases. The first, sear pulse dwell, is the amount of time the solenoid is energized at 100% power during each firing cycle. The second phase, sear pwm dwell, is the remaining portion of the dwell time where the solenoid power is modulated to conserve power. The initial pulse moves the sear solenoid, while the pwm portion holds it open.

It is recommended that you keep the sear pulse dwell and sear pwm dwell the same or close in value, and both as low as possible to conserve power. The default combination is 3 ms pulse, 2 ms pwm.

**Sear PWM dwell (default 2.0 ms, range 0.5-10.0)**

The sear dwell time consists of 2 phases. The first, sear pulse dwell, is the amount of time the solenoid is energized at 100% power during each firing cycle. The second phase, sear pwm dwell, is the remaining portion of the dwell time where the solenoid power is modulated to conserve power. The initial pulse moves the sear solenoid, while the pwm portion holds it open.

It is recommended that you keep the sear pulse dwell and sear pwm dwell the same or close in value, and both as low as possible to conserve power. The default combination is 3 ms pulse, 2 ms pwm.

**Bolt Dwell (default 9.0 ms, range 5.0-20.0)**

The bolt dwell is the initial pulse of power that energizes the ram solenoid and pushes the bolt back. After the bolt dwell ends, the ram solenoid is modulated, using pwm to continue to hold the bolt back while conserving power. You should set this as low as possible while still maintaining consistent bolt operation. If your bolt doesn't always completely cycle, you may need to increase this setting, or increase the pressure output from the LPR on your front block..

**Anti-bolt stick for MQ valves (default off, range 1-10)**

Used in combination with MQ valves to slightly increase the sear pulse dwell in the event you experience first shot drop-off. It is not meant to be used with the stock sear solenoid. If the marker is left sitting for more than 20 seconds, ABS adds extra dwell to ensure the next shot has proper velocity. The default is off.

**Bolt open delay (default 1.0 ms, range 0.5-15.0)**

Specifies a slight delay time between the end of the sear dwell and the beginning of the bolt open dwell. This ensures that the hammer is given enough time to hit the valve and fire the ball out the barrel before opening the bolt. If you experience blowback, it may be necessary to slightly increase this setting.

**Bolt close delay (default 15 ms, range 1-40)**

Specifies the time allowed for the bolt to close fully, after it has detected a paintball (if using the eye system), or at the end of the cycle (if the eye system is off/disabled). **This is one of the most important settings for the autococker.** If it is too short, you will double feed or get drop-off while rapid firing. If the setting is too high, it will dramatically reduce rate of fire, or in the case of having the eye system turned off, will make it difficult for paintballs to load, since it reduces the time the bolt is open. Please refer to the **initial setup** section for an explanation of the firing cycle.

**Breech watch time (default 400ms, range 200-800)**

Specifies how long the bolt will remain open while the eye system watches for a paintball to load. At the end of the set time, the bolt will close, even if no paintball is loaded. If a paintball is detected, the breech watch time ends early, allowing the bolt to close and maximize the rate of fire.

**Eye mode (default reflective; other settings are break-beam and disabled)**

The Yakuza E2 board supports the stock reflective eye, but can also use Ego break-beam eyes if your autococker is milled and equipped to use them. Owners without an eye system can also disable it so the board boots into eyes off mode and ignores the eye toggle switch.

**Eye sensitivity for paintballs (default 50, for reflective eye sensors ONLY)**

Allows you to adjust the reflective eye's sensitivity to the particular paint you are using. When the setting is adjusted, it will show the real-time digital sensor reading in parentheses on the lower right side of screen. This allows you to pick the correct setting so your paint is read properly.

In order to correctly set the sensitivity, select a number that is 10-20 above the reading shown when a paintball is inserted in the breech. For example, if the screen shows a reading of 20, set the eye sensitivity for paint to 30-40. **Do NOT use your bolt to select the value for this setting.**

**Eye sensitivity for the bolt (default 150, for reflective eye sensors ONLY)**

Allows you to adjust the reflective eye's sensitivity to the bolt in your autococker, since the eye sensor will react differently to various bolt colors and materials. When the setting is adjusted, it will show you the real-time digital sensor reading in parentheses on the lower right side of screen. This allows you to pick the correct setting so your paint is read properly.

In order to properly set the sensitivity, select a number that is roughly between the reading shown when the breech is empty and when the bolt is closed. For example, if the screen shows a reading of 60 when the bolt is forward and a reading of 170 when the bolt is back, set the eye sensitivity for the bolt to 110-120.

**BIP delay (default 1.0, range 0.5-10.0)**

A slight delay that allows each paintball to settle in the breech before the bolt closes. Lower settings potentially lead to higher achievable rates of fire.

**Ramping start (default 5, range 4-14)**

Adjusts how fast you must pull for the ramping fire modes to start adding additional shots. Used with the PSP ramping, Millennium ramping, and custom ramping fire modes. While using the Millennium fire mode, this setting is ignored if set below 6 pulls per second, since that is the minimum allowed in the Millennium series.

**Ramping percent (default 500%, range 10%-500%)**

Adjusts how much the software helps the user. A 50% ramp will add 50% of your pulling rate to the current rate of fire (e.g., if you pull 8 times per second, it will add an additional 50%, meaning the gun

will fire 12 times per second). It is recommended that you leave this setting at 500% while using the PSP or Millennium ramping fire modes.

### **G-mode or “breakout mode” (default off)**

Provides unlimited full-auto, which then falls back to the user-selected fire mode, on the 1<sup>st</sup>, 2<sup>nd</sup>, or 3<sup>rd</sup> shot after turning the board on. Breakout modes are illegal for use in all tournament series and most recreational paintball fields. **Tadao Technologies LLC takes no responsibility if a player chooses to use breakout modes.**

### **Screen layout (default left)**

Allows you to configure the orientation of the screen. Available options are left and right landscape, or vertical.

### **Rate of fire/Timer size (default big)**

Allows you to pick the text size for the current rate of fire or game timer display on the OLED screen. The available options are “normal” and “big” and only apply to the landscape screen orientation settings.

### **Rate of fire display mode (default average)**

1. Average – displays the highest average rate of fire based on 3 consecutive paintballs shot.
2. Maximum – displays the highest achieved rate of fire based on the shortest time between any 2 shots. This setting can give an unrealistic view of achieved rate of fire.

### **Brightness (default 5, range 1-5)**

Allows adjustment of the OLED display brightness. Lower settings are less bright, with a setting of 1 useful for night play and scenario games, or to extend battery life.

### **Auto off timer (default 30 minutes, range 5-60 minutes, and can be disabled)**

The auto off timer will automatically turn the marker off if it is left idle for the specified length of time. This is useful for scenario players who sometimes need to leave their marker on for very long periods of time without firing. The timer can also be completely disabled, but this is not recommended since you may drain your batteries completely if you forget to turn the marker off.

### **Shot counter**

The shot counter will record the number of shots that your Yakuza E2 board fires. It can be reset to zero by pressing the power switch while the setting is being viewed. The variable is 24 bits in length, which means it can record up to 16,777,215 shots.

### **Save profile**

Allows you to save your current settings to one of 3 profiles which are not deleted by a settings reset.

A save can be initiated by changing all the settings on the board to whatever you wish, then selecting a specific profile to save them to, and following the on-screen instructions.

### **Load profile**

Allows you to load any previously saved settings profiles. Select which profile you want to load and follow the on-screen instructions.

### **Reset**

Allows you to perform a settings reset, which returns all settings to their default values. Saved profiles and the shot counter will not be reset.

### **Version**

Displays the current software version running on the Yakuza series board.

## 7. INITIAL SETUP & RECOMMENDATIONS

### Initial Setup

Your Yakuza series E2/E1 board ships with default settings that should work with most electronic autocockers. However, it is very important to complete the following setup steps to ensure optimal performance:

1. **Eye type selection** – select the appropriate eye mode for the type of eyes on your autococker. The default is reflective. If you do not have an eye system and choose “No eyes,” the marker will boot into eyes off mode and disable the use of the eye toggle switch.
2. **Eye sensitivity for paintballs** – for reflective eyes only. This setting allows you to adjust the sensitivity of the reflective eye sensor with the paint you are using. When you activate this setting to modify the value, it will show the current sensor reading in digital format on the lower right side of the screen in parentheses. You want to select a value that is slightly above what the screen shows when you put a paintball in the breech, and below the value shown when the breech is empty. For example, if it shows 170 for an empty breech, and 20 when a paintball is sitting in the breech, you will find optimal performance if you select a value around 30-50.
3. **Eye sensitivity for the bolt** – for reflective eyes only. This setting allows you to adjust the sensitivity of the reflective eye sensor for the particular bolt in your autococker. Like the eye sensitivity for paint setting, this one will also display the actual value read by the sensor while you are adjusting it. You want to select a value that is right between the readings for a bolt blocking the eye and an empty breech. For example, if the sensor shows 50 when the bolt is blocking the eye, and 170 when the breech is empty, you want to select a value around 100-120.
4. **Explanation of the firing cycle** – the autococker has a complex firing cycle which varies greatly, depending on whether you’re using an eye system.
  - a. With eyes:
    - i. Trigger pull detected.
    - ii. Sear solenoid energized (sear pulse dwell + sear pwm dwell times), which drops the sear, allowing the hammer to slam into the valve, releasing a burst of air and firing the paintball out the barrel.
    - iii. Bolt open delay setting gives a slight delay to prevent blowback before opening the bolt.
    - iv. Bolt ram solenoid energized at 100% power (bolt dwell) to open the bolt. After the bolt dwell time ends, the bolt is held open by using PWM to reduce power consumption and prevent brownouts. The breech watch setting determines how long the bolt is held open while watching for a paintball to fall in.
    - v. If a paintball is detected, there is a slight delay to allow it to settle (bip delay), then de-energize the bolt solenoid, which allows the bolt to close.
    - vi. The bolt close delay makes sure that the bolt is given enough time to close fully. If this setting is too short, the bolt may not be completely closed before the next shot, which can cause drop-off or even double feeding.
    - vii. Entire cycle time while using eyes is: sear pulse dwell + sear pwm dwell + bolt open delay + breech watch time + bip delay + bolt close delay.
      1. It is important to note that the breech watch time will automatically end early if a paintball is detected by the eye system, allowing the marker to cycle as fast as possible.
  - b. Without eyes
    - i. Trigger pull detected.
    - ii. Sear solenoid energized (sear pulse dwell + sear pwm dwell times), which drops the sear, allowing the ram to slam into the valve, releasing a burst of air and firing the paintball out the barrel.



- iii. Bolt open delay setting gives a slight delay to prevent blowback before opening the bolt.
- iv. Bolt ram solenoid energized at 100% power (bolt dwell) to open the bolt. After the bolt dwell ends, the bolt is held open by using PWM to reduce power consumption and prevent brownouts. The bolt open time is dynamically set by the software, based on the selected rate of fire.
- v. Since no eyes are used, once the bolt open time ends, the bolt solenoid is de-energized, closing the bolt.
- vi. Bolt close delay time makes sure that the bolt is given enough time to close fully. If this setting is too short, the bolt may not be completely closed before the next shot, which can cause drop-off or even double feeding.
- vii. Entire cycle time without eyes is: sear pulse dwell + sear pwm dwell + bolt open delay + dynamically set bolt open time + bolt close delay
  1. The dynamically set bolt open time is based on your selected rate of fire. For example, if the rate of fire set to 8 bps, your total cycle time is 125 ms. You can then subtract all of the known settings from 125 ms to get the bolt open time ( $3 + 2 + 1 + 15 = 21$  ms, so bolt open time is 104 ms). Note that there are additional inherent delays due to the pneumatic system, so the actual time the bolt is completely open will be less than that.
  2. For optimal performance the dynamically set bolt open time should be as long as possible. This is done by minimizing the other settings, especially the bolt close delay. However, do not make the bolt close delay too low, or you will get drop-off while rapid firing, or double feeding.

### **Settings Recommendations**

Certain tournament series allow alternate fire modes with specific characteristics, so the following is a list of settings that will give you a baseline. Ultimately, every marker is unique and may require different settings for optimal performance.

**NPPL:** Use the default settings, possibly only changing debounce, A2D filter, and CPF to suit your personal trigger adjustments.

**PSP:** Use the PSP ramping or PSP burst fire modes, with maximum rate of fire set to the required cap for the league (13.3 bps for 2008). Make sure the debounce is near default values or higher to prevent bounce. Use the fine tuning rate of fire adjustment to set your maximum rate of fire to 13.2 bps.

**NXL:** Use the NXL full-automatic or PSP fire modes. The NXL used a 13.3 bps rate of fire cap for the 2008 season. Use the fine tuning rate of fire adjustment to set your maximum rate of fire to 13.2 bps.

**Millennium:** For 2008 the Millennium series modified their rules slightly. It is now a 12 bps cap with a 6 pulls per second activation, and requires the 1-2-3 semi-auto shots, like the PSP mode, before ramping can begin. Use the specific Millennium mode. The ramp start will automatically be set to 6 pulls per second as required by the Millennium series, unless a higher value is selected. Maximum rate of fire must be manually set to 12 bps.

Many European tournaments besides the Millennium series utilize semi-automatic, but capped at 15 bps. Select the capped semi-automatic fire mode for these events.

### **Care and cleaning**

Your Yakuza series board includes a conformal coating to help protect against damage caused by moisture such as broken paint or rain. Under normal conditions the board should continue to operate, even with small amounts of moisture present. However, paint is slightly corrosive and can destroy the conformal coating over time. In the event you get broken paint or water on the electronics, unplug the

battery and use rubbing alcohol and a blast of compressed air to clean the board. The compressed air will ensure that everything is cleaned out from beneath the components and connectors.

### **Batteries**

Tadao Technologies recommends the use of quality alkaline batteries such as those made by Duracell and Energizer. Photo lithium 9 volt batteries are also adequate. Batteries labeled “heavy duty” or “super heavy duty” are not true alkaline and will cause inconsistent operation, or may not properly power the electronics. Rechargeable batteries are also not recommended because they typically do not provide enough current.

### **Trigger adjustment**

The trigger switch used on the Yakuza series E2/E1 board is the same type of optical sensor used with the stock board. It is extremely important to use some kind of trigger return force, such as a spring or magnet. Excessive bounce may occur if a spring or magnet is not used, or if the actuation point is too close to the beginning or end of the trigger pull.

## **8. TROUBLESHOOTING**

Before contacting Tadao Technologies, please go through the following checklist:

1. Make sure each solenoid is plugged into the correct socket. The sear solenoid is the bottom socket, while the bolt solenoid is the top socket. All the sockets are labeled on the board, but it may be necessary to gently lift the large capacitor to see the labels.
2. Check your battery. Only high quality alkaline batteries such as Duracell or Energizer are recommended. Rechargeables are not recommended.
3. Due to the great variances among autocockers, it is your responsibility to properly set up the pneumatic system and corresponding mechanical adjustments. Here are a few tips:
  - a. The bolt should just barely clear the breech as the sear catches the hammer.
  - b. There should be at least a few millimeters of travel for the bolt after the sear has caught the hammer.
  - c. The hammer lug needs to be properly set in order for the sear solenoid to actuate it.
  - d. All threaded connections need to be secured via Loctite or other non-permanent thread sealers since the high cyclic rate achievable with the Yakuza E2/E1 board can cause screws to loosen. Important areas to check frequently are the ram to pump arm, sear lug, cocking rod, grip frame mounting screws, and trigger adjustment.
4. Check the board for signs of paint or other foreign substances that can cause a short, and clean them off with rubbing alcohol and a blast of compressed air. This will ensure that everything is cleared out from beneath components and connectors.
5. If your screen shows intermittent brightness or ceases to function, it may not be getting a secure connection on the pair of three pin connectors that attach it to the main board. It is recommended that you gently slide the OLED screen board off the main board and gently clean the pins of the connectors before reinstalling it, since they may have some conformal coating left over from the manufacturing process.

*Additional information at [www.tadaotechnologies.com](http://www.tadaotechnologies.com)*