BLASTER

MANUAL

PLEASE READ FIRST BEFORE PLUGGING IN MACHINE

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116-MAN-001

Contents

Revision History

-3/28/2014: REV-A Created.

-6/16/2014: REV-B Zigbee and Router Board information added.

-9/19/2014: REV-C Various changes.

-10/28/2014: REV-D Part Numbers for IO-Expanders corrected.

Every effort has been made to ensure that the information contained within this manual is accurate. Benchmark Games Inc. reserves the right to make alterations without prior notice.

1-Basic Components

Marquee

Bonus Display

Spinning sign

Targets

Shooter

Push Button

Coin mech

Shot Display

Balls/Platform

Ticket Drawer

Blaster is a game configuration which a player attempts to hit all the lit targets, by timing the shooting arm and hitting the ball up the ramp. The player will have a certain number of attempts to accomplish

the goal and proceed to the bonus round to obtain more tickets. If all targets are hit in the bonus round the player will acquire "Super Bonus" tickets displayed in the upper marquee.

2-Game Play Sequence/Behavior

I- Power-up initialization sequence (10 seconds)

- Initialization sound comes up

- Side LED's light up

- Player Credit Display shows pattern

- Marquee Jackpot display shows pattern

- 2-digit/4-digit display show pattern (playfield)

- Acrylic ball platform spins

- Lower/inside Marquee spins and lights up

- All Targets light up

- The game will then go into attract mode, or play mode if there were any previous credits saved

II- Attract Mode

- Various light patterns are shown while some background sound plays on.

  *Note: that, there is a low-activity rest period (which is programmable). See section 6-programming options, before these sequences are re-triggered, to avoid being too repetitive.

III- Adding money (Coin-Mech/Bill Acceptor/Card-swipe system)

- "Coin-in" or "bill-in" sound is heard on corresponding speaker.

- When enough money is added to buy credit(s), the current credits value will be shown on the four-digit display, and the game will enter Play-Mode.

IV- Play Mode

- Play-mode start sound "GO"

- The Play-field lights behind targets go solid and 2-digit display reads shot chances.

V- Player hits button

- Credit will be decreased.

- Player gets a predetermined amount of shot chances as displayed on playfield.

- Pressing the shoot button will release the shooter, hitting an acrylic ball on the spinning platform and reduce the ball count by one until all shots are used.

- The ball travels up the ramp and hits a lit target.

- When target is hit by ball, the light will turn off, and remain off for the remainder of the player's paid play.

- Tickets will be dispensed at the end of the game.
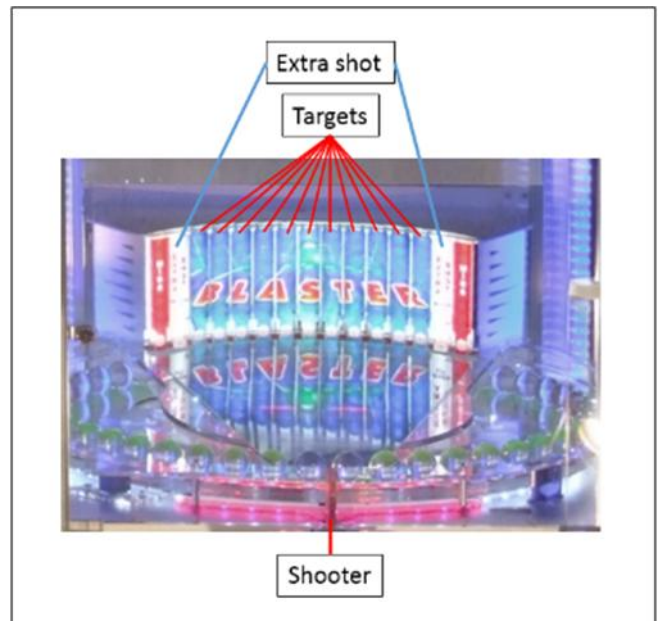
- *Note: If shoot button is pushed and the target ball is not in designated area of shooter, Blaster will make a "buzzer" noise and a shot will not be taken. This will not affect the shot chances for the round.

VI- Bonus Round

- If a player hits all lit targets in first round then they will advance to the Bonus Round.

- Bonus play-mode start sound "BONUS ROUND" is heard, accompanied by a drumroll and "DON'T CHOKE".

- In the Bonus Round a predetermined amount of targets are lit.

- The Player only receives a predetermined amount of shot chances to turn out the predetermined number of targets.

- The amount of tickets will be delivered based on the amount of bonus rounds lit targets hit with the ball.

- If all lit targets are hit in the bonus round, player receives super Bonus (Displayed on top Marquee).

VII- Normal after play

- Acrylic balls will return automatically to spots on spinning platform.

- If player has more credits, the machine will start round 1 again, otherwise Blaster will go back into attract mode.

3- Game setup

Unloading/Assembly

- The game is pre-assembled in the factory, with the exception of simple connections.

- The cabinet keys are tie-wrapped to the chute door handle.

- Remove acrylic balls, push button assembly, and coin chute.①

Button assembly

Coin Chute

- Make sure the coin mech wires inside the button assembly shown in②. The wire connection should be so the yellow wire (12V) is on the top (Blue Circle). The switch just below the wire connection is positioned up ("NO" position, red circle).

   *Note: there are location indicators written on the side of the coin mech to assist you.
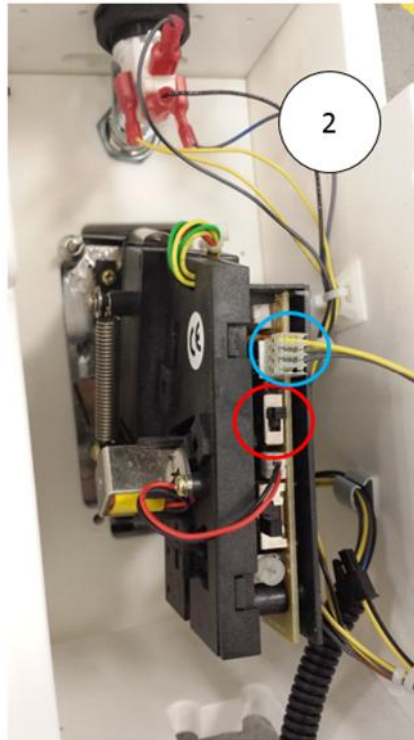
- Take the two coin chute panels, face them so there is a slot in-between that will allow the coin to travel to the coin box in the cabinet. Place the 2 panels in the door and lightly press **in and down** on the panels to lock in place as shown in ③.
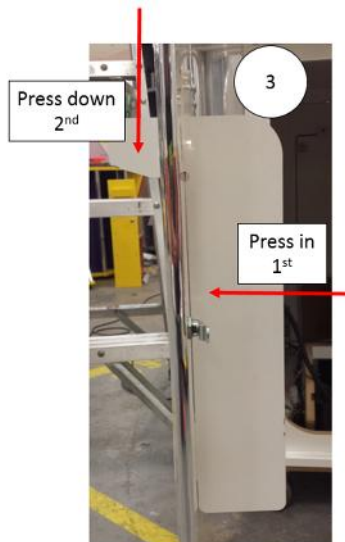
- Take button assembly, with coin mech included, placing the hooks in the slots shown in ④ and press **in and down**. Place the black wire through the hole, and twist the safeties until the lip of the safety is toughing the hook of the button assembly. Connect the black tubing from the button assembly, to a similar black wire located in the cabinet. Secure the black tubing to the door using the black clamps on the cabinet door.

-
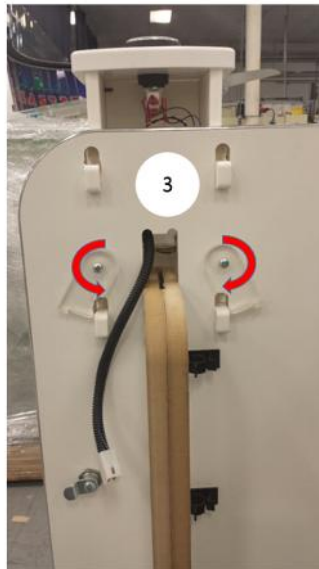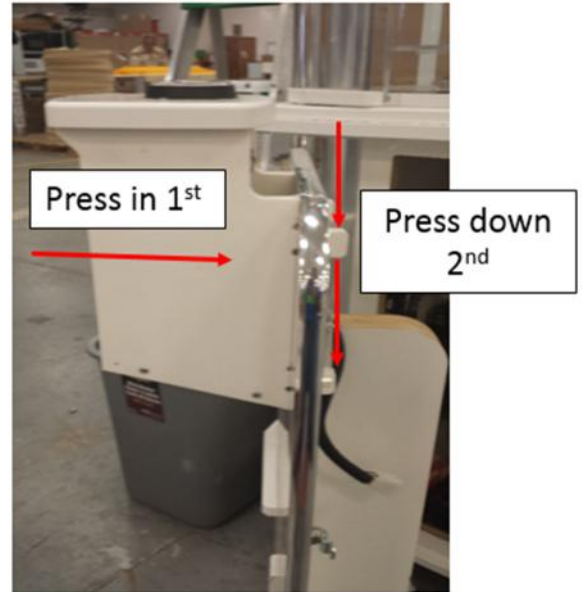
- Remove any shipping foam that might still be holding any parts.

- Marquee Assembly

- The marquee of Blaster can be easily disconnected and removed from the top of the structure to be able to maneuver through door ways.

1. Locate the header
2. Align the holes of the header with the holes of the platform.
3. Attach the marquee using the four supplies screws and connect the marquee harness to the main harness.

 (Disassemble in reverse order of assembly to maneuver through doorways or low ceiling areas)
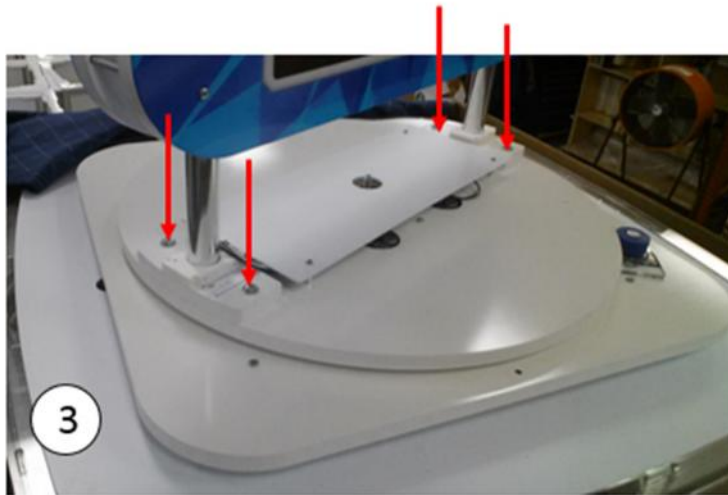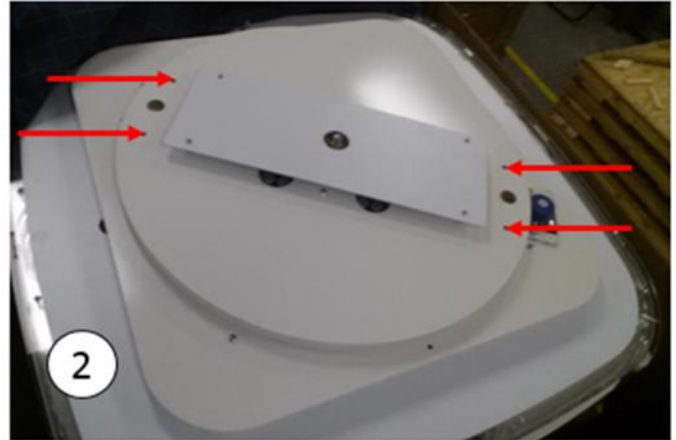
Power up

- The power cord is stored inside a bag that is stapled to the inside of the cabinet on the ticket drawer wall, next to the cash box, along with the manual and spare parts.
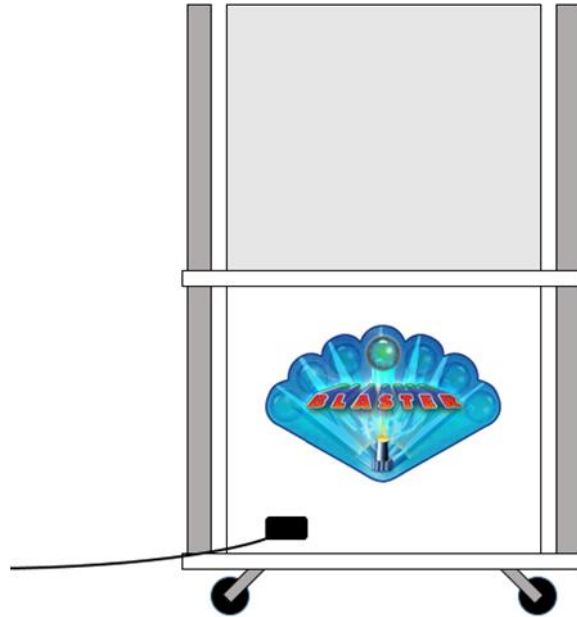
- Plug-in the machine and turn it on from the Switch located on the lower-left side of the cabinet.
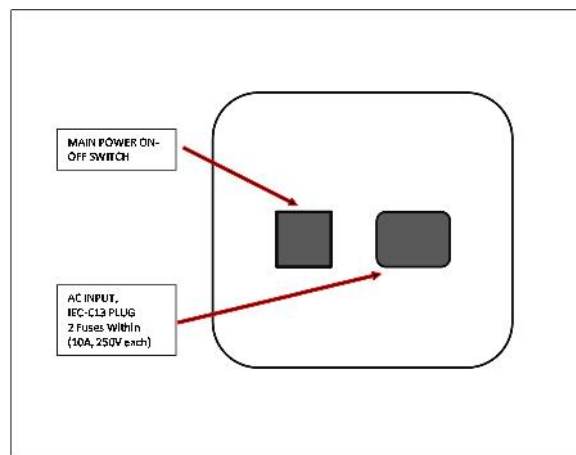
Note: There are two AC fuses within the power supply's IEC-320 receptacle (10Amp, 250V each).

First-Time Setup

- Ensure that all motors/sensors work by observing the sequence described on section 2-I. Any major anomaly, if present, should be seen at this point.

- Run through the 'Programming Mode' options and define your desired settings, like credits settings, sound volumes, etc. (See Section 5 for Benchmark's defaults).

- Confirm your settings to ensure they are what you wanted.

Setting up Coin Comparator

- The Coin Comparator is a section of the Coin Mech. that compares one your tokens or quarter to the inserted coin by the player. If the coins do not match, the Coin Mech. will return the inserted coin to the player.
- The Coin Mech. is attached to the button assembly.
- Detach the Coin Mech. by unscrew the lock nuts on the back of the four carriage bolts that hold the Coin Mech. in place.

- Pull up on the tab on the Coin Mech. that states, "Slide to replace coin".

Lift tab up, spring will give you some resistance.

- Place your token, under the lifted tab, in-between the two edges.

Place coin between the two edges on the bottom and top
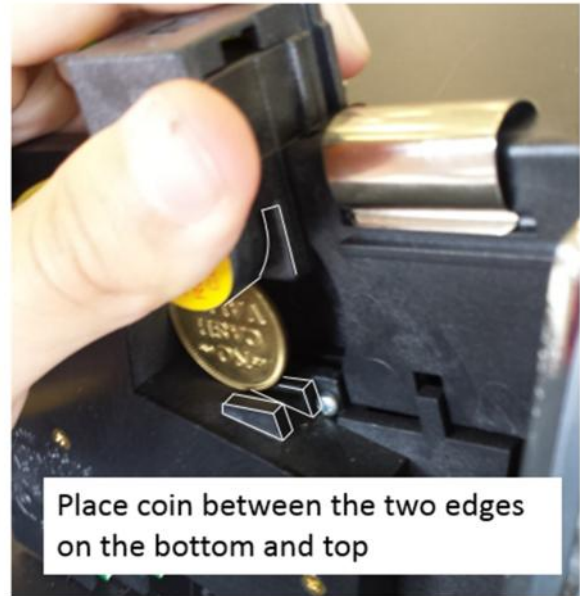
- Tab should be able to come back down and hold the token in place.

- Reattach the Coin Mech to the button assembly by screwing the lock nuts onto the four carriage bolts, and connect the wires so that the yellow wire is on top shown on page 8.

Dual Game Set up

If a Blaster was previously owned and a second Blaster was purchased or if two Blasters were purchased simultaneously, this section will help physically connect the Blasters and allow the Blasters to compete for a common Bonus.

If you purchased two Blasters at separate times you will need to contact Benchmark for additional parts that will be needed to make them compatible.

The parts are as follows:

QTY	Part #	Description
2	116MAC108	Cabinet Attach Bracket Top _2 Player
2	116MAC109	Cabinet Attach Bracket bottom _2 Player
1	PCB00026	Router Board
1	116HNS011	485 extension
1	116HNS015	Router Board 485 Adapter
1	116HNS031	Marquee Comutator Extension
1	116HNS032	Marquee Motor Extension

- If you are combining multiple blasters that have been purchased at different times. Go down to the heading "COMBINING GAMES FROM DIFFERENT PURCHASES"

Game Placement
- Place the Two games side by side. Game A is the Blaster with the Router Board Present. Game B is the Blaster without the Router Board.

- Game A needs to be to the left of Game B.

- Plug in the power cords to both the Blasters, but DO NOT plug the power cords into the power outlet. Make sure that the switch for game B is on, so when plugged in the game will automatically turn on. If you do not place the switch on before attaching the two games, it will be difficult to reach that switch again.

- There are two sets of brackets in the cabinet of Blaster that will physically connect the games.

    o The set with the hook ends will be placed on the front and back of the machine on the bottom tubing, securing the bottom of the games, (you will have to unscrew two screws in the bottom of the game to be able to place the brackets).
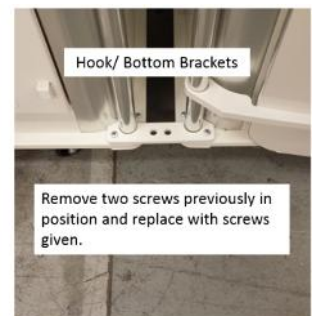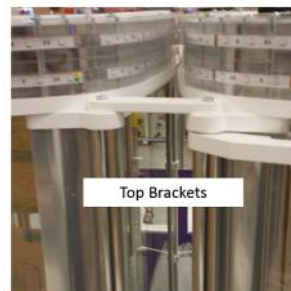
- The set without the hook ends will be placed on top of the tubing, securing the top of the Blasters.

Game Header Placement

- On the top of the game the base of the header needs to be moved so that the header will sit in the middle of the two games. Unscrew the four screws that are holding the base in place. And disconnect the wires under the base.

Remove screws to detach base from game top. Disconnect wires under the base.
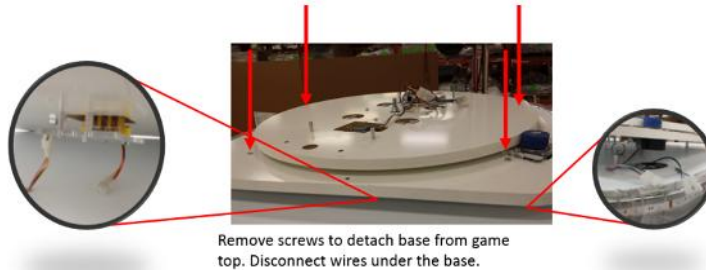
- The base needs to be rotated so that the friction motor sits to the back/left, if you are standing in front of the game.

- Take the Motor extension wire (green, blue, black, and purple) and the commutator extension (yellow, orange, and black) and connect them to the ports from the Blaster to the base of the header.
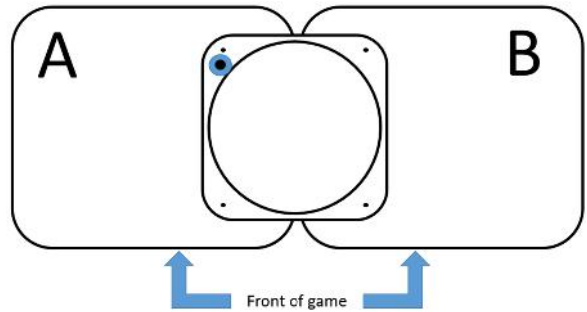
- To secure the base to the two games, use the screws that are located in the packet and screw in two through the base into the two right side stand-offs of Game A and the two left stand-offs of Game B.
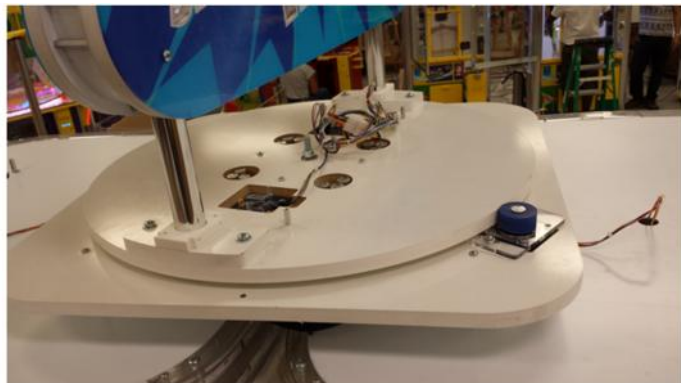
- Place the header on the base, as shown on page 10.

Cable Connection

- Go to the back of both the games, and take off both back doors of the lower cabinets.

- The router board, located on the control panel on page 17, should have a long 485 cable attached to it with zip ties.

- Cut off zip ties and run the cable to Game B. There are slots on the bottom of the door where the cable is meant to run to allow the ability to continue to close and lock the back door.

- There will be a 485 connection on the control panel of Game B in the upper/right corner. Detach the connection and attach the port to the wire that is running from Game A.

- Plug in both games and make sure all is working correctly.

- Place back doors to back of games.

Game B connection
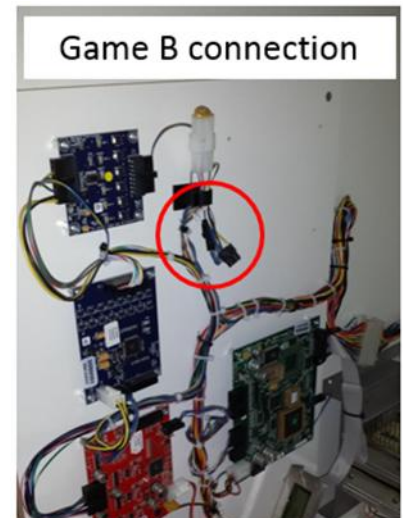
COMBINING GAMES FROM DIFFERENT PURCHASES
- Hopefully you have all the extra parts on the table on page 14. First thing is to combine the games as shown above in section "Game Placement".

- The Router board will go in position as on the control panel shown on page 18 <u>IN GAME A</u>. Screw the four standoffs in the four holes and mount the board to the standoffs using the four ¼" screws that came with the standoffs.

- Take the 485 connection that is shown in the red circle, in the picture located to the right and up.

- Break the connection and plug the female connector into the router board in port 1. Take the male connector and attach the Router Board 485 adaptor and plug that into port 2 of the router board.

- Take the 485 extension and place it in the 3rd or 4th port of the router board. Run the wire to the back of the machine through the notch on the bottom left side of the back door shown at the top of the previous page, and to the corresponding notch on Game B.
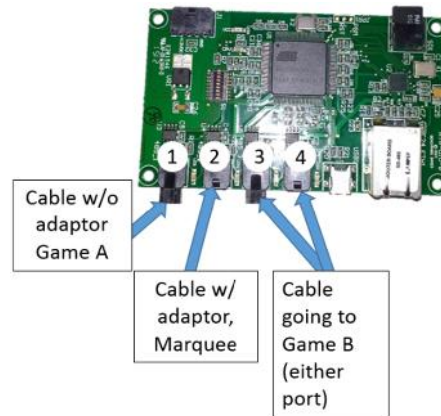
- Game B will also have a 485 connection that will need to be disconnected as described in the third step.

- Connect the extension to the Game B 485 wire and close up both backs of the games.

- Finally, follow the section above called "Game Header Placement" to position the header accordingly using the motor extension harness and the commutator harness.

- Once all done plug in both games to operate.

Recommended pay-out settings

Note: tweaking the payout of the machine to low levels will affect your net revenue negatively. Fair payout (28%-35%) should maximize net income. The player will visually see the uniqueness of the game play and should feel that the payout is fair, but can be increased by playing another game.

- Section 5 of this manual describes the different Settings that can be used to configure the machine. From those settings, the following are the ones that will most likely affect the payout-percentage and the income of the machine:

- Game Price
- Number of Shots
- Payout table
- Jackpot Start Value
- Jackpot increment

The default payout table applies to the game. It determines the amount of tickets awarded for the different targets hit by the players.

Note: Default pricing on the Blaster game is $0.50 (American Currency) and the $ 0.50 payout table is installed on the playfield. This payout table determines the amount of tickets awarded for the different

targets hit by the players. Changing the price per play will require the operator to change the payout table (see pages 24-25 for payout tables).

4- Main Electronic Components

PCB BOARD LOCATIONS, MAIN CONTROL PANEL:

(Router Board will not be present for single Blasters)
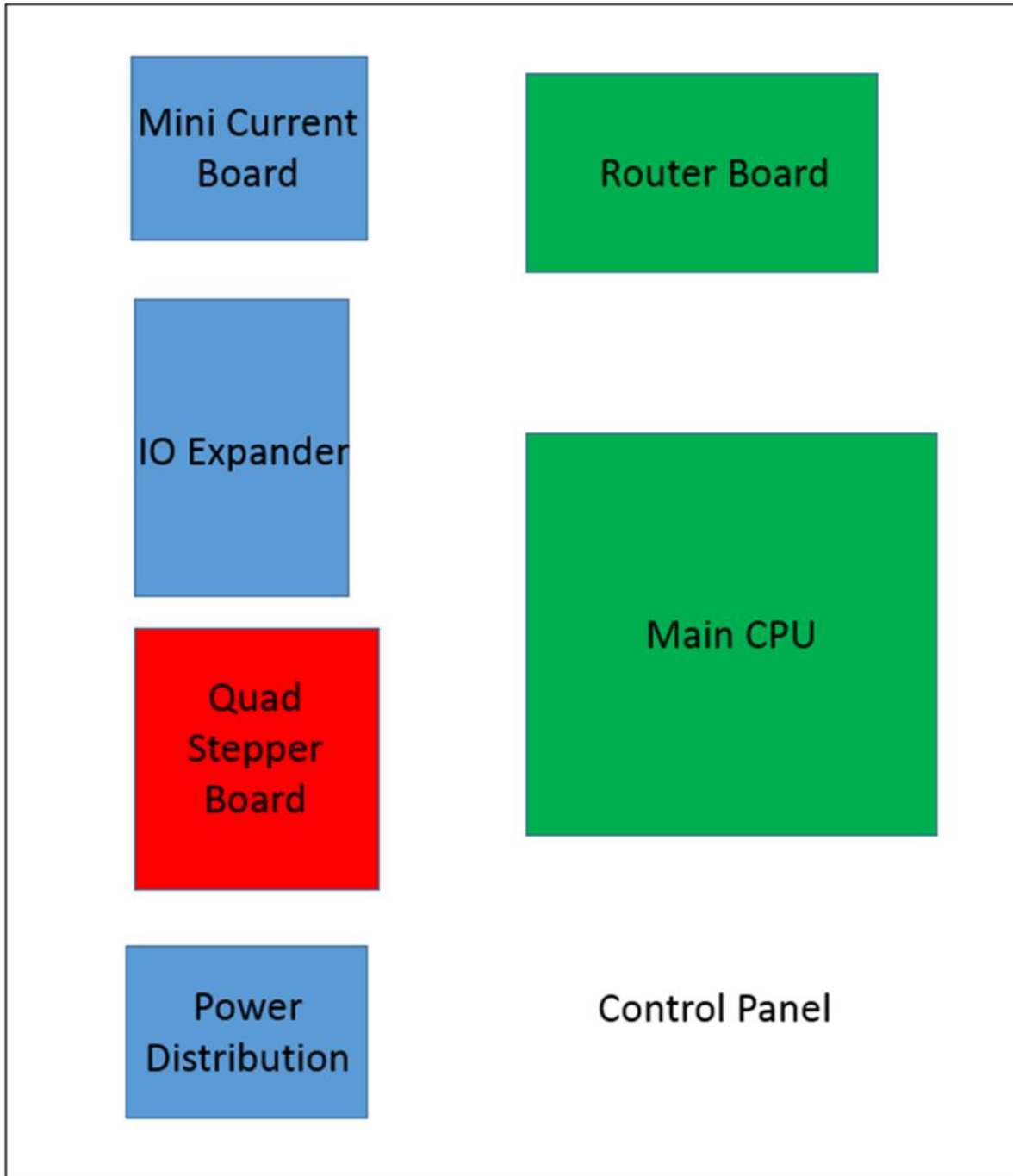
Power Distribution Board

Part# 500PCB032
Qty: 1
Location: Control Panel.
ID-Switch setting: None, board has no computer.

Distributes DC power from the power-supply to the different devices, through a Poly-Switch (thermal, resettable fuse) for each voltage circuit. Not that for convenience, the 'Programming Options' Buttons are also located on this board, even though they're not power-related.
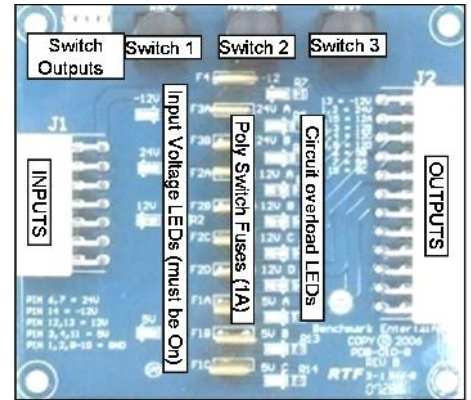
Power is distributed in the following manner (worst case estimations):

BOARD/DEVICE	Estimated consumption	Fuse circuit (see board)
POWER DISTRIBUTION BOARD CIRCUITS:		
Sound Board, Quad-Stepper	2.A	24v [A]
Solenoids, Jackpot display	1A	24v [B]
IO-Expander 1 (Logic)	0.4A	12v [A]
P1 Ticket-dispenser, reload button, door (coin-mech.)	1A	12v [B]
P2 Ticket-dispenser, reload button, door (coin-mech.)	1A	12v [C]
P1 playfield-lights & marquee, P2 playfield-lights	4A	12v [D]
Player1 4-digit display	0.2A	5v [A]
Main board (logic)	0.2A	5v [B]
Player2 4-digit display	0.2A	5v [C]
DEDICATED 'PIGTAIL' TERMINALS:		
Inner/Lower Marquee	1.5A	12V pigtail (5 Amp Fuse)
Outer/Upper Marquee	0.5A	24V pigtail (5 Amp Fuse)

Related Note: There are 2 AC fuses on the Power supply IEC-130 receptacle (10Amp, 250 V).

Main CPU Board (BMC-001-B)

Part# 116PCB001
Qty: 1
Location: Control Panel.
ID-Switch setting: None Master board needs no ID.

This board is the main controller of the game. It decides all the game actions and commands the other boards to act according to the game scheme.
Communication to the other boards is performed via a 485 differential wire-pair (Gray and blue wires).
The 'Programming Mode' game-settings information is saved in an on-board FRAM chip.
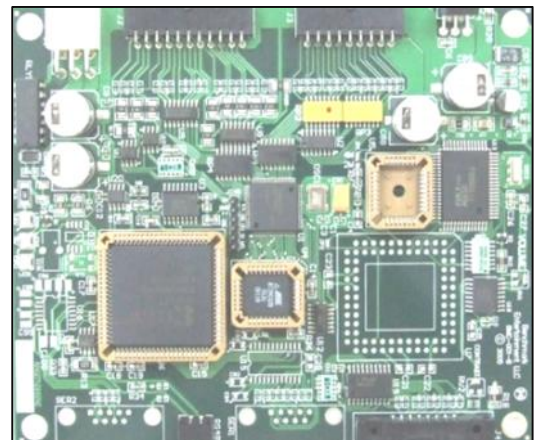
Main ROM program Version Updates:
1.2 Adjustment of default payout options
1.1 Performance and timing adjustments, additional programming options.

IO-Expander Board

This board can handle 16 inputs and outputs as commanded remotely by the Main CPU board through the 485 serial pair.

TYPES:

- Part# PCB00022

Qty: 1

- CONTROL PANEL, 1 board

Controls column light strips for both cabinets.
Receives the targets detection signal, when contacted by a ball, and
conveys it to the main-CPU board when prompted.
Receives the programming-button signals coming from the Power
Distribution Board.
Firmware: **IO-exp Generic 2.5 or above**
ID-Switch setting: **0100 (off, on, off, off)**
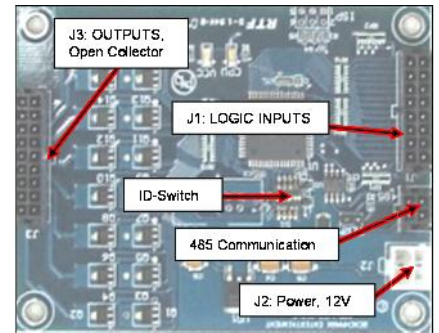
-Part# PCB00022

Qty: 2

- CABINET TOP, 2 boards

These control the game playfield lights, as illustrated below.
Both boards are connected by 485 communication with the Main CPU board.

Firmware: **IO-exp Generic 2.5 or above**
ID-Switch settings: **0010 (off, off, on, off),   1100 (on, on, off, off)**

-Part # PCB00022

Qty: 1

- MARQUEE, 1 Board

This controls the lights on the overhead
marquee, respectively.
Firmware: IO-exp Generic 2.5 or above for
correct sequencing
ID-Switch settings: **0000 (off, off, off, off)**
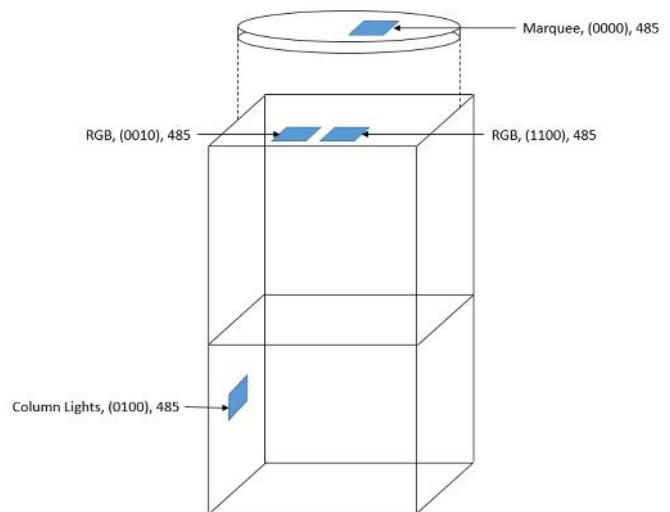
Quad Stepper Board

Part# PCB00068
Qty: 1
Location: Control Panel
ID-Switch setting: **00 (off, off)**

This Stepper-motor controller board handles the movements of the
Playfield wheel, the inner marquee, and the outer/upper marquee.
Motor control output goes in groups of 3 wires off the J1 connector:
Playfield Wheel: Motor 1
Inside Marquee: Motor 2
Upper Marquee: Motor 3
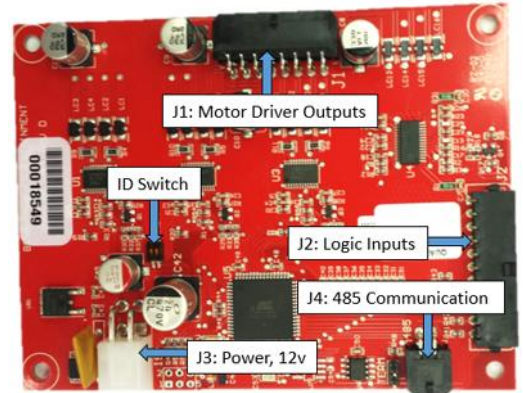
Sound Board

Part# 116PCB002
Location: Top of Cabinet
ID-Switch setting: **0000 (off-off-off-off)**

SD Sound Card Part # 116PCB004

Handles background and event sounds.
Sound files are stored on the plug-in SD-card memory board.
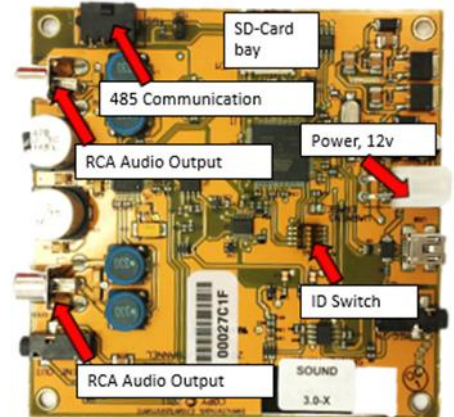
Router Boards

Part# PCB00026
Location: Control Panel
ID-Switch setting: none

Allows up to three games to communicate with each other to build and compete
for a common bonus.

SD Card Part# PCB00055

Small 4-Digit Display (player credits)

Part# PCB00067 [485 capable, connector in front]
Qty: 2 (one per game side)
Location: Front-right of Playfield
ID-Switch settings:
Game1: 1**00000 (on, off, off, off, off, off)**

Large 5-Digit Display

Part# PCB00015
Location: Inside Blaster Jackpot display assembly
Qty: 1 (for Blaster Jackpot)
ID-Switch settings:
Blaster Jackpot Display: **010000 (off, on, off, off, off, off)**
The ID-Switch is located on the back of the Display and is labeled as "S1".

Large 2-Digit Display

Part# PCB00009
Location: Center of Playfield
Qty: 1
ID-Switch settings:
Shot Counter Display Player 1: **000000 (off, off, off, off, off, off)**
The ID-Switch is located on the back of the Display and is labeled as "S1".
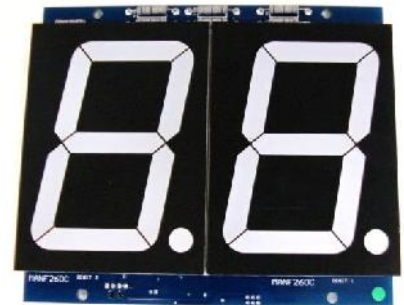
Target Indexer Switch

Part# ELM00165
Qty: 15
Location: Behind each of the 15 targets at the top of the ramp.
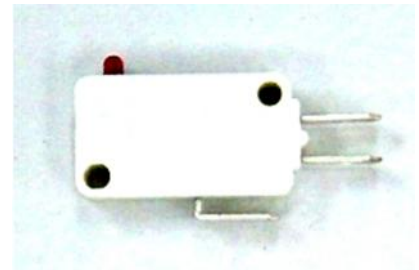
Shooting arm Solenoid

Part# 500ASM120
Qty: 1
Location: Under Playfield, part of the Shooting arm assembly

Coin Mech (factory default)

Part# ELM00301
MPU WJ-A17, 12V DC, 20-28.5mm coin
Qty: 1
Location: Front Door

Hard-meter Pair (optional only)

Part# 500ASM020 [2-in-1 Assembly, with common connector]
Qty: x2 meters
Location: Cash Drawer
Non-resettable type
#1 (left): Coin-in Count
#2(Right): Ticket

Ticket Dispensers (Intelli-Triple Series)

Part# 112ASM001
Location: Ticket Side-Drawers
Qty: 1

On this game, the ticket dispensers use the standard 'Run' and 'Notch' signals common in the redemption industry.

For more information, see Benchmark's Ticket Dispenser manual.
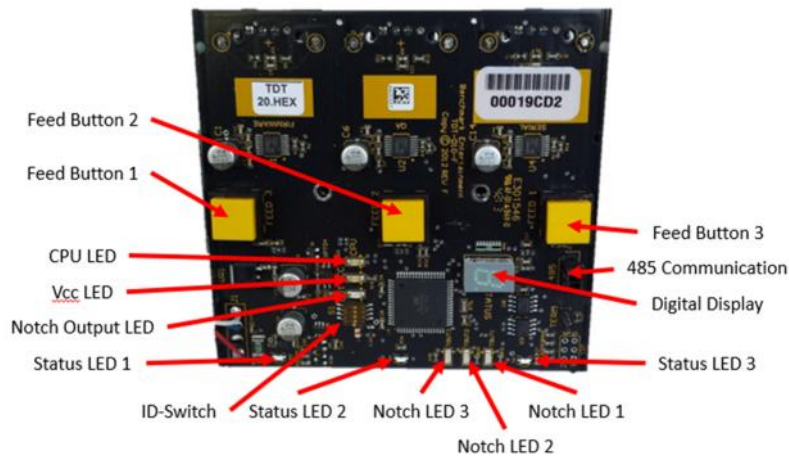
Commutator Board

Part#PCB00071
Location: On top of the spinning marquee
Qty: 1

The Commutator board acts as a power connection, which powers the LEDs and displays on the lower and upper marquee. The brushes are held in contact to the three gold rings which acts as a constant power supply. If the brushes somehow lose contact from the rings, the 12 capacitors will supply power to the marquee until the charge runs out.
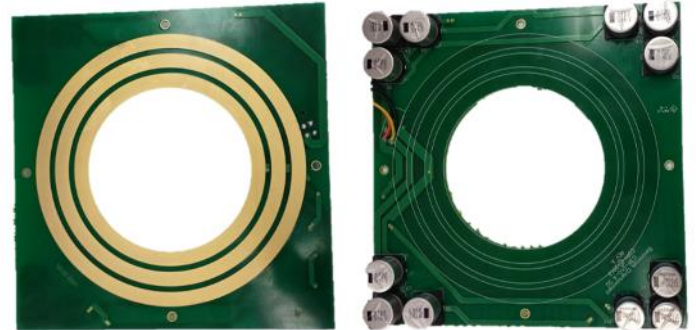
Commutator power wires 500HNS118
6" 18gauge wire 4pin 093 female soldered to J1 on commutator

093 4pin female	commutator J1
Pin 1 orange 24v	Pin 1 black GND
Pin 2 yellow 12v	Pin 2 black GND
Pin 3 black GND	Pin 3 orange 24v
Pin 4 black GND	Pin 4 yellow12v

Commutator notes
Inner ring GND
Middle ring 12v
Outer ring 24v
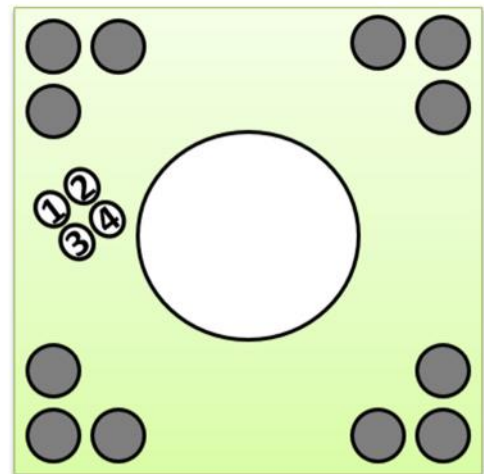
Commutator brush wires 500HNS119
6" 18guage wire 3pin 093 female
Soldered to brush housing
093 3pin female
Pin 1 24v orange
Pin 2 GND black
Pin 3 12v yellow
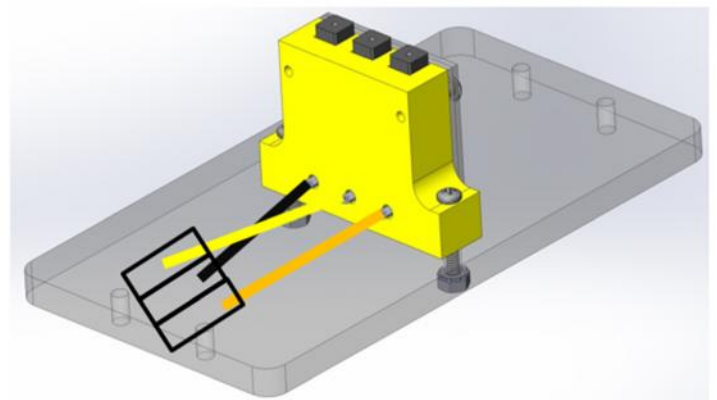
Zigbee Board

Part#500PCB049
Location: One in lower cabinet, one on top marquee
Qty: 2
Act as a wireless 485 connection. The Zigbee board in the lower cabinet is directly connected to the Main CPU by a 485 connection. The Zigbee board then transmits the signal to the Zigbee board located on the top of Blaster, thus sending signals to the IO expanders through wiring and controlling the LED lights of the upper cabinet and the marquee.

ZigBee Board Trouble shooting

Note: Changing the channel of the Zigbee boards will create a connection between the two Zigbee boards of the same game (if you have more than one game that uses Zigbee boards).

How to change the channel of each Zigbee board:

Before boards can be game-synched, they need to be on the same frequency channel (1 to 16).
Note: However, the default channel is #15 for all boards upon initial programming.

- put a jumper on PRG terminal, at this point the LED light will flicker quickly and you will have 2 seconds to start pressing the button slowly, counting up to the channel number desired for the board (1 to 16). Each press will give you additional time to continue.

- When finished pressing, the board will continue flickering for a couple of seconds, then it will start flashing slowly, it will flash thru to the number of the channel (i.e. channel 15 ->15 flashes).

- A couple of seconds after the last flash is done, normal heartbeat flashing will resume, done.

- Now remove the jumper from the PRG terminal.

- Please Label the board with the channel number.

- Do the same for the second Zigbee board.

5-Technical Operation

Inter-Board Communication: 485 Serial pair

The Circuit Boards communicate with each other using a 485 differential wire-pair network, using the SNAP software protocol layer.

- On this machine, this wire pair has colors Blue and Gray.

- The Main CPU Board acts as the master, initiating commands and receiving responses from the slave boards.

- Like-boards differentiate from each other by means of an ID-Switch setting.
  See the following pages to find each board's ID-Switch location and setting.
  Note that we indicate the required on-off state of each micro switch in the previous pages with **1**'s and **0**'s, respectively.
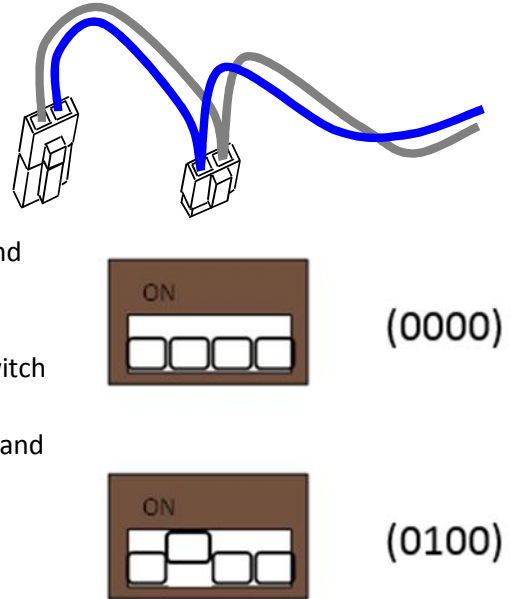
- The following PCB boards are <u>NOT</u> connected to the 485 network:

  ➢ The Power distribution board.
  ➢ The Ticket Dispensers
  ➢ Mini High Current Board

-Note that the 485 network wire-pair chain jumps from board to board:

  ➢ The Marquee IO-expander is not connected by a physical 485 wire, but operates using a Zigbee board, which communicates with the Main-CPU board.

  ➢ In some places the chaining is done by double-crimps at the connector (these are usually 2-pin connectors)

  ➢ In other places, PCB traces on the board itself carry the chain from a pair of connector pins to the next (usually a four-pin connector); thus, disconnecting such a board's 485 might actually disconnect the rest of the 485 chain. Keep this in mind when troubleshooting or replacing parts.

Note: the games is provided with two styles of jumper wires to use while diagnosing problems for this reason.

485 Communication, network daisy chain:

Control Panel:
➢ Main CPU (BMC-001-B) (Daisy chain start)
➢ Quad Stepper
➢ IO-expander-1
➢ Router Board (if linked)
➢ upper marquee (if not linked)

- Top:
➢ IO-expander-2
➢ IO-expander-3
➢ sound

- Bottom:
➢ Playfield shot display
➢ Playfield credit display
➢ Playfield target IO-expander

6- Programming Options
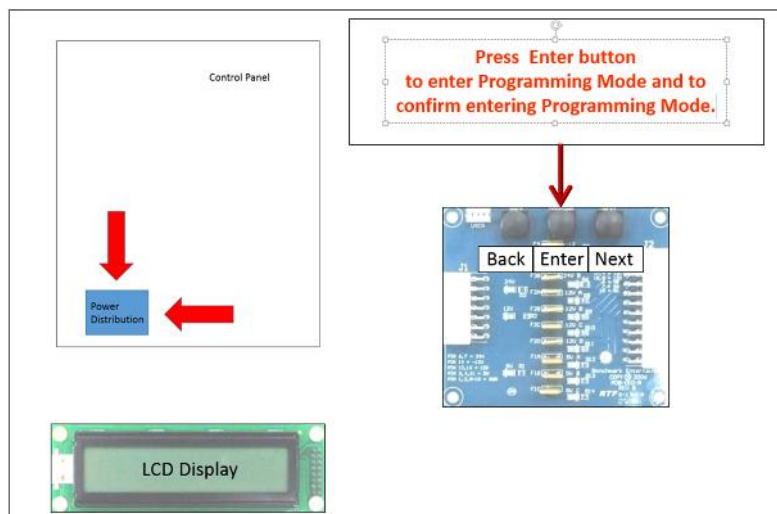
To enter Programming mode, press the enter button on the Power Distribution Board, by reaching down to the board in the Control Panel, on the right, as shown in figure.

The LCD Display will ask you to confirm attempt to enter Programming mode. Press the enter button again to say "yes", press the left or right button to say "no".

The LCD Display will then ask for your password. If you have not yet set a password different from the default settings the password is 0000.

The menu is followed in a sequential order, by using the side buttons to scroll and the center button to enter into the options displayed.

PROGRAMMING MAIN MENU

1- *STATISTICS*
   Enters the sub-menu that shows statistics values.

2- *CHANGE PASSWORD*
   Allows you to change the programming mode entry-password. You will be asked for a confirmation.
   If you lose your password, you can call customer service for assistance.

3- *LCD CONTRAST*
   Allows you to change the lighting on the LCD screen to setting that is comfortable for you to see.

4- *PLAY VOLUME*
   Background music and event volume, when Player has credits.
   Value Range: 0-100   Default: 10

5- *ATTRACTION VOLUME*
   Background music volume, when outside of play mode.
   Value Range: 0-100   Default: 10

6- *JACKPOT VOLUME*
   Background music and event volume when a Player hits all the targets in bonus round, regardless of it being through the Jackpot or not.
   Value Range: 0-100   Default: 15

7- *ATTRACTION PERIOD*
   Time period before the attraction sequence is played, to attract customers.
   Value Range: 0-30   x1minutes Default: 15

8- *GAME PRICE*
   The amount of Coin-Mech pulses required to add +1 credit.
   Value Range: 1-8   Default: 1

9- **NUMBERS OF SHOTS**
   The number of shots each player will receive per game.
   Value Range: 6-16   Default: 13

10- **PAYOUT TYPE**
   Redemption credits could be considered for game play.
   The way redemption tickets will be rewarded: tickets or cards

11- **LINKING**
   Turning on allows up to 3 blasters to communicate with one another to build and compete for a common jackpot.

12- **PAYOUT TABLE (ARTWORK VALUES SHOULD MATCH TABLE)**
   There are four payout tables to choose from. Here are the recommended tables per credit value:

Table 1: $4.00 (4x standard)

ROUND 1

TARGETS REMAINING	TICKETS
0	Win 400
1	Win 200
2	Win 100
3	Win 40
4	Win 28
5	Win 24
6-11	Win 20

BONUS ROUND

TARGETS	BONUS TICKETS
Shoot 1	Win 400
Shoot 2	Win 600
Shoot 3	Win 1000
Shoot 4	Win SUPER BONUS

Table 2: $0.25

ROUND 1

TARGETS REMAINING	TICKETS
0	Win 25
1	Win 12
2	Win 6
3	Win 4
4	Win 3
5	Win 2
6-11	Win 1

BONUS ROUND

TARGETS	BONUS TICKETS
Shoot 1	Win 25
Shoot 2	Win 40
Shoot 3	Win 60
Shoot 4	Win SUPER BONUS

Table 3 (Default): $0.50

ROUND 1

TARGETS REMAINING	TICKETS
0	Win 50
1	Win 25
2	Win 12
3	Win 5
4	Win 4
5	Win 3
6-11	Win 2

BONUS ROUND

TARGETS	BONUS TICKETS
Shoot 1	Win 50
Shoot 2	Win 75
Shoot 3	Win 125
Shoot 4	Win SUPER BONUS

Table 4: $1.00 (standard)

ROUND 1

TARGETS REMAINING	TICKETS
0	Win 100
1	Win 50
2	Win 25
3	Win 10
4	Win 7
5	Win 6
6-11	Win 5

BONUS ROUND

TARGETS	BONUS TICKETS
Shoot 1	Win 100
Shoot 2	Win 150
Shoot 3	Win 250
Shoot 4	Win SUPER BONUS

(In order as displayed on LCD screen)

   Value Range: Table 1-4   Default: Table 3

   Note: For low cost setups that run $0.25 play, the jackpot settings are run at lower values, to keep payout proportionate to play.

13- **JACKPOT INCREMENT**
   Amount by which the common Jackpot increases with each coin added.
   Value Range: 0-50   Default: 2

14- **JACKPOT START VALUE**
   Initial-value for the common Jackpot. (Note: each unit represents one ticket)
   This value is set after the last Jackpot is awarded.
   Value Range: 100 – 9999   Default: 1000

15- *JACKPOT MAXIMUM*
    Limit-value for the common Jackpot. (Note: each unit represents one ticket)
    Credits after this value is reached won't increment it further.
    Value Range: 100 – 9999   Default: 9999

16-   RESET TOTAL COINS
    Total amount of coins in game.
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

17- RESET TOTAL TICKETS
    Total amount of tickets dispensed. Separate Ticket total allows estimation of Ticket Dispenser service schedule.
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- *EXIT*
    Back to normal game operation, game-play will resume.

Entering Statistics SUB MENU

To enter statistics SUB menu mode, press the back and next button, simultaneously, on the Power Distribution Board, by reaching down to the board in the Control Panel, on the right, as shown in figure.
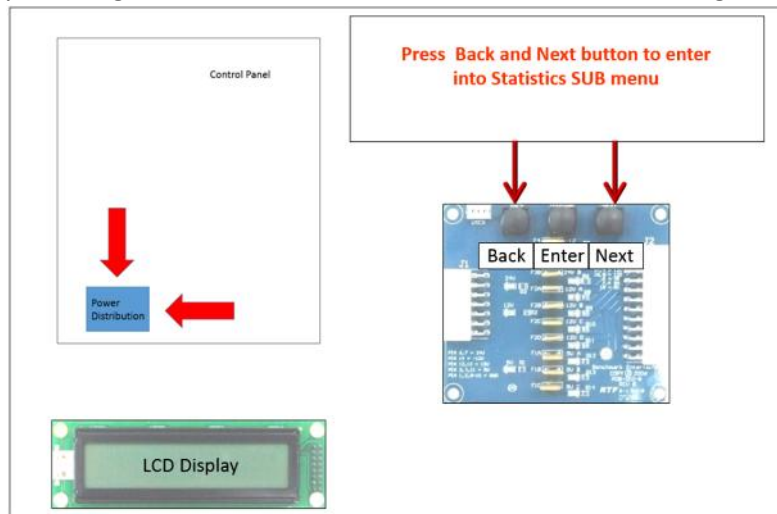
The LCD screen will then begin to show the statistics as follows:

STATISTICS SUB MENU

- 0 TARGETS HIT
    How many times target "0" has been hit
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 1 TARGETS HIT
    How many times target "1" has been hit
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 2 TARGETS HIT
  How many times target "2" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 3 TARGETS HIT
  How many times target "3" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 4 TARGETS HIT
  How many times target "4" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 5 TARGETS HIT
  How many times target "5" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 6 TARGETS HIT
  How many times target "6" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 7 TARGETS HIT
  How many times target "7" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 8 TARGETS HIT
  How many times target "8" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 9 TARGETS HIT
  How many times target "9" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 10 TARGETS HIT
  How many times target "10" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- 11 TARGETS HIT
  How many times target "11" has been hit
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- STAGE2 0 TARGETS HIT
  How many times target "0" has been hit in bonus round
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- STAGE2 1 TARGETS HIT
  How many times target "1" has been hit in bonus round
  Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- STAGE2 2 TARGETS HIT

How many times target "2" has been hit in bonus round
Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- STAGE2 3 TARGETS HIT
    How many times target "3" has been hit in bonus round
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation).

- *TOTAL JACKPOTS*
    Total jackpots awarded
    Hit 'Enter' to take this back to zero (you will be prompted for confirmation)

- *CREDITS*
    How many credits are present.
    Hit 'Enter' to take this back to zero.

- *TICKETS OWED*
    How many tickets are still due by the corresponding Ticket Dispenser device.
    Hit 'Enter' to take this back to zero; Ticket Dispenser will stop.

- *PLAY HISTORY*
    You can see the last five game results for the corresponding player (the left-most is the oldest one).
    These uses the following result symbols:

    "_"   = blank entry (usually when machine first used or settings have been reset).

    Number   = Ticket-award determined by payout table.

    JK!   = Jackpot

- *BACK TO MAIN MENU*
    Goes back to the initial options list.

7-Alternative coin/bill and card-swipe configurations

There are a several alternative Card Swipe systems and Bill Acceptor configuration possibilities, depending on your location. These are described in a general fashion as follows.

Note that the system expects the following timing ranges for any pulses:
  Low time: 40-80ms
  Up time: 100-150ms

CARD SWIPE SYSTEM

The Coin-Mech and/or Bill Acceptor can be replaced to set up a swipe-for-credits, or e-tickets scheme. This is the recommended set up:

-Remove the Coin-Mech and/or Bill Acceptor and install your card swipe systems in the lower front door.
  [Contact customer service if custom plastic plates for this purpose are required].

-Some of the necessary signal lines are available on the connector at the door hinge:
   > Enable signal, output.
   > Bill acceptor line, input
   > Coin-in line, input

For the 'Run' and 'Notch' signals, you can tap directly from the lines on the Ticket Dispenser drawer, or from the following pins at the main to control harness connection (24pin minifit)
  Ticket Notch: Blue wire on pin 23 (make sure not to grab the blue 485 wire or the stepper controller wire)
  Ticket Run: white wire on pin 11

-    Have your card swipe system tap into the Coin or Bill signal line.

-    Configure your card swipe system for a 1-pulse-per-swipe response.

-    If tapping the coin signal line (Gray/yellow), 1 pulse (swipe) will count as 1 coin internally.

-    If tapping the bill signal line (Gray/red), 1 pulse (swipe) will count as 4 coins internally.

-    Configure the game to provide the necessary credits for the 'coin' count indicated above and the actual money you will charge per-swipe.

-    If possible (strongly recommended), hook up your system to the enable line (Blue/green), so that the game can stop money intake in case of any machine error or fault.

COIN MECHS

It is possible to use other coin mechanisms on this machine. The wiring harness terminates on both Spade-type connectors and an IDC connector for this purpose, the signal lines are:

#	Wire Color	Signal
1	Yellow	12V
2	Gray-Red	Coin Signal
3	Blue-Green	Enable (low=enable, high=disable) (this should be hooked to coin-mech ground)
4	Black	GND, actual DC Ground

Notes:

The 'Device Ground/Enable' line comes from the IO-Expander 3 Board, as commanded by the main CPU to enable or disable money intake. It is necessary that your coin-mech device has a coin-lock 'reject' solenoid so that this feature is available.

Normally, for an Imonex, if it has a coin reject solenoid, you hook the solenoid's 'ground' to the enable line, so that the game can control it.

For an electronic coin-mech, like the MPU, you hook up the coin-mech's 'ground' to the enable line.

8-Error Codes and Troubleshooting guide

TROUBLESHOOTING GUIDE

Following a methodical approach will make it easier for you to resolve issues with any type of equipment. In most cases, machinery consists only of a set of input signals, a process for those signals, and some resulting outputs. Separating the system into these three areas lets you have a clear map when looking for solutions.

In general terms, to isolate a fault, you usually follow these steps (not necessarily in this order):

1) INPUT (from button switch, etc.)
   - Determine if the related input signals (i.e. button, etc.) are reaching the processing stage, usually a PCB board.
   - Determine if its related input signal reaches the control system (i.e. board), by measuring continuity in the wires.
   - If there is still some doubt on the consistency of the connection, you can ground the input on the board directly, by removing the connector in question and using a small wire to bypass the harness and bring ground (or the appropriate signal) to it.

2) PROCESS (usually a PCB board)
   - Check power is reaching the device. If it's a PCB board, it usually has a static LED light showing it's powered.
   - Check board is running, usually showing a separate flashing LED light.
   - Check the board has the right program, by checking the firmware name sticker on the board surface.

- Swapping the board for a known-good replacement is a very common way to determine right away if it the problem lays with the board. Be mindful though, that there might be an external issue that damages the board in the first place. That's why it's important to first check the power voltage has the proper level, etc.
- If there are more that on like-boards on the machine, swapping them around will let you know if the problem follows the board or if stays with the assembly section.

3) OUTPUTS (to light, solenoid, motor, or another pcb board)
- Determine if the process output signals are reaching the end-device
- Measure continuity on the wires from the output of the PCB board to the end device.
- If there is still some doubt regarding the connection, try activating the device directly by disconnecting the outputs connector from the board, and using a spare piece of wire to feed it the proper signal.
- For example, disconnecting the hi-current output board and feeding ground to one of the output pins on the harness side, to activate a solenoid directly for a brief moment.
- Like in the other examples, swapping the device for a known good unit also helps in narrowing things down.

Blaster Error Codes:

- E-1: Target Assembly IO Expander Board Communication Error

- E-2: Sound Board Communication Error

- E-3: Out of Tickets or Ticket Jam

- E-4: Quad Stepper controller board Communication Error

- E-5: Router Board Communication Error (Only present if linking is enabled)

- E-6: Router Board No SD Card Error (Only present if linking is enabled)

NOTE: A description of the error is shown on the LCD Display inside the machine, as well as the "E" code on the shots display.

Trouble-Shooting Error Codes

E-1: Target Assembly IO Expander Board Communication Error	- Check board has power, Vcc-LED should be lit. - Check board program is running, heartbeat LED should be flashing slowly, fast when receiving 485 serial comm. Commands. - Check board firmware labeled "IO-EXP GENERIC" code. - Check on-board ID-switch settings, as per PCB board section. - Note: that relevant 485 traffic makes the green LED flash quickly as messages are received, check for this as well. - Check 485 communication connector for proper crimping and polarity (try flipping 485 connector or its pins). - Check that all boards are connected to the 485 network, remember that in some of them, a disconnection will break the rest of the 485 chain. - Check 485 communication connector on main CPU board. - Swap for known good unit to see if problem follows board.
E-2: Sound Board Communication Error	- The sound board controls playback and amplifications for the game. - Check for board power, Vcc-LED should be lit. - Check board program is running (green LED flashes slowly). - Check board firmware label for "sound card" code. - Check board communication-485, including on-board ID-switch settings. - Note: relevant 485 traffic makes the green LED flash quickly as messages are received, check for this as well. - Check that all boards are connected to the 485 network, remember that in some of them, a disconnection will break the rest of the 485 chain. - Check 485 communication connector on main CPU board. - Swap for known good unit to see if problem follows board.
E-3: Out of Tickets or Ticket Jam	- Reload tickets for the Ticket Dispenser, press reload button underneath Ticket Dispenser device to restart it. - Check power on the Ticket Dispenser, board LED's should be lit. - If there is no power to the Ticket Dispenser. Measure the voltage coming in, and all the

	way back to the power distribution beard if needed. ➢ Also check continuity for the Run and Notch lines coming from the main CPU outputs/inputs. ➢ Remember to power down first before any continuity test.
E-4:Quad Stepper controller board communication error	➢ The board controls the three motors for Blaster (Playfield, Spinning Sign, and Marquee). ➢ Check for board power (Vcc LED on) ➢ Check board firmware for "Quad Stepper Generic". ➢ Check on-board ID-switch setting, as per PCB board section. ➢ Note: relevant 485 traffic makes the green LED flash quickly as messages are received, check for this as well. ➢ Check that all boards are connected to the 485 network, remember that in some of them, a disconnection will break the rest of the 485 chain. ➢ Check 485 connector on main CPU board. ➢ Swap for known good unit to see if problem follows board.
E-5: Router Boards communication error (only present if Linking is enabled)	➢ Check for board power (Vcc LED on) ➢ Check that all boards are connected to the 485 network, remember that in some of them, a disconnection will break the rest of the 485 chain. ➢ Check 485 connector on main CPU board. ➢ Check ID-switch settings ➢ Swap for known good unit to see if problem follows board.
E-6: Router Boards no SD card error (only present if Linking is enabled)	➢ The SD card on the router board is for holding data. ➢ Make sure card is present in Router Board. ➢ Check is card is inserted completely ➢ Swap for known good SD card to see if problem follows card.

HOW TO CHANGE THE CHANNEL OF EACH ZIGBEE BOARD:

Before boards can be game-synched, they need to be on the same frequency channel (1 to 16).
Note: However, the default channel is #15 for all boards upon initial programming.

1- put a jumper on PRG terminal, at this point the LED light will flicker quickly and you will have 2 seconds to start pressing the button
   slowly, counting up to the channel number desired for the board (1 to 16). Each press will give you additional time to continue.
2- When finished pressing, the board will continue flickering for a couple of seconds, then it will start flashing slowly,
    it will flash thru to the number of the channel (i.e. channel 15 ->15 flashes).
3- A couple of seconds after the last flash is done, normal heartbeat flashing will resume, done.
4- Now remove the jumper from the PRG terminal.
   (NOTE:The only exception is for the SolarEclipse pie radio, it needs a jumper permanently (so it uses uart2 instead of 485 line))

9- Assemblies and Diagrams

Target Assembly

Sheet 1 of 2 — Drawing 116ASM039, "blaster target assm 2", Benchmark Games, Inc.

ITEM NO.	PART NUMBER	DESCRIPTION	exploded1/QTY.
1	116ASM029	blaster target assy 6	1
2	116ASM028	blaster target assy 5	1
3	116ASM027	blaster target assy 4	1
4	116MAC026	blaster target assy 3	1
5	116ASM025	blaster target assy 2	1
6	116ASM024	blaster target assy 1	1
7	116ASM035	blaster target assy 12	2
8	116ASM030	blaster target assy 7	1
9	116ASM031	blaster target assy 8	1
10	116ASM032	blaster target assy 9	1
11	116ASM033	blaster target assy 10	1
12	116ASM034	blaster target assy 11	1
13	116ASM036	blaster target assy 13	2
14	116ASM037	Target switch mount assembly Blaster	15
15	SPA20006	#6-32x.250hexx.500L	4
16	PCB00022	PCB I/O Expander 485_16	1
17	116MAC070	target side cover	1
18	116MAC071	target side cover_Mirror	1
19	116MAC069	target assembly top cover	1
20	HAR11084	6-32 x .750 PPMS	7
21	HAR11075	6-32 x .25 PPMS	15
22	116MAC008	blaster bonus ramp	1
23	116MAC009	Blaster bonus ramp top target holder	1
24	116SCM002	Blaster target standoff	7
25	SPA20019	250ODx375Lx632MF	5
26	116ASM066	ball ramp w_artwork	1
27	SPR00043	spring_compression_5 00Lx375ODx020Wire	15

Loc.	Rev.	Description	Date
	2	Correct BOM & add missing balloons	02/25/14
	A	Release to Production	04/05/14
	B	Correct PCB display part number	04/19/14
	C	Add springs	04/25/14

SIZE B — DWG. NO. 116ASM039 — SCALE: 1:6 — SHEET 1 OF 2

Sheet 2 of 2 — Drawing 116ASM039, "blaster target assm 2", Benchmark Games, Inc.

ITEM NO.	PART NUMBER	DESCRIPTION	explode2/QTY.
1	116MAC008	blaster bonus ramp	1
2	116MAC009	Blaster bonus ramp top target holder	1
3	116ASM029	blaster target assy 6	1
4	116ASM028	blaster target assy 5	1
5	116ASM027	blaster target assy 4	1
6	116MAC026	blaster target assy 3	1
7	116ASM025	blaster target assy 2	1
8	116ASM024	blaster target assy 1	1
9	116ASM035	blaster target assy 12	2
10	116ASM030	blaster target assy 7	1
11	116ASM031	blaster target assy 8	1
12	116ASM032	blaster target assy 9	1
13	116ASM033	blaster target assy 10	1
14	116ASM034	blaster target assy 11	1
15	116ASM036	blaster target assy 13	2
16	116ASM037	Target switch mount assembly Blaster	15
17	116SCM002	Blaster target standoff	7
18	116MAC012	ball ramp bottom ball keep out	1
19	116MAC068	Blaster playfield display cover	1
20	PCB00009	pcb display biglass credit	1
21	SPA20006	#6-32x.250hexx.500L	7
22	SPA20018	#6-32x.250hexx.375L	4
23	PCB00022	PCB I/O Expander 485_16	1
24	116MAC070	target side cover	1
25	116MAC071	target side cover_Mirror	1
26	116MAC069	target assembly top cover	1
27	SPA20019	250ODx375Lx632MF	5
28	HAR11084	6-32 x .750 PPMS	7
29	HAR11075	6-32 x .25 PPMS	15
30	116ASM038	ball ramp assy mount	1
31	HAR11121	6-32 x 1.250 FHMS	3
32	HAR11068	6-32 x 1.000 FHMS	4
33	HAR35009	#6-32 Kep Nut	7
34	HAR13043	4-24 x 1.0 FHSM _(AB)	4
35	116ASM066	ball ramp w_artwork	1
36	SPR00043	spring_compression_500Lx375ODx020Wire	15

Loc.	Rev.	Description	Date
	1	Prototype Release	01/14/14
	A		04/05/14

SIZE B — DWG. NO. 116ASM039 — SCALE: 1:5 — SHEET 2 OF 2

Playfield Assembly

Shooter Assembly

ITEM NO.	PART NUMBER	DESCRIPTION	explode1/QTY.
1	116MAC067	Blaster - Playfield Wheel LED Mount Ring	1
2	116SCM003	Playfield Wheel Bearing Post	5
3	116MAC073	Blaster playfield mirror main	1
4	10SASM009	bearing roller assembly 375x875 flanged	5
5	HAR11074	6-32 x .500 PPMS	5
6	HAR11126	8-32 x 1.75 PPMS	2
7	HAR11001	250-20 x 1.000 PPMS	5
8	HAR11016	10-32 x 1.000 PPMS	2
9	HAR11048	4-40 x .500 PPMS	2
10	116MAC077	target assembly latch bar	2
11	HAR13031	8-18 x .750 PPSM_(AB)	2
12	HAR13041	10-18 x 1.250 PPSM_(AB)	2
13	HAR13019	6-24 x .500 PPSM_(AB)	4
14	BRG00011	Ball Bearing 250ID x 750OD x 281T	1
15	HAR35007	#4-40 Kep Nut	4
16	116MAC001	Blaster Playfield 5	1
17	116ASM042	Blaster Shooter Assy	1
18	116MAC029	Blaster Playfield 4 digit mount	1
19	PCB00006	PCB 4 digit display	1
20	116MAC002	Blaster -Playfield Ball Ramp Pivot Mount	2
21	SPR00030	spring extension 438ODx2000Lx046Wire	1
22	HAR13001	10-18 x 1.000 PPSM_(AB)	1
23	HAR11077	6-32 x 1.250 PPMS	2
24	HAR35009	#6-32 Kep Nut	4
25	116ASM061	blaster wheel opto	1
26	116ASM062	credits display w_art	1
27	SPA10030	250x500ODx063L	5
28	SPA10013	250x500ODx313L	5
29	HAR37002	tee nut propeller 10-32	2

Loc.	Rev.	Description	Date
	6	Add (2) set screws and change (2) spacers	03/03/14
	A	Add SPA10030 & SPA10013	03/24/14
	B	Fix bearing part number, delete (4) spacers from BOM	04/19/14
	C	Change (1) #10-32x1-1/4" screw to #10-32x1-1/2"	05/08/14

DETAIL A
SCALE 1 : 3

Benchmark Games, Inc.
TITLE: blaster playfield 5 assm
SIZE B DWG. NO. 116ASM048
SCALE: 1:6 WEIGHT: SHEET 1 OF 2

Shooter Assembly

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
2	SPA10053	#8-32x375ODx1000L	1
3	HAR11103	8-32 x .625 PPMS	2
4	HAR1118B	4-40 x .750 PPMS	2
5	HAR11084	6-32 x .750 PPMS	2
6	HAR11089	6-32 x .375 PPMS	2
7	HAR36007	#4 Fiberlock	2
8	SPA20017	#6-32x.250hexx.750L	2
9	HAR14040	8-18 x 1.75 PPSM_(AB)	1
10	HAR13040	8-18 x 1.500 PPSM_(AB)	1
11	SPR00023	spring extension 250ODx1500Lx026Wire	1
12	116MAC003	Blaster -Shooting Arm Pivot Mount	1
13	116MAC004	Blaster -Shooting Arm Bearing End Cap	1
14	116MAC005	Blaster -Shooting Arm Mount	1
15	116MAC006	Blaster -Shooting Arm Pushrod	1
16	116MAC078	Blaster -Solenoid Plunger Stop	2
17	116MAC007	Blaster shooting arm	1
18	ELM00011	Solenoid L82	1
19	116HNS016	Blaster shooter LED strip	1
20	BRG001	bearing ball 188IDx500OD flanged, double sealed	2
21	HAR60014	cotter pin .06 dia	1
22	HAR45002	10-16 x 1.000 FHSM_(AB)	2
23	GEN40026	oring 438x625	1
24	HAR35004	#10-32 Kep Nut	1
25	HAR11029	10-32 x 2.500 PPMS	1
26	HAR36004	#10-32 Fiberlock Nut	1
27	116GEN002	Heat Shrink Tubing _shooter	2

Loc.	Rev.	Description	Date
	1	Prototype Release	01/14/14
	2	Change hardware	02/26/14
	3	Add (1) 116MAC078	03/05/14
	A	Release to Production	04/04/14

Note:
Insert and shrink heat shrink tubing over the end of the shooter after inserting LED strip. Do not cover LED device on the LED strip with tubing.

Benchmark Games, Inc.
TITLE: blaster shooter assm
SIZE B DWG. NO. 116ASM042
SCALE: 1:2 WEIGHT: SHEET 1 OF 1

Marquee Assembly

marquee assembly Blaster — Benchmark Games, Inc. — DWG. NO. 116ASM055 — DETAIL A SCALE 1:5

Loc.	Rev.	Description	Date
	3	Add 3/8" bolt and nut & correct BOM part #'s	02/24/14
	4	Repace elastic band with spring	03/11/14
	5	Add 3/8" lock nut	03/13/14
	A	Major Revision	03/22/14

BOM Table

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	116ASM054	Marquee base assy_Blaster	1
2	116MAC090	marquee mount plate_Blaster	1
3	BRG00009	bearing ball 375 x 875 flanged	1
4	134ASM023	Coin Flip - Wheel Stepper Motor Assembly	1
5	105ASM009	bearing roller assembly 375x875 flanged	3
6	HAR41001	hanger bolt #6-375maxx35lag	4
7	HAR13001	10-18 x 1.000 PPSM_(AB)	4
8	HAR33005	375 Kep Nut	1
9	HAR11074	6-32 x .500 PPMS	4
10	HAR11025	10-32 x 1.250 PPMS	2
11	HAR11091	6-32 x .875 PPMS	4
12	SPA00027	#6-32x.250hexx.625L	2
13	HAR60029	375 x 3000 hex bolt	1
14	SPR00030	spring_extension 438ODx2000Lx04 6Wire	1
15	SPA10021	#10 flat washer	2
16	HAR36004	#10-32 Fiberlock Nut	1
17	HAR00036	375 Fiberlock Nut	1
18	116ASM070	Marquee Upper Assembly	1
19	HAR14038	250-20 x 1.500 PPMS	4
20	HAR20014	250 flat washer	4
21	134ASM017	Coin Flip - Cabinet Top Commutator Assembly	1

SIZE B — SCALE: 1:10 — WEIGHT: — SHEET 1 OF 1

Spinning Sign Assembly

blaster spin sign assm — Benchmark Games, Inc. — DWG. NO. 116ASM057 — DETAIL A SCALE 1:5

Loc.	Rev.	Description	Date
	2	Change Bearing to 1/2" ID	02/28/14
	3	Add (4) #4 x 1/2" PPSM screws	03/06/14
	4	Add 134MAC065 and (2) screws	03/21/14
	A	Release to Production	04/03/14

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	116MAC052	blaster sign wheel	1
2	116MAC053	blaster sign plastic trim first level	2
3	116MAC054	blaster display top layer	1
4	116EXT0004	blaster sign tubes	2
5	116MAC055	blaster spin sign bottom layer	1
6	116MAC056	blaster spin sign mirror trim	1
7	116ASM056	blaster spin sign center assy	1
8	PCB00071	PCB Commutator_3 ring	1
9	HAR13019	6-24 x .500 PPSM_(AB)	6
10	HAR14017	6-24 x 1.500 PPSM_(AB)	4
11	HAR13022	6-24 x .750 PPSM_(AB)	4
12	BRG00025	bearing ball 500Dx112SODx310W	2
13	116MAC104	spin sign side trim	4
14	116ASM058	blaster spin sign plate w_art_marquee	1
15	116ASM059	blaster spin sign plate w_art_instructions	1
16	134MAC064	Coin Flip - Rotating Sign Display Service Clamp - Thru Holes	2
17	134MAC063	Coin Flip - Rotating Display Service Clamp - Tapped Holes	2
18	116MAC103	tube locator plate	2
19	116SCM005	spin sign threaded rod	2
20	HAR30002	acorn nut 1/4-20	2
21	SPA10054	#10x375ODx125L	2
22	HAR14207	tee nut propeller 250-20x440L	2
23	HAR13012	4-24 x .500 PPSM_(AB)	4
24	134MAC065	coin flip rotating sign display zigbee mount	1

SIZE B — SCALE: 1:8 — WEIGHT: — SHEET 1 OF 1