Compact™ High Speed Counter Module Programming

(Catalog Number 1769-HSC)

This Programming Quick Reference contains at-a-glance listings of the:

- Configuration Array
- Output Array
- Input Array

Refer to the *Compact High Speed Counter Module User Manual*, publication 1769-UM006A-EN-P for more information.

Publication 1769-QR002A-EN-E - March 2002

Configuration Array

The default value for the Configuration Array is all zeros except where noted.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Description		
0							NumberOfCtrs					PFE			CtrRst	OCLO	GeneralConfigBits	→	OvercurrentLatchOff CtrReset ProgToFaultEn
1	Filter_Z1			Filter_B1			Filter_A1		Filter_Z0			Filter_B0			Filter_A0		FilterA0_0, FilterA0_1 -- ...Z1_1		
2									Out3 PSR	Out2 PSR	Out1 PSR	Out0 PSR	Out3 PM	Out2 PM	Out1 PM	Out0 PM	Out0ProgramStateRun -- Out3... and Out0ProgramMode -- Out3...		NumberOfCounters_0[1] NumberOfCounters_1
3													Out3 PV	Out2 PV	Out1 PV	Out0 PV	Out0ProgramValue --- Out3...		
4									Out3 FSR	Out2 FSR	Out1 FSR	Out0 FSR	Out3 FM	Out2 FM	Out1 FM	Out0 FM	Out0FaultStateRun --Out3FaultStateRun and Out0FaultMode -- Out3FaultMode		
5													Out3 FV	Out2 FV	Out1 FV	Out0 FV	Out0FaultValue -- Out3FaultValue		
6 7	Ctr0MaxCount[2]																Ctr0MaxCount		
8 9	Ctr0MinCount[3]																Ctr0MinCount		
10 11	Ctr0Preset																Ctr0Preset		
12	Ctr0Hysteresis																Ctr0Hysteresis		
13	Ctr0Scalar[4]																Ctr0Scalar		
14	Ctr0CyclicRateUpdateTime[5]																Ctr0CyclicRateUpdateTime		
15				Linear		Storage Mode								Operational Mode			Ctr0ConfigFlags	→	Ctr0Config.OperationalMode_0 Ctr0Config.OperationalMode_1 Ctr0Config.OperationalMode_2 Ctr0Config.StorageMode_0 Ctr0Config.StorageMode_1 Ctr0Config.StorageMode_2 Ctr0Config.Linear
16 17	Ctr1MaxCount[2]																Ctr1MaxCount		
18 19	Ctr1MinCount[3]																Ctr1MinCount		
20 21	Ctr1Preset																Ctr1Preset		
22	Ctr1Hysteresis																Ctr1Hysteresis		
23	Ctr1Scalar[4]																Ctr1Scalar		
24	Ctr1CyclicRateUpdateTime[5]																Ctr1CyclicRateUpdateTime		
25				Linear		Storage Mode								Operational Mode			Ctr1ConfigFlags	→	Ctr1Config.OperationalMode_0 Ctr1Config.OperationalMode_1 Ctr1Config.OperationalMode_2 Ctr1Config.StorageMode_0 Ctr1Config.StorageMode_1 Ctr1Config.StorageMode_2 Ctr1Config.Linear
26 27	Ctr2MaxCount[2]																Ctr2MaxCount		
28 29	Ctr2MinCount[3]																Ctr2MinCount		
30 31	Ctr2Preset																Ctr2Preset		
32	Ctr2Hysteresis																Ctr2Hysteresis		
33	Ctr2Scalar[4]																Ctr2Scalar		
34	Ctr2CyclicRateUpdateTime[5]																Ctr2CyclicRateUpdateTime		
35				Linear													Ctr2ConfigFlags	→	Ctr2Config.Linear
36 37	Ctr3MaxCount[2]																Ctr3MaxCount		
38 39	Ctr3MinCount[3]																Ctr3MinCount		
40 41	Ctr3Preset																Ctr3Preset		
42	Ctr3Hysteresis																Ctr3Hysteresis		
43	Ctr3Scalar[4]																Ctr3Scalar		
44	Ctr3CyclicRateUpdateTime[5]																Ctr3CyclicRateUpdateTime		
45				Linear													Ctr3ConfigFlags	→	Ctr3Config.Linear
46 47	Range0to11[0].HighLimit																Range0to11[0].HighLimit		
48 49	Range0to11[0].LowLimit																Range0to11[0].LowLimit		
50	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[0].OutputControl		
51								Inv				Type			ToThisCtr		Range0to11[0].ConfigFlags	→	Range0To11[0].ToThisCounter_0 Range0To11[0].ToThisCounter_1 Range0To11[0].Type Range0To11[0].Invert
52 53	Range0to11[1].HighLimit																Range0to11[1].HighLimit		
54 55	Range0to11[1].LowLimit																Range0to11[1].LowLimit		
56	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[1].OutputControl		
57								Inv				Type			ToThisCtr		Range0to11[1].ConfigFlags	→	Range0To11[1].ToThisCounter_0 Range0To11[1].ToThisCounter_1 Range0To11[1].Type Range0To11[1].Invert
58 59	Range0to11[2].HighLimit																Range0to11[2].HighLimit		
60 61	Range0to11[2].LowLimit																Range0to11[2].LowLimit		
62	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[2].OutputControl		

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Description		
63								Inv				Type			ToThisCtr		Range0to11[2].ConfigFlags	→	Range0To11[2].ToThisCounter_0 Range0To11[2].ToThisCounter_1 Range0To11[2].Type Range0To11[2].Invert
64 65	Range0to11[3].HighLimit																Range0to11[3].HighLimit		
66 67	Range0to11[3].LowLimit																Range0to11[3].LowLimit		
68	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[3].OutputControl		
69								Inv				Type			ToThisCtr		Range0to11[3].ConfigFlags	→	Range0To11[3].ToThisCounter_0 Range0To11[3].ToThisCounter_1 Range0To11[3].Type Range0To11[3].Invert
70 71	Range0to11[4].HighLimit																Range0to11[4].HighLimit		
72 73	Range0to11[4].LowLimit																Range0to11[4].LowLimit		
74	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[4].OutputControl		
75								Inv				Type			ToThisCtr		Range0to11[4].ConfigFlags	→	Range0To11[4].ToThisCounter_0 Range0To11[4].ToThisCounter_1 Range0To11[4].Type Range0To11[4].Invert
76 77	Range0to11[5].HighLimit																Range0to11[5].HighLimit		
78 79	Range0to11[5].LowLimit																Range0to11[5].LowLimit		
80	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[5].OutputControl		
81								Inv				Type			ToThisCtr		Range0to11[5].ConfigFlags	→	Range0To11[5].ToThisCounter_0 Range0To11[5].ToThisCounter_1 Range0To11[5].Type Range0To11[5].Invert
82 83	Range0to11[6].HighLimit																Range0to11[6].HighLimit		
84 85	Range0to11[6].LowLimit																Range0to11[6].LowLimit		
86	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[6].OutputControl		
87								Inv				Type			ToThisCtr		Range0to11[6].ConfigFlags	→	Range0To11[6].ToThisCounter_0 Range0To11[6].ToThisCounter_1 Range0To11[6].Type Range0To11[6].Invert
88 89	Range0to11[7].HighLimit																Range0to11[7].HighLimit		
90 91	Range0to11[7].LowLimit																Range0to11[7].LowLimit		
92	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[7].OutputControl		
93								Inv				Type			ToThisCtr		Range0to11[7].ConfigFlags	→	Range0To11[7].ToThisCounter_0 Range0To11[7].ToThisCounter_1 Range0To11[7].Type Range0To11[7].Invert
94 95	Range0to11[8].HighLimit																Range0to11[8].HighLimit		
96 97	Range0to11[8].LowLimit																Range0to11[8].LowLimit		
98	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[8].OutputControl		
99								Inv				Type			ToThisCtr		Range0to11[8].ConfigFlags	→	Range0To11[8].ToThisCounter_0 Range0To11[8].ToThisCounter_1 Range0To11[8].Type Range0To11[8].Invert
100 101	Range0to11[9].HighLimit																Range0to11[9].HighLimit		
102 103	Range0to11[9].LowLimit																Range0to11[9].LowLimit		
104	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[9].OutputControl		
105								Inv				Type			ToThisCtr		Range0to11[9].ConfigFlags	→	Range0To11[9].ToThisCounter_0 Range0To11[9].ToThisCounter_1 Range0To11[9].Type Range0To11[9].Invert
106 107	Range0to11[10].HighLimit																Range0to11[10].HighLimit		
108 109	Range0to11[10].LowLimit																Range0to11[10].LowLimit		
110	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[10].OutputControl		
111								Inv				Type			ToThisCtr		Range0to11[10].ConfigFlags	→	Range0To11[10].ToThisCounter_0 Range0To11[10].ToThisCounter_1 Range0To11[10].Type Range0To11[10].Invert
112 113	Range0to11[11].HighLimit																Range0to11[11].HighLimit		
114 115	Range0to11[11].LowLimit																Range0to11[11].LowLimit		
116	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range0to11[11].OutputControl		
117								Inv				Type			ToThisCtr		Range0to11[11].ConfigFlags	→	Range0To11[11].ToThisCounter_0 Range0To11[11].ToThisCounter_1 Range0To11[11].Type Range0To11[11].Invert

(1) The default value for NumberOfCounters is 01 (two counters declared).

(2) The default value for Ctr*n*MaxCount is +2,147,483,647 decimal for counters 0 and 1. The default value is 0 for counters 2 and 3.

(3) The default value for Ctr*n*MinCount is -2,147,483,648 decimal for counters 0 and 1. The default value is 0 for counters 2 and 3.

(4) The default value for Ctr*n*Scalar is 1 for counters 0 and 1. The default value is 0 for counters 2 and 3.

(5) The default value for Ctr*n*CyclicRateUpdateTime is 10 for counters 0 and 1. The default value is 0 for counters 2 and 3.

Output Array

The default value for the Output Array is all zeros.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Description	
0	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	OutputOnMask.0 -- OutputOnMask.15	
1	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	OutputOffMask.0 -- OutputOffMask.15	
2	R15	R14	R13	R12	R11	R10	R09	R08	R07	R06	R05	R04	R03	R02	R01	R00	RangeEn.0 -- RangeEn.15	
3																	Reserved	
4									RBF								ResetBlownFuse	
5							RPW	RREZ	Z Inh	Z Inv	D Inh	D Inv	RCU	RCO	SP	En	Ctr0ControlBits →	Ctr0En Ctr0SoftPreset Ctr0ResetCountOverflow Ctr0ResetCountUnderflow Ctr0DirectionInvert Ctr0DirectionInhibit Ctr0ZInvert Ctr0ZInhibit Ctr0ResetRisingEdgeZ Ctr0ResetCtrPresetWarning
6							RPW	RREZ	Z Inh	Z Inv	D Inh	D Inv	RCU	RCO	SP	En	Ctr1ControlBits	
7							RPW					D Inv	RCU	RCO	SP	En	Ctr2ControlBits	
8							RPW					D Inv	RCU	RCO	SP	En	Ctr3ControlBits	
9																	Reserved	
10 11	Range12To15[0].HiLimOrDirWr																Range12To15[0].HiLimOrDirWr	
12 13	Range12To15[0].LowLimit																Range12To15[0].LowLimit	
14	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range12To15[0].OutputControl.0 ... .15	
15								Inv			LDW	Type			ToThisCtr		Range12To15[0].Config Flags →	Range12To15[0].ToThisCounter_0 Range12To15[0].ToThisCounter_1 Range12To15[0].Type Range12To15[0].LoadDirectWrite Range12To15[0].Invert
16 17	Range12To15[1].HiLimOrDirWr																Range12To15[1].HiLimOrDirWr	
18 19	Range12To15[1].LowLimit																Range12To15[1].LowLimit	
20	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range12To15[1].OutputControl.0 ... .15	
21								Inv			LDW	Type			ToThisCtr		Range12To15[1].Config Flags →	Range12To15[1].ToThisCounter_0 Range12To15[1].ToThisCounter_1 Range12To15[1].Type Range12To15[1].LoadDirectWrite Range12To15[1].Invert
22 23	Range12To15[2].HiLimOrDirWr																Range12To15[2].HiLimOrDirWr	
24 25	Range12To15[2].LowLimit																Range12To15[2].LowLimit	
26	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range12To15[2].OutputControl.0 ... .15	
27								Inv			LDW	Type			ToThisCtr		Range12To15[2].Config Flags →	Range12To15[2].ToThisCounter_0 Range12To15[2].ToThisCounter_1 Range12To15[2].Type Range12To15[2].LoadDirectWrite Range12To15[2].Invert
28 29	Range12To15[3].HiLimOrDirWr																Range12To15[3].HiLimOrDirWr	
30 31	Range12To15[3].LowLimit																Range12To15[3].LowLimit	
32	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Range12To15[3].OutputControl.0 ... .15	
33								Inv			LDW	Type			ToThisCtr		Range12To15[3].Config Flags →	Range12To15[3].ToThisCounter_0 Range12To15[3].ToThisCounter_1 Range12To15[3].Type Range12To15[3].LoadDirectWrite Range12To15[3].Invert

Input Array

The default value for the Input Array is all zeros.

	15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0	Description	
0											Z1	B1	A1	Z0	B0	A0	InputStateA0 -- InputStateZ1	
1	Out15	Out14	Out13	Out12	Out11	Out10	Out09	Out08	Out07	Out06	Out05	Out04	Out03	Out02	Out01	Out00	Readback.0 -- Readback.15	
2	InvalidRangeLimit12…15				InvalidCtrAssignToRange12…15				GenErr	InvOut	MCfg		Out0Overcurrent -- Out3…				Status Flags →	InvalidRangeLimit12 ... 15 InvalidCtrAssignToRange12 ... 15 GenError InvalidOutput ModConfig Out0Overcurrent0 ... 3
3	R15	R14	R13	R12	R11	R10	R09	R08	R07	R06	R05	R04	R03	R02	R01	R00	RangeActive.0 -- RangeActive.15	
4 5	Ctr[0].CurrentCount																Ctr[0].CurrentCount	
6 7	Ctr[0].StoredCount																Ctr[0].StoredCount	
8 9	Ctr[0].CurrentRate																Ctr[0].CurrentRate	
10 11	Ctr[0].PulseInterval																Ctr[0].PulseInterval	
12										C0PW	RV		IDW	REZ	CUdf	COvf	Ctr[0].StatusFlags →	Ctr[0].Overflow Ctr[0].Underflow Ctr[0].RisingEdgeZ Ctr[0].InvalidDirectWrite --- Ctr[0].RateValid Ctr[0].PresetWarning
13																	Reserved	
14 15	Ctr[1].CurrentCount																Ctr[1].CurrentCount	
16 17	Ctr[1].StoredCount																Ctr[1].StoredCount	
18 19	Ctr[1].CurrentRate																Ctr[1].CurrentRate	
20 21	Ctr[1].PulseInterval																Ctr[1].PulseInterval	
22										C1PW	RV	IC	IDW	REZ	CUdf	COvf	Ctr[1].StatusFlags →	Ctr[1].Overflow Ctr[1].Underflow Ctr[1].RisingEdgeZ Ctr[1].InvalidDirectWrite Ctr[1].InvalidCounter Ctr[1].RateValid Ctr[1].PresetWarning
23																	Reserved	
24 25	Ctr[2].CurrentCount																Ctr[2].CurrentCount	
26 27	Ctr[2].CurrentRate																Ctr[2].CurrentRate	
28										C2PW	RV	IC	IDW		CUdf	COvf	Ctr[2].StatusFlags →	Ctr[2].Overflow Ctr[2].Underflow --- Ctr[2].InvalidDirectWrite Ctr[2].InvalidCounter Ctr[2].RateValid Ctr[2].PresetWarning
29																	Reserved	
30 31	Ctr[3].CurrentCount																Ctr[3].CurrentCount	
32 33	Ctr[3].CurrentRate																Ctr[3].CurrentRate	
34										C3PW	RV	IC	IDW		CUdf	COvf	Ctr[3].StatusFlags →	Ctr[3].Overflow Ctr[3].Underflow --- Ctr[3].InvalidDirectWrite Ctr[3].InvalidCounter Ctr[3].RateValid Ctr[3].PresetWarning

www.rockwellautomation.com

Corporate Headquarters
Rockwell Automation, 777 East Wisconsin Avenue, Suite 1400, Milwaukee, WI, 53202-5302 USA, Tel: (1) 414.212.5200, Fax: (1) 414.212.5201

Headquarters for Allen-Bradley Products, Rockwell Software Products and Global Manufacturing Solutions
Americas: Rockwell Automation, 1201 South Second Street, Milwaukee, WI 53204-2496 USA, Tel: (1) 414.382.2000, Fax: (1) 414.382.4444
Europe: Rockwell Automation SA/NV, Vorstlaan/Boulevard du Souverain 36-BP 3A/B, 1170 Brussels, Belgium, Tel: (32) 2 663 0600, Fax: (32) 2 663 0640
Asia Pacific: Rockwell Automation, 27/F Citicorp Centre, 18 Whitfield Road, Causeway Bay, Hong Kong, Tel: (852) 2887 4788, Fax: (852) 2508 1846

Headquarters for Dodge and Reliance Electric Products
Americas: Rockwell Automation, 6040 Ponders Court, Greenville, SC 29615-4617 USA, Tel: (1) 864.297.4800, Fax: (1) 864.281.2433
Europe: Rockwell Automation, Brühlstraße 22, D-74834 Elztal-Dallau, Germany, Tel: (49) 6261 9410, Fax: (49) 6261 17741
Asia Pacific: Rockwell Automation, 55 Newton Road, #11-01/02 Revenue House, Singapore 307987, Tel: (65) 351 6723, Fax: (65) 355 1733

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