

# Arduino plugin for Homeseer 3.

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## **Introduction**

This Plugin was written to interact with the Arduino range of I/O boards and Homeseer. The Plugin has the following functions:

1. Boards can be connected with USB, Serial or Ethernet.
2. Board pins can be assigned as Input, Analogue input, Output, PWM, Servo or Onewire.
3. The Plugin will auto generate the used devices in homeseer.
4. 1 LCD per board can be added.
5. All Inputs are switched Inputs that are on when pulled to ground.(no resistors are required)
6. All outputs are High when On in Homeseer.
7. All inputs and Outputs are updated on connection to homeseer.
8. Up to 9 Arduino boards are supported.
9. One Wire DS18S20, DS18B20 and DS1822 temperature sensors are supported.
10. PWM fade times can be set from a device in Homeseer
11. Calculations can be performed on the analogue inputs to display custom data.
12. Analogue inputs can be inverted to accommodate various sensors.
13. The board will Auto reconnect if reset while connected to HS.
14. Servos can be set to a value for 0 to 180° from a HS device.
15. An RGB device can be created from 3 pwm outputs
16. There is an API for the board so you can send and receive your own values to and from the board to Homeseer.


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## Homeseer Setup

Add A board. 

On the plugin configuration page click add a board and a new board will be setup in Homeseer for you.

Connection:  Type:  ☐ Advanced Comport Settings

Select the com port and Board type for the board. The board types are:

**Normal** = This will set the board up with basic function using a built in .ino file

**API**= This will set the board up with a customisable .ino file so you can add your own code to the board

IP Address:  Port No:  Mac Address:  ☐ Advanced Ethernet Settings.


If you would like to connect the board with Ethernet add the Ethernet shield to the board and then enter the IP address, port, subnet, gateway and Mac address you would like to use for this board the defaults will be unique. The IP address, Port and Mac addresses of each board you add should be unique to your network

**Advanced Ethernet Checkbox** = When the board is set to be Ethernet the pins used by the Ethernet shield are removed from the selectable list. Checking this will enable all the pins to be added back to the list so you can change your pin allocation for the Ethernet shield. Please only use this is if you understand as this can cause connection errors.

## Board Setup

You will need the Arduino environment which can be downloaded from the link on the Arduino plugin configuration page if you do not have it.

**Note:** **Please only use IDE version stated on the Plugin Configuration page.**

Download the Arduino libraries. 

Next unzip and copy the libraries to the libraries folder that is located in the same folder as the Arduino.exe." C:\Program Files (x86)\Arduino\libraries". These can be downloaded by clicking on the link on the plugin config page. If the Arduino environment software is open then restart it to install the libraries.

Download firmware  for board no:

Once you have set up the board in the plugin click select the board number to be setup in the dropdown menu then click the download board firmware link on the plugin config page to save the firmware to your pc.

Open the Arduino software and go to File / Open then select the .ino file you just downloaded.

Connect your board to your computers usb port.

Go to Tools / Board and select the Board type you are using.

Go to Tools / Serial Port and select the Serial port you are using.

If you are running the API.ino then add your code to the board. ([See section below on API](#))

Now go to file/ upload to send this setup to the board.

### **To add a NodeMCU board to the plugin:**

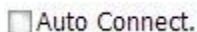
1. In the Arduino IDE go to File, Preferences. Under Additional Boards Manager Urls add [http://arduino.esp8266.com/staging/package\\_esp8266com\\_index.json](http://arduino.esp8266.com/staging/package_esp8266com_index.json) then click OK.
2. In the Arduino IDE go to Tools, Board, Board Manager and search for nodemcu and click install to install the board V2.3.0-rc2
3. In the Plugin you should select NodeMcu as your board type for a new board.
4. Fill in your SSID and password.
5. Download the Sketch for the board.
6. In the Arduino IDE chose the NodeMCU V1.0(ESP-12E Module)
7. Select the comport after plugging in the board.
8. Download the Sketch to the board.

### **Connecting your board to Homeseer.**



#### **Connecting:**

To connect the board to Homeseer by either pressing the Connect button on the Main board device on the Device management page or on the plugin config page.



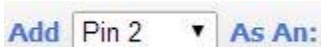
If you would like the board to connect to Homeseer every time it starts then place a check in the box labelled Auto connect in the board setup on the config page.



#### **Disconnecting:**

To Dissconnect the board either press the Disconnect button on the Main board device on the Device management page or on the plugin config page.

### **Adding a Pin**



Select the pin you wish to configure from the drop down menu.

### To add an input pin:

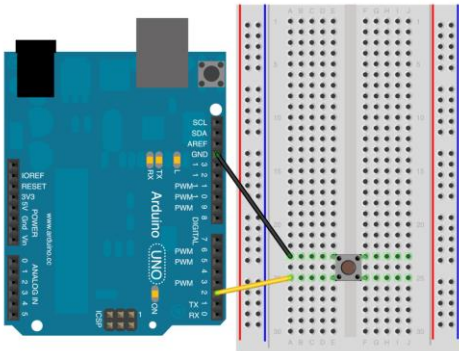
Select the pin you wish to configure from the drop down menu.

Click on the + image next to Input pin.

This pin is now set as an Input.

After you have added an input pin you will be able to set up a debounce time for the input pins. The Debounce time is in milliseconds. So a value of 500 would mean that the input will not change in Homeseer until the input has changed for half a second. The default time is 30ms.

This image shows how to connect a switch to pin 2.



**Note:** The plugin has a limit of 40 inputs pins per board.

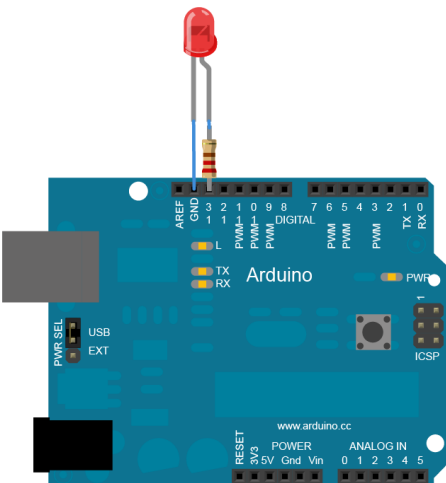
### To add an Output pin:

Select the pin you wish to configure from the drop down menu.

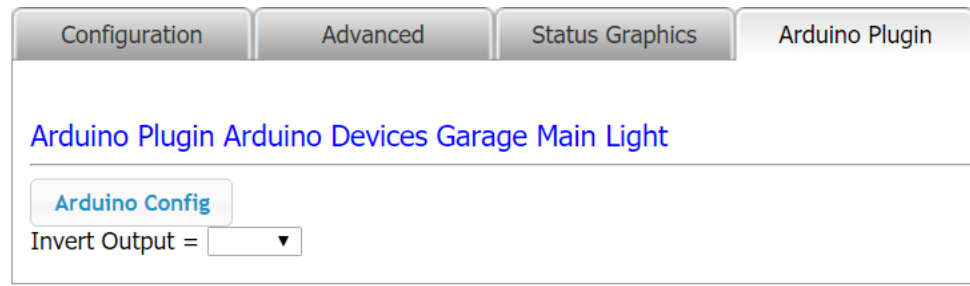
Click on the + image next to Output pin.

This pin is now set as an Output.

**Note:** The plugin has a limit of 40 output pins per board.  
This image shows how to connect a Led to pin 13.



Outputs can be inverted for each individual output. This is set on the Arduino configuration tab under the standard device configuration. Setting this changes the status values automatically to represent the output status.



### **To add an PWM pin:**

Select the pin you wish to configure from the drop down menu.

Click on the + image next to PWM.

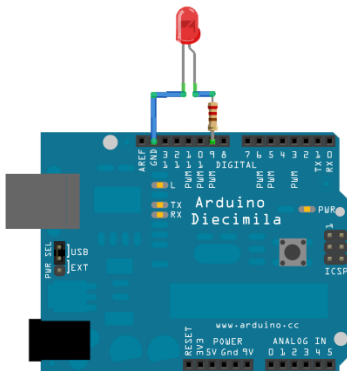
This pin is now set as an PWM pin.

Note: The plugin has a limit of 25 PWM pins per board.

PWM is a technique for getting an analogue-like behaviour from a digital output by switching it off and on very fast.

**Note.** The pin must be a pwm marked pin on the board.

This image shows how to connect a Led to pin pwm pin 9.



If you have more than 3 PWM outputs you can create a RGB device on the plugin config page:

Add a RGB Device. 

Name	Red Pin	Green Pin	Blue Pin	Color	Delete
RGB:1	<input type="text"/>	<input type="text"/>	<input type="text"/>	<div style="background-color: #5de2af; width: 100px; height: 20px;"></div>	

Select the red, green and blue pins from the dropdown list then select the colour from the picker to set the colour of the 3 pins.

The RGB Device created in Homeseer I now also a master over intensity of all 3 pins.

	Color=#5DE2AF Level= 100 %	Arduino Devices	Arduino Plugin	Board:2, RGB:1	Arduino, Board:2, RGB:1	Arduino RGB	Today 22:55:19	Control...
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### To add an Servo pin:

Select the pin you wish to configure from the drop down menu.

Click on the + image next to Servo.

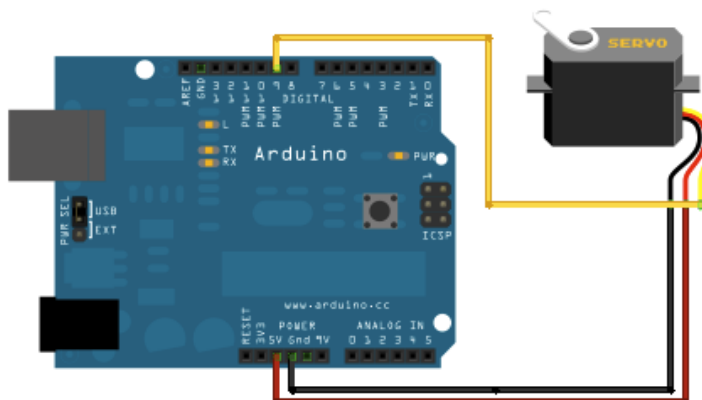
This pin is now set as a Servo pin.

Servo motors have three wires: power, ground, and signal. The power wire is typically red, and should be connected to the 5V pin on the Arduino board. The ground wire is typically black or brown and should be connected to a ground pin on the Arduino board. The signal pin is typically yellow, orange or white and should be connected to your selected pin on the Arduino board.

**Note:** The plugin has a limit of 8 Servo pins per board.

**Note:** On boards other than the Mega, use of the library disables analogWrite() (PWM) functionality on pins 9 and 10, whether or not there is a Servo on those pins.

This image shows how to connect a Servo to pin pin 9.



### To add a onewire pin:

Select the pin you wish to configure from the drop down menu.

Click on the + image next to OneWire.

This pin is now set as a OneWire pin.

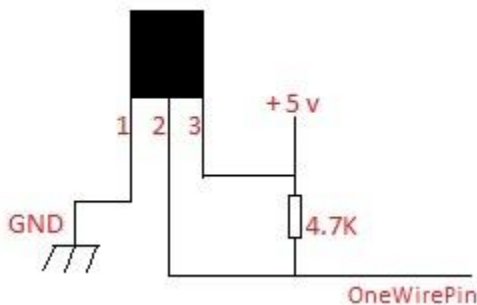
**Note:** After adding or removing the onewire pin the power to the board must be cycled off and on to fully reset the board.

One Wire Pin = 6.  
Resolution = 9-bit  ☐ Stop Creating New One Wire Devices.

The one wire resolution can be set by selecting from the drop down list.

The “Stop creating new one wire devices” can be checked to stop extra or phantom devices being created in Homeseer.

To connect your DS18S20, DS18B20 or DS1822 use the diagram below.



**Note:** The plugin has a limit of 1 Onewire pin per board.

**Note:** For Homeseer to see and create the One Wire Device it must go up or down in value. Try heating it up or cooling it down if the device is not in Homeseer.

**Note:** There is a plugin limit of 15 onewire devices per board

### To add a Analogue Input pin:

Select the pin you wish to configure from the drop down menu.

Click on the + image next to Analogue Input .

This pin is now set as a Analogue Input pin.

If you have any analogue pins set up there will be several options at the bottom of the board setup tab:

#### **Invert:**

If Analogue is inverted it would send the value from 1023 to 0

If Analogue is not inverted so would send the value from 0 to 1023

#### **Sum:**

This is a Value you would like to calculate the board analogue input by before displaying it in the Homeseer device string. The Default is Value\*100/1023

The Calculation can have the following variables:

“+ “for Add,” – “ For Subtract, “\* “for multiply, ” / “for divide and “Value” for the incoming data from the analogue input.

Eg. The default “Value\*100/1023” takes the input value multiplies it by 100 then divides by 1023 giving a reading between 0 and 100%

**Unit:**

This is a Value you would like to display at the end of the Homeseer analogue device string after the value. The Default is %

The Default values give you a value a percentage from 0% to 100% in homeseer.

**Time:**

This is a Time you would like to Update each analogue input in Homeseer. An analogue device can send lots of data to Homeseer with constant changes and this can cause problems in the connection so use this time to slow down the update speed.

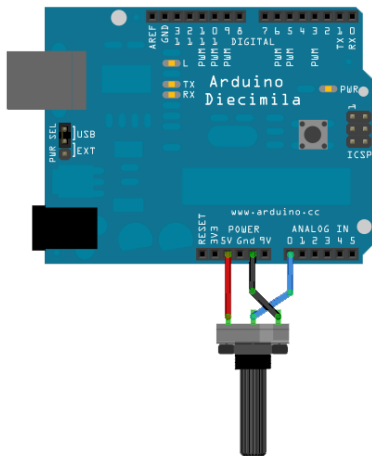
**Note:** 1023 is what the Arduino will outputs when the analogue input is at full.

**Note:** The plugin has a limit of 10 Analogue Input pins per board.

**Note:** The Analogue input pin must be marked as an Analogue in on the board.

This image below shows how to connect a potentiometer to Analogue pin 0.

Connect three wires to the Arduino board. The first goes to ground from one of the outer pins of the potentiometer. The second goes from 5 volts to the other outer pin of the potentiometer. The third goes from analogue input 0 to the middle pin of the potentiometer.



**Note:** To add an Analogue pin as a digital input pin use the chip pin number and not the A0 – A15 selections. This should also be added as an input pin and not a Analogue pin.



### To add a LCD:

**Note:** Only 4x20 LCD Version 1 - Marked "YwRobot Arduino LCM1602 IIC V1" are supported by default without changing the LCD Address in the plugin. If you do not know your LCD Address then run the I2c Scanner found [Here](#) to get your Address.

See [here](#) for instructions about displays.

### **Arduino Connections:**

#### **LCD > Arduino Pin**

GND - GND

VCC - 5V

SDA - ANALOG Pin 4

SCL - ANALOG pin 5

### **NodeMCU Connections:**

#### **LCD > Node MCUL Pin**

GND > GND

VCC > VIN (this pin gives you 5v from the usb)

SDA > D2

SCL > D1

Click the + image on the plugin config page to add the LCD to the board. This will create a device for each line in the LCD with the first line also including some extra options.

### **Device options:**

Send = Send the text in the device string to the LCD

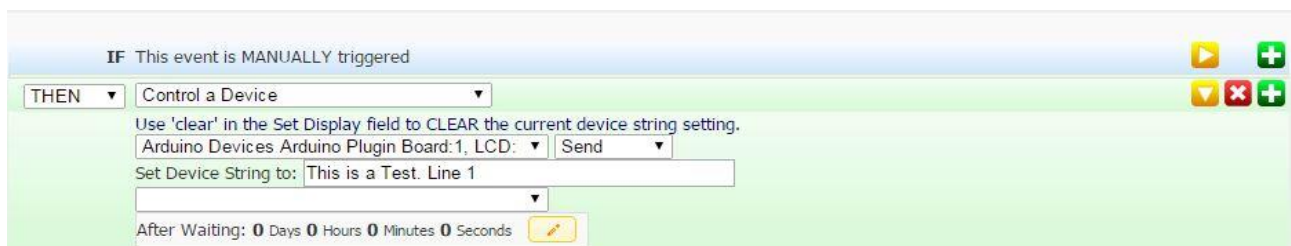
On = Turn on the LCD

Off = Turn Off the LCD

Clear = Clear the line of the LCD

Clear All = Clear All Lines on the LCD

To send text to the LCD from an event use the device advanced options by clicking on the red airplane graphic in the event and then select the line you want to use. Set the device value to send in the dropdown and the device string to the text required. (see image below)



There are some Variables that can be used to manipulate the text on the Line:

|C| = will centre the text on the line.

|R| = will align the text to the right

Homeseer replacement variables can also be used on the display.

### **LCD Page Device:**

The LCD page device can be used to recall pages of display data on the LCD. To store data to a page select the page with the LCD Page device + and – buttons then enter the text on the LCD device lines and send them to the display. When you have the data you want for that page press the “Store” button on the LCD Page device to store this data to the page. You can then scroll through pages of data with the + and – buttons on the device or from an event. You can even recall the page number directly from an event.

### **LCD Page hardware + and –**

On the config page when you create an LCD you will also have the option of assigning Arduino inputs as a + and – for the page device. This is so you can have hardware buttons on the display and scroll through the pages of data.

### **Adding , removing and naming pages**

To add or remove a page from the page device edit the Status Text for the LCD:Page device.

To add another page add the next number in the range. The plugin generates 7 pages numbered 0-6 so to add another you would add 8 to the status text.

You can also delete pages from here but pages must be in numeric order from 0 to whatever number you require.

You can name the values to whatever you want to make it easier to recall them from events

### **To add a Alive Pin:**

Select the pin you wish to configure from the drop down menu.

Click on the + image next to Alive pin.

The Alive pin is a pin on the board that when connected to Homeseer will be “HIGH” and has a watchdog on it that when the connection to Homeseer is lost it will go “LOW”. This can be used for backup system switchover.

### **Device control:**

**Inputs:** will show in the device as on and off.

**Analogue Inputs :** will show in the device value and string.

**Output:** Outputs can be controlled in the following way:

On: Turns the output High

Off: Turns the output Low

Blink: This will Blink the output on and off at the time set by the Output Time device for the given pin

One Flash: This will Set the Output High then Low using the time set by the Output Time device for the given pin

Toggle: This will turn the output Off if it is On or On if it is Off

**PWM:** PWM Outputs are controlled with 2 devices. PWM Fade Time is used to set the time it takes the device fade to a new value from 0 to 5sec max. PWM Output is used to set the level of the PWM output from 0 to 100.

If required you can set your own values. These values can be changed to any value you require by changing the Device Values-Status/Graphics and the values within the range of 0 to 5000ms for fade time and 0 to 100 for %.


**OneWire:** One wire devices will be created and monitored once Homeseer has received a Value change from the device.

**Servo:** Servo Outputs can be controlled by setting the device value from 0 to 180 which will in turn control the servo from 0° to 180°.



If required you can set your own values. These values can be changed to any value you require by changing the Device Values-Status/Graphics and the values within the range of 0 to 180.


## API Setup

If the Board type is set to API then when you download the firmware this will be a different ino with only the following options in Homeseer.


No Of API Outputs = 2 

API Output Device Setup:

Name:	Output No	Dimmable.	Delete
Arduino Devices Arduino Plugin Board:5, API Output:0	0	False ▾	
Arduino Devices Arduino Plugin Board:5, API Output:1	1	True ▾	

No Of API Inputs = 1 

API Input Device Setup:

Name:	Input No	Update.	Unit	Delete
Arduino Devices Arduino Plugin Board:5, API Input:1	1	Value ▾		

Add output (This adds a device in Homeseer that will update an array on the API.ino.)

When you add an API Output this will create a device with the following options:

Dimmable: (This has the following options)

True(This will create a slider on the device Management page)

False(This will remove the slider on the device Management page)

The default code will send 0 for OFF and 255 for ON if you set Dimmable to true you can set it to any value in that range. The device values can be changed to accommodate your custom code.

Add API Input(This adds a device in Homeseer that will be updated with the values you send from the board.)

When you add an API Input this will create a device with the following options:

Update: (This has the following options)

Value. (Select this to update the device value with the value you send from the board.)

String. (Select this to update the device String with the value you send from the board.)

Value & String. (Select this to update the device value and String with the value you send from the board.)

Unit: (This is the text to display after the device Value in the Device string if you select string or Value and string from the Update option)

To add your own code to the board add your setup code after the lines:

```
//*****  
//Add YOUR SETUP HERE;  
//*****
```

Then add your code after the lines:

```
//*****  
//Add YOUR CODE HERE;  
//*****
```

In your code To Send Data to Homeseer use SendToHS(Device,Value) you can send a int, Long or Float to Homeseer.

Eg.. SendToHS(1,200); where 1 is the API device in homeseer and 200 is the value to send

In your code To Receive Data from Homeseer use FromHS(Device) this is an array of the values of your output devices in Homeseer. You can then do what you want with the value.

Eg.. digitalWrite(MyPin, FromHS[5]); would set MyPin to the same value as API Output device 5

### **Important Notes For API use:**

When adding code to the API .ino do not use Delays of any kind as this will interfere with the main loop used to communicate with Homeseer. If you do need to add delays to your code then please use a timer as described [HERE](#).

### **Notes:**

Ethernet Note:

Arduino communicates with both the W5100 and SD card using the SPI bus (through the ICSP header). This is on D11, D12, and D13 on "classic" format Arduino models such as the Duemilanove, and pins D50, D51, and D52 on the Arduino Mega.

D10 is used to select the W5100 and cannot be used for general I/O.

D4 is used for the SD card and can only be used for general I/O if the SD slot is not occupied. D2 is used if a solder bridge is placed across the "INT" pads to connect it to the W5100's INT pin.

On the Mega, the hardware SS pin, D53, is not used to select either the W5100 or the SD card, but it must be kept as an output or the SPI interface won't work.

Although not used by most SD card libraries, A0 is connected to the SD slot's write protect (WP) pin and A1 is connected to the card detect switch. Both are pulled high by 10k resistors on the Ethernet shield. These pins therefore cannot be used for analog input with the shield unless they are bent back or clipped off before inserting the shield into the arduino. Additionally, if a user's circuit uses these pins for digital IO, the pullups may cause problems for existing circuitry.

## **Running as a remote plugin.**

The plugin can be run as a remote plugin by installing all the folders in the same location as on the Homeseer server.

The following files are required for this to work.

```
Arduino Images found in \html\images\Devices\Arduino
All files found in \html\Arduino
All files found in \Config\Arduino Config
hspi_Arduino.exe found in the Homeseer3 root folder.
```

So if Homeseer is installed at C:\Program Files (x86)\HomeSeer HS3\hspi\_arduino.exe then on the remote server create a HomeSeer HS3 folder in the location C:\Program Files (x86) and add the files and folders above.

To run the plugin from the command prompt run: "C:\Program Files (x86)\HomeSeer HS3\hspi\_arduino.exe" server=192.168.0.10

Where "C:\Program Files (x86)\HomeSeer HS3\hspi\_arduino.exe" is the location of the hspi\_arduino.exe and 192,168.0.10 is the Homeseer3 IP Address.

## **Debugging**

If you have a problem then please tick the Debug logging check box and then run the item causing the problem. This will produce a file named ArduinoDebug.txt that can be downloaded by clicking the link created next to the Debug logging checkbox. Then e-mail the file to me at the address below.

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**[For Change log Click Here.](#)**

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