

The program to control the counterweight is ic/fio_c/cw.c.

Counterweight are confusing. Partly because old tcs1 had a stange, non-consistent naming system
 For TCS3, new names were establish. This table summarizes the changes:

MoveLimit inx pos	NewName	Descriptions	TCS1 or Old Names	CSR enable	tcs1 cw_cntl	tcs1 cw_sense	Mv_Neg	Mv_Pos	neg
0	THF.1	Tube-Hor-2-Fast	15(TH)	1	4	CW0 TH	CW04_Dn	CW04_Up	-4.05
4.10									
1	THS.2	Tube-Hor-1-Slow	4	0	4	CW04	CW04_Dn	CW04_Up	-7.75
6.36									
2	TVF.3	Tube-Ver-3-Fast	16(TV1)	1	5	CW09_TV1	CW05_Dn	CW05_Up	-5.10
6.00									
3	TVF.4	Tube-Ver-4-Fast	17(TV2)	1	6	CW10_TV2	CW06_Dn	CW06_Up	-5.10
6.00									
4	TVS.5	Tube-Ver-1-Slow	5	0	5	CW05	CW05_Dn	CW05_Up	-5.07
5.11									
5	TVS.6	Tube-Ver-2-Slow	6	0	6	CW06	CW06_Dn	CW06_Up	-5.17
5.11									
6	YHF.7	Yoke-Hor-2-Fast	14(YH)	1	1	CCW YH	CW01_Dn	CW01_Up	-5.50
5.56									
7	YHF.8	Yoke-Hor-3-Fast	NEW or CCW8	1	2	CW08	CW02_Dn	CW02_Up	-5.40
5.40									
8	YHS.9	Yoke-Hor-1-Slow	1	0	1	CW01	CW01_Dn	CW01_Up	-6.96
7.17									
9	YVS.10	Yoke-Ver-1-Slow	2	0	2	CW02	CW02_Dn	CW02_Up	-4.90
5.25									
10	YVS.11	Yoke-Ver-2-Slow	3	0	3	CW03	CW03_Dn	CW03_Up	-5.03
5.13									

CSR Enable - This is the value of FIOC_DO_CRS_Enable Digital Output connected to the CSR_ENB on the hardware.
 The CRS_Enable bank switches the CW1-6 control signal, allowing the 6 control UP/DW pairs to control 12 counterweights.

cw_cntl - There are only 6 pairs of control signals. A pair consists of an Up and a Down Digital Output bit. This column indicates which control pair is used for a specific counter weight. Label as CW1_UP, CW1_DN, etc on the schematics.

cw_sense - Each counterweight position has an individual sense line. These values indicate the the sense line names from the tcs1 mcc.

T3lib defines the following for each counterweight. Refer to source code for latest values.

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CW_val_close[CW_NUM] // position is reached if apos within +/- val_close of dpos
CW_timeout[CW_NUM] // number of cycles to determine if CW is stuck (more for slow Cws)
CW_val_min[CW_NUM] // min (neg) value for counter weight
CW_val_max[CW_NUM] // max (pos) value for counter weight
  
```

CW control is not very precise. The CW control works as:

Auto mode:

1. Only 1 CW is moved at one time. The .active variable indicates which counterweight will be controlled.
2. The CW.Dpos command sets the .dpos and .state to indicate the requested position and direction to move the active counterweight.
3. The cw code moves the active counterweight in the direction indicated by .state until the .apos is within +/- CW_val_close of the dpos or a software position limit is reached. The .state is changed on DONE. If the .apos is steady for CW_timeout, the .state is set to STUCK.

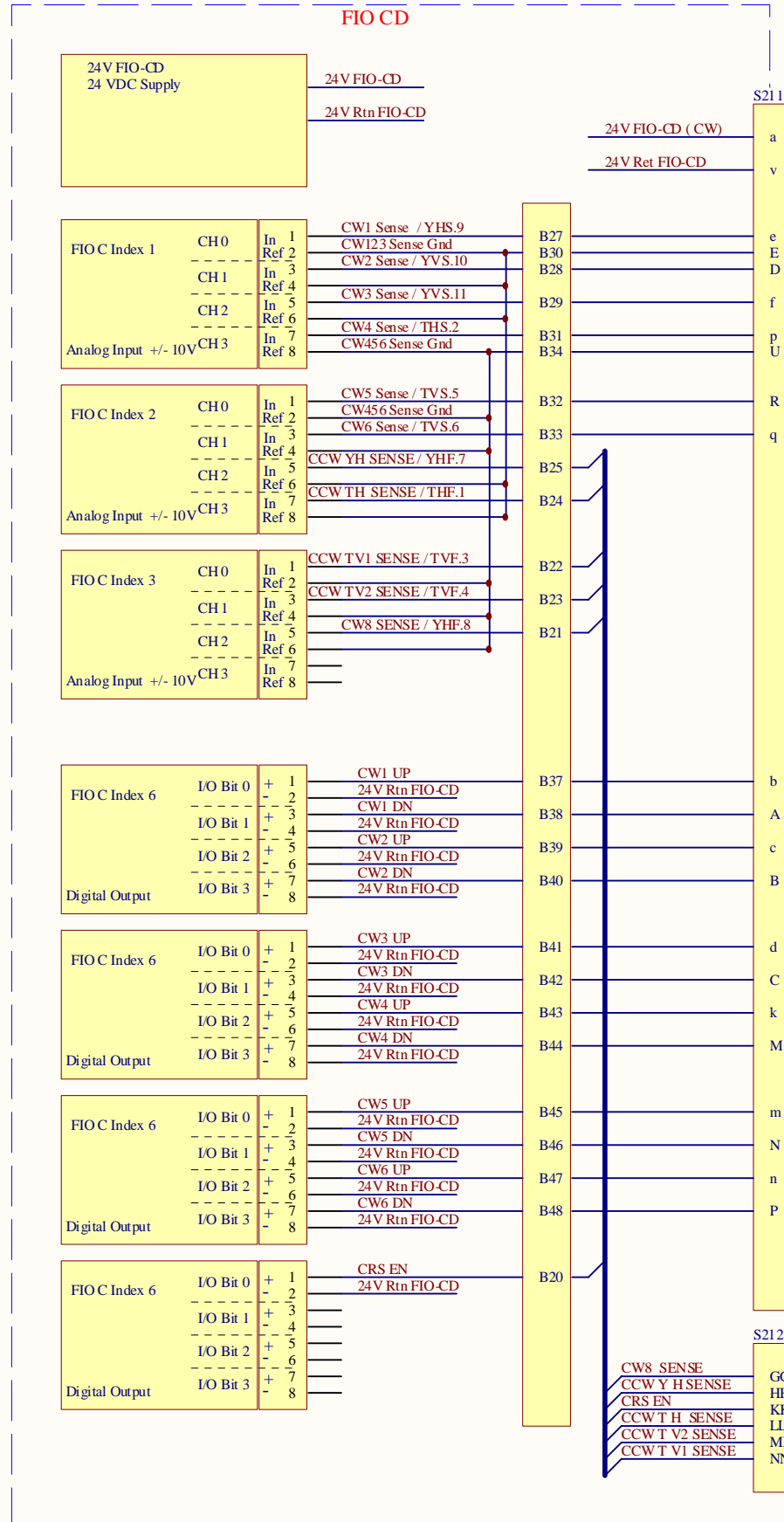
The stick values are different for each counter weight. Refer to t3lib.h: CW_timeout[] for the number of cycles to determine when a counterweight is stuck.

Mnaual mode:

1. The CW.Manual.Up or CW.Manual.Down command indicates the counterweight to be moved and the direction to move it. The .manual_active variable indicates either the cw being moved, or the first cw of a pair.
2. The cw code activates the appropriate up, down, and enable control lines for the specified counterweight and keeps them active until a CW.Manual.Clear command is received.
3. The apos and dpos parameters are updated as in the auto mode, but are only used for informational display while in the manual mode. The dpos value is set equal to the apos value every cycle so that if the system is switched to the auto mode the counterweights will remain at their last position. Software limits are monitored and displayed on the mcc, but reaching a software limit will not automatically stop the counterweight motion as it would in the auto mode.
4. There are three pairs of counterweights which may optionally be moved at the same time.

The .enable flag enables/disable CW control (controlled avail Balance Tab).

Schematic Reference	
FIOC D	T3-2050-FIOC D.SchDoc



Title	T3-3030-COUNTER_WEIGHT_OVERVIEW.SCHDOC	
Size	Number	Revision
B		
Date:	4/25/2008	Sheet of
File:	H:\Documents and Settings\...T3-3030-COUNTER_WEIGHT_OVERVIEW.SCHDOC	