

Free Performance Upgrade for RoboNova roboBasic V2.72

It is not often that performance upgrades are free, but the new version of roboBasic is over ten times faster than the previous version on many instructions. The odd thing is that this new software version has not been publicised or even acknowledged by Hitec. This may be due to licensing and support issues between Hitec and Robobasic.com who appear to own V2.72.







The performance improvement in V2.72 is due to running the byte code inside the RoboNova MR-C3024 controller from flash memory instead of EEPROM in the previous version. In fact you have a choice of whether to use flash memory or EEPROM in V2.72.

The roboBasic software has two components, the compiler which runs on the PC converts the .bas files to intermediate byte code which is downloaded to the MR-C3024 in the RoboNova. The second part is the code which runs on the ATmega128 on the MR-C3024. The ATmega128 code performs all the control code for the RoboNova servos and sensors, provides a serial interface to the PC, and has a byte code interpreter which runs the code downloaded from the PC. Version 2.72 of Robobasic also upgrades the MR-C3024 firmware to version 2.7.

Installing V2.72

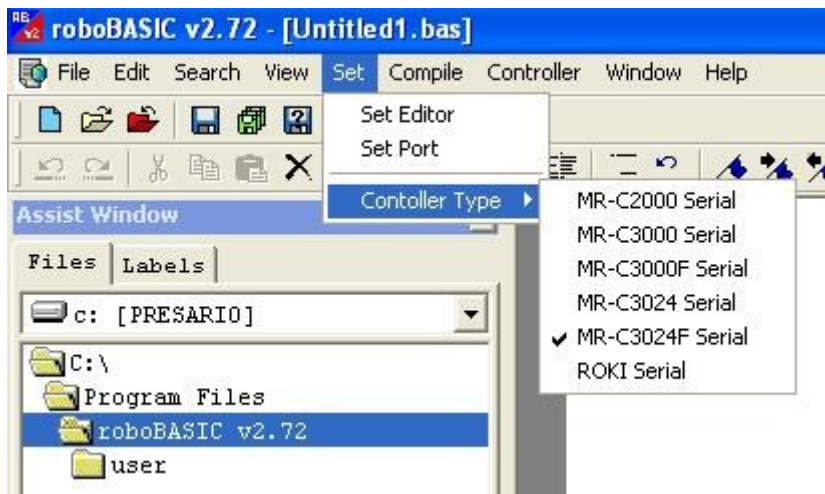
Version 2.72 can be downloaded and installed from the roboBasic website.

ROBOBASIC.COM

<p>ROBOBASIC</p> <p>ROBOBASIC is a BASIC compiler for robot control.</p> <p>Feature of roboBASIC v2.72</p> <ul style="list-style-type: none">- Install all with roboBASIC, roboScript, roboRemocon and roboMaker.- Auto firmware update while program downloading. <p>History of roboBASIC v2.5</p> <ul style="list-style-type: none">- 2006/11/29 : Add PC direct motor control function in roboScript v2.6- 2006/10/26 : Bug fix of MOTOROFF command.- 2006/10/12 : Bug fix in ROBONOVA zero value setting window.- 2006/01/26 : Bug fix of left/right motors control in ROBONOVA motor control window.- 2006/01/26 : Add command "OFFSET" for zero value modification in real time.	<p>Program Download</p> <ul style="list-style-type: none">* Korean Version v2.72  * Japanese Version v2.72  * English Version v2.72  
<p>ROBOSCRIP</p> <p>ROBOSCRIP is a script program for robot control.</p>	
<p>ROBOREMOCON</p> <p>ROBOREMOCON is a robot control program like as IR remote controller. This program connect .rsf file(using with ROBOSCRIP)</p>	

Once installed the new software appears compatible with .bas files from previous versions.

The most significant difference is in the set controller menu, where a new controller type has appeared, the MR-C3024F.



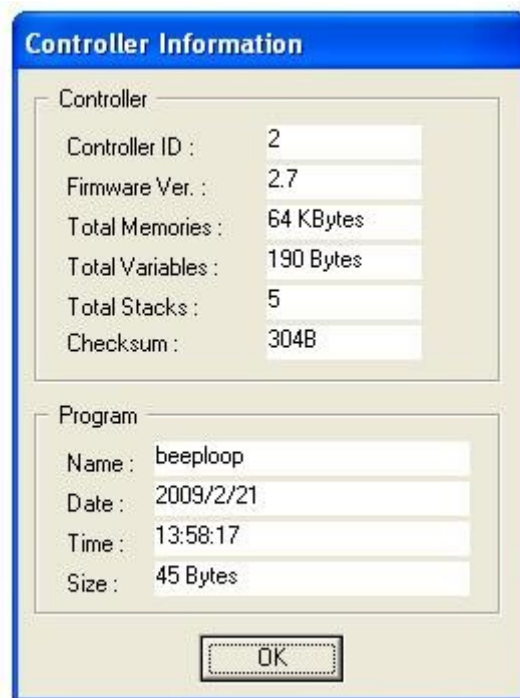
By selecting either the MR-C3024 Serial or the MR-C3024F Serial, you determine whether subsequent downloads will go to EEPROM or flash.

The first time you perform a download using V2.72, it will ask to upgrade the MR-C3024 firmware to enable the new features.



Clicking OK will download the new firmware which supports both EEPROM and flash storage of the byte code. Subsequent changing of the controller type does no change the controller firmware, just, where the byte code is located.

After download a Controller information check will confirm the new firmware version.



Robobasic files can subsequently be compiled and downloaded to EEPROM or flash by setting of the controller type.

Performance Improvement

To understand the performance improvement potential and actual, it is best to first explain some of the MR-C3024 timing internals. Most (over 60%) of the processor time in the MR-C3024 is taken in interrupt routines which manage the servos and gyros. The rest of the processor time is available for the the interpretation and execution of the byte code. Some roboBasic instructions are very large consumers of processor time, these include: MOTORIN, MUSIC, REMOCON, SONAR, RCIN, and of course WAIT. The performance of these instructions are not improved much by running from flash. Other instructions including arithmetic are considerable improved showing a reduction of execution time by a factor of 15.

As an example the simple roboBasic code:

```
DIM a AS INTEGER  
DIM b AS INTEGER
```

```
entry:  
MUSIC "C"  
FOR a= 1 TO 5000  
b = a * a  
NEXT a  
GOTO entry
```

This executes in about 31 seconds from EEPROM, which is the expected speed of one or two milliseconds per simple instruction.

From flash this executes in 1.9 seconds which is down to a more respectable 10 instructions per millisecond.

Timing will always be a challenge for the RoboNova and Robobasic, but this improvement can be well applied to the sensors and to the interpretation of sensor data. Consideration should also be given to other ways to improve performance, avoid the IR remote or RC control and use bluetooth or PS2 for control, and use MOTORIN and MUSIC sparingly.

Disclaimer:

I do not know the position of Hitec on the support of version 2.72 and controllers which are upgraded to V2.7. I regularly update both my controllers using V2.72 and RoboFlash and have never had any problem. I am here documenting my experience and cannot take any responsibility for the consequences of installing the software from Robobasic .com.

Questions:

Did V2.72 fix the other known bugs in Robobasic ?

V2.72 does appear to make some changes to the SONAR, MOTORIN and PRINT commands, but the bugs in MOTOROFF and POKE still appear to be there.

What about the patched versions of the controller software ?

The patches I made to fix the Poke instruction, add a second I2C port and some speed improvements are now done for 2.72 and in my file area. Also a new disassembly listing for the V2.7 controller code.

Can I go back to V2.5 ?

Using Roboflash and the original payload file for V2.5 the controller may be put back to the previous version.