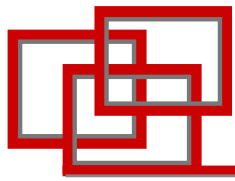


LISTEN.
THINK.
SOLVE.SM

MicroLogix 1100 RSLogix 500 LAB#4

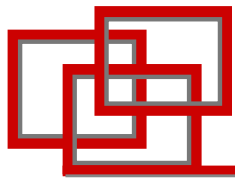


High Speed Counter



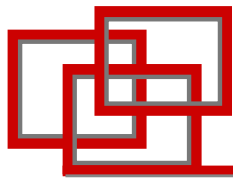
What we are going to do:

- We are going to configure and program a High Speed Counter for Mode 2-Counter with external direction
- The HSCNT will control immediate outputs when the presets are reached.



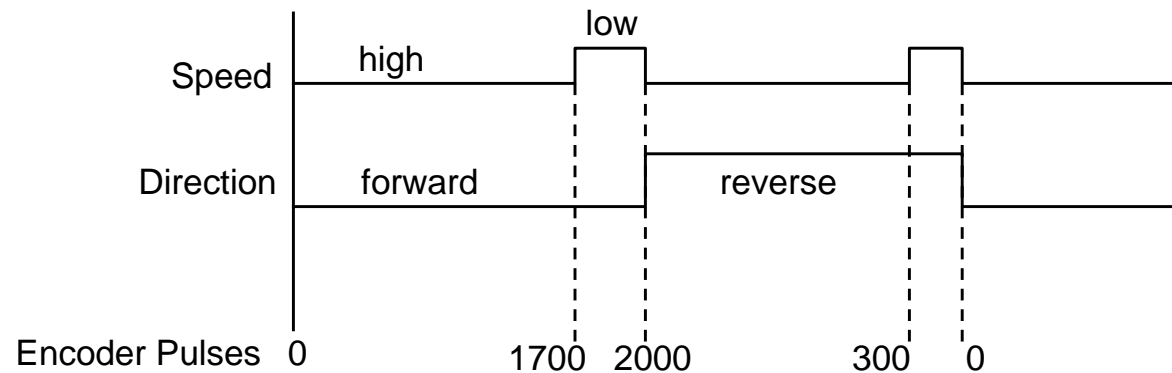
Steps for Today's Assignment

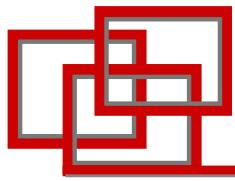
1. Create a new project
2. Configure the HSC Function file
3. Create a HSC Subroutine
4. Adjust Input Filter Settings
5. Enter 4 rungs of ladder logic
6. Transfer your program to the MicroLogix 1100
7. Monitor and test your program



Basics

- Controlling an AC Drive with Preset Speed and Direction (Position Feedback with A/B Encoder)
- Definitions:
 - Output O/4 --> Speed reference (OFF = high, ON = low Speed)
 - Output O/5 --> Direction (OFF = forward, ON = reverse)
 - Input I/2 --> Reset HSCNT Accumulator
- Timing Diagram:





Creating a new "PROJECT"

1. Create New Project

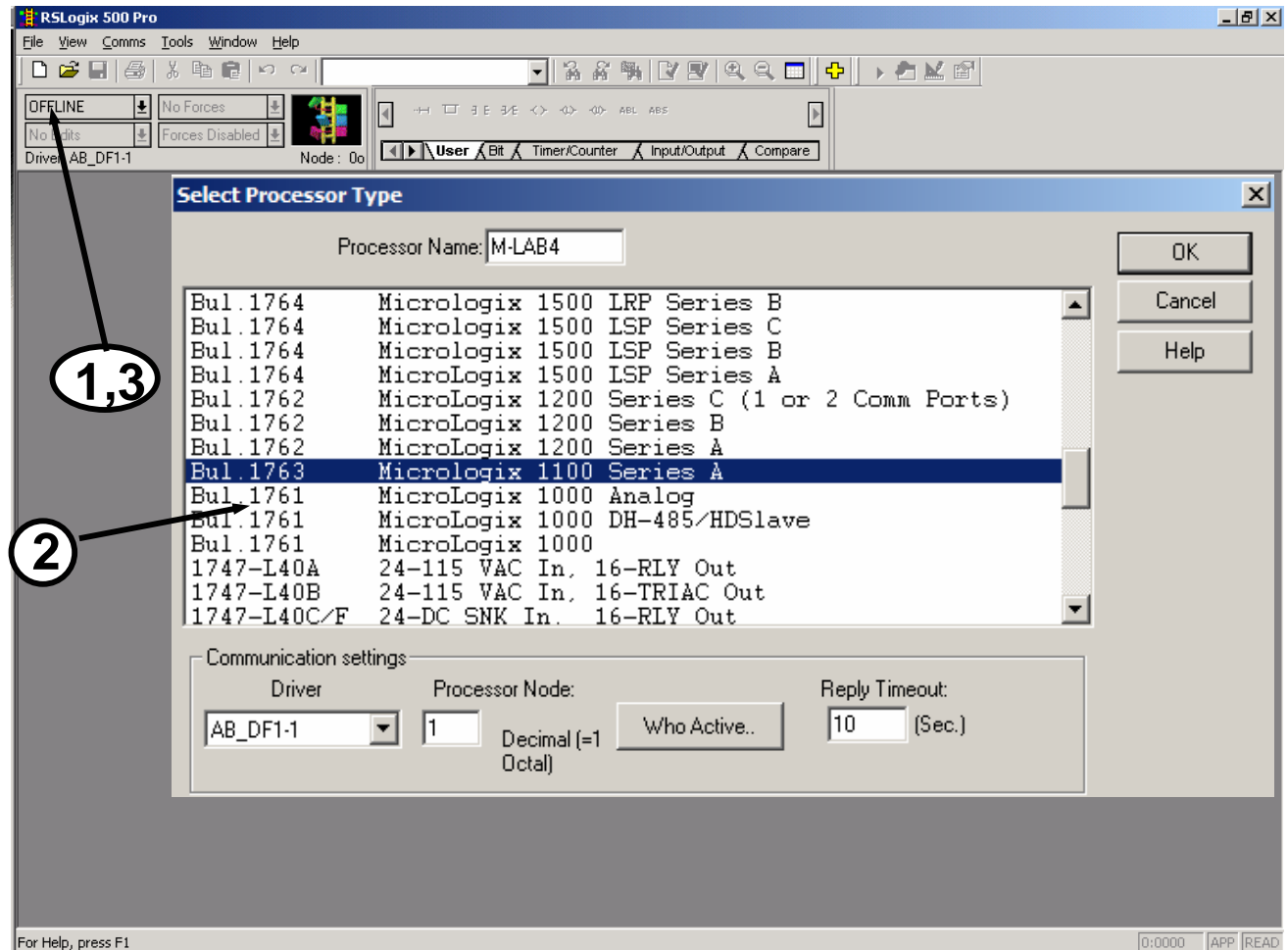
- Select "File > NEW" To Create a File

2. Select Controller

- Enter Processor Name "M-LAB4"
- "Click" on "Bul.1763 MicroLogix 1100 Series A"
- (Either double click, or select and then click OK)

3. Save Program Files

- Select "File > Save As"
- Type MicroEconomix LAB 4 in the "File name" box
- Click "Save"
- Click "Yes" when asked to change the processor name
- Click "Ok" for revision note box



Configure the HSC Function File

4. Function Files

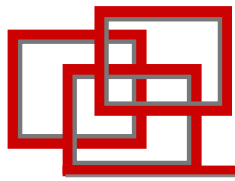
- Double click on the Function File in the Project tree

5. HSC Function File

- Enlarge the HSC0 Function File to see all the appropriate Parameters

The screenshot shows the RSLogix 500 Pro software interface. The Project tree on the left is expanded to show the 'Function Files' folder. A circled '4' points to the 'Function Files' folder in the tree. The 'Function Files' window is open, showing a table with columns 'Address', 'Value', and 'Description'. The 'HSC0' function file is selected and enlarged, as indicated by a circled '5' pointing to the window. The table contains one entry: 'HSC:0' with an empty 'Value' and 'Description' field.

Address	Value	Description
HSC:0		



Configure the HSC Function File

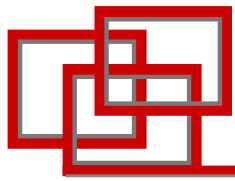
6.HSC Parameters

- Enter the following Values to define the HSC0 signals.

- **Program File Number: 10**, this defines the subroutine that will be called (executed) when the HSC0 counts to High/Low preset or Over/underflow
- **Auto start: 1**, This defines if the HSC function automatically starts whenever the controller enters the run mode
- **Counting Enabled: 1**, Used to enable or disable HSC
- **HSC Mode: 2**, sets mode to counter w/external direction
- **Output Mask: 48h**, defines the HSC control of outputs 5 and 6
- **High/Low presets values**
 - High preset = 17
 - Low preset = 0
- **Over/Under flow values**
 - Overflow = 21
 - Underflow= -21

The screenshot shows the RSLogix 500 Pro interface with the 'Function Files' window open. The 'HSC' tab is selected, and the 'HSC:0' configuration is visible. A circled number '6' has arrows pointing to the following parameters and their values:

Parameter	Value
- PFN - Program File Number	10
- ER - Error Code	0
- UIX - User Interrupt Executing	0
- UIE - User Interrupt Enable	0
- UIL - User Interrupt Lost	0
- UIP - User Interrupt Pending	0
- FE - Function Enabled	0
- AS - Auto Start	1
- ED - Error Detected	0
- CE - Counting Enabled	1
- SP - Set Parameters	0
- LPM - Low Preset Mask	1
- HPM - High Preset Mask	1
- UFM - Underflow Mask	1
- OFM - Overflow Mask	1
- LPI - Low Preset Interrupt	0
- HPI - High Preset Interrupt	0
- UFI - Underflow Interrupt	0
- OFI - Overflow Interrupt	0
- LPR - Low Preset Reached	0
- HPR - High Preset Reached	0
- DIR - Count Direction	0
- UF - Underflow	0
- OF - Overflow	0
- MD - Mode Done	0
- CD - Count Down	0
- CU - Count Up	0
- MOD - PLS file (bits 15-8) HSC Mode (bits 7-0)	2 (h)
- ACC - Accumulator	0
- HIP - High Preset	17
- LOP - Low Preset	0
- OVF - Overflow	21
- UNF - Underflow	-21
- OMB - Output Mask Bits	48
- HPO - High Preset Output	16
- LPO - Low Preset Output	0



Creating a Program File

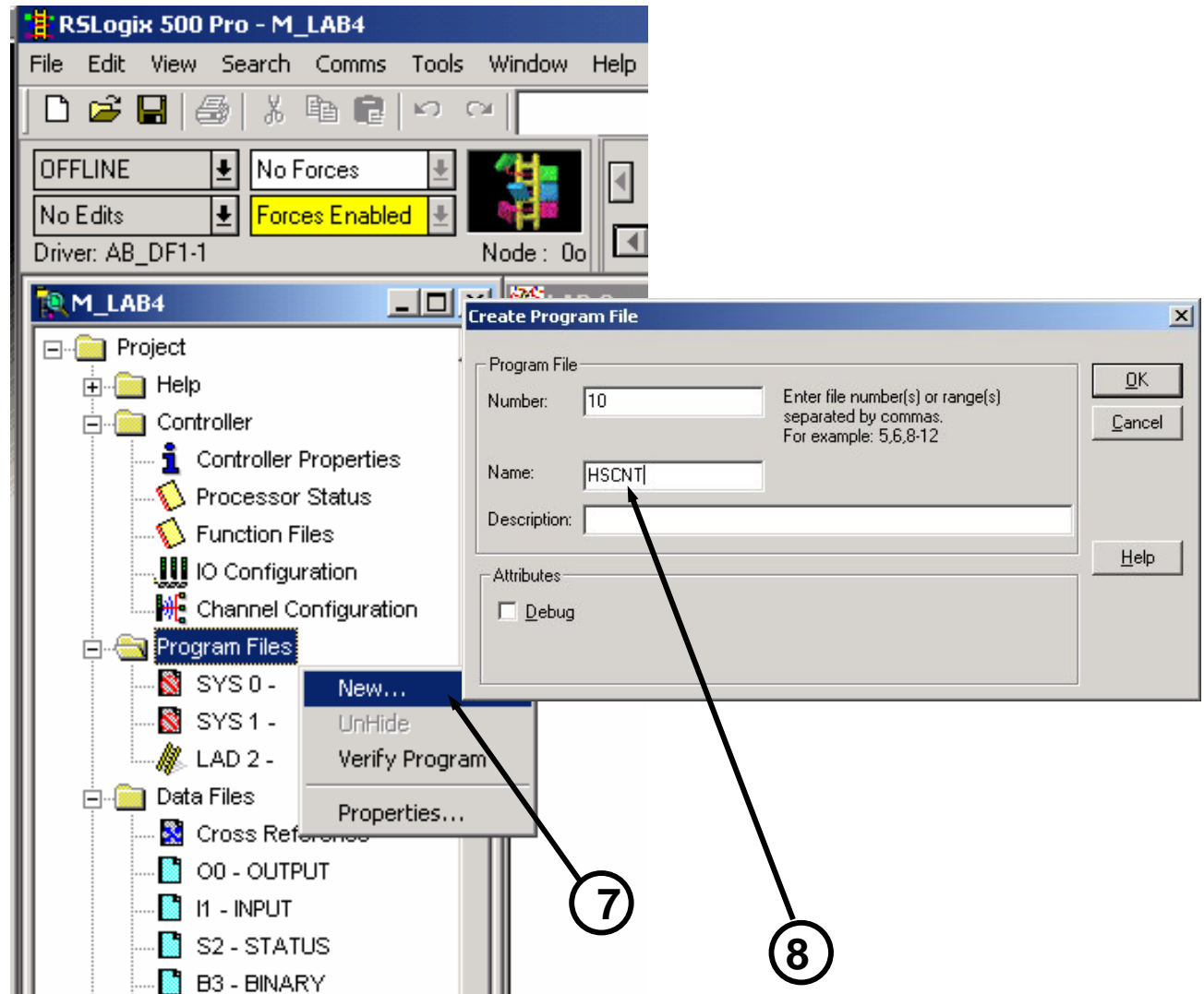
The High Speed Counter requires a program file to be executed on any HSC interrupt

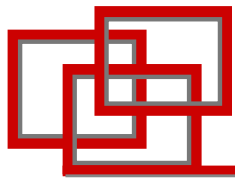
7. New Program File

- Right click on the Program File Folder in the Project Tree and select "New"

8. HSCNT File #10

- Enter the file number "10"
- Enter the file name "HSCNT"
- Accept the edits with OK





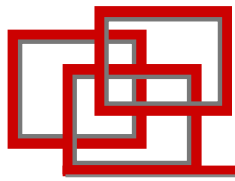
Adjust Input Filter Settings

In order for the High Speed Counter Inputs to recognize the short impulses of the encoder, the input filter time must be properly configured

9. Configure Embedded I/Os

- Double click on the I/O Configuration in the project tree
- Double click on the Bul. 1763 MicroLogix 1100 in the I/O Configuration window
- Select the Embedded I/O Configuration tab
- Change Input 0+1 from “default” to “100us”
- Accept edits with OK
- Exit the I/O configuration window

The screenshot displays the RSLogix 500 Pro software interface. The main window is titled 'I/O Configuration' and shows a list of modules. The selected module is 'Module #0: Bul.1763 Micrologix 1100 Series A'. The 'Embedded I/O Configuration' tab is active, showing the 'Input Filter' settings. The 'Input Filter' dropdown for 'Inputs 0+1' is set to '100 uS'. The 'Input Latch' section shows bits 0-7 with 'Rising' edge detection selected for each. The 'Analog Input Filter' is set to '10 Hz'.



Creating Ladder Logic

Create new rungs according to previous labs

10. Reset Accumulator RAC

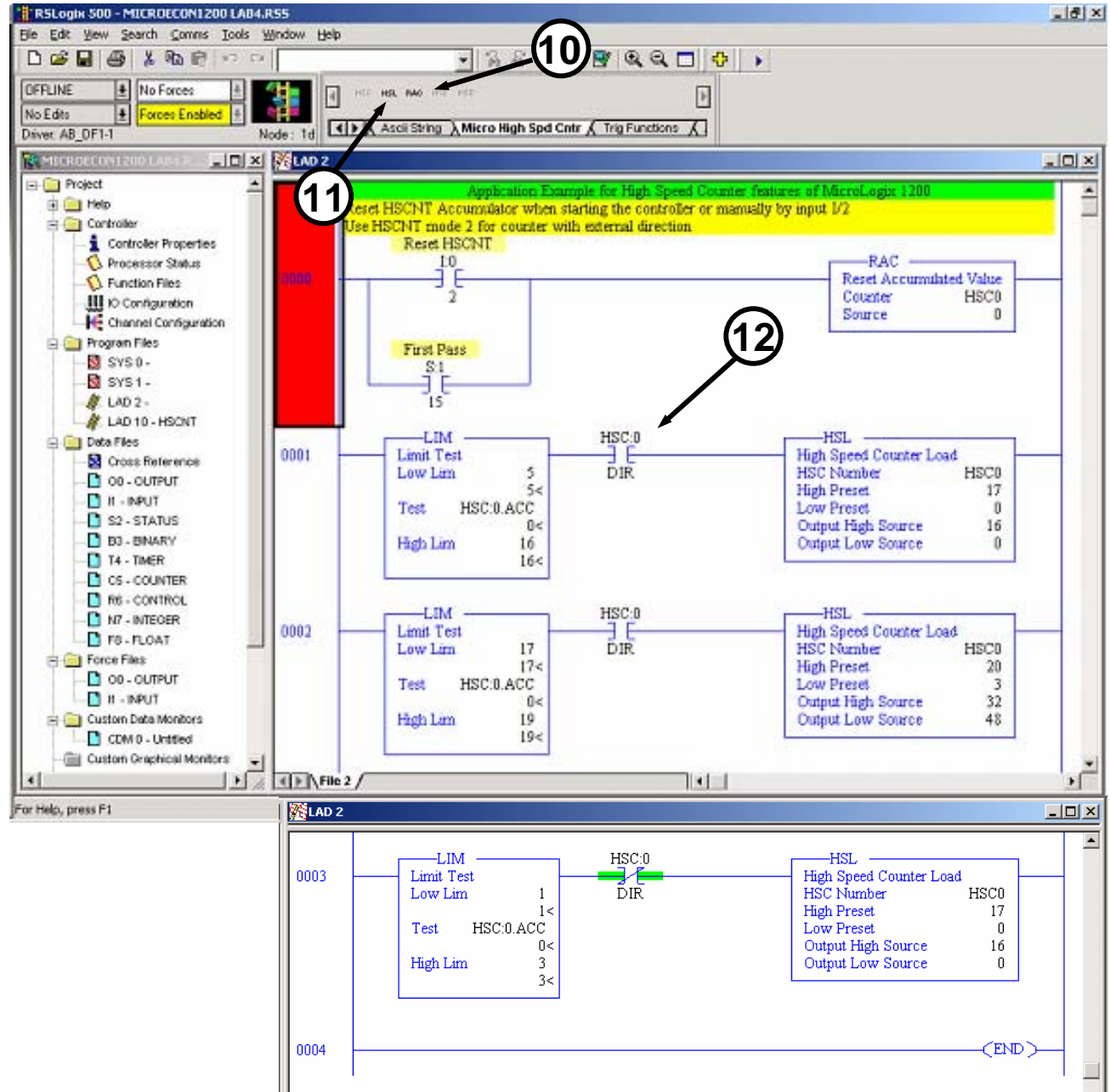
- Select the "Micro High Spd Cntr" Tab in the toolbar
- Drag and drop the RAC instruction to the 1st rung according to the picture
- Specify HSC0 and "0"

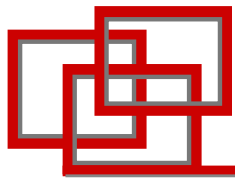
11. Load HSC Values HSL

- Drag and drop the HSL instruction to the appropriate place
- Enter the parameters for each rung according to the picture

12. Counting Direction

- Drag and drop the XIC (XIO at rung 3) to the assigned place
- Enter the address HSC:0/DIR .





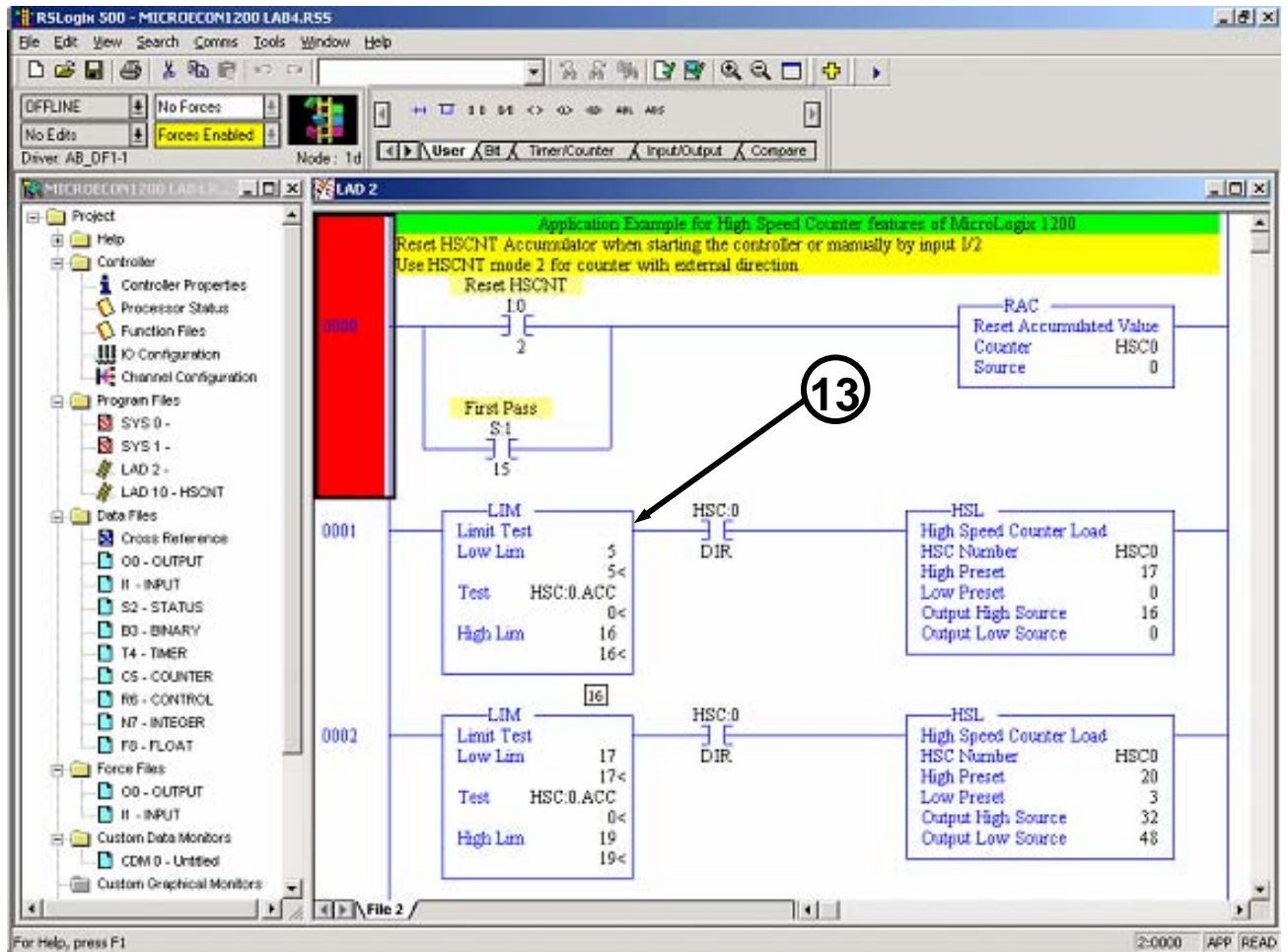
Creating Ladder Logic

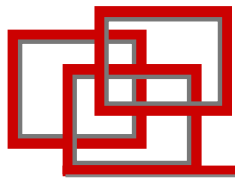
13. Compare instruction LIM

- Select the "Compare" Tab in the toolbar



- Drag and drop the LIM instruction to the rungs according to the picture
- Specify HSC:0.ACC as Test
- Enter Low Lim and High Lim parameters according to the picture





Transfer the Program to the Micro

14. Save your work

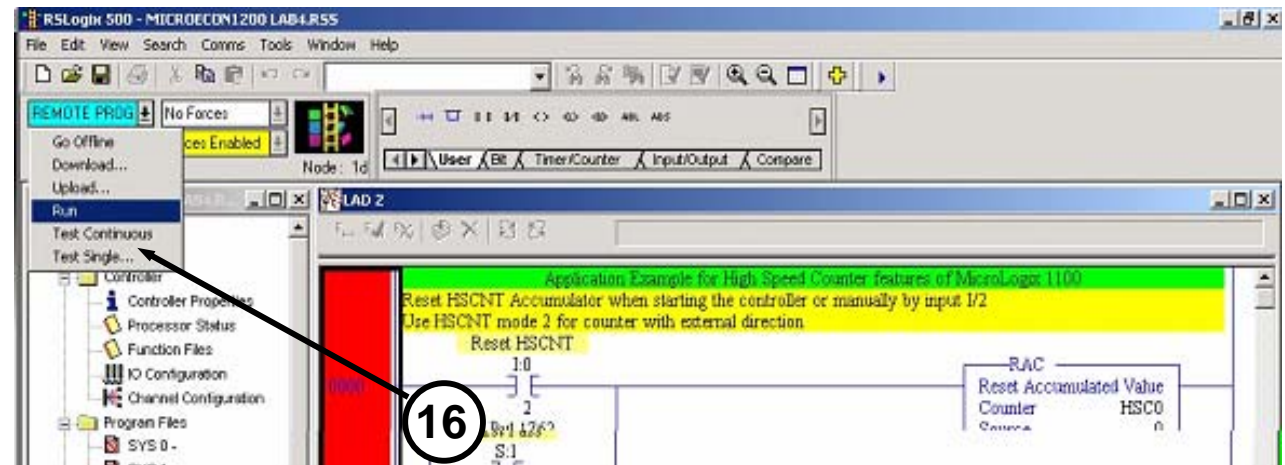
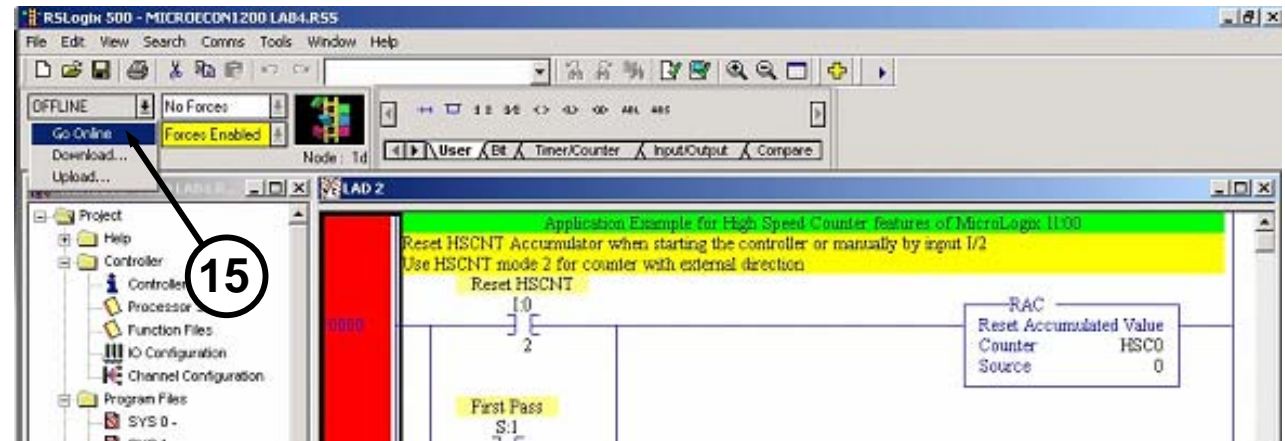
- Click on the “Save” button
- Click “OK” for revision note box

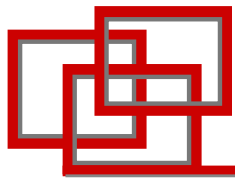
15. Download the Program

- Select the menu item OFFLINE
- Select “Download”
- Click “YES” if/when asked to change processor from Run to Program Mode
- Click “Yes” if/when asked to change processor back to RUN Mode
- Click “Yes” when asked to go Online

16. Put the Micro into RUN

- Click on the down arrow next to the word REMOTE PROG
- Select “Run”





Test & Monitor the Program

17. With the controller in "Remote Run", you can monitor or edit data within the controller. This allows:

- Program debugging
- Change data variables while in run

18. Push Button I:0/0 to see any changes of the accumulator

19. Functional Test

With input I:0/1(external direction) off, Push button I:0/0 (high speed input) on. Verify the HSC accumulator is counting up.

At 17 --> output O/4 turns ON

At 20 --> output O/5 turns ON, output O/4 turns OFF

Push on I:0/1(external direction), with I:0/0 (high speed input) off. Verify the HSC accumulator is counting down.

At 3 --> output O/4 and O/5 turns ON

At 0 --> output O/4 and O/5 turns OFF

The screenshot shows the RSLogix 500 software interface. The main window displays a ladder logic program for a High Speed Counter (HSC). The program is titled "Application Example for High Speed Counter features of MicroLogix 1100" and includes the following instructions:

- Reset HSCNT Accumulator when starting the controller or manually by input I/2
- Use HSCNT mode 2 for counter with external direction
- Reset HSCNT

The data monitor window is open, showing the following table:

Address	Value	Description
- MD - Mode Done	0	
- CD - Count Down	1	
- CU - Count Up	1	
- MD - PLS file [bits 15-8] HSC Mode [bits 7-0]	2 [h]	
- ACC - Accumulator	0	
- HIP - High Preset	17	
- LOP - Low Preset	0	
- OVF - Overflow	21	
- UNF - Underflow	21	
- OMB - Output Mask Bits	48	
- HPO - High Preset Output	16	
- LPO - Low Preset Output	0	
HSC:1	[...]	

The data monitor window also shows the following table:

Parameter	Value	Description
Low Lim	17	HSC Number
	17<	High Preset
Test	HSC:0.ACC	Low Preset
	0<	Output High Source
High Lim	19	Output Low Source

LISTEN.
THINK.
SOLVE.SM

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