Arduino UNO R4 WiFi TITO Deluxe

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Project: https://github.com/marcrdavis/ArduinoTITO-PlayerTracking

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HARDWARE REQUIRED

Arduino UNO R4 WiFi
https://www.amazon.com/Arduino-UNO-WiFi-ABX00087-Bluetooth/dp/B0C8V88Z9D

MAX3232 Serial port (or compatible)
https://www.amazon.com/gp/product/B083L99CGZ

1' USB Cable
https://www.amazon.com/GHNTJAP-SuperSpeed-Charging-Android-Controller/dp/B0D541N33M/

Four 2" DuPont M-F jumper wires

Serial cable to connect to game

- For IGT Games: 5-pin Dupont to Male DB9 Serial pigtail (I reused the one from the BETTORSlots TITO board)
- https://www.amazon.com/gp/product/B081GJR1MN

5 Watt or greater USB Power Brick

Compatible slot machine

- Tested on IGT S2000/GameKings/AVP, Bally, WMS and Konami machines; will probably work on others based on the SAS 6.x protocol; you will need a compatible cable to connect to the serial port on the machine

SOFTWARE REQUIRED

Latest version of Arduino IDE
https://www.arduino.cc/en/software

BEFORE YOU BEGIN

These instructions assume familiarity with electronics, coding and slot machine configurations. If you are new to any of these then this project may not be for you. My instructions were not written for beginners. You may damage your game or the Arduino/TITO hardware if you do not understand what you are doing.

WIRING

The Serial board needs to be wired as follows:

Serial	Arduino
VCC	5V
RXD	Data Pin 0
TXD	Data Pin 1
GND	GND

You will need to power the Arduino board from the Accessory Outlet in the base of the slot machine using a USB power brick (5W or greater).

- Do not power the board from any built-in USB port on the game – it will not provide enough power

INITIAL SETUP

- Assumes you have the Arduino IDE setup, the board and COM port settings are correct
- Install version 1.2.2 of the Arduino UNO R4 Boards from within Boards Manager
    - You must update two files to enable 9-bit Serial support. The updated files are located in the 'UNO R4 WiFi 9-Bit Serial' folder within the package
    - Replace HardwareSerial.h in C:\Users\<YOURID>\AppData\Local\Arduino15\packages\arduino\hardware\renesas_uno\1.2.2\cores\arduino\api
    - Replace Serial.cpp in C:\Users\<my_username>\AppData\Local\Arduino15\packages\arduino\hardware\renesas_uno\1.2.2\cores\arduino
- The following libraries and versions are required:
    - WiFiS3 (latest)
    - ArduinoGraphics (latest)

      *Can be downloaded via the Arduino IDE Library Manager

- Connect the board to your computer via USB and load the ArduinoTITODeluxeR4WiFi sketch
- There are some settings that need be modified in the sketch before you download it to the Arduino UNO R4 WIFI:
    - ChangeToCredits – set to 1 to add credits via the Service/Change button
    - changeCredits – set to the number of credits to add on each push of the Service/Change button
    - useDHCP – set to 1 to get a unique IP address from the network; you will need to discover the address by checking your router after the device is connected
    - ssid – set to the name of your WiFi
    - pass – set to the password for your WiFi
    - webUI – By default this is set to the address of the hosted web console; if you want to host the web console on your network change this to the address of your site
    - mac – set a unique mac address for the Ethernet board; only necessary if you will be deploying more than one Arduino TitoDeluxe board on your network
    - ip – set a unique IP address for your network; required if useDHCP is set to 0
- Download the sketch to the Arduino; wait until complete
- Unplug the Arduino from the PC
- Mount the hardware into the slot machine's lower cabinet
- Connect the board to the game's serial port using the DB9-to-DuPont cable or existing compatible cable
- Connect the USB power to the machine's accessory outlet
- Power on the machine and test
    - Assumes you are replacing an existing TITO board or have already setup your machine per the instructions later in this document

REMOTE ACCESS

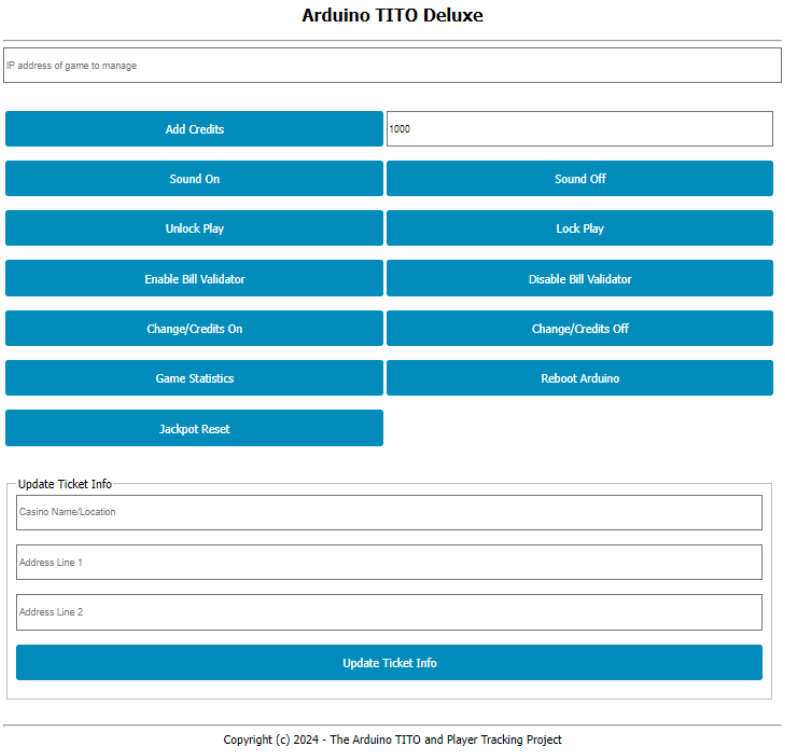
The web interface allows you to control various aspects of your game by using a web browser.

In the latest version the web interface has been moved from the device to a hosted site. This was done for several reasons:

- Performance
- Memory limitations of the Uno (R3) hardware
- The need to free up code space for additional features

Even though the web interface is hosted on the Internet it does not have access to your network. You can only manage machines on the same local network as the device you are connecting from. If you are still not comfortable with that for any reason you can host the webpage yourself on a web server on your network – then simply change the 'webUI' property in the code to point to your server. The only file needed is the index.html file, which is included in the package.

To access the web interface you can either browse to the IP Address of your game or go to http://arduinotito.infinityfreeapp.com and enter the IP Address of the game in the space provided.



Most functions are self-explanatory; The Change/Credits feature allows you to enable adding credits by pressing the Change (or Service) button. The number of credits added on each press is set in the sketch prior to loading it onto the Arduino.

The Update Ticket Info option allows you to change the information printed on the cash-out ticket.

CONFIGURING YOUR IGT MACHINE (S2000/GameKing)

Before getting started with setting up your IGT machine for TITO please ensure your Bill Validator is working correctly and your Ticket Printer can print clear and legible tickets. You will also need a Keychip appropriate for your type of machine. These instructions assume familiarity with the Keychip process. Note – keychips and menu option locations vary from model-to-model. Please consult your IGT user manual or me if you have questions.

1. Clear any credits off your machine
2. Keychip your machine
3. Once in the Keychip Menu, ensure your Denomination, Devices, Limits and Game settings are as you want them
4. Setup the Comm Options as follows
    a. IGT SAS Primary Channel = Channel 3
    b. SAS Secondary = Off
    c. Bally Miser = Off
    d. Progressive Link = 7
    e. WAMM 1.0 = Off
5. Setup the Validation/Redemption Options as follows
    a. Validation = System Validation
    b. Redemption = SAS Redemption
6. Setup the IGT SAS Options as follows
    a. System Bonusing = SAS Legacy
7. Setup the SAS Channel (Primary Channel) Options as follows
    a. Address = 1
    b. Legacy Bonus = Enabled (X)
    c. Validation = Enabled (X)
8. Setup the Machine Terminal Options as follows
    a. Voucher Limit Follows = Credit Limit
9. Save all options and make any other changes you wish before pressing Return to Game to exit the keychip menu

Test the game by inserting money and then pressing Cash Out to generate a ticket. The ticket serial number should match the number of credits you inserted. Insert the ticket into the machine, it should accept it for the same number of credits.

CONFIGURING YOUR IGT MACHINE (AVP)

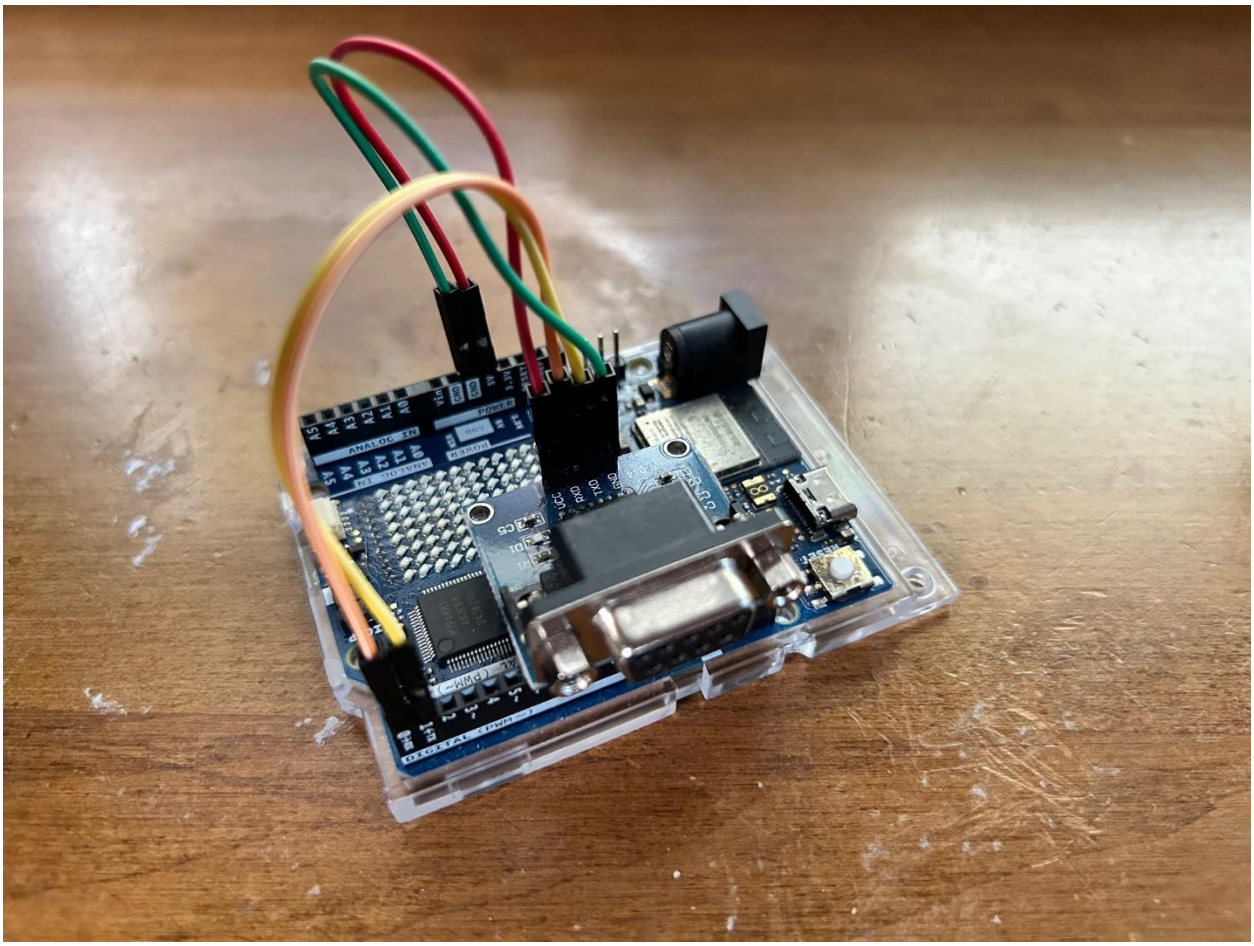
Please see this video for how to configure your AVP Game:
https://www.youtube.com/watch?v=JKjyeFQPltA

NOTES AND COMMENTS

- The board will output diagnostic info via the USB-C serial port when powered by a laptop running the Arduino IDE Serial Monitor
- The Matrix display on the R4 board will display OK when the board is running normally and ERR when a network or serial error has occurred. Use the Serial Monitor (above) to diagnose the issue

DISCLAIMER

Figure 1 – Mockup



Example of R4 board wiring

FIGURE 2: IGT Serial Cable

IGT S2000/GameKing Serial Pinout

DB9 Male	Signal direction	S2000 J82
3 Receive Data	←	1 Transmit Data
2 Transmit Data	→	2 Receive Data
5 Signal Ground	---	5 Signal Ground

Option: DB9 to Dupont Serial Cable: https://www.amazon.com/gp/product/B081GJR1MN