Setting up GRIFO® QTP12/R84 with LadderWORK®

1) Main Features

QTP12/x84 and LadderWORK software create a complete PLC (Programmable Logic Controller) system with the following main features

- 8 Opto inputs
- 4 Relay or NPN outputs
- IEC 1131-3 Ladder/FBD Programming
- 24K of code memory available
- 1K of RAM available
- Integrated DISPLAY & KEYBOARD (HMI&MMI)

2) Burning BLM51 in QTP12

For a correct communication with LadderWORK IDE, a firmware, named BLM51 should be burned into QTP12/R84 flash memory. The code could be programmed using ATMEL Flip program (Flexible In-system Programmer).

What you need is listed below :

- QTP12/x84
- ATMEL FLIP Program
- Serial cable to connect PC <-> QTP12/R84
- BLM51 Firmware HEX File (See Table 1). This code is present in the LadderWORK installation folder under <..\boot\qtp12x84>

Min. LadderWORK Version	BLM51 Version	Firmware Code
2.37.E - 28.02.2005	QTP12/R84 46F2/8K	B0200420.xxx

Table 1 - BLM51 File Version

Follow this is the sequence a correct BLM51 programming

2.1) Open the QTP12/R84 rear panel and locate the P1 jumper (ISP enable on PSEN#)
2.2) Short the P1 jumper
2.3) Now reset or power-up the QTP12/R84
2.4) Connect the serial cable from your PC to QTP12/R84
2.5) Launch the ATMEL flip program
2.6) Press F2 and select the device named T89C51AC2
2.7) Press F3 to open the connect dialog and press <Connect>
2.8) From FLIP program access menu File -> Open HEX File and give the complete path for the HEX file indicated in Table 1.
2.9) From FLIP program access menu Device -> Program to start the programming
2.10) Remove the P1 short (Flip Enable)
2.11) Reset or power-up the QTP12/R84
2.12) On the display you should see the message “QTP12/R84-BLM51 V2.0”

3) Communicating with LadderWORK

LadderWORK software communicates with QTP12/x84 using a standard RS232 port. Connect the serial cable from your PC to the QTP12/R84 back serial port. Used signals are TX, RX and GND. Communication parms are 19200N81.

4) Working sequence of BLM51 on QTP12/R84

After RESET or POWER-UP the BLM51 software perform the following boot sequence

4.1) The RED LED on the front panel flashes twice quickly
4.2) On DISPLAY the following message is displayed “QTP12/R84-BLM51 Vx.y” (x.y is the firmware version)
4.3) At this point the BLM51 searches for a valid program in the USER CODE area. If no program is found the message “ERR=1:NO PRG” is displayed.
4.4) If a program is found the firmware checks the integrity using a CRC32 computation.
4.5) At this point you should observe the message CRC=n% where <n> spans from 0% to 100%.
4.6) If the CRC is ok the system display the message “RUN” for a while then the user program is launched
4.7) If the CRC is not-ok the message “ERR=2:BAD CRC” is displayed and no other operation is possible
4.8) After the CRC checking, but before the user code is launched the firmware waits for about 1 second and half for a keypad pressing. During this time the pressing of the keys ESC and ENTER will allow you to avoid user program running.

Avoid the program launching using keyboard at startup

No key pressing during CRC to RUN delay	The user code, if valid, is launched
Both ESC and ENTER keys are pressed during CRC computation or CRC to RUN delay	No user code is launched

5) Hardware resources

LadderWORK handles all the QTP12/R84 like indicated in table

Hardware resource table for QTP12/R84

Resource Name	Category	LadderWORK's resource name	Mapping
IN1 - IN8	Inputs	IN1 - IN8	%IX0.0.0 - %IX0.0.7
OUTA1 - OUTA2	Outputs	OUTA1 - OUTA2	%OX0.1.0 - %OX0.1.1
OUTB1 - OUTB2	Outputs	OUTB1 - OUTB2	%OX0.1.3 - %OX0.1.4

6) Watching

***** READY SOON *****

7) HMI & MMI

QTP12/x84 is enabled to use HMI & MMI components like DISPLAY, KEYBOARD, FIELD.
Since QTP12 keypad has keys only, some keyboards functions are activable using the combination of the ESC key [ESC/*] plus another keypad key. Refer to the following table for the 2nd keyboard functionality. Normally these functions are used with the FIELD component.

Keyboard Pressing	Activated Function
ESC + 9	TAB : Move to next field block
ESC + 8	BACKSPACE : Cancel characters moving cursor to the left
ESC + 7	ABORT : Discharge the current field modifies and leave the field unaltered resuming the previous value

8) Sample schematics

In the distribution disc there are some sample schematics that illustrate QTP12x84 feature and capability.

Project	Description
blink.pjn	This project show the using of basic I/O system where timings are generated by the CLOCK component. The project also demonstrate the using of DISPLAY component.
hmi.pjn	This project demonstrate the using of the FIELD component to enter values into PLC.

Before compiling ensure the following things :

- Check if the serial port, where the QTP12 is attached, is the same port indicated by the configuration dialog accessible with the menu < Options -> Port >.
- In the same dialog configure the baud rate as 19200

Once the project is loaded simply press F10 to Compile&Download&Run

9) Begin a new LadderWORK project

Follow the instructions to begin a new LadderWORK project

- Perform a NEW command (or click on the white page icon)
- Entry a name for your project and eventually change your ROOT folder with the <Browse> button.

  IMPORTANT : The software automatically generates a folder with the name of your project and inside this folder will be placed your design. From release 2.x all the files generated by LadderWORK for a particular project will be enclosed in a single distinct directory.

- Select the "**QTP12**" entry from the PLB selecting list
- Place at least one component in the sheet
- Open the *Compiler* dialog from the *Options* menu
- Press the *Import* button on the Profiles section of the dialog
- Locate the "**QTP12EXT**" entry in the profile list and select it using the *OK* button (The profile automatically become the used profile).
- Press the major *OK* button of the Compiler dialog
- Open the System I/O editor using the *Options -> System Edit* menu path
- You will see one only entry on the right list (*Available I/O modules*) named **QTP12.** Double click on the entry (Core module) and you will see the module copied on the left list (*Current Configuration*).
- Insert additional memory modules or virtual modules
- Press the *OK* button of the dialog
- Now all the resources of the configurated modules are available as function blocks using the standard components -( )- and -| |- .
- Save your project with the save command. By default the sofware opens the standard Windows save dialog with the same name you have entered during the new command.