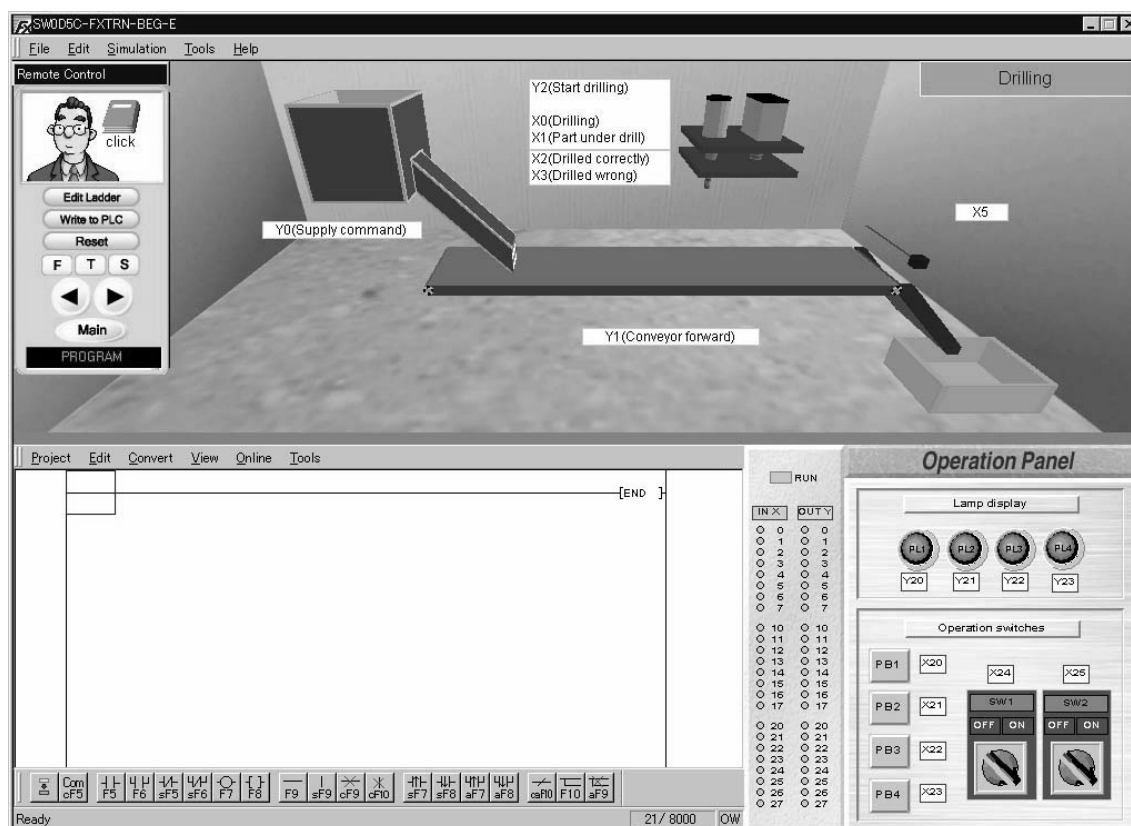


Exercise 9. Write a program in LAD (and optional IL) in the FX program for the following example.

Part Separation

Exercise	E-4. Drilling
Objective	Control the drill and other devices.

Training Screen



Device Assignment

Type	Device No.	Device name	Operation
Input	X0	Drilling	ON while drilling.
	X1	Part under drill	ON when part is under the drill.
	X2	Drilled correctly	ON when part is drilled correctly. Previous result is cleared
	X3	Drilled Wrong	ON when part is not drilled correctly. Previous result is
	X5	Sensor	ON when part is detected at the right end.
	X21	Error	Stop system
	X22	Error	Stop system
	X23	Error reset button	Reset system
Output	Y0	Supply command	One part is supplied when Y0 is ON. A process cycle begins: Large metal cube.
	Y1	Conveyor forward	Conveyor moves forward when Y1 is ON.
	Y2	Start drilling	Starts drilling when Y2 is ON (A process cycle that cannot be stopped partway).

Control Objective

Drill holes in parts supplied from the hopper.

Control Specifications

- 1) When [PB1] (X20) on the operation panel is pressed, **Supply command** (Y0) for the hopper is turned ON.

When [PB1] (X20) is released, **Supply command** (Y0) is turned OFF. When **Supply command** (Y0) is turned ON, the hopper supplies a part.

- 2) When [SW1] (X24) on the operation panel is turned ON, the conveyor moves forward.

When [SW1] (X24) is turned OFF, the conveyor stops.

Control of drill

- 1) When the sensor for **Part under drill** (X1) in the drill is turned ON, the conveyor stops.

- 2) When **Start drilling** (Y2) is turned ON, the drilling starts.

Start drilling (Y2) is turned OFF when **Drilling** (X0) is set ON.

- 3) When **Start drilling** (Y2) is turned ON, either **Drilled correctly** (X2) or **Drilled wrong** (X3)

is set ON after the drill machine has operated for one complete cycle. (The drill cannot be stopped in the middle of an operation.)

- 4) After **Drilled correctly** (X2) or **Drilled wrong** (X3) is confirmed, the work is carried and put on the tray at the right.

When multiple holes are drilled, **Drilled wrong** (X3) is set ON. In this exercise no specified control for scrap parts exists.

- 5) Use a counter C0 with preset 5 to count 5 **Drilled correctly** parts and another counter C1 with preset 2 to count 2 **Drilled wrong** parts. When the counter C0 reaches the preset value, the lamp Y23 is lit and when the counter C1 reaches the preset value, the lamp Y20 is lit. Use X22 to reset the counters. As soon as one of the counters has reached the preset value, it must be reset. The other counter must continue to count until it reaches its preset, then it is reset by X22.