

**AVAILABLE AUX CODES ON CRUSADER-II, SERIES M & SERIES G**

31 Jan 02- KKS

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
1	100	Mirror X Axis
2	200	Mirror Y Axis
3	300	Mirror X & Y Axis
4	400	Mirror Z Axis
5	500	Mirror X & Z Axis
6	600	Mirror Y & Z Axis
7	700	Mirror X, Y, & Z Axis
8	800	Cancel All Mirrors
9	900	Double Next X, Y, & Z Coordinates
10	1000	Turn On Contouring Mode
11	1101	Enable Zero Shift
12	1110	Enable Outer Limit
13	1111	Set and Enable Software Limit Switches
14	1112	Enable Outer Limits
15	1113	Set Limits Only
16	1114	Disable Inner Limit
17	1115	Set and Enable Inner Limit Switches
18	1116	Enable Inner Limits
19	1117	Set Limits Only
20	1150	Disable Shifted Inner Limit
21	1151	Set and Enable Shifted Limit
22	1152	Enable Shifted Outer Limit
23	1153	Set Limits Only
24	1154	Disable Shifted Inner Limit
25	1155	Set and Enable Shifted Inner Limit
26	1156	Enable Shifted Inner Limit
27	1157	Set Limits Only
28	1160	Disable Backlash Compensation
29	1161	Set and Enable Backlash Compensation
30	1162	Enable Backlash Compensation
31	1165	Disable Limits on U and W Axes (Series "G" Only)
32	1166	Set and Enable Limits on U and W (Series "G" Only)
33	1167	Enable Limits on U and W (Series "G" Only)
34	1168	Set Limits on U and W (Series "G" Only)
35	1121	Seek First Zero Crossing on X Axis
36	1122	Seek First Zero Crossing on Y Axis
37	1124	Seek First Zero Crossing on Z Axis

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
38	1131	Seek Limit Switch, Reverse and Stop at First Zero Crossing on X Axis
39	1132	Seek Limit Switch, Reverse and Stop at First Zero Crossing on Y Axis
40	1134	Seek Limit Switch, Reverse and Stop at First Zero Crossing on Z Axis
41	1141	Enable Zero Crossing Detection on X Axis
42	1142	Enable Zero Crossing Detection on Y Axis
43	1144	Enable Zero Crossing Detection on Z Axis
44	1170	Execute for Display of Absolute Coordinate
45	1171	Execute to Stop Display of Absolute Coordinate
46	1200	Disable Lathe Mode
47	1201	Enable Lathe Mode (Series "M" & "G" Only)
48	1210	Enable Axial Threading
49	1211	Enable Radial Threading
50	1212	Disable Axial Turning
51	1213	Enable Axial Turning
52	1300	Cancel Axis Swapping
53	1310	Swap X-Y Axis
54	1311	Swap Y-Z Axis
55	1312	Swap X-Z Axis
56	1313	Enable Z Plane Retract in G80 Cycles
57	1314	Disable Z Plane Retract in G80 Cycles
58	1400	Disable Feed Rate Override for Rapid Moves
59	1401	Enable Feed Rate Override
60	1410	Cancel Vectorial Rapid Mode
61	1411	Set Vectorial Rapid Mode
62	1420	Clear Both (Z & Feed) Move Inhibits
63	1421	Set Z Move Inhibit
64	1422	Clear Z Move Inhibit
65	1423	Set Feed Move Inhibit
66	1424	Clear Feed Move Inhibit
67	1425	Set Both (Z & Feed) Move Inhibits
68	1500	Enable Program Enter Mode
69	1501	Disable Program Enter Mode
70	1600	Disable Dryrun Mode
71	1601	Enable Dryrun with Cutter Compensation
72	1602	Enable Dryrun without Cutter Compensation

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
73	1603	Simulation Off
74	1604	Simulation On
75	1605	Beeper Off for Keys
76	1606	Beeper On for Keys
77	1607	Clear Drift Registers
78	1608	Display Available Memory
79	1609	Clear Handwheel Mode
80	1610	Set Handwheel Mode
81	1611	System Warm Reset
82	1612	Cold Start (Series "M" Only)
83	1613	Move Default Field Mods to Shared Memory (Series "G" Only)
84	1614	Terminate Move
85	1615	Preset Axis From a Manual Step (Series "G" Only)
86	17xx	Fill Register "xx" with Spindle Direction
87	1800	Break Out of "DO" Loop if "V0" Not Zero
88	1801	Break Out of "DO" Loop if "V1" Not Zero
89	1802	Break Out of "DO" Loop if "V2" Not Zero
90	1803	Break Out of "DO" Loop if "V3" Not Zero
91	1804	Break Out of "DO" Loop if "V4" Not Zero
92	1805	Break Out of "DO" Loop if "V5" Not Zero
93	1806	Break Out of "DO" Loop if "V6" Not Zero
94	1807	Break Out of "DO" Loop if "V7" Not Zero
95	1808	Break Out of "DO" Loop if "V8" Not Zero
96	1809	Break Out of "DO" Loop if "V9" Not Zero
97	1810	Set Infinite Loop
98	1900	Single Step by Event (Default)
99	1901	Single Step by Motion
100	2000	Turn Off Contouring Mode
101	2100	Turn Off Low Gain At Target Mode
102	2101	Turn On Drift
103	2102	Turn Off Drift
104	2110	Turn Off AC Target Drift
105	2111	Set AC Drift Gain to / 256 (Lowest)
106	2112	Set AC Drift Gain to / 128
107	2113	Set AC Drift Gain to / 64
108	2114	Set AC Drift Gain to / 32
109	2115	Set AC Drift Gain to / 16
110	2116	Set AC Drift Gain to / 8 (Highest)
111	2200	Turn On Low Gain at Target Mode
112	2500	Turn Off "Z Axis Readout Only" Mode
113	2600	Turn On "Z Axis Readout Only" Mode



<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
114	2700	Write to RS-232 Device in RS-274 Format
115	2701	Read from RS-232 Device in RS-274 Format
116	2702	Write to RS-232 Device in Anilam Format
117	2711	Enable Continuous Download Mode
118	2740	Loop Back Test
119	2754	Use RS-224-A (ISO) Characer Set
120	2758	Use RS-258 (ASCII) Characer Set
121	2765	Set 5 Bits Per Character
122	2766	Set 6 Bits Per Character
123	2767	Set 7 Bits Per Character
124	2768	Set 8 Bits Per Character
125	2770	Set No Parity
126	2771	Set Odd Parity
127	2772	Set Even Parity
128	2780	Set Baud Rate to 110 Bits Per Second
129	2781	Set Baud Rate to 150 Bits Per Second
130	2782	Set Baud Rate to 300 Bits Per Second
131	2783	Set Baud Rate to 600 Bits Per Second
132	2784	Set Baud Rate to 1200 Bits Per Second
133	2785	Set Baud Rate to 1800 Bits Per Second
134	2786	Set Baud Rate to 2400 Bits Per Second
135	2787	Set Baud Rate to 4800 Bits Per Second
136	2788	Set Baud Rate to 9600 Bits Per Second
137	2789	Set Baud Rate to 19200 Bits Per Second
138	2790	Set No Handshake
139	2791	Set Software Handshake (XON, XOFF)
140	2792	Set Hardware Handshake (DTR, DSR)
141	2800	Convert From 13 Byte Form to Compact Form
142	2801	Convert From Compact Form to 13 Byte Form
143	2900	Pack Program to Shortest Form
144	4000	Vxx <- Scaled Vxx
145	4300	Add Without Type Convert
146	4400	Subtract Without Type Convert
147	4500	Multiply With Type Convert
148	4600	Divide With Type Convert

### V REGISTER ARITHMETIC

V0 is used as an offset into 10 groups of 10 registers each (0-99). The symbol "<-" represents transfer of data to a register. (Vs) represents contents of register "s" (Source Register). Vd represents the destination register "d". Source register "s" is computed as ((V0) + X) and Destination register as ((V0) + Y). X and Y are the third and fourth digits of the Aux Code Used.

The quotient of an integer division is a whole number. The remainder or fractional part is discarded.

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
149	50XY	Vd <- (Vs) (Direct Transfer)
150	51XY	Vd <- V (Vs) (Indirect Transfer)
151	52XY	V (Vd) <- (Vs) (Indirect Transfer)
152	53XY	Vd <- (Vd) + (Vs) (Addition)
153	54XY	Vd <- (Vd) - (Vs) (Subtraction)
154	55XY	Vd <- (Vd) * (Vs) (Multiplication)
155	56XY	Vd <- (Vd) / (Vs) (Integer Division)
156	57XY	Vd <- (Vd) + y (Add Immeadiate)
157	58XY	Vd <- (Vd) - y (Subtract Immeadiate)
158	59XY	Vd <- - (Vs) (Negate)

### V REGISTER LOGIC

The V register specified as source (Vs) is tested and the V register specified as destination (Vd) is set to one if the result of the test is true, otherwise it is set to zero.

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
159	60XY	Vd <- 1, if (Vs) = 0, else Vd = 0
160	61XY	Vd <- 1, if (Vs) <> 0, else Vd = 0
161	62XY	Vd <- 1, if (Vs) > 0, else Vd = 0
162	63XY	Vd <- 1, if (Vs) < 0, else Vd = 0
163	64XY	Vd <- 1, if (Vs) >= 0, else Vd = 0
164	65XY	Vd <- 1, if (Vs) <= 0, else Vd = 0

### V REGISTER BOOLEAN ALGEBRA

The V register specified as source (Vs) is tested and the V register specified as destination (Vd) is set to one if the result of the test is true, otherwise it is set to zero.

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
165	66XY	Vd <- (Vd) AND (Vs)
166	67XY	Vd <- (Vd) OR (Vs)
167	68XY	Vd <- (Vd) XOR (Vs)
168	69XY	Vd <- NOT (Vs)

### V REGISTER SPECIAL FUNCTIONS

The Conversion Aux Codes "70RR" and "71RR" use both V registers to save results. In Aux 7000, the radius is computed as the square root of the sum of the square of the contents of the registers, and the angle as the ArcTan of the ratio of the contents of the two registers.

The coordinate is computed as the product of the radius and the Cosine of the angle, and the Y coordinate as the product of the radius and the Sine of the angle.

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
169	70XY	Rectangular to Polar Conversion Radius = Vd <- Square root ((Vd) **2 + (Vs) **2) Angle = Vs <- ArcTan (Vs) / (Vd)
170	71XY	Polar to Rectangular Conversion X Coordinate = Vd <- (Vd) * Cos (Vs) Y Coordinate = Vd <- (Vd) * Sin (Vs)
171	72ds	Vd <- Square Root (Vs)
172	73ds	Vd <- Sin (Vs)
173	74ds	Vd <- Cos (Vs)
174	75ds	Vd <- Tan (Vs)
175	76ds	Vd <- ArcSin (Vs)
176	77ds	Vd <- ArcCos (Vs)
177	78ds	Vd <- Log (Vs)
178	79ds	Vd <- Exp (Vs)

<u>SERIAL#</u>	<u>AUX CODE</u>	<u>EXPLANATION</u>
179	80nn	Put "nn" as Error Number
180	9000	Store Feed Rate and Position in V Registers V26 <- Actual X Coordinate V27 <- Actual Y Coordinate V28 <- Actual Z Coordinate V29 <- Programmed Feed Rate
181	9030	Cancel Mold Rotation
182	9031	Mold Rotation on X Axis
183	9032	Mold Rotation on Y Axis
184	9033	Mold Rotation on Z Axis
185	908x	Store Next Move Block in V Register and execute G8x Cycle V21 <- X Coordinates V22 <- Y Coordinates V23 <- Z Coordinates
186	9090	Cancel X, Y, and Z Expansion in G8x Cycle
187	9093	Clear Units/Rev Expansion
188	9094	Enable Units/Min Mode
189	9095	Enable Units/Rev Mode
190	91ds	Vd + 1 if Vs in Inches
191	99x0	Set Vx + 1 if in Inch Mode, else Vx = 0



## Crusader Error Codes and Messages

1.	Excess Digit	61.	Spindle Running
2.	Tape Power	62.	Bad Spindle Speed
3.	No Tape	63.	No G before Canned Cycle
4.	Record Tab	64.	Subroutine not Found
5.	No Program	65.	Program not Found
6.	Play Error	66.	Not Found
7.	Play Error	67.	Bad Plane
8.	Not Used	68.	Null Move
9.	Tape Stopped	69.	Zero Radius
10.	Record Error	70.	U+ Limit
11.	Circle Error	71.	W+ Limit
12.	Limit Switch	72.	S+ Limit
13.	No Intersect	73.	U- Limit
14.	Not Manual	74.	W+ Limit
15.	Z not Rapid	75.	S+ Limit
16.	Excess Acceleration	76.	Not Used
17.	Negative Velocity	77.	Not Used
18.	Servo Disconnect	78.	Not Used
19.	Lag Error	79.	Not Used
20.	Excess Velocity	80.	P3 < P2 < Cut
21.	Not Used	81.	Positive Drill?
22.	No Cutter Comp	82.	Tool > Groove
23.	Verifying	83.	Wrong FPR
24.	Playing	84.	Excess Feed
25.	Recording	85.	DRO Axis
26.	Search Tape	86.	Probe Error
27.	Tape Done	87.	Probe Battery
28.	Drift Register	88.	Not Used
29.	Error Register	89.	Not Used
30.	Invalid 2700 Code	90.	No Intersect
31.	RS232 Abort	91.	Wrong Way
32.	RS232 Overflow	92.	No Blend
33.	RS232 Read	93.	Concentric
34.	RS232 Write	94.	Tangent
35.	Buffer Overflow	95.	Epsilon Error
36.	UART Error	96.	No Reference Point
37.	Illegal Step	97.	Down-Loading
38.	DSR / DTR Failure	98.	Negative Square Root
39.	UART Failure	99.	Entry Error
40.	Checksum Error	100.	Complete
41.	Thread Pitch	101.	Not Used
42.	Not Used	102.	Failed
43.	Tool Error	103.	Not Used
44.	Zero Feed	104.	Not Used
45.	Emergency Stop	105.	Not Used
46.	Play	106.	Not Used
47.	Record	107.	Not Used
48.	Stop Tape	108.	Not Used
49.	Memory Exceeded	109.	Not Used
50.	X+ Limit	110.	Bad File
51.	Y+ Limit	111.	Timeout Error
52.	Z+ Limit	112.	Aux (M) Code Error
53.	X- Limit	113.	No File Error
54.	Y- Limit	114.	File Exists
55.	Z- Limit	115.	Bad Format
56.	Not Used	116.	Write Protect
57.	Dwell Forever	117.	Directory Full
58.	Tool Change	118.	Disk Full
59.	Hold	119.	File Too Large
60.	Tool Definition Error	120.	No Disk Error
		121.	Disk Error