0000

DIGITAL IO
```
        ┌─────JSR─────────────┐
        │ Jump To Subroutine  │
        │ SBR File Number  U:3 │
        └─────────────────────┘
```

0001

INIT
```
        ┌─────JSR─────────────┐
        │ Jump To Subroutine  │
        │ SBR File Number  U:4 │
        └─────────────────────┘
```

0002

SYSTEM MODE LOGIC
```
        ┌─────JSR──────────────┐
        │ Jump To Subroutine   │
        │ SBR File Number  U:11 │
        └──────────────────────┘
```

0003

CONTROLS
```
        ┌─────JSR──────────────┐
        │ Jump To Subroutine   │
        │ SBR File Number  U:10 │
        └──────────────────────┘
```

0004

Mode String
Outputs Sustem Mode
as String Reference
```
        ┌─────JSR──────────────┐
        │ Jump To Subroutine   │
        │ SBR File Number  U:14 │
        └──────────────────────┘
```

0005

〈 END 〉

**DIGITAL INPUTS**

0000

PROXIMITY SWITCH
RAW DIGITAL INPUT
I:0
0
Bul.1763

PROXIMITY SWITCH
DIGITAL INPUT BIT
PS
B3:1
0

0001

LEVEL SWITCH
RAW DIGITAL INPUT
I:0
1
Bul.1763

LEVEL SWITCH
DIGITAL INPUT BIT
LS
B3:1
1

0002

RED PHOTO EYE
RAW DIGITAL INPUT
I:0
2
Bul.1763

RED PHOTO EYE
DIGITAL INPUT BIT
RP
B3:1
2

0003

BLUE PHOTO EYE
RAW DIGITAL INPUT
I:0
3
Bul.1763

BLUE PHOTO EYE
DIGITAL INPUT BIT
BP
B3:1
3

DIGITAL OUTPUTS

CONVEYOR MOTOR
DIGITAL OUPUT BIT
CM
                                                                    CONVEYOR MOTOR
                                                                    RAW DIGITAL OUTPUT
        B3:2                                                            O:0
0004 ──┤ ├──                                                          ─◇─
         0                                                              0
                                                                    Bul.1763

WALNUT HOPPER
DIGITAL OUPUT BIT
WH
                                                                    WALNUT HOPPER
                                                                    RAW DIGITAL OUTPUT
        B3:2                                                            O:0
0005 ──┤ ├──                                                          ─◇─
         1                                                              1
                                                                    Bul.1763

PECAN HOPPER
DIGITAL OUPUT BIT
PH
                                                                    PECAN HOPPER
                                                                    RAW DIGITAL OUTPUT
        B3:2                                                            O:0
0006 ──┤ ├──                                                          ─◇─
         2                                                              2
                                                                    Bul.1763

**Special IO**

**0007**

SYSTEM RESET
RAW DIGITAL INPUT
I:0
4
Bul.1763

SYSTEM RESET
SYS_RESET
B3:1
4

**0008**

SYSTEM ESTOP
RAW DIGITAL INPUT
I:0
5
Bul.1763

SYSTEM ESTOP
S0
SYS_ESTOP
B3:1
5

IF IN EITHER S3 OR S4 AND LEVEL SWITCH ACTIVATES, MOVE TO SYSTEM MODE S5

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

**0009**

AIC
Integer to String
Source          N7:1
0<
Dest            ST9:0

**0010**

⟨ END ⟩

0000

IF IN EITHER S3 OR S4 AND LEVEL SWITCH ACTIVATES, MOVE TO SYSTEM MODE S5

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

First Pass
S:1
| |
15

```
┌─────── MOV ───────┐
│ Move              │
│ Source          1 │
│                1< │
│ Dest         N7:1 │
│                0< │
└───────────────────┘
```

0001                                                    ─< END >─

**CONVEYOR MOTOR DCL**

DIGITAL CONTROL LOGIC FOR CONVEYOR MOTOR

**Rung 0000**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        EQU                      ONS              MOTOR START TRIGGER
        Equal                    B3:0                    B3:4
0000    Source A      N7:1      | ONS |                  <  >
                        0<       3                        2
        Source B         1
                         1<

        SYSTEM MODE:
        1-2-3-4-5
        0-ESTOP
        SYSTEM_MODE
        EQU
        Equal
        Source A      N7:1
                        0<
        Source B         5
                         5<
```

**Rung 0001**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        EQU                      ONS              MOTOR INTERRUPT
        Equal                    B3:0                    B3:4
0001    Source A      N7:1      | ONS |                  <  >
                        0<       3                        3
        Source B         2
                         2<
```

**Rung 0002**

```
                                                  CONVEYOR MOTOR
                                                  DIGITAL OUPUT BIT
                                                  CM
        MOTOR START TRIGGER                              B3:2
              B3:4                                       <  >
0002    ----| |----                                      0
              2

        CONVEYOR MOTOR
        DIGITAL OUPUT BIT
        CM
              B3:2          MOTOR INTERRUPT
                                 B3:4
        ----| |----       ----|/|----
              0                  3
```

PECAN HOPPER

**0003**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
      EQU
   Equal
   Source A       N7:1
                    0<
   Source B          3
                    3<
```

ONS
B3:0
ONS
4

PECAN HOPPER TRIGGER
B3:4

4

**0004**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
      NEQ
   Not Equal
   Source A       N7:1
                    0<
   Source B          3
                    3<
```

ONS
B3:0
ONS
5

PECAN HOPPER
INTERRUPT
B3:4

5

**0005**

PECAN HOPPER TRIGGER
B3:4

4

PECAN HOPPER
DIGITAL OUPUT BIT
PH
B3:2

2

PECAN HOPPER
INTERRUPT
B3:4

5

PECAN HOPPER
DIGITAL OUPUT BIT
PH
B3:2

2

```
                              WALNUT HOPPER
         SYSTEM MODE:
         1-2-3-4-5
         0-ESTOP                                              WALNUT HOPPER
         SYSTEM_MODE           ONS                            TRIGGER
             ┌─EQU──────┐      B3:0                              B3:4
0006  ───────┤ Equal    ├──────┤ONS├─────────────────────────────( )──────
             │ Source A  N7:1│    6                                 6
             │          0<   │
             │ Source B    4 │
             │          4<   │
             └───────────────┘


         SYSTEM MODE:
         1-2-3-4-5
         0-ESTOP                                              WALNUT HOPPER
         SYSTEM_MODE           ONS                            INTERRUPT
             ┌─NEQ──────┐      B3:0                              B3:4
0007  ───────┤ Not Equal├──────┤ONS├─────────────────────────────( )──────
             │ Source A  N7:1│    7                                 7
             │          0<   │
             │ Source B    4 │
             │          4<   │
             └───────────────┘

                                                             WALNUT HOPPER
                                                             DIGITAL OUPUT BIT
         WALNUT HOPPER                                       WH
         TRIGGER                                                B3:2
           B3:4                                                   1
0008  ──────┤ ├──┬──────────────────────────────┬──────────────( )──────
            6   │                                │
                │  WALNUT HOPPER                 │
                │  DIGITAL OUPUT BIT  WALNUT HOPPER
                │  WH                 INTERRUPT  │
                │    B3:2               B3:4     │
                └────┤ ├──────────────┤/├────────┘
                      1                 7


0009  ─────────────────────────────────────────────────────────( END )────
```

**SYSTEM RESET LOGIC**

```
0000   SYSTEM RESET                                                    SYSTEM MODE:
       SYS_RESET        ONS                                            1-2-3-4-5
       B3:1             B3:0                                           0-ESTOP
        ] [──────────] ONS [─────────────────────────────────        SYSTEM_MODE
         4                1                                           ┌─── MOV ──────────┐
                                                                      │ Move             │
                                                                      │ Source         1 │
                                                                      │               1< │
                                                                      │ Dest       N7:1  │
                                                                      │               0< │
                                                                      └──────────────────┘
```

**SYSTEM E-STOP LOGIC**

```
0001   SYSTEM ESTOP                                                   SYSTEM MODE:
       S0                                                             1-2-3-4-5
       SYS_ESTOP                                                      0-ESTOP
       B3:1             B3:0                                          SYSTEM_MODE
        ] [──────────] ONS [─────────────────────────────────       ┌─── MOV ──────────┐
         5                2                                          │ Move             │
                                                                     │ Source         0 │
                                                                     │               0< │
                                                                     │ Dest       N7:1  │
                                                                     │               0< │
                                                                     └──────────────────┘
```

**IF SYSTEM MODE IS S1 AND PROX SWITCH IS ACTIVATED, THEN MOVE TO SYSTEM MODE S2**

```
0002   SYSTEM MODE:               PROXIMITY SWITCH                    SYSTEM MODE:
       1-2-3-4-5                  DIGITAL INPUT BIT                   1-2-3-4-5
       0-ESTOP                    PS                                  0-ESTOP
       SYSTEM_MODE                B3:1                                SYSTEM_MODE
       ┌─── EQU ──────────┐        ] [────────────────────           ┌─── MOV ──────────┐
       │ Equal            │         0                                │ Move             │
       │ Source A   N7:1  │                                          │ Source         2 │
       │              0<  │                                          │               2< │
       │ Source B      1  │                                          │ Dest       N7:1  │
       │              1<  │                                          │               0< │
       └──────────────────┘                                          └──────────────────┘
```

**IF RED LABEL + BOX DETECTED + LEVEL SWITCH IS NOT TRIGGERED + NOT DETECTING BLUE THEN OK TO MOVE TO SYSTEM MODE S3 -> PECAN FILLING**

```
0003   RED PHOTO EYE          PROXIMITY SWITCH      LEVEL SWITCH          BLUE PHOTO EYE
       DIGITAL INPUT BIT      DIGITAL INPUT BIT     DIGITAL INPUT BIT     DIGITAL INPUT BIT
       RP                     PS                    LS                    BP                     S3 Inputs
       B3:1                   B3:1                  B3:1                  B3:1                   B3:4
        ] [───────────────────] [───────────────────]/[──────────────────]/[─────────────────── < >
         2                      0                     1                     3                      0
```

**IF RED LABEL + BOX DETECTED + LEVEL SWITCH IS NOT TRIGGERED + NOT DETECTING BLUE THEN OK TO MOVE TO SYSTEM MODE S3 -> PECAN FILLING**

```
0004   SYSTEM MODE:                                                   SYSTEM MODE:
       1-2-3-4-5                                                      1-2-3-4-5
       0-ESTOP                                                        0-ESTOP
       SYSTEM_MODE            S3 Inputs                               SYSTEM_MODE
       ┌─── EQU ──────────┐   B3:4                                    ┌─── MOV ──────────┐
       │ Equal            │    ] [────────────────────               │ Move             │
       │ Source A   N7:1  │     0                                    │ Source         3 │
       │              0<  │                                          │               3< │
       │ Source B      2  │                                          │ Dest       N7:1  │
       │              2<  │                                          │               0< │
       └──────────────────┘                                          └──────────────────┘
```

**0005**

IF BLUE LABEL + BOX DETECTED ... THEN OK TO MOVE TO SYSTEM MODE S4 -> WALNUT FILLING

| BLUE PHOTO EYE | PROXIMITY SWITCH | LEVEL SWITCH | RED PHOTO EYE | |
| DIGITAL INPUT BIT | DIGITAL INPUT BIT | DIGITAL INPUT BIT | DIGITAL INPUT BIT | |
| BP | PS | LS | RP | S4 INPUTS |
| B3:1 | B3:1 | B3:1 | B3:1 | B3:4 |
| ] [ | ] [ | ]/[ | ]/[ | < > |
| 3 | 0 | 1 | 2 | 1 |

**0006**

IF RED LABEL + BOX DETECTED + LEVEL SWITCH IS NOT TRIGGERED + NOT DETECTING BLUE THEN OK TO MOVE TO SYSTEM MODE S3 -> PECAN FILLING

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── EQU ───────┐
        │ Equal              │
        │ Source A     N7:1  │
        │                 0< │
        │ Source B        2  │
        │                 2< │
        └────────────────────┘
```

S4 INPUTS
B3:4
] [
1

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── MOV ───────┐
        │ Move               │
        │ Source          4  │
        │                 4< │
        │ Dest         N7:1  │
        │                 0< │
        └────────────────────┘
```

**0007**

ERROR CATCHING:
IF S3 (PECANS) AND BLUE (WALNUTS) SENSOR COMES ON, RETURN TO S2
IF S4 (WALNUTS) AND RED (PECANS) SENSOR COMES ON, RETURN TO S2

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── EQU ───────┐
        │ Equal              │
        │ Source A     N7:1  │
        │                 0< │
        │ Source B        3  │
        │                 3< │
        └────────────────────┘
```

BLUE PHOTO EYE
DIGITAL INPUT BIT
BP
B3:1
] [
3

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── MOV ───────┐
        │ Move               │
        │ Source          2  │
        │                 2< │
        │ Dest         N7:1  │
        │                 0< │
        └────────────────────┘
```

**0008**

ERROR CATCHING:
IF S3 (PECANS) AND BLUE (WALNUTS) SENSOR COMES ON, RETURN TO S2
IF S4 (WALNUTS) AND RED (PECANS) SENSOR COMES ON, RETURN TO S2

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── EQU ───────┐
        │ Equal              │
        │ Source A     N7:1  │
        │                 0< │
        │ Source B        4  │
        │                 4< │
        └────────────────────┘
```

RED PHOTO EYE
DIGITAL INPUT BIT
RP
B3:1
] [
2

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
        ┌─────── MOV ───────┐
        │ Move               │
        │ Source          2  │
        │                 2< │
        │ Dest         N7:1  │
        │                 0< │
        └────────────────────┘
```

**IF IN EITHER S3 OR S4 AND LEVEL SWITCH ACTIVATES, MOVE TO SYSTEM MODE S5**

0009

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE
```
      ┌─EQU─────────┐
      │ Equal       │
      │ Source A  N7:1
      │             0< │
      │ Source B    3  │
      │             3< │
      └─────────────┘
```

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE
```
      ┌─EQU─────────┐
      │ Equal       │
      │ Source A  N7:1
      │             0< │
      │ Source B    4  │
      │             4< │
      └─────────────┘
```

LEVEL SWITCH
DIGITAL INPUT BIT
LS
```
  B3:1
──┤ ├──
   1
```

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE
```
      ┌─MOV─────────┐
      │ Move        │
      │ Source      5 │
      │             5< │
      │ Dest      N7:1 │
      │             0< │
      └─────────────┘
```

**IF IN MODE 5 FOR 5 SECONDS, MOVE TO SYSTEM MODE 1 TO RESTART CYCLE**

0010

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE
```
      ┌─EQU─────────┐
      │ Equal       │
      │ Source A  N7:1
      │             0< │
      │ Source B    5  │
      │             5< │
      └─────────────┘
```

SYSTEM MODE 5 DELAY
```
      ┌─TON──────────────┐
      │ Timer On Delay ──⟨EN⟩
      │ Timer       T4:0 │
      │ Time Base   1.0 ──⟨DN⟩
      │ Preset       5< │
      │ Accum        0< │
      └──────────────────┘
```

0011

SYSTEM MODE 5 DELAY
```
  T4:0
──┤ ├──
   DN
```

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE
```
      ┌─MOV─────────┐
      │ Move        │
      │ Source      1 │
      │             1< │
      │ Dest      N7:1 │
      │             0< │
      └─────────────┘
```

**ERROR HANDLING, IF MACHINE HAS BOTH RED AND BLUE PHOTO EYES, BUT NO PROX OR LEVEL SWITCH, THEN RETURN TO E-STOP POSITION**

0012

BLUE PHOTO EYE
DIGITAL INPUT BIT
BP
```
  B3:1
──┤ ├──
   3
```

RED PHOTO EYE
DIGITAL INPUT BIT
RP
```
  B3:1
──┤ ├──
   2
```

LEVEL SWITCH
DIGITAL INPUT BIT
LS
```
  B3:1
──┤/├──
   1
```

PROXIMITY SWITCH
DIGITAL INPUT BIT
PS
```
  B3:1
──┤/├──
   0
```

ERROR STATE
```
  B3:3
──⟨ ⟩──
   6
```

0013

ERROR STATE
B3:3
┤ ├
6

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─── MOV ──────────┐
│ Move             │
│ Source        0  │
│              0<  │
│ Dest       N7:1  │
│              0<  │
└──────────────────┘
```

0014                                    ─< END >─

**0000**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─EQU─────────┐
│ Equal       │
│ Source A  N7:1 │
│            0< │
│ Source B    0 │
│            0< │
└─────────────┘
```

ESTOP
B3:3
◇◇
0

**0001**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─EQU─────────┐
│ Equal       │
│ Source A  N7:1 │
│            0< │
│ Source B    1 │
│            1< │
└─────────────┘
```

INIT Conditions
B3:3
◇◇
1

**0002**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─EQU─────────┐
│ Equal       │
│ Source A  N7:1 │
│            0< │
│ Source B    2 │
│            2< │
└─────────────┘
```

Box Arrived at
Filling Station
B3:3
◇◇
2

**0003**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─EQU─────────┐
│ Equal       │
│ Source A  N7:1 │
│            0< │
│ Source B    3 │
│            3< │
└─────────────┘
```

Box Filling with
Pecans
B3:3
◇◇
3

**0004**

SYSTEM MODE:
1-2-3-4-5
0-ESTOP
SYSTEM_MODE

```
┌─EQU─────────┐
│ Equal       │
│ Source A  N7:1 │
│            0< │
│ Source B    4 │
│            4< │
└─────────────┘
```

Box Filling with
Walnuts
B3:3
◇◇
4

```
0005            SYSTEM MODE:
                1-2-3-4-5
                0-ESTOP
                SYSTEM_MODE                                          Box Filling Complete
                    ┌───── EQU ─────┐                                       B3:3
                    │ Equal         │                                       ─<  >─
                    │ Source A   N7:1                                         5
                    │               0< │
                    │ Source B      5  │
                    │               5< │
                    └──────────────────┘


0006                                                                      ─< END >─
```