

Schematic Reference	
FIOC CD	T3-2050-FIOC.D.SchDoc
FIOC Motor Relay Board	T3-2051-FIOC-Relay.SchDoc
T3C023	T3-2205-T3C023.SchDoc

Schematic Reference	
710-459	Tube Ring Cable Harness
710-460	Tube Ring Electronics
710-461	Chopping Secondary Assy

The Focus control are located on the MCC2 GUI Tab.
 Details are located in MCC/Details/FIOC.
 The ic/fio_c/focus.c program controls the focus control.

Summary of the focus program:

User Variables:

```

int enable; // UI: enable control loop [0=off, 1=on]
int adj_enable; // UI: enables Temperature/Position adjustment to focus.[0=off, 1=on]

float user_dpos; // UI: user requested focus position.
float adj_zero; // UI: adj_value when user_dpos is set (for relative adjustments)
float adj_value; // Software calculated adjustment value using Temperature and Position.

float dpos; // UI: requested Focus position as voltage (user_dpos + adjustment)
float apos; // AI: value of Focus position indicator [-7.33 - 7.0 volts]
int speed; // DO: Focus Speed [0=slow | 1=fast]
int stuck; // UO: set if focus does not respond to move command
  
```

Digital Output:

```

FIOC_DO_Focus_In - opto 22 logic: 0=stop; 1=focus_in
FIOC_DO_Focus_Out - opto 22 logic: 0=stop; 1=focus_out
FIOC_DO_Focus_Fast - opto 22 logic: 0=slow; 1=fast;
FIOC_DO_Focus_Brake - opto 22 logic: 0=on; 1=off;
  
```

Analog Inputs:

```

FIOC_AI_Focus_Pos - raw ranges -10.99 to +10.55 (-7.33 to +7.00V scaled by relay board).
  
```

Summary of Logic:

apos is the focus position, the relay board reduces the voltage by 2/3 to bring the +/- 15v range to within +/- 10 volts of the opto22 A2D. The focus program, multiplies the opto22 A2D input by 1.5 for focus.apos:
 $focus.apos = FIOC_AI_Focus_Pos * 1.5;$

The FIOC_DO_Focus_Fast is set to 1. In the past, the slow setting would cause the motor to stick. User operation of Fast/Slow was removed from the GUI.

The operator must set focus.enable ON to allow changes in the focus. When focus.enable is ON, the focus program tries to position the focus.apos to match focus.dpos. A match is when $abs(focus.apos - focus.dpos) < 0.05$ volts.

```

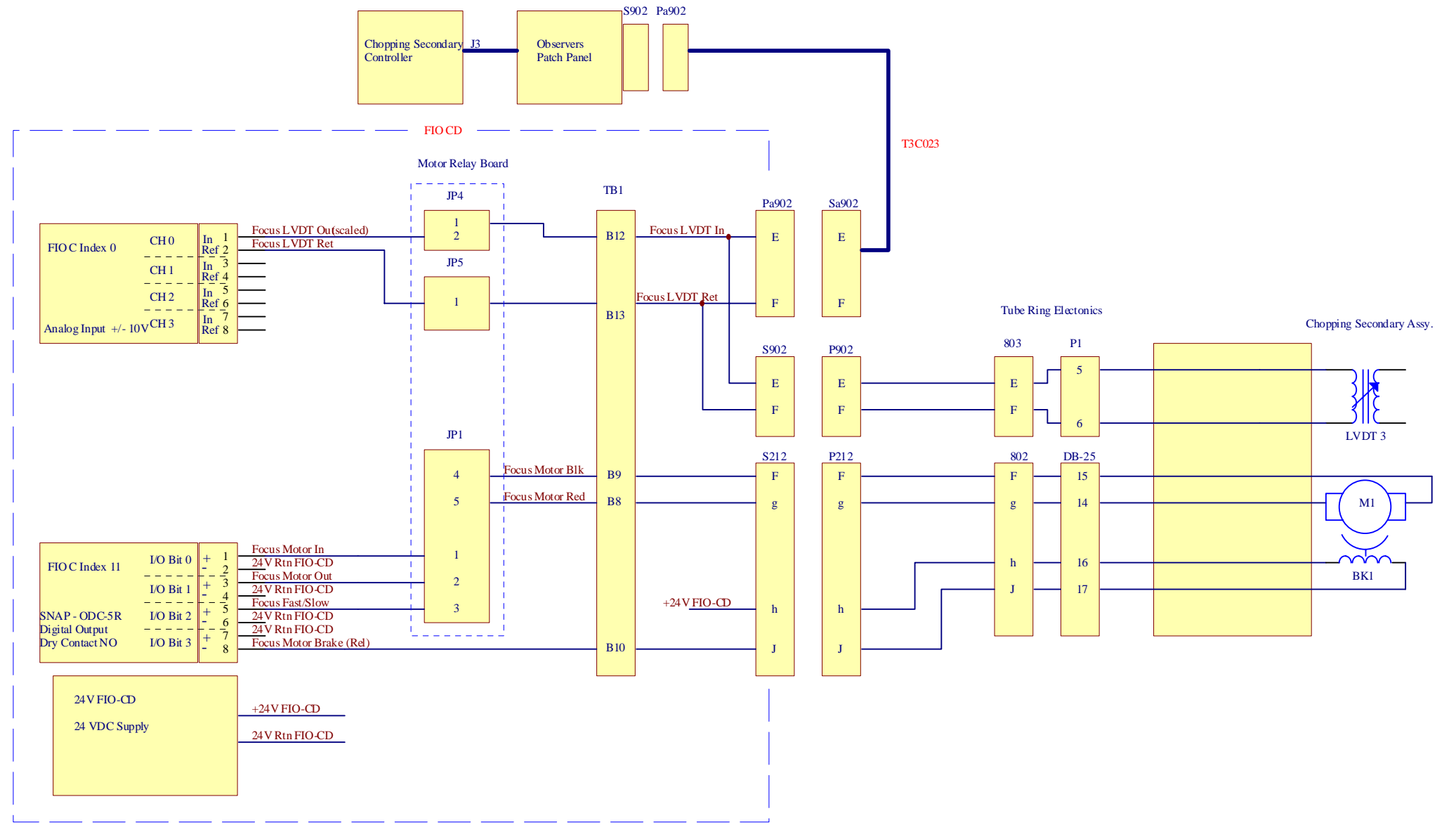
To move the focus In:
FIOC_DO_Focus_In = 1
FIOC_DO_Focus_Out = 0
FIOC_DO_Focus_Brake = 1
To move the focus Out:
FIOC_DO_Focus_In = 0
FIOC_DO_Focus_Out = 1
FIOC_DO_Focus_Brake = 1
To disable movement:
FIOC_DO_Focus_In = 0
FIOC_DO_Focus_Out = 0
FIOC_DO_Focus_Brake = 0
  
```

When trying to move the focus mechanism, if the voltages does not change within 1.5 seconds, a stuck flag is set to alert the operator. And mcc1 warning is generated with the focus is stuck.

User_dpos is set the the user via the tcs commands to change the focus dpos. When user_dpos is set the temperature_position_adjust is calculated and stored in adj_zero (zero point for adjustment). In the 10Hz loop, the adj_value is calculated. The actual desired position, dpos is:

```

if( adj_enable )
dpos = user_dpos + (adj_value - adj_zero);
else
dpos = user_dpos;
  
```



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