OCS Training Workshop
LAB21

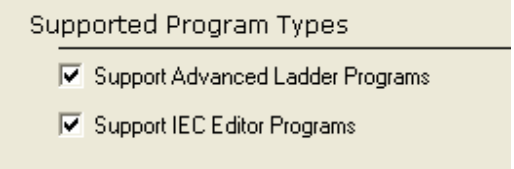
Basic OCS Programming with IEC Sequential Flow Charts

Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

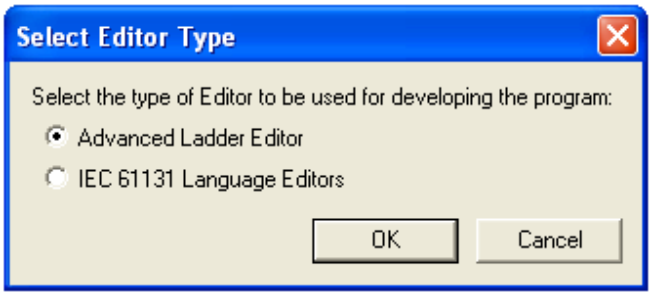
Objective:
The objective of this lab is to give you the knowledge to use Cscape to create a program including hardware configuration, logic design and screen development in IEC 61131-3 Ladder Logic.

This foundation will then be used to help you expand your skills in the use of Cscape and the OCS.

To start with the selection of Type of program, go to Tools/Application Settings/Supported Types and select both the program types Advanced Ladder Program and IEC Editor Program.



Procedure for IEC Languages: When the New file button is clicked a dialog box opens up with an option to select the editor type as Advanced Ladder Program or IEC 61131 Language Editor. For IEC Language programs select IEC 61131 Language Editors.



Programming using IEC Ladder Editor

Step 1

- **Connect the Demo Case to your PC.** Connect the 9 pin connector of programming cable to the USB Adapter provided. Connect the RJ45 connector to the OCS programming port 'MJ1'. Connect the USB adapter to USB port on your PC.

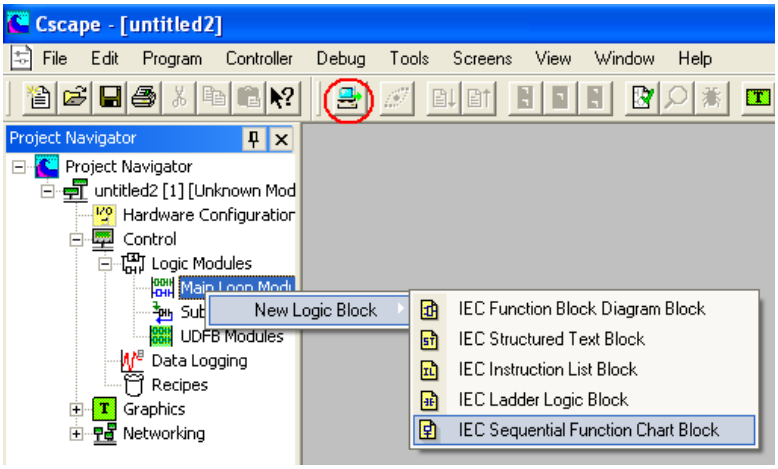
Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

Step 2

- **Power up the OCS and start Cscape on your PC.** Connect power supply to the XL6e. Open Cscape programming software on your PC. A new, blank program called “untitled2” is opened and should be automatically configured for your XL6e if the serial cable is properly connected.

  Whether the device is communicating with your developing software Cscape can be known from the communication icons present at the tool bar. If the Connect/Disconnect icon is not visible then go to Tools/Application Settings/ Communications/ Configure and check you communication settings.

  NOTE: Only the controller is automatically configured as described above. Any I/O will still have to be configured as described later in this lab.



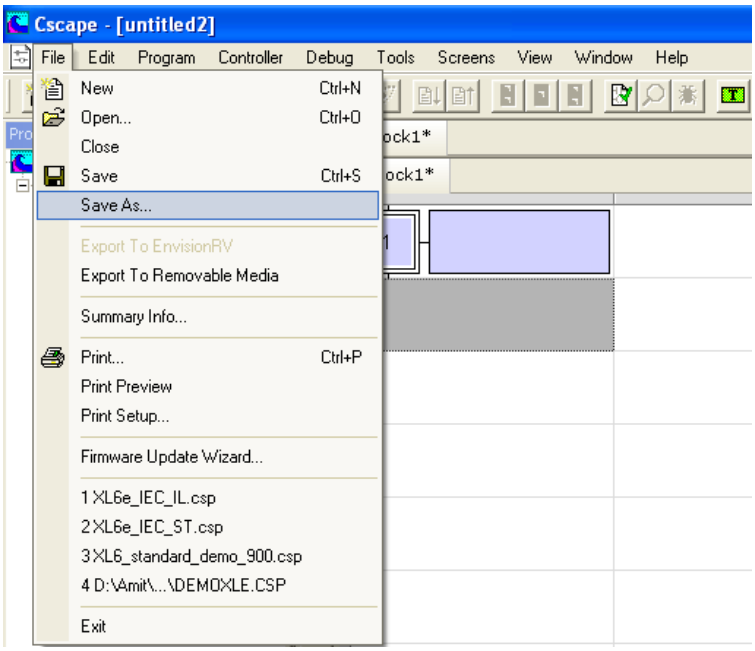
From the Project Navigator select Control/Logic Modules/ Main Loop Modules/ New Logic Block/ IEC Sequential Function Chart Block

Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

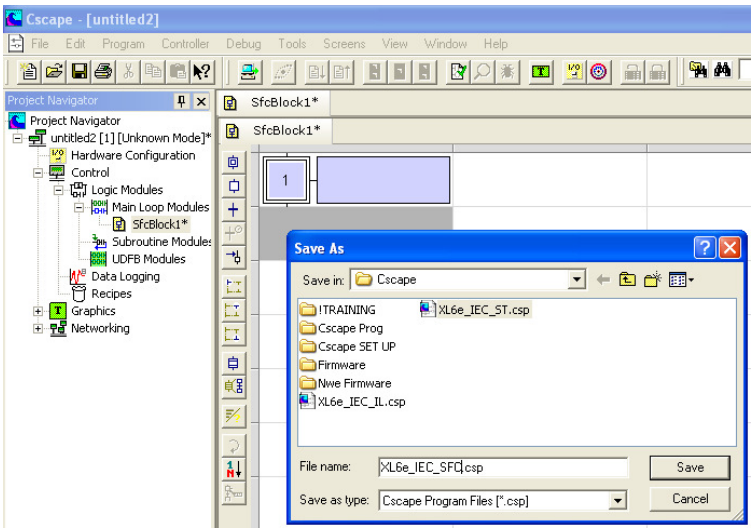
Step 3

- **Save the 'untitled2' program with a new name.**

Click on the **File** menu and select **Save As…**



Type your program name, such as XL6e_IEC_SFC.csp, in the File Name dialog box and click the Save button.



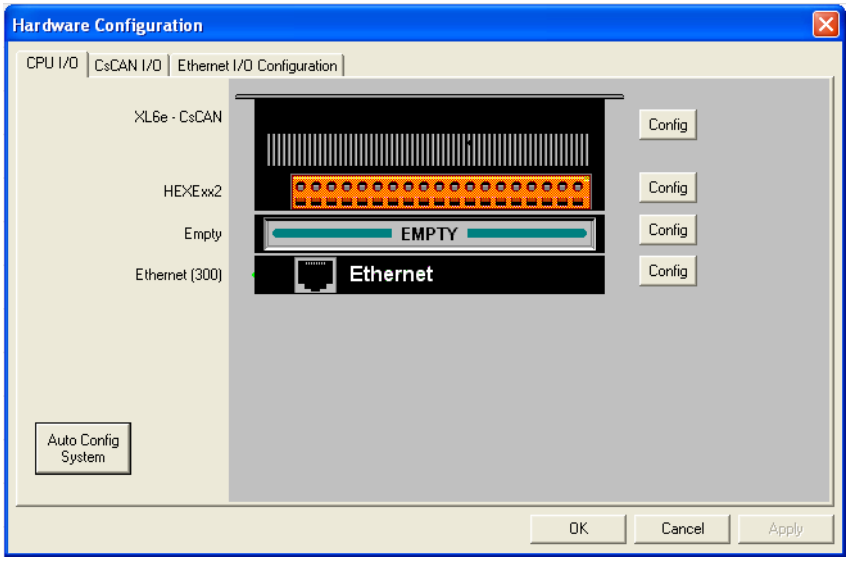
Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

Step 4

- **Configure the OCS Controller**

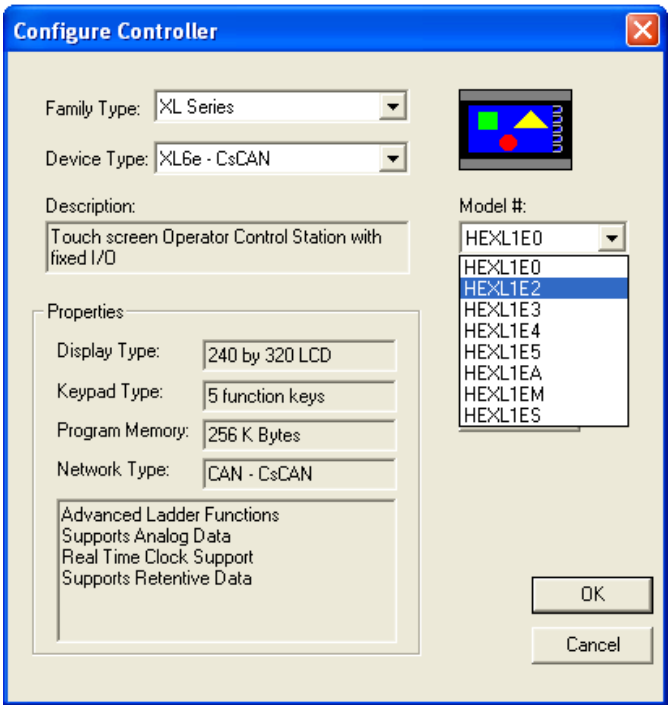
  Click on the **Controller** menu and select **Hardware Configuration**

  If you are online with the OCS, use the **Auto Config System** button. Clicking it will automatically, configure the controller and any attached I/O if you are connected to the OCS properly.



Else, to do it manually:

1. Double click on the controller picture or click the 'Config' button next to it to open Configure Controller window
2. Select XL6e from the list and select the type of I/O card from Model#
3. Click OK



4. Click OK again to exit the I/O configuration.

Step 5

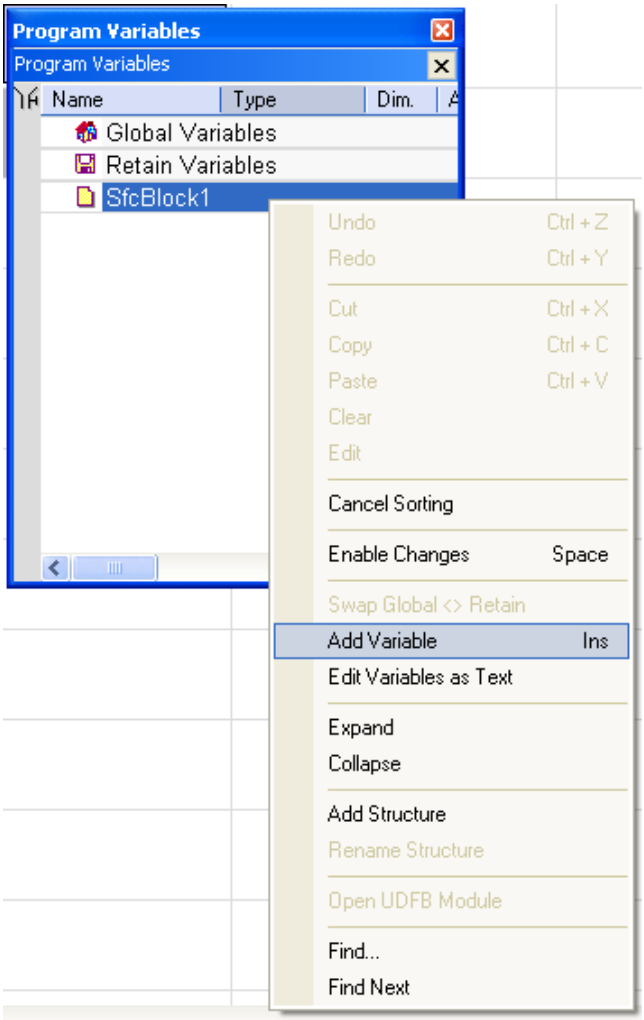
- **Save the program.**
  Click on the **File** menu and select **Save**.

Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

Step 6

- **Name some I/O points.**

  Click on the **Tools**/ **Program Variables**
  This opens a Program Variables window. Right click on the Instruction List Block for your program ILBlock1 and click Add variable.



- **Add** I/O points by clicking the 'Add variable' button and filling in the Type and Tags (addresses).
- **Edit** an existing I/O point by finding it in the list and double-clicking it.

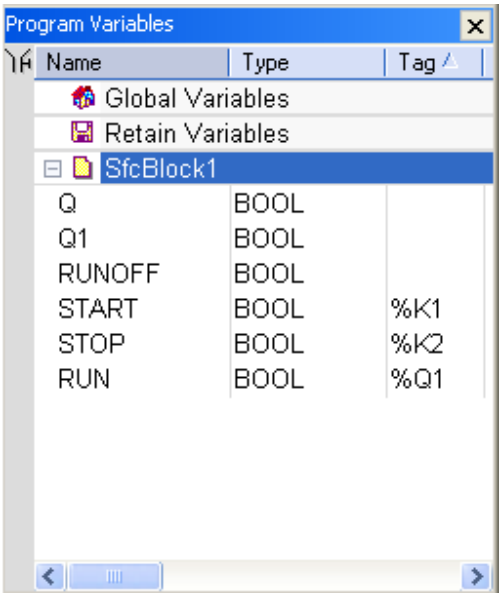
Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

Add the following I/O points:

%K1 *START*: %K1 is named 'F1_KEY' by default so it will need to be edited instead of added. Configure for 1 bit.

%K2 *STOP*: %K2 is named 'F2_KEY' by default so it will need to be edited instead of added. Configure for 1 bit.

%Q1 *RUN*: Configure for 1 bit
Stopped_Screen: Configure for 1 bit
Running_Screen: Configure for 1 bit

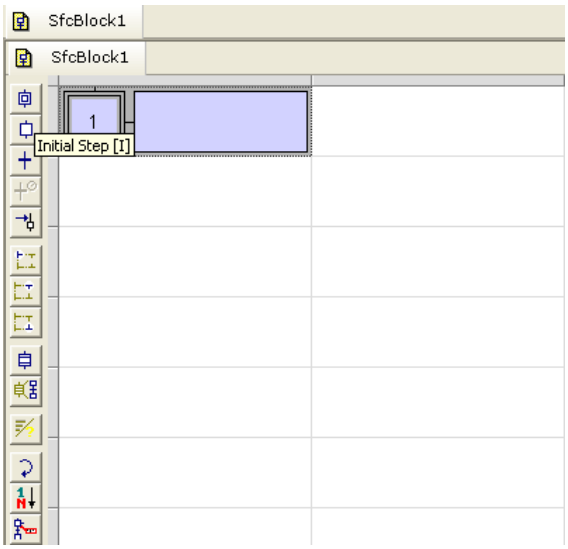


A variable can be created to be used locally without attributing a 'Tag' or a memory address to it. However the variable value will be stored in any random memory area by the OCS for referencing.

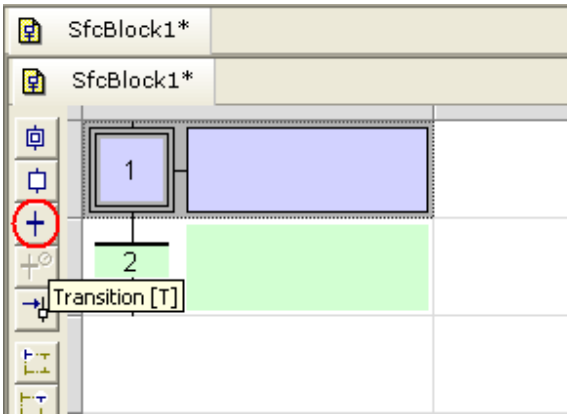
Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

Step 7

- **Developing the program rungs:**



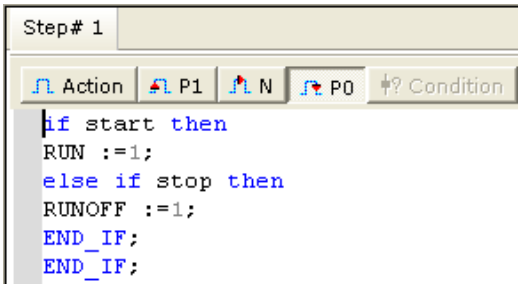
Click on the Step or Transition or Initial Step Icon as required on the Functions icons and place it in the SFC language flow chart area.

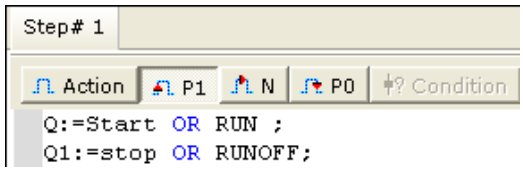


Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

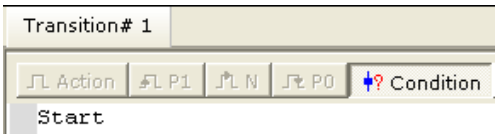
Double click on the Step or Transition. This opens a Step- Action or Transition- Condition window. Configure the Step and Transition as required and create the flow chart

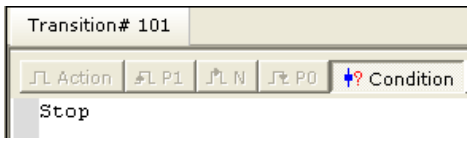
The Step Actions are the activities to be carried out in order to proceed with the Process Flow according to the flowchart.

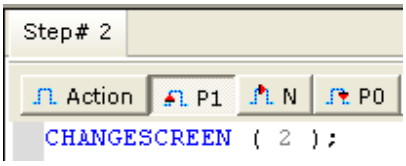


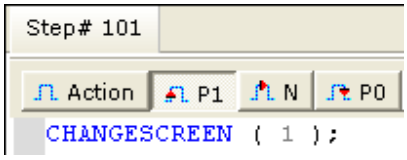


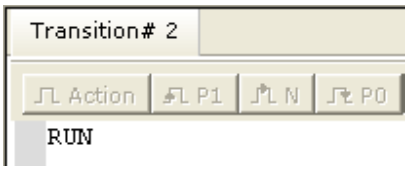
Transition – Conditions are the process conditions to be confirmed as a feedback of the activities carried out in the previous step. The next Step of action will be carried out only after the feedback conditions are fulfilled according to the flowchart.



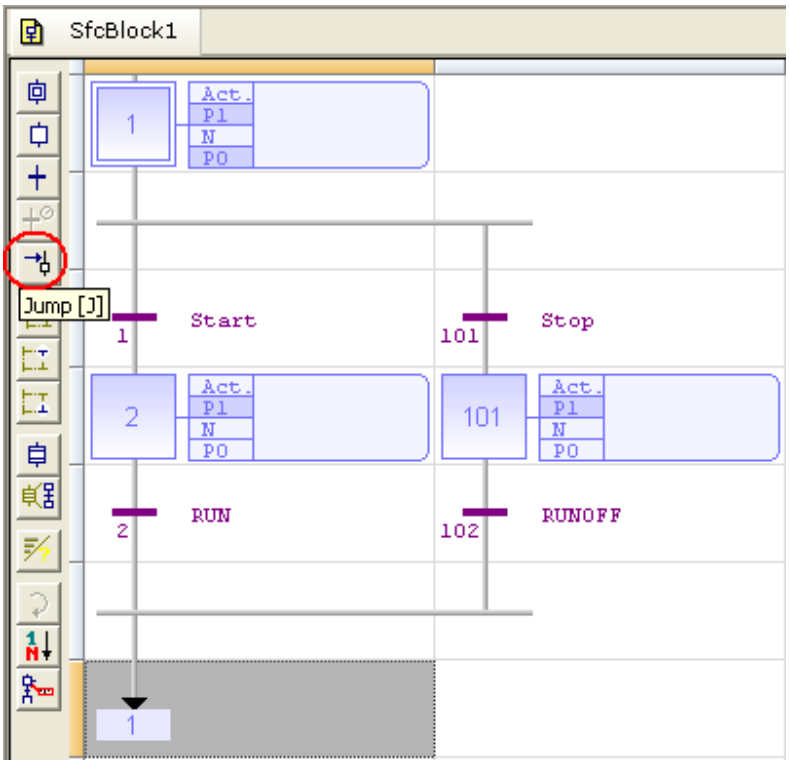








Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

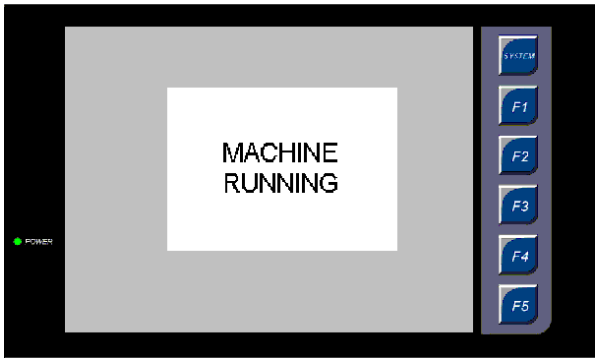


Sequential Flow Chart Block configuration is completed.

Lab 21: Basic OCS Programming with IEC Sequential Flow Chart

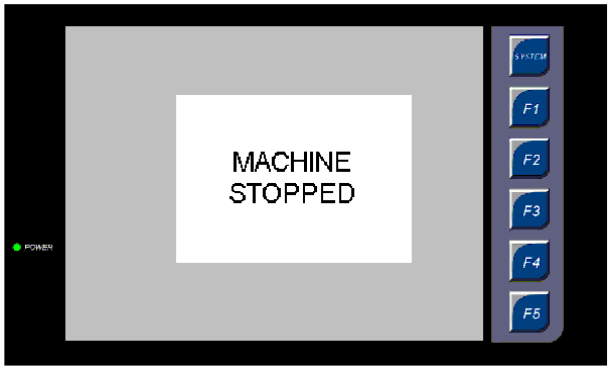
Step 8

- **Add words to Screen 2.**
  1. The Graphics Editor can be opened by double clicking the graphics editor icon in the ladder logic.
  2. Insert Static Text at the top center of the screen. Edit the text to display MACHINE RUNNING
  3. Note that the size of the box will need to be stretched and the font sized should be increased from the default.
  4. Close the graphics editor.
  5. Click OK



Step 9

- **Add Screen 1**
  1. Click on the **Screens** menu and select **View** / **Edit Screens…**
  2. Repeat points 2 – 5 from above. Change text to display MACHINE STOPPED



Step 11

- **Save the program.**

CONGRATULATIONS! You have finished writing your first IEC Instruction List Block program.