



Translate the following 61131-3 Structured Text program to 61131-3 Instruction List:

```
PROGRAM PickAndPlace
VAR
    ManualButton : BOOL; // Input signal for manual mode
    AutoButton : BOOL; // Input signal for auto mode
    ClipButton : BOOL; // Input signal for clip action
    TransferButton : BOOL; // Input signal for transfer action
    ReleaseButton : BOOL; // Input signal for release action
    ConveyorA : BOOL; // Input signal for presence of product on conveyor A
    ConveyorB : BOOL; // Output signal to control conveyor B
    RoboticArm : BOOL; // Output signal to control the robotic arm
    Mode : INT := 0; // Internal variable to store the current mode (0 = manual, 1 = auto)
    AutoProcess : BOOL := FALSE; // Internal variable to store whether the auto control process is currently running
END_VAR

// Manual mode control process
IF ManualButton THEN
    Mode := 0; // Set mode to manual
END_IF

IF Mode = 0 THEN // Manual mode
    IF ClipButton AND ConveyorA THEN
        RoboticArm := TRUE; // Clip the product
    ELSIF TransferButton THEN
        ConveyorB := TRUE; // Transfer the product to conveyor B
    ELSIF ReleaseButton THEN
        ConveyorB := FALSE; // Release the product from conveyor B
    END_IF
END_IF

// Auto mode control process
IF AutoButton THEN
    Mode := 1; // Set mode to auto
END_IF

IF Mode = 1 THEN // Auto mode
    IF NOT AutoProcess AND ConveyorA THEN // Only start the process if not currently running and there is a product on conveyor A
        AutoProcess := TRUE; // Set flag to indicate that the auto process is running
        RoboticArm := TRUE; // Clip the product
        WAIT 2; // Wait for 2 seconds to transfer the product
        ConveyorB := TRUE; // Transfer the product to conveyor B
    END_IF
    IF ConveyorB AND NOT ConveyorA THEN // Release the product from conveyor B once it has been transferred and there is no product on conveyor A
        ConveyorB := FALSE;
        AutoProcess := FALSE; // Clear the flag to indicate that the auto process is not running
    END_IF
END_IF
```



```
PROGRAM PickAndPlace
VAR
    ManualButton AT %I* : BOOL;
    AutoButton AT %I* : BOOL;
    ClipButton AT %I* : BOOL;
    TransferButton AT %I* : BOOL;
    ReleaseButton AT %I* : BOOL;
    ConveyorA AT %I* : BOOL;
    ConveyorB AT %Q* : BOOL;
    RoboticArm AT %Q* : BOOL;
    Mode : INT := 0;
    AutoProcess : BOOL := FALSE;
END_VAR

// Manual mode control process
LD ManualButton
STN(=) Mode,0

EQ Mode,0
JMPCN ManualMode
JMP AutoMode

ManualMode:
LD ClipButton
AND ConveyorA
ST(=) RoboticArm,TRUE

LD TransferButton
ST(=) ConveyorB,TRUE

LD ReleaseButton
ST(=) ConveyorB,FALSE
JMP EndManualMode

// Auto mode control process
AutoMode:
LD AutoButton
STN(=) Mode,1

EQ Mode,1
JMPCN AutoModeControl
JMP EndProgram

AutoModeControl:
LDN AutoProcess
AND ConveyorA
ST(=) AutoProcess,TRUE
ST(=) RoboticArm,TRUE

WAIT 2
ST(=) ConveyorB,TRUE

LD ConveyorB
ANDN ConveyorA
ST(=) ConveyorB,FALSE
ST(=) AutoProcess,FALSE

EndManualMode:
NOP

EndProgram:
NOP

END_PROGRAM
```