Error Codes for MS2000 and TG1000 Diagnostics

Error codes are dumped to the serial terminal with the last error code shown first using the DU Y command.

If you're looking for command syntax error codes such as N-1, N-2, etc you can find a table at the bottom of the page.

If you're looking for filter wheel error codes, they are listed at the bottom of the page.

DU Y Example Output

```
2DU Y

Adr:2:ZF
       0       0       0       0       0       0       0       0
0       0       0       0
       0       0       0       0       0       0       0       0
0       0       0       0
       0       0       0       0       0       0       0       0
0       0       0       0
       0       0       0       0       0       0       0       0
0       0       0       0
       0       0       0       0       0       0       0       0
0       0       0       0
       0       0       0       0
```

An empty error buffer on card #2.

The table below lists the meanings of the error codes.

Error Code Table	
Error Number	**Error Description**
0	No Error
1-9	OVERTIME – RECOVERABLE. Error caused by competing tasks using the microprocessor. Should be treated as warning.
10-14 †	OVERSHOT – Move overshot the target; happens frequently, not really an error.
15	NEGATIVE LOG – Negative number for Log conversion.
20-23 †	AXIS DEAD – FATAL. No movement for 100 cycles; axis halted.
30-33 †	RUN AWAY – FATAL. Getting further from the target; axis halted. Commonly preceded by 90-93.
34	UPPER LIMIT – Upper Limit reached. (axis unspecific)
35	LOWER LIMIT – Lower Limit reached. (axis unspecific)
36	MOVE INTO UPPER (axis unspecific)
37	MOVE INTO LOWER (axis unspecific)

38	BACK VOLTAGE LIMIT (axis unspecific)
42	CRISP Error
43	CRISP Halted
44	Finish Speed Clamp
45	ADC_LOCK_OOR – Out-of-range error for locked servo - causes unlock.
46	ADC_FOLLOW_ERR – Error attempting to follow an analog ADC input.
47	Servo Locked
48	Task Loop Overtime
49	Low Light
50-53 †	ENCODER ERROR OVERFLOW – FATAL. Error term so large that move intent is indiscernible; axis halted.
54	I2C Poll Error
55	EPROM NO LOAD – Saved-settings on EPROM not loaded, compile date mismatch.
56	I2C Busy Error
57	I2C Write Error 1
58	I2C Read Error 1
59	I2C No Acknowledgement Error , followed by I2C Chip Address
60-64 †	ADJUST-MOVE ERROR – Failed to clear ‘M’ more than 18 times in a row. FATAL
65-69 †	ADJUST-MOVE WARNING - Failed to clear 'M' less than 19 times in a row, but eventually cleared. RECOVERABLE.
85	SCAN LOST PULSES – During a scan, missing pulses were detected.
86	SCAN INCOMPLETE – During a scan, terminated before completing the row.
87	TTL Report Buffer Overrun
90-94 †	ERROR_LARGE – RECOVERABLE. Motor set to FULL SPEED; hope to catch up (e.g. speed set faster than possible).
100-104 †	INDEX NOT FOUND
105	Buffer Overrun
106	Buffer Underrun
110	SPIM Loop Time, followed by the SPIM State and the Task ID
120-124 †	Encoder E Flag
140	ADEPT High Voltage low
141	ADEPT I2C Dead
142	PIEZO READ POS
143	PIEZO WRITE POS
144	PIEZO MOVE ERR
145	PIEZO READ POS1
146	PIEZO INIT
147	PIEZO POS ERROR
148	Autofocus 200um safety limit Encountered
149	I2C_BAD_BUSY ERROR
150	READ_I2C_ZERO_POT_ERR1
151	READ_I2C_ZERO_POT_ERR2
152	READ_I2C_FEEDBACK_POT_ERR1
153	READ_I2C_FEEDBACK_POT_ERR2
154	READ_I2C_ALIGNSET_ERR1
155	READ_I2C_ALIGNSET_ERR2
156	WRITE_I2C_ALIGNSET_ERR1

157	WRITE_I2C_ALIGNSET_ERR2
158	READ_BYTE_I2C_U15_ERR1
159	READ_BYTE_I2C_U15_ERR2
160	READ_BYTES_I2C_U15_ERR1
161	READ_BYTES_I2C_U15_ERR2
162	WRITE_BYTE_I2C_U15_ERR1
163	WRITE_BYTE_I2C_U15_ERR2
164	WRITE_BYTES_I2C_U15_ERR
165	WRITE_I2C_ZERO_POT_ERR1
166	WRITE_I2C_ZERO_POT_ERR2
167	WRITE_I2C_FEEDBACK_POT_ERR1
168	WRITE_I2C_FEEDBACK_POT_ERR2
169	DC_PORT_SETUP1_ERR
170	DC_PORT_SETUP2_ERR
171	DC_PORT_SETUP3_ERR
172	I2C_CALIBRATION_ERR
173	I2C_AXIS_ENABLE_ERR1
174	I2C_AXIS_ENABLE_ERR2
175	I2C_AXIS_MUTE1_ERR
176	I2C_AXIS_MUTE2_ERR
177	I2C_READ_TTL_ERR1
178	I2C_READ_PIEZO_DAC_ERR1
179	I2C_READ_PIEZO_DAC_ERR2
180	I2C_WRITE_PIEZO_DAC_ERR
181	I2C_READ_ERR2
182	MS_I2C_IDLE_ERR
183	MS_I2C_STOP_ERR
184	I2C_WRITE_ERR2
185	I2C_WRITE_ERR3
186	I2C_WRITE_ERR4
187	I2C_WRITE_ERR5
188	I2C_WRITE_ERR6
189	I2C_WRITE_ERR7
190	I2C_WRITE_ERR8
191	I2C_WRITE_ERR9
192	I2C_WRITE_ERRA
193	I2C_WRITE_ERRB
194	I2C_WRITE_ERRC
195	I2C_NACK_ERR3
196	I2C_NACK_ERR4
197	I2C_READ_ERR3
198	I2C_READ_ERR4
199	I2C_READ_ERR5
200	I2C_READ_ERR6
201	I2C_READ_ERR7 Tunable lens temp sensor I2C_NACK error
202	I2C_READ_TTL_ERR2

203	I2C_NACK_ERROR
204	ERR_TTL_READ_TIMEOUT
205	ERR_TTL_MISMATCH I2C bus error.
206	I2C_WRITE_ERRD
207	I2C_WRITE_ERRE
208	I2C_READ_ERR8
209	I2C_READ_ERR9
210	I2C_WRITE_ERRF
211	I2C_WRITE_ERR10
212	I2C_WRITE_ERR11
213	I2C_WRITE_ERR12
214	I2C_WRITE_ERR13
215	I2C_WRITE_ERR14
216	I2C_WRITE_ERR15
217	READ_BYTE_I2C_U15_ERR3
218	READ_BYTE_I2C_U15_ERR4
219	READ_BYTE_I2C_U15_ERR5
220	READ_BYTE_I2C_U15_ERR6
221	I2C_BUS_ERROR_RD
222	I2C_BUS_ERROR_WR
223	I2C_WRITE_ERR16
224	I2C_WRITE_ERR17
225	RDBYTE_0
226	RDBYTE_1
227	RDBYTE_2
228	RDBYTE_3
229	RDBYTE_4
230	RDBYTE_5
231	RDBYTE_6
233	RDBYTE_7
234	RDBYTE_8
235	RDBYTE_9
236	READ_I2C_ALIGNSET_ERR3
243	I2C_NACK_WRITING
244	LIMIT_NOT_FOUND
254	REPORT_PSD
255	WRITE_DAC_ERROR0
256	WRITE_DAC_ERROR1
257	WRITE_DAC_ERROR2
258	I2C_DIP_SWITCH_ERR0
259	I2C_DIP_SWITCH_ERR1
260	I2C_DIP_SWITCH_ERR2
261	WRITE_DAC_ERROR3
262	I2C_DIP_SWITCH_ERR3
263	WRITE_I2C_ALIGNSET_ERR3
264	LCD_STATE_ERROR

300	Autofocus Scan failed due to insufficient contrast
301	Autofocus Calibration Failed
302	Clutch Disengaged, Engage clutch to do Autofocus
305-311	Source of last Reset, very common and there will always be one reset on controller start. 305 (External VDD Mon), 309 (Software cmd or reset button), 307 (Missing Clk), 306 (Onboard VDD Mon)
500	TX1_OVERRUN
501	TST_ERROR0
502	TST_ERROR1
503	TST_ERROR2
504	TST_ERROR3
505	TST_ERROR4
600-604	FEEDBACK_POT0_TEST
610-614	ZERO_POT0_TEST
620-624	ALIGNSET0_TEST
630-634	ENCODER_TEST
635	DIP_SWITCH_SELF_TEST
636	PIEZO_DAC_TEST
640-641	FW_DEAD_ERRO
650-651	FW_ABSENT_ERROR
665	I2C_RECOVER_SUCCESS
666	I2C_RECOVER_FAILED
670	TTL1_LIMIT_X - TTL1 went “HIGH”, halted X axis
671	TTL1_LIMIT_Y - TTL1 went “HIGH”, halted Y axis
672	TTL1_LIMIT_Z - TTL1 went “HIGH”, halted Z axis
673	TTL1_LIMIT_F - TTL1 went “HIGH”, halted F axis
65535	10 MINUTE ELAPSED TIME MARK

† The last digit indicates the axis number that is in error in controller ordering starting from 0. E.g. on three-axis units X=0, Y=1, and Z=2; on single-axis MFC units, Z=0.

FATAL errors cause the controller to halt motion on the axis that has the error. A commanded move will not be completed to the desired precision if a FATAL error occurs.

RECOVERABLE errors do not stop the controller from attempting to complete a commanded move. Large numbers of recoverable errors should be taken as a warning. Frequent servo errors (numbers 90-92) often mean that the speed is near or exceeding the stage maximum. Frequent overtime errors (numbers 1-9) often mean that competing processes, such as over-frequent serial status requests, are using too much CPU time.

Legacy Error Codes

These errors codes are no longer in use.

CRIFF Error Codes

These error codes are for legacy CRIFF devices.

Error Number	Error Description
237	I2C_WRITE_INT_ERR1
238	I2C_WRITE_INT_ERR2
239	I2C_WRITE_OP_CODE_ERR1
240	I2C_WRITE_OP_CODE_ERR2
241	I2C_READ_INT_ERR1
242	I2C_READ_INT_ERR2
248	CRIFF_I2C_ERR1
249	CRIFF_I2C_ERR2
250	I2C_READ_FAIL

Other Error Types

Command Syntax Error Codes

When a command is received that the controller cannot interpret, for one reason or another, an error is returned in the following format:

```
:N-<error code>
```

The error codes are as follows:

Command Syntax Error Codes	
:N-1	Unknown Command *(not issued in TG-1000)*
:N-2	Unrecognized Axis Parameter *(valid axes are dependent on the controller)*
:N-3	Missing Parameters *(command received requires an axis parameter such as x=1234)*
:N-4	Parameter Out of Range
:N-5	Operation Failed
:N-6	Undefined Error *(command is incorrect, but for none of the above reasons)*
:N-7	Invalid Card Address
:N-8 … :N-10	Reserved
:N-11 … :N-20	Reserved For Filterwheel
:N-21	Serial Command Halted *(by the HALT command)*
:N-30 … :N-39	Reserved

Filter Wheel Error Codes

A list of recent errors are available through the Dump Errors (DE) command.

Error Codes		
Name	**Number**	**Notes**
OVERSHOT	10	Plus axis number.

DRIVER_HOT	25	
RUN_AWAY	30	Plus axis number, followed by mode. See mode table below.
LARGE_OVERFLOW	50	Plus axis number.
SLIP_ERROR	70	Plus axis number.
PAST_ERROR	80	Plus axis number.
ERROR_OVERFLOW	90	Plus axis number.
KP_ERR_OVERFLOW	100	Plus axis number.
KV_SPD_OVERFLOW	110	Plus axis number.
KI_SUM_OVERFLOW	120	Plus axis number.
ERR_INTEGRAL_OF	125	Plus axis number.
KD_TRM_OVERFLOW	130	Plus axis number.
KA_TRM_OVERFLOW	140	Plus axis number.
ENCODER0_ERROR	160	Plus error number.
ENCODER1_ERROR	170	Plus error number.
MOVE_OVERTIME	180	Plus axis number.

serial, tech note, ms2000, tiger