

The Ultimate MPU Board



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Manual and Users Guide
Version L.3.1

Getting Started

Thanks for purchasing the Ultimate MPU Board. The following instructions will allow you to have your pinball machine operating quickly. If at any time you are unsure of how to proceed or have a question, STOP. We offer e-mail support at mpusupport@allteksystems.com with an ever-improving technical support page on our website, www.allteksystems.com. The Ultimate MPU Board now includes a limited lifetime warranty. See the website for details.

The firmware on the EPROM has been included free of charge for the sole purpose of repairing your game; by using this product you agree to the license agreement. You can read the license agreement at www.allteksystems.com/firmware_license.

Before you plug in The Ultimate MPU Board

Review Table 1 on the last page of this manual to determine if the “CLK” SPEED” jumpers need to be changed for the game being selected. The jumpers only need to be moved for the later model Stern games. You can also refer to the table below or the legend located next to the “CLK SPEED” jumpers on the Ultimate MPU Board.

JUMPERS

CLK Speed (J6 & J7)

LEFT

All Stern MPU-200

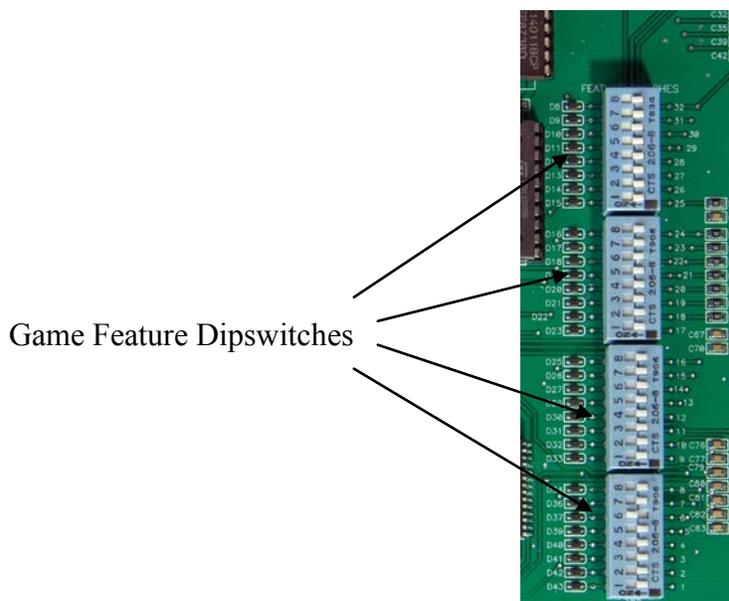
Games starting with Ali

RIGHT

All Bally Games



If you have the old MPU board that you feel has the correct dipswitch settings for game features, go ahead and make the Ultimate MPU Board Game Feature Dipswitches (S1-32) the same as your old board. If you choose free play mode, you will need to turn off the credit display game feature switch, which is typically switch 20 or 27 depending on the game (refer to your original game manual). Additionally, if you are setting the board for a Stern machine, you must set the game feature switches. If the Game Feature Dipswitches are all ON or OFF, the machine will start in self-test mode. Also there isn't free play for Stern Games.



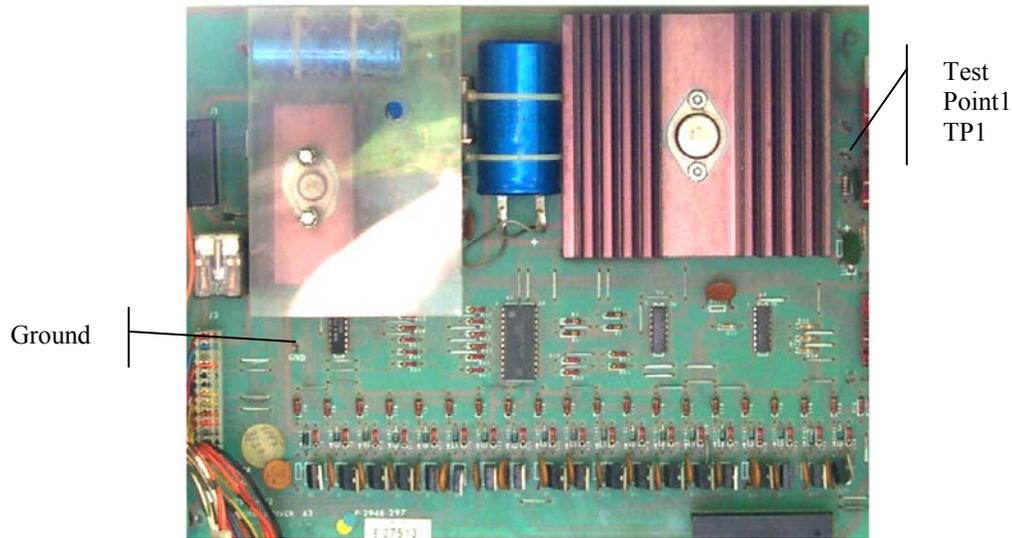
Connecting Up

***** Important *****

Don't apply power until you have checked the +5vdc and +5vac voltage.

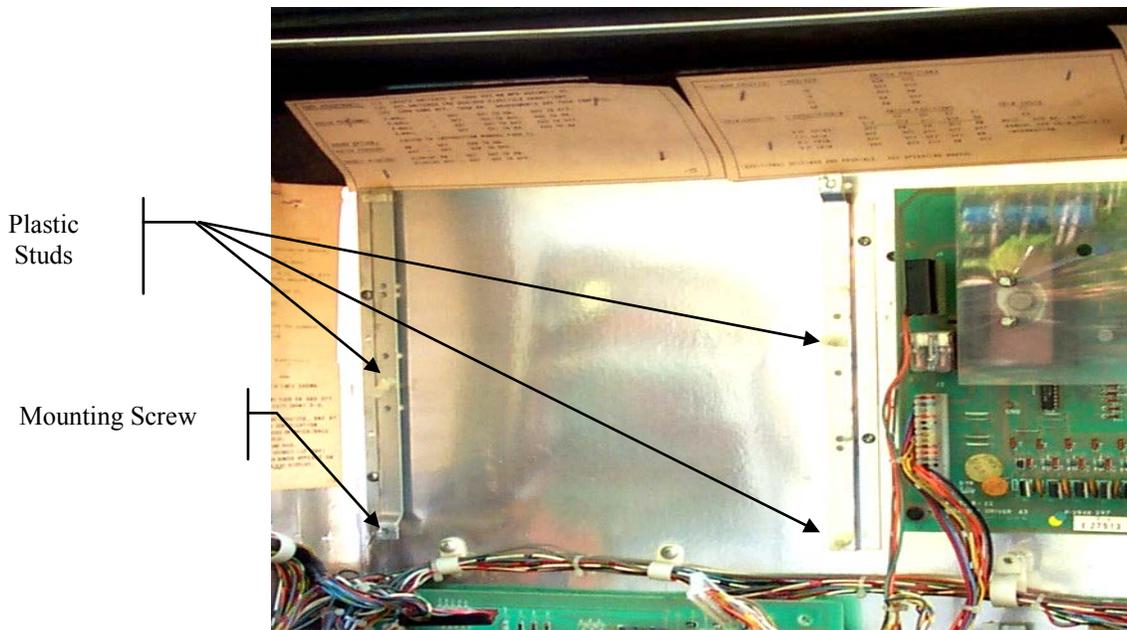
Before plugging in the Ultimate MPU board, get a flashlight to get a good look at the connectors that are hanging in the top left corner of the head of the machine. If you have a Stern machine, you may have two extra connectors for the soundboard. Visually inspect the cables for broken wires or bad pins. If you see any damage you will need to repair this before continuing. Inspect the pins for corrosion. If you find any corrosion further action may be necessary. Corroded pins could prevent your new board from working properly.

Old Solenoid Driver Board



Now make sure the +5vdc supply is functioning correctly. You only need to do this if you're using an old Solenoid Driver Board. If you have installed a new Allteksystems Ultimate Solenoid Driver Board then move to the next page; otherwise continue the following steps. Again, make sure the **Ultimate MPU Board is not installed**. Turn the game on. Using a digital voltmeter set to DC, measure the +5 Volts between Test Point 1 (TP1) and the Ground Test Point (Gnd) located on the solenoid board in the top right corner in the head. The voltage should be between 4.90 and 5.25 volts. Place the voltmeter setting to AC; measure the +5 volts making sure you don't have more the 150mv AC. If you have more then the recommended voltages, see the troubleshooting section before install the new board in the machine. One special note, if your installing this in a "Baby Pacman" or a "Granny and the Gators", use (TP2) to check the +5 Volts. **After you make the measurement, turn off the game.** If you don't have a voltmeter see if you can borrow one from a friend or purchase one from Radio Shack (~\$20).

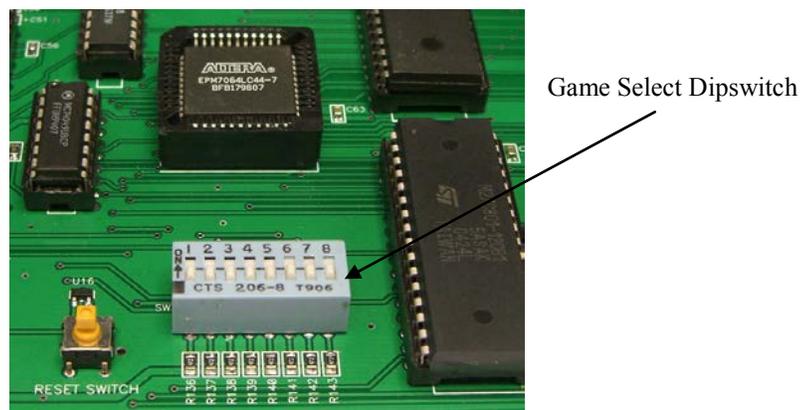
Once the connectors and power supply have been checked, mount the new board into the game. Install the board by placing it on top of the plastic spacers.



Plug in the connectors, two on the left and two on the right, assuring that the connector keys line up for each connector. If you have a Stern game that has an aux. soundboard, plug this connector into the top connector, J5. Remember, on the Ultimate MPU Board the right most side of J5 is pin 1. Make sure you match up the pin 1 of J5 to the aux. soundboard pin 1. Depending on the Stern machine, you might have 2 unused pins on the left side of the connector.

Power Up

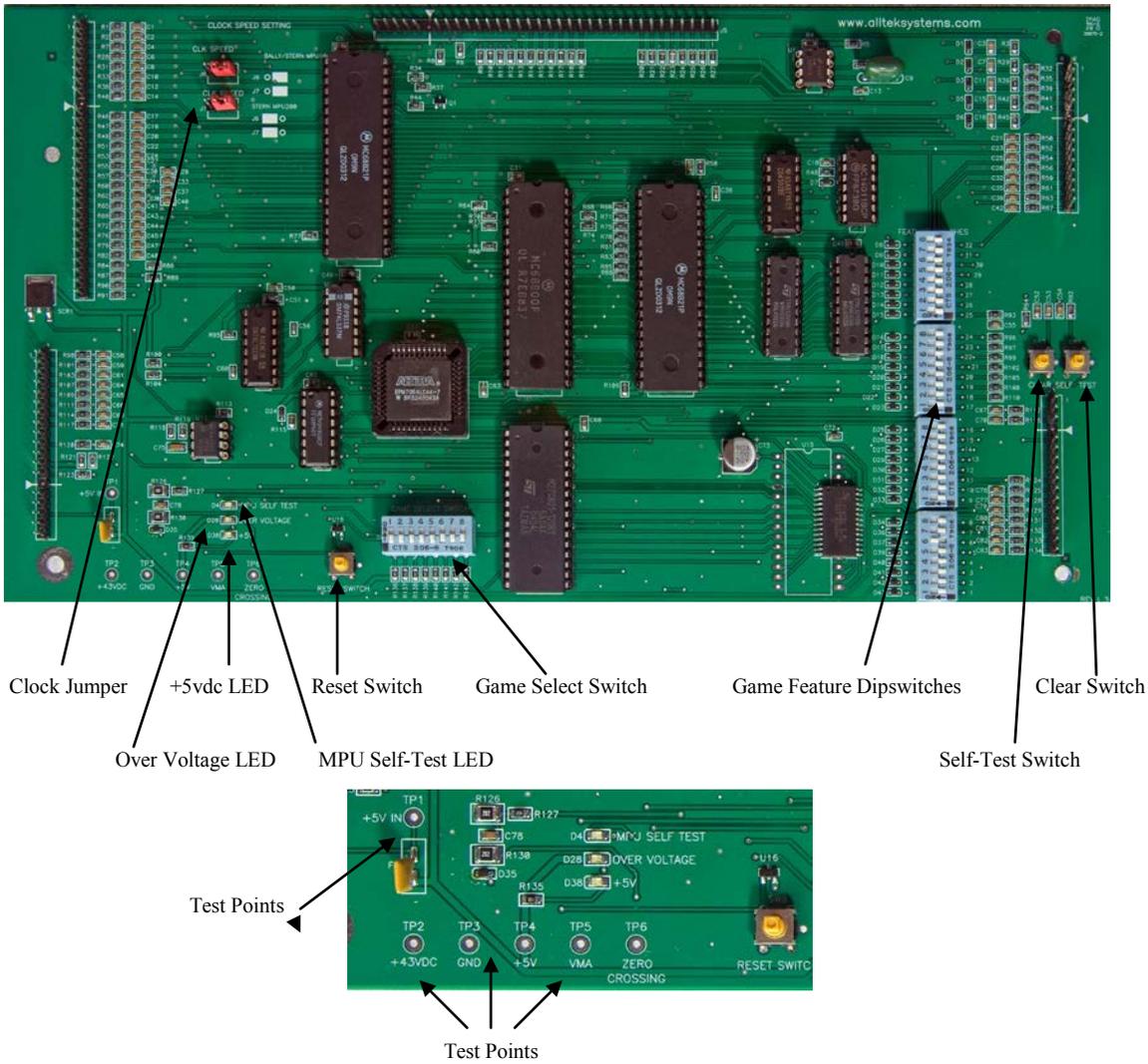
It's now time to set the MPU board for a specific game. Look at Table 1 to find your game. If it's a Bally machine decide if you want to set the dipswitch for free play or normal game mode. Now, configure the Game Select Dipswitch (SW7) to the game that you own. If switching from one game to another, meaning you already had the Ultimate MPU Board in another machine, run a Memory Clear Function. Refer to page 11, for performing a Memory Clear Function.



Let's get to the fun part of the machine. Everything is checked, set, and plugged in, turn on the game. Notice the three LED's on the lower left hand side of the board.

- **Green** LED (D4), MPU Self Test should pulse 8 times, with the first pulse being reset, the remaining pulses representing the board self test. After the 8th pulse, the LED will glow dimly.
- **Red** LED (D28), Over Voltage should be OFF.
- **Green** LED (D38), +5vdc should be ON.

If the LED's are not operating as stated above, proceed to the troubleshooting section of this manual.



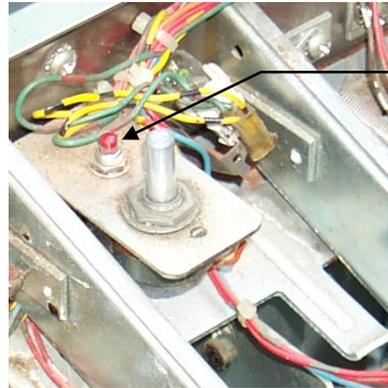
Programming Game Bookkeeping

At this point, the game should be operational. There is one last important step that needs to be done. You need to set your free play scores and other bookkeeping features. There might also be several settings in your bookkeeping that need to be set for sound options. It is best to refer to your game manual for this step but just in case you don't have a manual we will try and step you through it.

High Score Feature Adjustments

The game is designed to award an extra ball or free game at each of three score levels. The recommended levels are on the scorecard of the game. Any level from 10,000 to 9,999,000 can be set, as desired, as long as your game has 7 digit displays. If you have 6 digit displays then you can only go from 10,000 to 990,000. It is also possible to reset or turn off any or all of the levels, if desired.

1. Push and release the Self-Test button at one-second intervals approximately six times or until identification number 01 appears on the 'Match/Ball in Play' display.
2. The number on the Player Score Display is the score level. Press the Clear Button (SW3) located on The Ultimate MPU Board to reset the displayed value to 00. Then hold the credit button in until you get the desired replay value. Release the credit button when the desired number appears. If the number '00' is left on the displays, the high score feature is eliminated for that level. Note the level changes 10,000 points at a time.
3. Repeat steps 1 and 2 for the second and third score levels. The identification numbers '02' and '03' on the 'Match/Ball in Play' display are for the second and third levels, respectively.



Red
Self-Test
Button

High Score to Date

The game is designed to award free games when you beat the current 'High Score to Date'. The adjustment procedure is the same as for the High Score Feature Adjustment, Steps 1 and 2. Continue pushing the Self-Test button until the identification number '04' appears on the 'Match/Ball in Play' display and then do step 2.

Bookkeeping Features

The game is designed to help perform certain accounting functions. The game can display the number of total plays and replays (free games) as well as several other features as follows:

‘05’ – Current Credits

‘06’ – Total Plays (Paid & Free Games)

‘07’ – Total Free Games

‘08’ – Game Percentage

‘09’ – Total times ‘High Score to Date’ is beat

‘10’ – Coins dropped thru coin chute #1

‘11’ – Coins dropped thru coin chute #2

‘12’ – Coins dropped thru coin chute #3*

‘13’ – Number of specials awarded from panel specials only*

‘14’ – Number of minutes of game play*

‘15’ – Number of service credit*

* *Not all games have these features*

If desired, you can reset the bookkeeping numbers. The procedure is the same as before but you set the numbers with the credit button.

1. To clear the bookkeeping push the Self-Test button until the identification number ‘05’ appears on the ‘Match/Ball in Play’ display and then press the clear button on The Ultimate MPU Board.
2. Then repeat step 1 for identification numbers for ‘06’ thru ‘15’, remembering that not all games go to identification number ‘15’.

Feature options '16' thru '22'*

To setup positions '16' thru '22' push and release the Self-Test button until '16' shows on the 'Match/Ball in Play'. Now press the credit button until you get to the value desired. It is best to use the game's manual for these features, but if you don't have the original manual, then make the desired number 03. Repeat this step until the game goes in to a reset condition. At this point your game is all ready for play but if you made a mistake on any of the settings, you can go through them again and change only the ones that you desire.

** Not all games have these features*

Memory Clear Function

It may be necessary to perform a Memory Clear Function if you have switched the Ultimate MPU from one machine to another. The Memory Clear Function may need to be performed if you observe strange display values or are unable to access the bookkeeping mode. This may be due to different memory space allocation from one machine to another.

Refer to Table 1 to initiate the Memory Clear Function. Set the Game Select Dipswitch as indicated in Table 1. Once the switches are set, turn the machine on. You will notice that the Green Self-Test LED (D4) will pulse ON and OFF about ever second. The machine memory is now clear. You will now have to set the Game Select Dipswitch back to the game prior to performing the Memory Clear Function.

Troubleshooting Section

I turn on the game and nothing happens. None of the game lights or LED's on the Ultimate MPU Board are on.

- Check that the machine is plugged in.
- Move power plug to a different outlet.
- Check that all of your connectors are correct.

I turn on the game and nothing happens. I do have game lights but no LED's on the Ultimate MPU Board.

- Check that all of the connectors are plugged in.
- If you checked the +5 Volts and it was OK, check the +5 volts on the Ultimate MPU Board. You will notice a Test Point labeled +5 volts and Ground. If you don't have it on the board, you are losing the power between your Solenoid Board and your new MPU board.

I turn on the Game but don't see the green LED flash 8 times. The +5 volt LED is on.

- Remember the first flash is the reset pulse. When you turn on the game you will notice the Self- Test LED turn on, then you will see another pulse, then a pause with 5 more pulses, this means you have a +43 volt solenoid power problem; meaning that the MPU board J4, pin 15 is not getting +43vdc. Check the +43 volt fuse, wiring from the transformer board, or it could be a bad connector.

Is it OK that the Self-Test LED is glowing dimly after completing its 8 flashes?

- Yes, this is normal.

Is there a free play setting for Stern machines?

- No.

The game turns on and starts but only the flippers and free game knocker are working.

- Check the fuse that is located under the playfield.

I have the MPU board setup for a newer Stern machine and it's running slow.

- Check that the clock jumpers (J6 & J7) are on the left 2 pins.

I have the MPU board setup for a Stern machine and the game is stuck in self-test mode.

- You must have the game feature switches set to something other than all on or all off.

The games self-test will not allow me to go into bookkeeping mode or the games displays have some strange high score values when I start the game or the displays have digits in strange places.

- Run the memory clear function located in Table 1.

The +5vdc or +5vac voltages are not correct or the over voltage LED (D28) is on.

- There are only two important components that make up the +5vdc. The voltage regulator (Q20) and the big capacitor (C23) on the old solenoid board. If you have too much AC voltage, then replace the big capacitor. If you have too much DC voltage, then replace the voltage regulator. Recheck the voltages before plugging in the MPU again. Sometimes you might have to replace both components and with the game being over 40 years old, it's not a bad idea to replace both components at this time. Remember that if you don't feel comfortable working to this level of your game it would be wise to call in a technician to help out or you purchase our new Ultimate Solenoid Driver. There will be times that you have multiple problems with a game, especially if it has sat idle for sometime.

Game Select Switch Chart

How to use this chart		Free Play Settings
Up = On or 1 Down = Off or 0 Example: Future Spa 00010010 ↓ ↓ ↓ ↓ ↑ ↓ ↓ ↓ ↑ ↓	GoldBall 00101100 FireBall Classic 00101101 Spy Hunter 00101110 X & O's 00101111 Black Pyramid 00110000 Kings of Steel 00110001 Grand Slam 00110010 Rapid Fire 00110011 Baby Pacman ² 00110100 Speakeasy 4 Player 00110101 Big Bat Baseball ² 00110110 New Vector ² 00110111 New Fathom ² 00111000	(Bally Only) To place any of the Bally games in free play mode, just place the left most switch in the on position. For example lets use Future Spa again. Example: Future Spa 10010010 ↑ ↓ ↓ ↓ ↑ ↓ ↓ ↓ ↑ ↓
Bally Machines	Stern Machines	Then turn off your credit display feature which is either switch 20 or 27 of the game feature dipswitches. Consult our manual or the settings cards located in the game for the correct switch to turn off or just try one or the other.
Freedom 00000000 Night Rider 00000001 Evel Knievel 00000010 Eight Ball 00000011 Power Play 00000100 Mata Hari 00000101 Blackjack 00000110 Strikes & Spares 00000111 Lost World 00001000 6 Million \$ Man 00001001 Playboy 00001010 Sexy Girl 00001010 Voltan 00001011 Supersonic 00001100 Star Trek 00001101 Kiss 00001110 Paragon 00001111 Harlem Globe 00010000 Dolly Parton 00010001 Future Spa 00010010 Nitro Ground 00010011 Silver Ball Mania 00010100 Rolling Stones 00010101 Mystic 00010110 Hot Doggin 00010111 Viking 00011000 Space Invaders 00011001 SkateBall 00011010 Frontier 00011011 Xenon 00011100 Flash Gordon 00011101 Eight Ball Deluxe 00011110 FireBall II 00011111 Embryon 00100000 Fathom 00100001 Medusa 00100010 Centaur 00100011 Elektra 00100100 BMX 00100101 Mr. & Mrs. Pacman 00100110 Speakeasy 2 player 00100111 Spectrum 00101000 Vector 00101001 Granny & Gators ² 00101010 Cybernaut 00101011	Pinball 01000000 Sting Ray 01000001 Dracula 01000010 Wild Fyre 01000011 Lectronamo 01000100 Nugent 01000101 Magic 01000110 HotHand 01000111 Memory Lane 01001000 Stars 01001001 Trident 01001010 Ali ¹ 01001011 Big Game ¹ 01001100 Catacomb ¹ 01001101 Cheetah ¹ 01001110 Dragonfist ¹ 01001111 Flight 2000 ¹ 01010000 Galaxy ¹ 01010001 Iron Maiden ¹ 01010010 Lazer Lord ¹ 01010011 Lightning ¹ 01010100 Meteor ¹ 01010101 NineBall ¹ 01010110 Orbitor1 ¹ 01010111 Quick Silver ¹ 01011000 Seawitch ¹ 01011001 Split Second ¹ 01011010 Star Gazer ¹ 01011011 Viper ¹ 01011100 FreeFall ¹ 01011101 Cosmic Princess 01011110	
		Enhanced Diagnostics Test
		Place the two left most switches in the on position. You can keep the other switches as they are. Example: 11000000 ↑ ↑ ↓ ↓ ↓ ↓ ↓ ↓
		Memory Clear Function
		Place all the switches in the up position except switch one. See Example. Example: 01111111 ↓ ↑ ↑ ↑ ↑ ↑ ↑ ↑
		Other Game Software:
		Sexygirl 00001010 Big Ball Bowling ² 01011111 Blk Sheep Squadron ² 01100000 Genesis Puck Bowler ² 01100001 Blk Beauty Shuffle ² 01100010 Mystic Star 01100011
		Special Notes for some Games
		Note 1: Clock Jumpers need to be on the left side. Note 2: No freeplay for these games.

Table 1