



# SW HW CO-Design

## Lecture 0 Tools Installation

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# Welcome To AVR Interfacing

OBTAINING INSTALLER





# Introduction



# Introduction



## **1- Tool chain**

The basic set of tools used to convert the source file to executable file. Mainly they are *Preprocessor* -> *Compiler* -> *Assembler* -> *Linker*

## **2- Integrated Development Environment**

*IDE* is a generic set of tools providing some GUI that facilitate the programming process, main tools are *source code editor*, *build automation tools*, and *debugger*.

## **3- Flashing Tool**

Tool used to transfer the executable file to a serial port (USB) to be received by the hardware programmer circuit that flash this file to the microcontroller flash memory.



# Tool Installation



# Installing Tool Chain

In our course, we will use a tool chain called **AVR GCC**. This customized version of the GCC to generate an executable file for AVR processor. This type of tool chain called **cross tool chain**.

## WinAVR tool

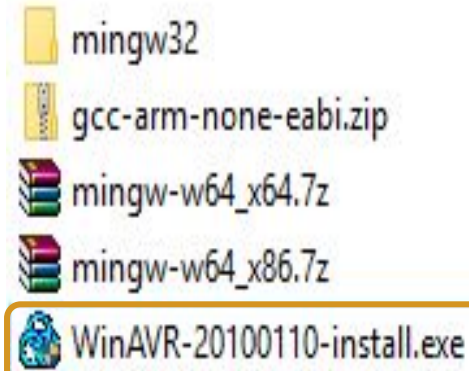
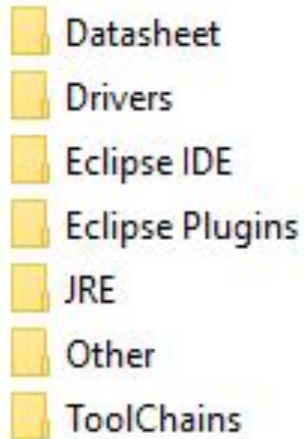
The WinAVR is an open source tool that combines some basic tools used for AVR development such as:

1. Avr-gcc as a compiler.
2. Avr-gdb as a debugger.
3. Avr-gprof as profiling tool.
4. Avr-dude as flashing tool.

- Win AVR
  - **AVR GCC**
  - **AVR Dude**
  - **gprof**
  - **gdb**

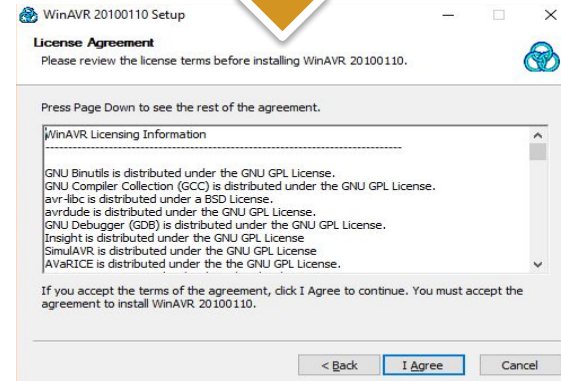
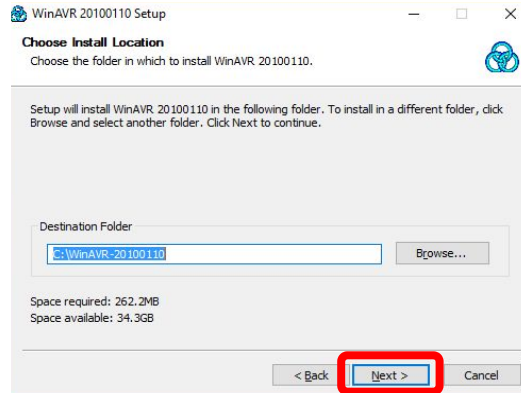
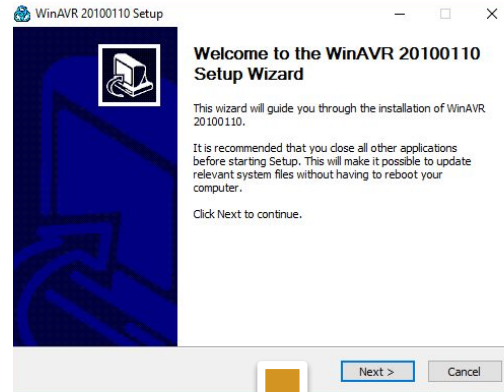
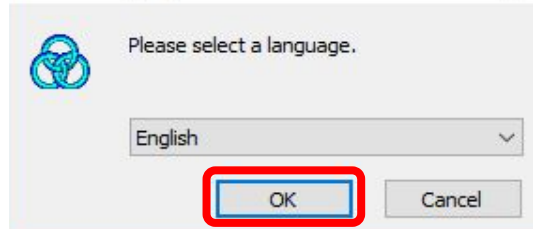
# Installing Win AVR

- In the folder IMT Tools provided , you will find another folder called Toolchains.
- Then install WINAVR from the tool.



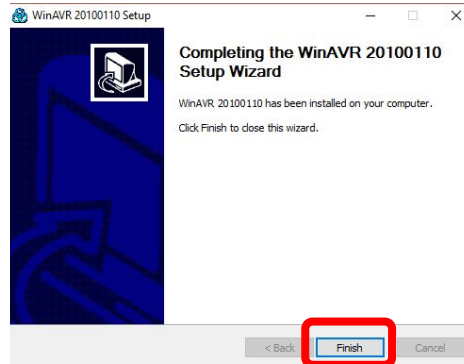
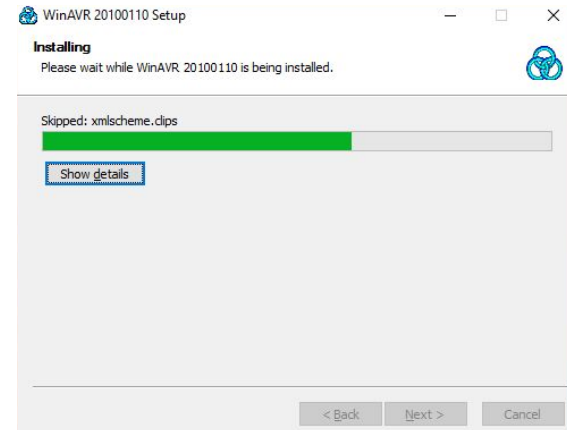
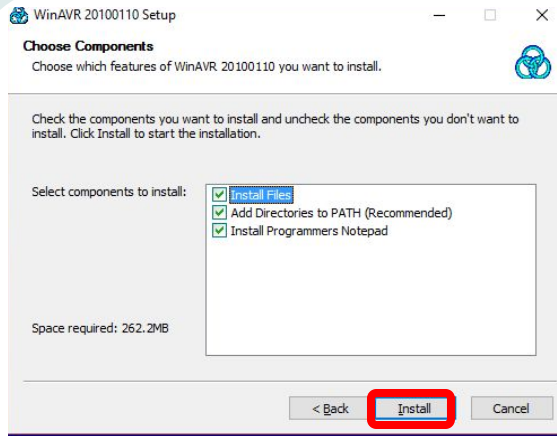
# Installing Win AVR

## Installer Language





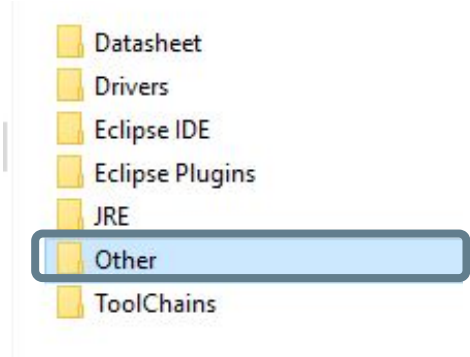
# Installing Win AVR



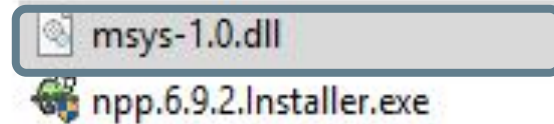
# Installing Win AVR

This step only for windows 8 and 10

- In the folder IMT Tools provided , you will find another folder called Other.
- Inside this folder, you will find a file called *msys-1.0.dll*, copy this file.



- Datasheet
- Drivers
- Eclipse IDE
- Eclipse Plugins
- JRE
- Other**
- ToolChains



msys-1.0.dll

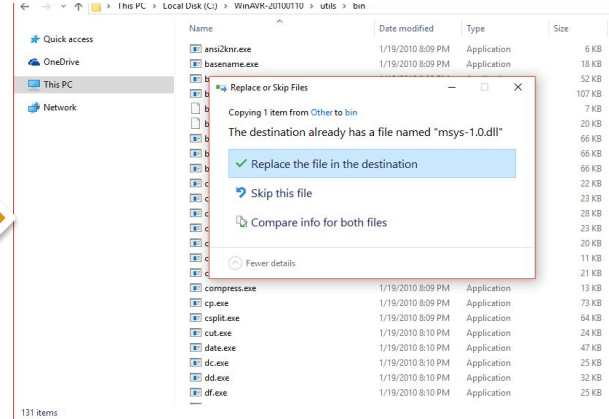
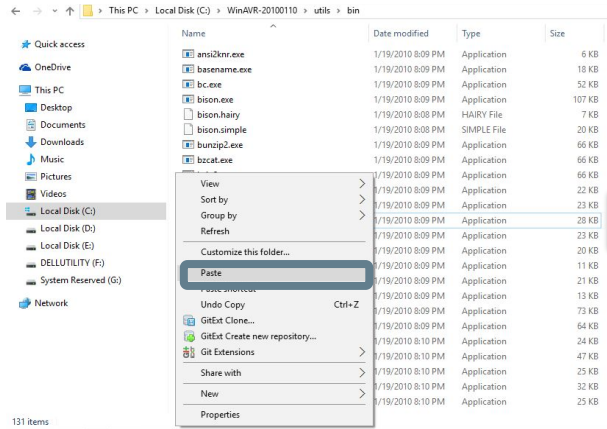
npp.6.9.2.Installer.exe

# Installing Win AVR

This step only for windows 8 and 10

**Paste the copied file to:**

***c:->WinAVR-20100110->utils->bin***



You will be asked to replace another file with the same name, say yes to replace.



# Installing Eclipse



# Installing Eclipse

Now let's install the IDE, We will use one of the most professional IDE in the world. It is being used by many companies due to its high capabilities. It is called **Eclipse**.

## Step 1:

- For that we need to install the java runtime environment (JRE) first. It is a mandatory tool used by eclipse to open because originally Eclipse is programmed in Java.
- Under the Folder JRE, choose the version of the JRE based on your Operating System (x32bit(x86)/x64).



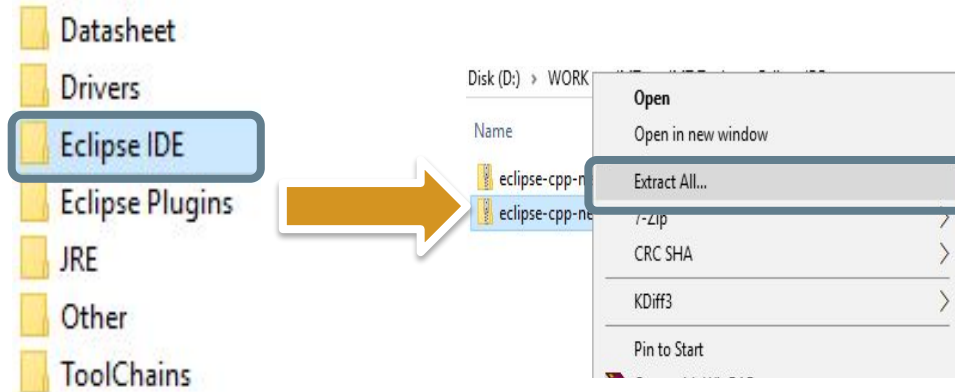
# Installing JRE



# Opening Eclipse

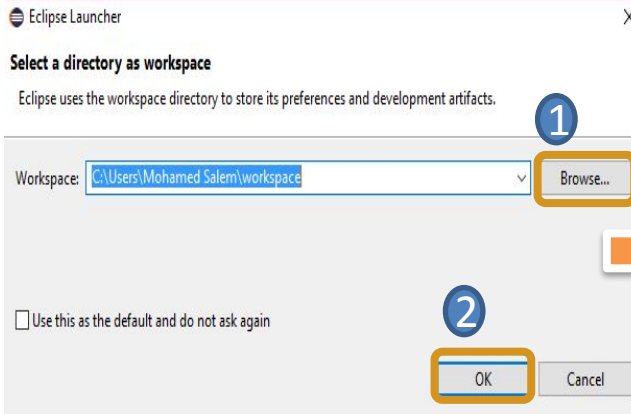
## *Step 2, opening Eclipse:*

- Under the folder eclipse IDE choose the version of your eclipse based on your operating system. (x32bit(x86)/x64).
- Extract the folder and you shall get your eclipse.

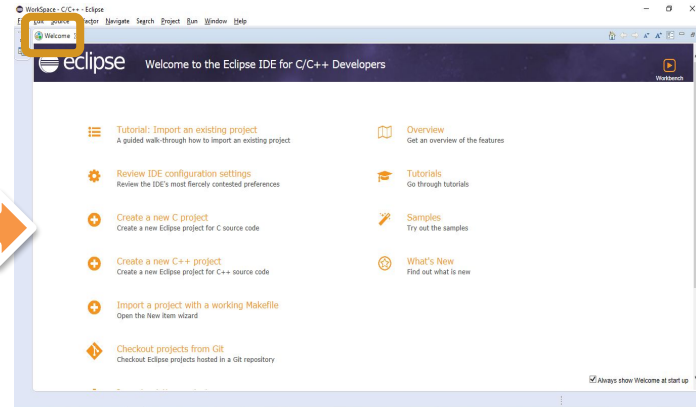


# Opening Eclipse

For the first time only you need to create a workspace where all your projects will be saved.



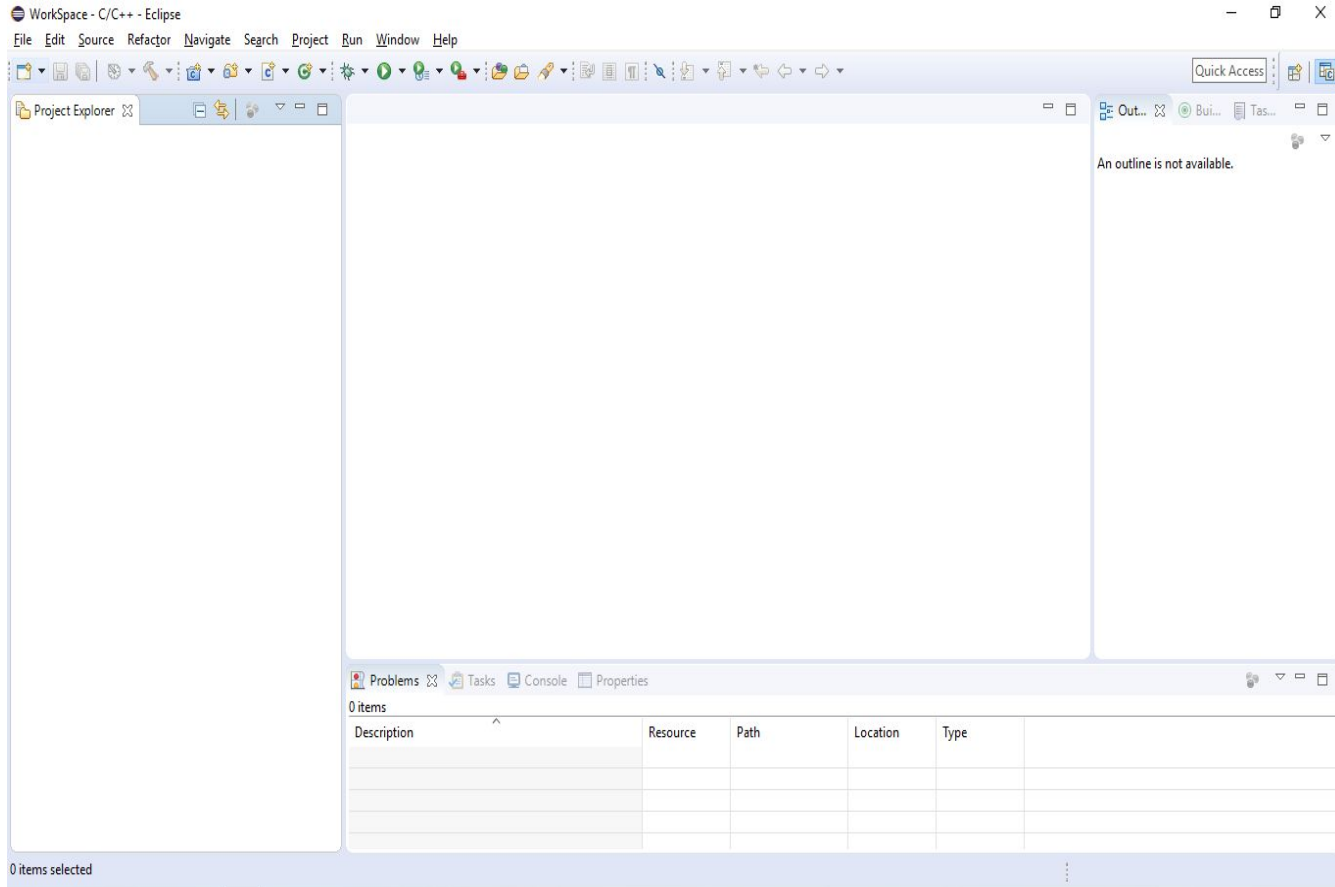
*Browse to select the new directory for the Workspace*



*Now the welcome screen will appear, it's quite irrelevant so close it ;)*



# Welcome to Eclipse



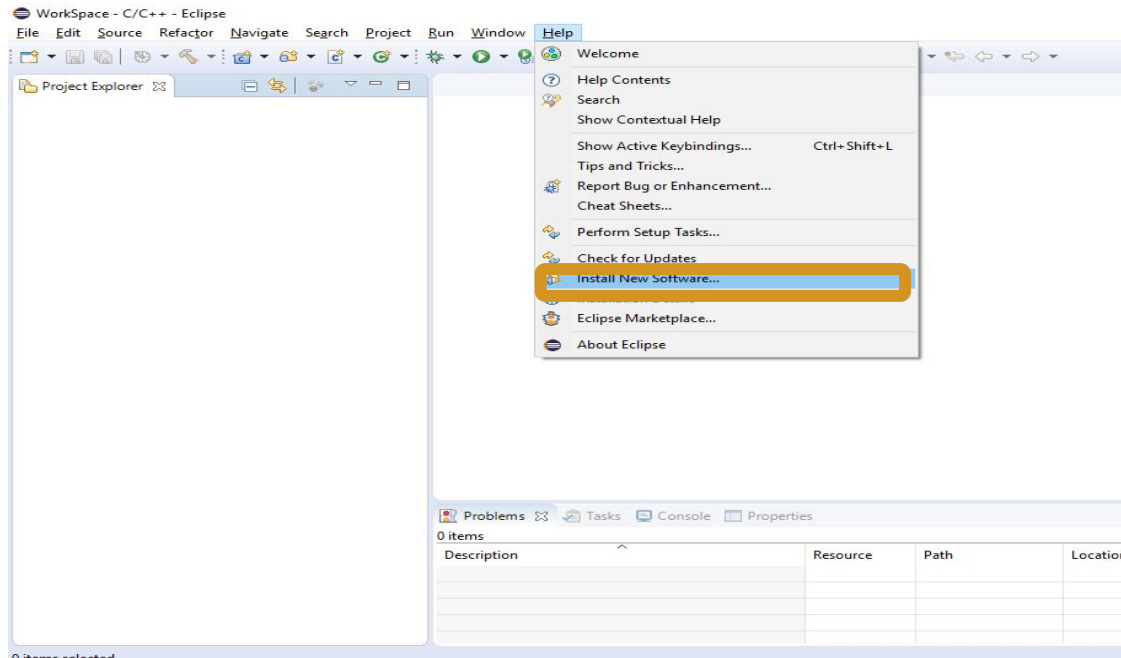


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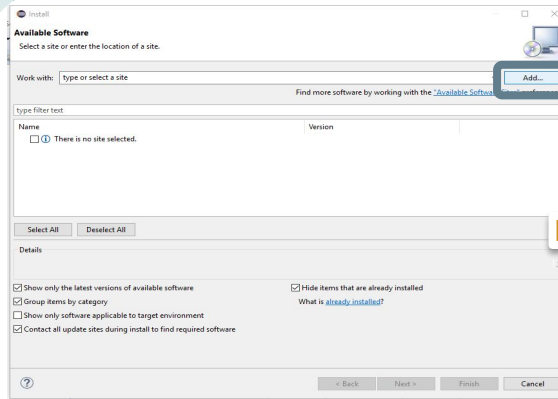
# AVR Plugin

# AVR Plugin

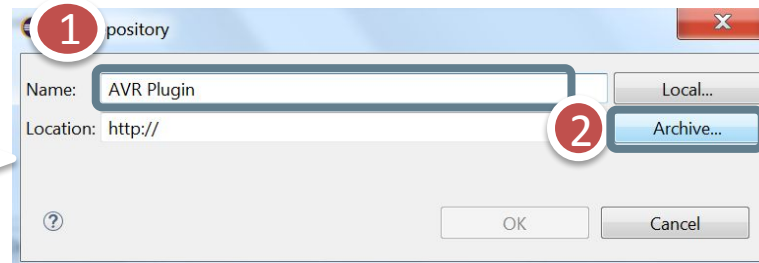
- Eclipse is a generic tool used to write software in many programming languages and for many targets. To adapt Eclipse to work for certain target, we add a specific plugin for this target.
- We need to AVR plugin to on eclipse.



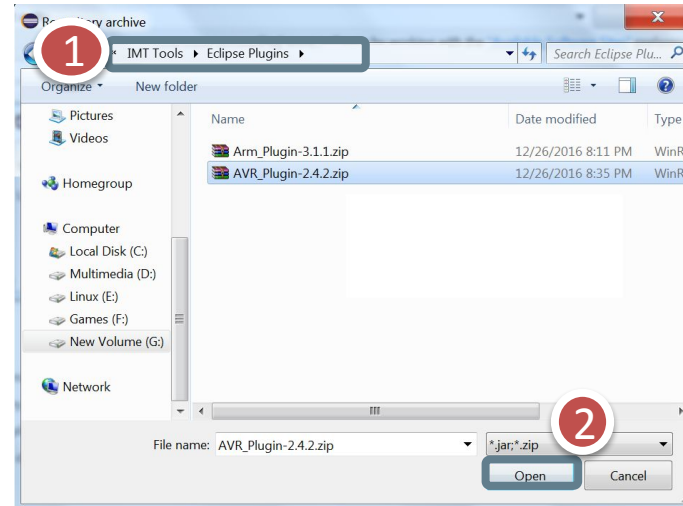
# AVR Plugin



*Press on **Add** button on the top*

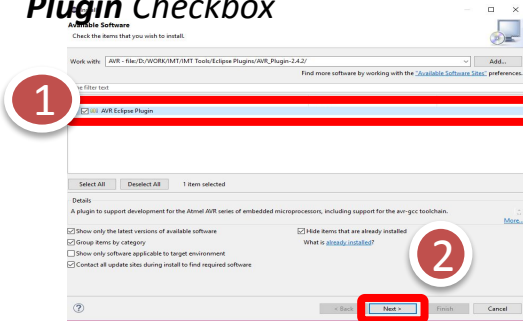


*Now select the **AVR\_Plugin-2.4.2.zip***

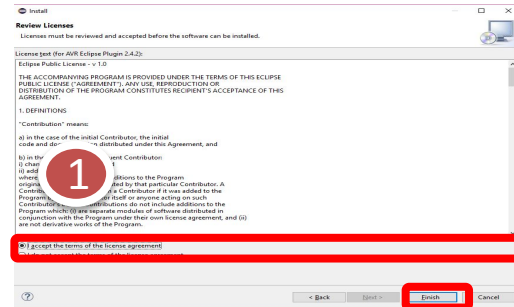
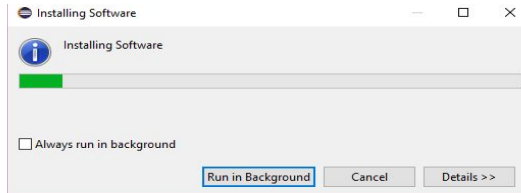
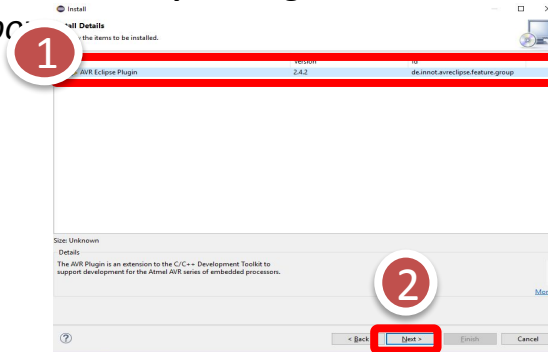


# AVR Plugin

## Select the **AVR Eclipse Plugin** Checkbox



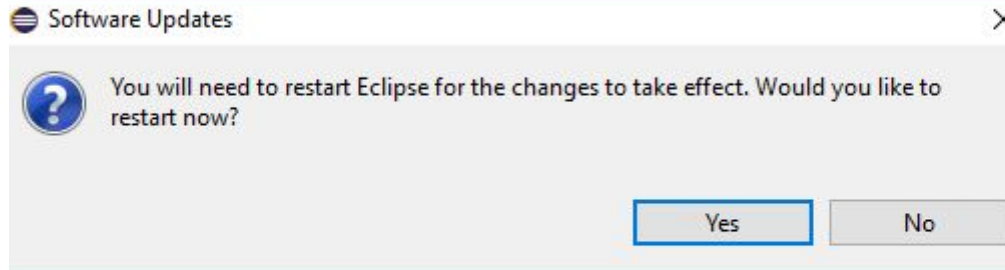
## Select the **AVR Eclipse Plugin** Checkbox



Now wait till the plugin finishes installation.

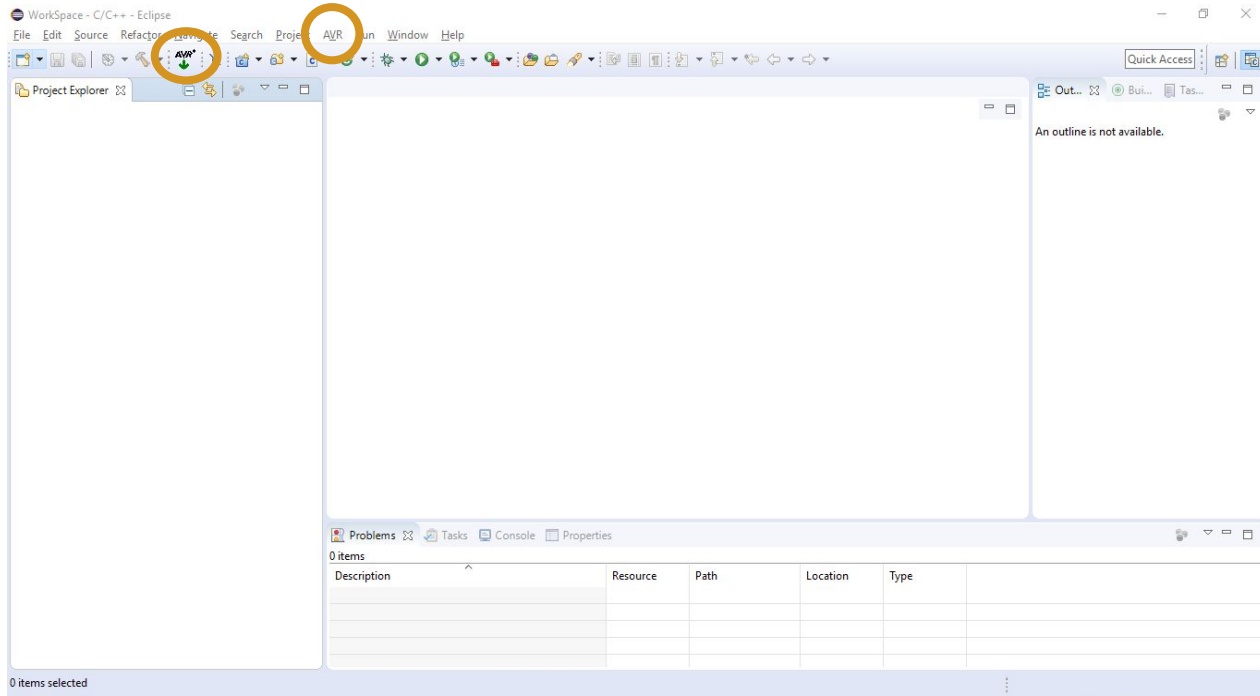
Select **I accept** then press finish

# AVR Plugin



*You will be asked to restart eclipse press **Yes***

# AVR Plugin




Once the Plugin gets installed successfully you will find the AVR tools installed



USP ASP

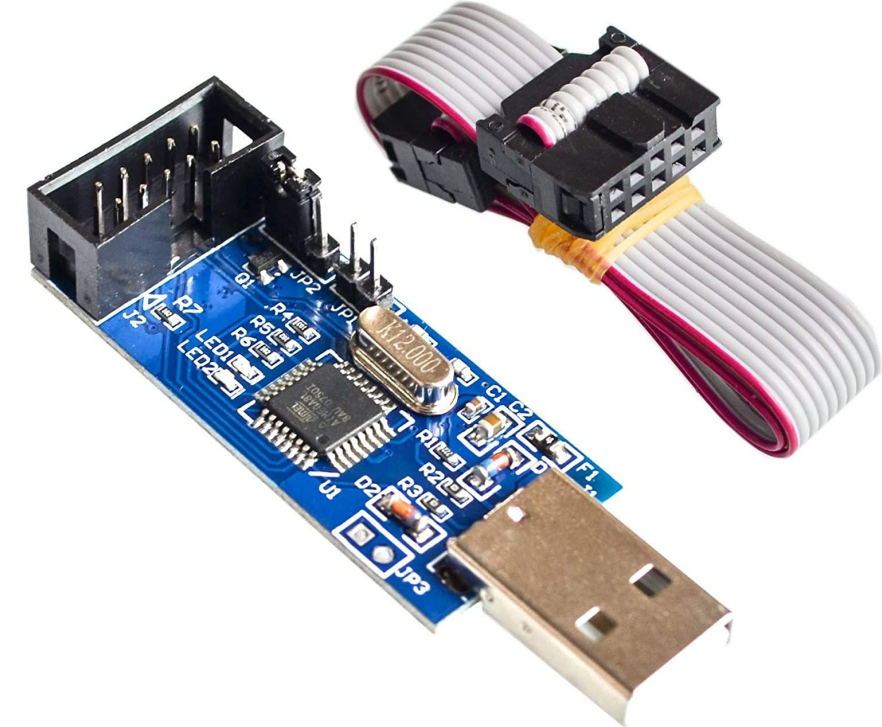
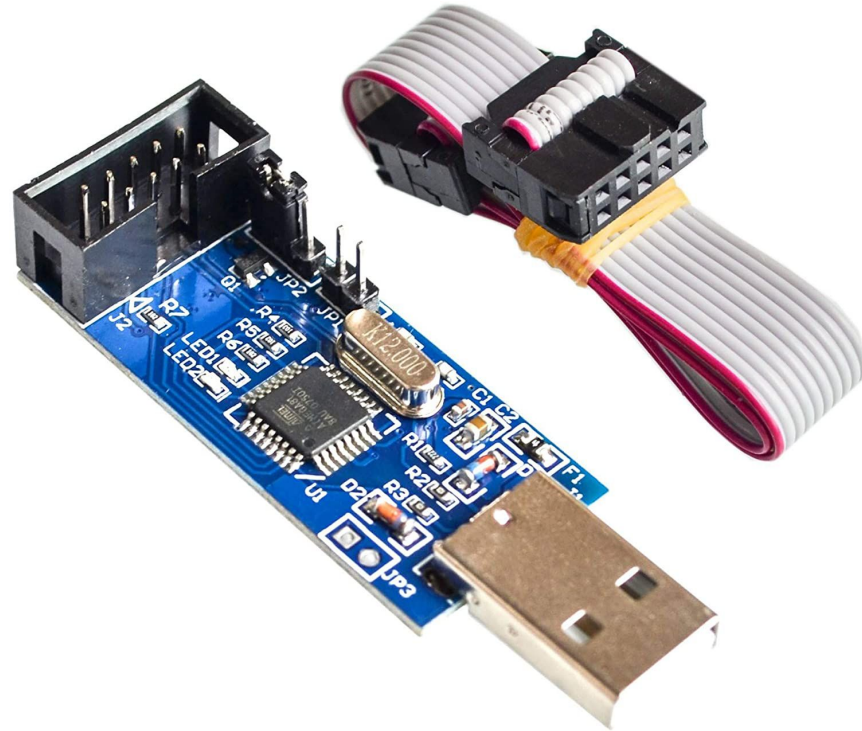




## USPasp Driver

The USBasp is the hardware tool used to flash the software into the microcontroller flash memory.

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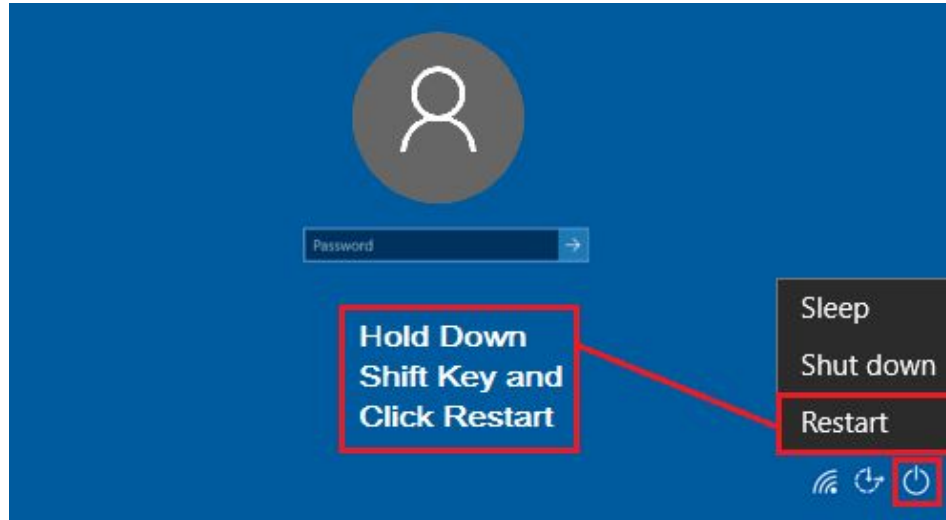
A photograph of a USBasp programmer circuit board. The board is blue with various electronic components including a microcontroller, resistors, and LEDs. It has a USB Type-A connector at one end and a ribbon cable with a multi-pin connector at the other. The board is labeled with component identifiers like R1, R2, R3, R4, R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18, R19, R20, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R31, R32, R33, R34, R35, R36, R37, R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R66, R67, R68, R69, R70, R71, R72, R73, R74, R75, R76, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92, R93, R94, R95, R96, R97, R98, R99, R100, R101, R102, R103, R104, R105, R106, R107, R108, R109, R110, R111, R112, R113, R114, R115, R116, R117, R118, R119, R120, R121, R122, R123, R124, R125, R126, R127, R128, R129, R130, R131, R132, R133, R134, R135, R136, R137, R138, R139, R140, R141, R142, R143, R144, R145, R146, R147, R148, R149, R150, R151, R152, R153, R154, R155, R156, R157, R158, R159, R160, R161, R162, R163, R164, R165, R166, R167, R168, R169, R170, R171, R172, R173, R174, R175, R176, R177, R178, R179, R180, R181, R182, R183, R184, R185, R186, R187, R188, R189, R190, R191, R192, R193, R194, R195, R196, R197, R198, R199, R200, R201, R202, R203, R204, R205, R206, R207, R208, R209, R210, R211, R212, R213, R214, R215, R216, R217, R218, R219, R220, R221, R222, R223, R224, R225, R226, R227, R228, R229, R230, R231, R232, R233, R234, R235, R236, R237, R238, R239, R240, R241, R242, R243, R244, R245, R246, R247, R248, R249, R250, R251, R252, R253, R254, R255, R256, R257, R258, R259, R260, R261, R262, R263, R264, R265, R266, R267, R268, R269, R270, R271, R272, R273, R274, R275, R276, R277, R278, R279, R280, R281, R282, R283, R284, R285, R286, R287, R288, R289, R290, R291, R292, R293, R294, R295, R296, R297, R298, R299, R300, R301, R302, R303, R304, R305, R306, R307, R308, R309, R310, R311, R312, R313, R314, R315, R316, R317, R318, R319, R320, R321, R322, R323, R324, R325, R326, R327, R328, R329, R330, R331, R332, R333, R334, R335, R336, R337, R338, R339, R340, R341, R342, R343, R344, R345, R346, R347, R348, R349, R350, R351, R352, R353, R354, R355, R356, R357, R358, R359, R360, R361, R362, R363, R364, R365, R366, R367, R368, R369, R370, R371, R372, R373, R374, R375, R376, R377, R378, R379, R380, R381, R382, R383, R384, R385, R386, R387, R388, R389, R390, R391, R392, R393, R394, R395, R396, R397, R398, R399, R400, R401, R402, R403, R404, R405, R406, R407, R408, R409, R410, R411, R412, R413, R414, R415, R416, R417, R418, R419, R420, R421, R422, R423, R424, R425, R426, R427, R428, R429, R430, R431, R432, R433, R434, R435, R436, R437, R438, R439, R440, R441, R442, R443, R444, R445, R446, R447, R448, R449, R450, R451, R452, R453, R454, R455, R456, R457, R458, R459, R460, R461, R462, R463, R464, R465, R466, R467, R468, R469, R470, R471, R472, R473, R474, R475, R476, R477, R478, R479, R480, R481, R482, R483, R484, R485, R486, R487, R488, R489, R490, R491, R492, R493, R494, R495, R496, R497, R498, R499, R500, R501, R502, R503, R504, R505, R506, R507, R508, R509, R510, R511, R512, R513, R514, R515, R516, R517, R518, R519, R520, R521, R522, R523, R524, R525, R526, R527, R528, R529, R530, R531, R532, R533, R534, R535, R536, R537, R538, R539, R540, R541, R542, R543, R544, R545, R546, R547, R548, R549, R550, R551, R552, R553, R554, R555, R556, R557, R558, R559, R560, R561, R562, R563, R564, R565, R566, R567, R568, R569, R570, R571, R572, R573, R574, R575, R576, R577, R578, R579, R580, R581, R582, R583, R584, R585, R586, R587, R588, R589, R590, R591, R592, R593, R594, R595, R596, R597, R598, R599, R600, R601, R602, R603, R604, R605, R606, R607, R608, R609, R610, R611, R612, R613, R614, R615, R616, R617, R618, R619, R620, R621, R622, R623, R624, R625, R626, R627, R628, R629, R630, R631, R632, R633, R634, R635, R636, R637, R638, R639, R640, R641, R642, R643, R644, R645, R646, R647, R648, R649, R650, R651, R652, R653, R654, R655, R656, R657, R658, R659, R660, R661, R662, R663, R664, R665, R666, R667, R668, R669, R670, R671, R672, R673, R674, R675, R676, R677, R678, R679, R680, R681, R682, R683, R684, R685, R686, R687, R688, R689, R690, R691, R692, R693, R694, R695, R696, R697, R698, R699, R700, R701, R702, R703, R704, R705, R706, R707, R708, R709, R710, R711, R712, R713, R714, R715, R716, R717, R718, R719, R720, R721, R722, R723, R724, R725, R726, R727, R728, R729, R730, R731, R732, R733, R734, R735, R736, R737, R738, R739, R740, R741, R742, R743, R744, R745, R746, R747, R748, R749, R750, R751, R752, R753, R754, R755, R756, R757, R758, R759, R760, R761, R762, R763, R764, R765, R766, R767, R768, R769, R770, R771, R772, R773, R774, R775, R776, R777, R778, R779, R780, R781, R782, R783, R784, R785, R786, R787, R788, R789, R790, R791, R792, R793, R794, R795, R796, R797, R798, R799, R800, R801, R802, R803, R804, R805, R806, R807, R808, R809, R810, R811, R812, R813, R814, R815, R816, R817

# USPasp Driver

**This step only for windows 8 and 10**

Before installing the driver, we shall disable the “Driver Signature Check” feature for *windows 8 and 10 only* to allow us to install the driver correctly.

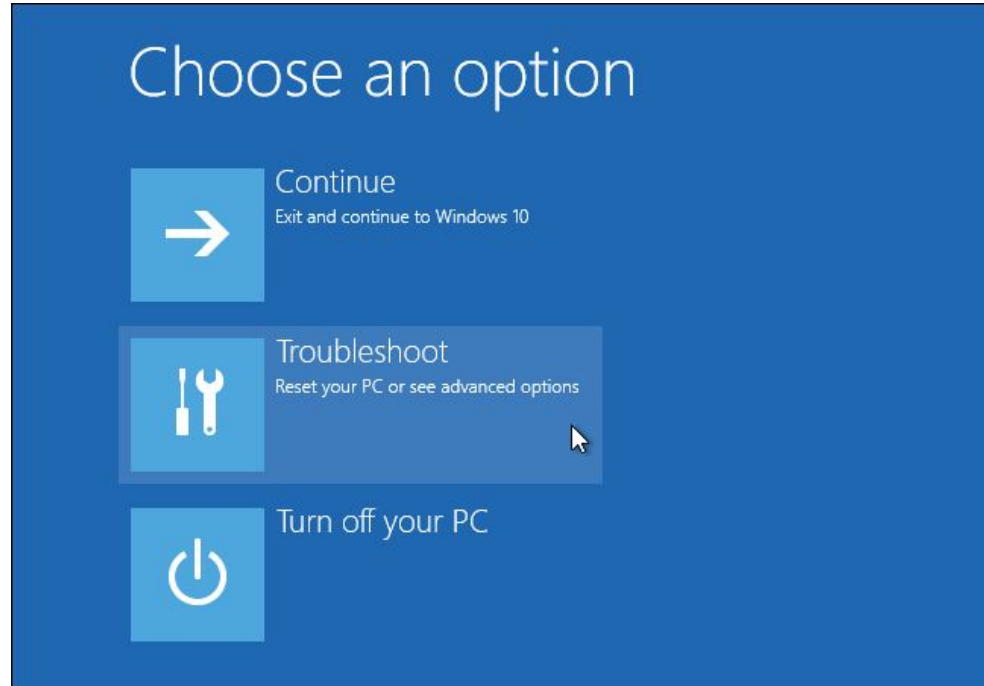
1- Hold down the Shift key while you click the “Restart” option in Windows.



# USPasp Driver

This step only for windows 8 and 10

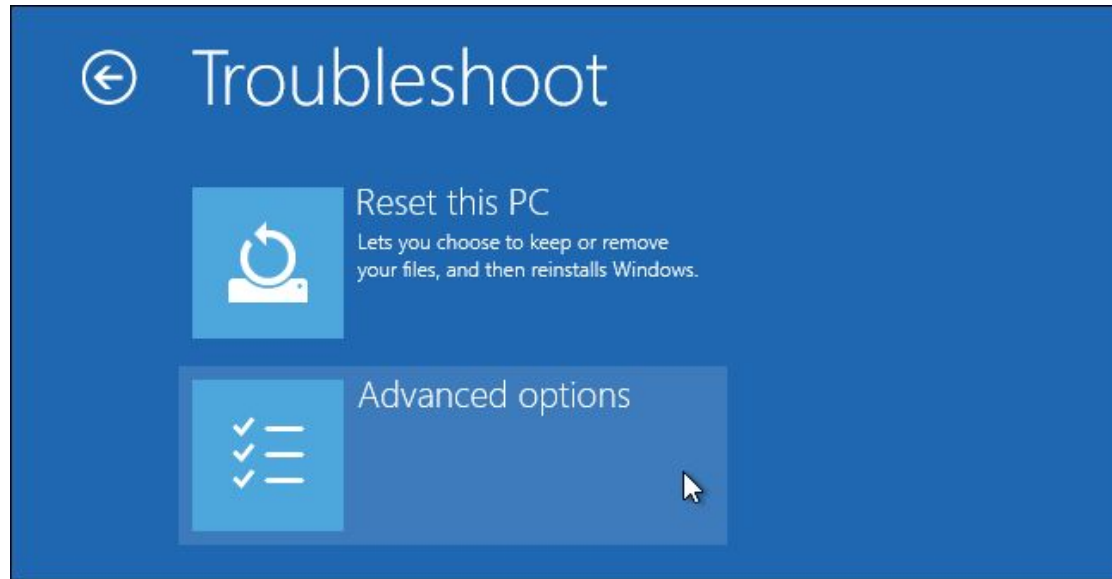
2- Select the “Troubleshoot” tile on the Choose an option screen that appears.



# USPasp Driver

This step only for windows 8 and 10

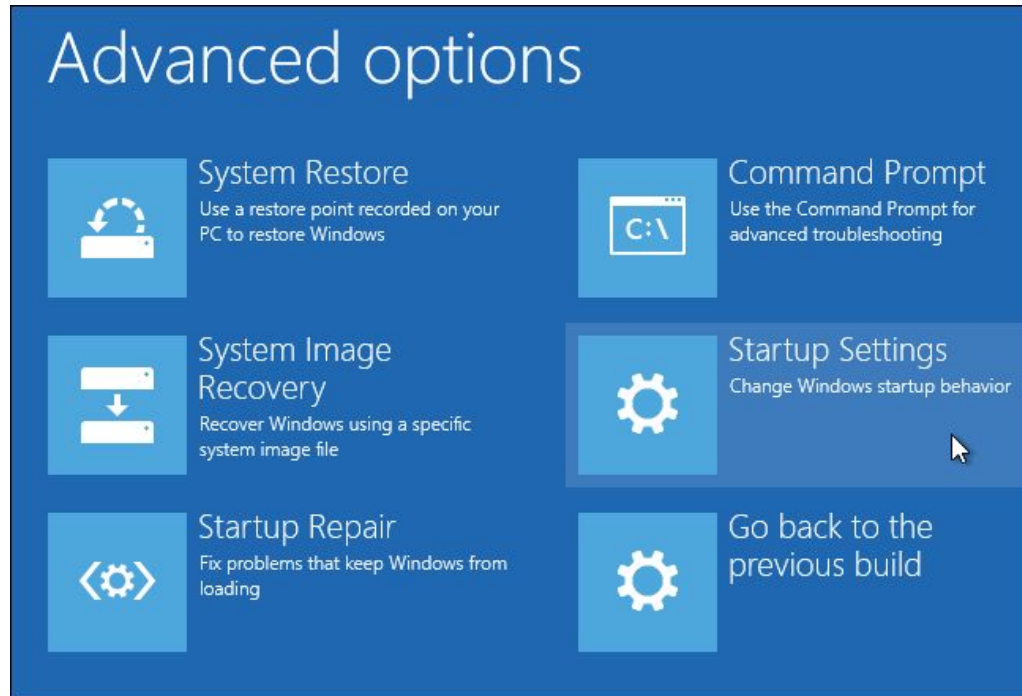
3- Select “Advanced options”.



# USPasp Driver

This step only for windows 8 and 10

4- Click the “Startup Settings”.



# USPasp Driver

This step only for windows 8 and 10

5- Click the “Restart” button to restart your PC into the Startup Settings screen.

## Startup Settings

Restart to change Windows options such as:

- Enable low-resolution video mode
- Enable debugging mode
- Enable boot logging
- Enable Safe Mode
- Disable driver signature enforcement
- Disable early-launch anti-malware protection
- Disable automatic restart on system failure

Restart

# USPasp Driver

This step only for windows 8 and 10

6- Type “7” or “F7” at the Startup Settings screen to activate the “Disable driver signature enforcement” option.

## Startup Settings

Press a number to choose from the options below:

Use number keys or functions keys F1-F9.

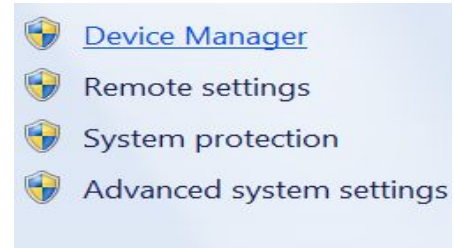
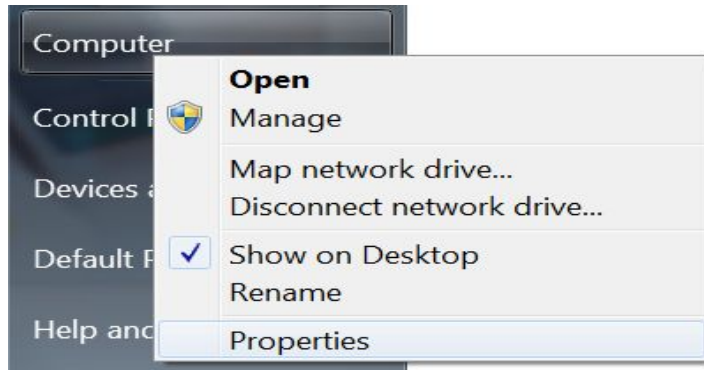
- 1) Enable debugging
- 2) Enable boot logging
- 3) Enable low-resolution video
- 4) Enable Safe Mode
- 5) Enable Safe Mode with Networking
- 6) Enable Safe Mode with Command Prompt
- 7) Disable driver signature enforcement
- 8) Disable early launch anti-malware protection
- 9) Disable automatic restart after failure

Press F10 for more options

Press Enter to return to your operating system

# USPasp Driver

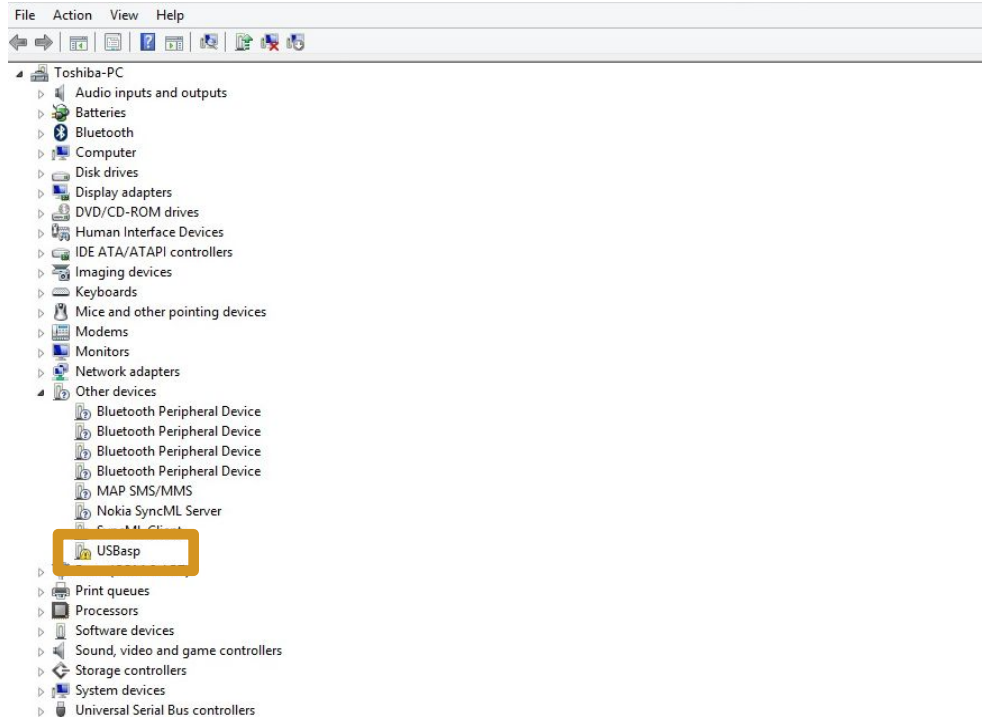
For all operating systems, right click on *“My Computer”* or *“This PC”* and choose **Properties** then click **Device Manager**.





# USPasp Driver

You shall find the USBasp with this yellow exclamation mark. Right click on it and choose “**Update**”



# USPasp Driver

Choose “Browse my computer for driver software”.



# USPasp Driver

Browse to: ***\\IMT Tools\Drivers\usbasp-windriver.2011-05-28***



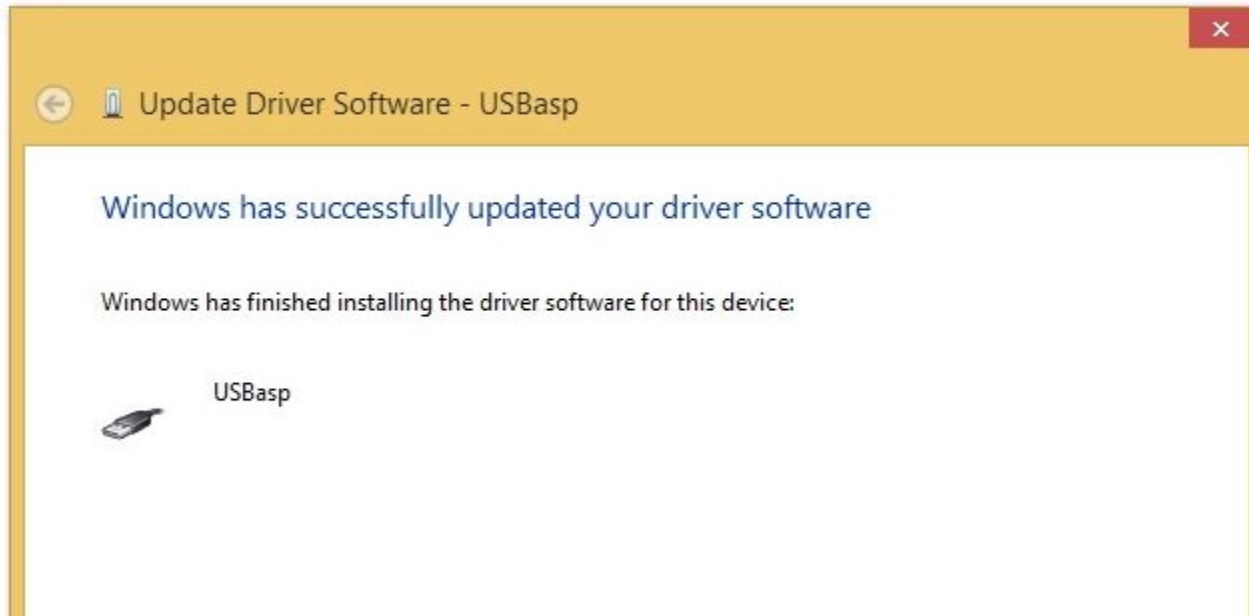
# USPasp Driver

When this warning appear, choose “Install this driver software anyway”.

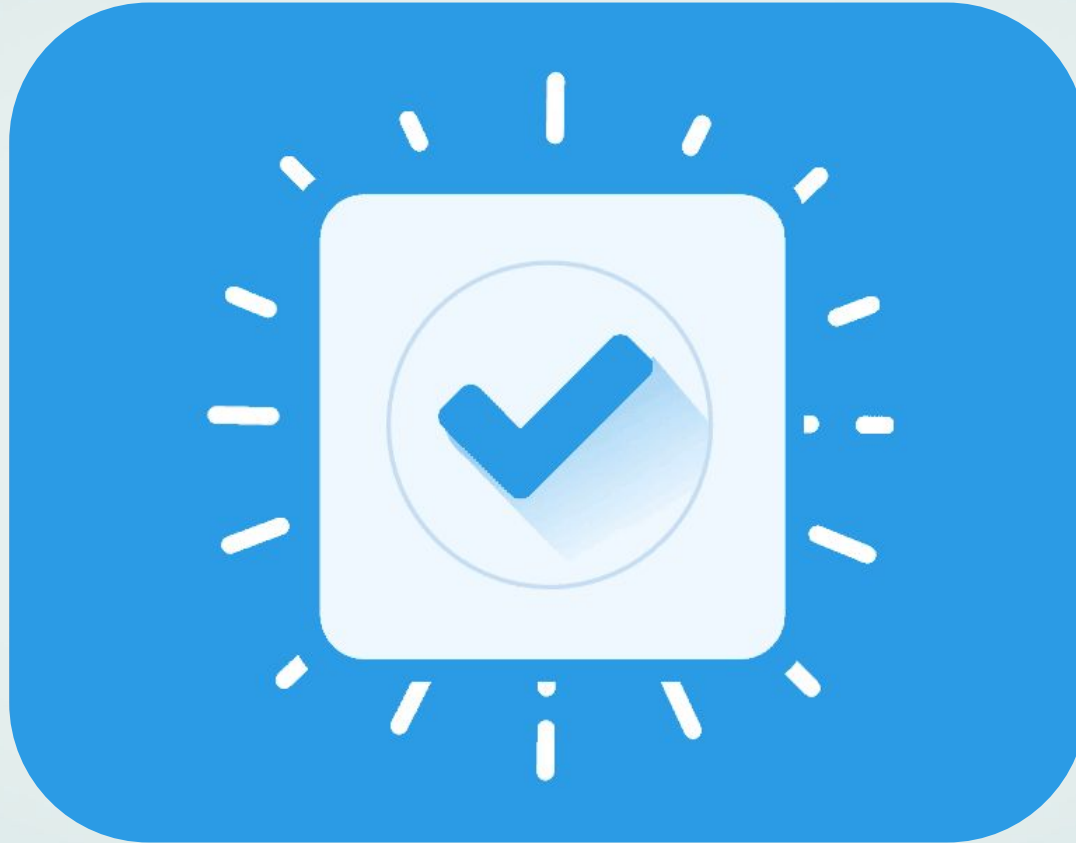


# USPasp Driver

Finally the driver has been successfully installed.



Done





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