# Chapter 2 Troubleshooting

#### **CHAPTER CONTENTS**

Isolation Procedures List	2- 2
Error Code List (numeric order)	2- 4
Error Code List (alphabetical order)	2- 14
Chapter overview	2- 18
Introduction to Troubleshooting	2- 19
Normal Operating Procedure	2- 21
Interpreting the Status Messages	2- 23
Isolation Procedures	2- 33

#### **WARNING!**

Procedures in this chapter require following biohazard, electrical hazard, and electrostatic discharge precautions.







Tools must be decontaminated before and after servicing the analyzer. Tools must be decontaminated before they are returned to the tool kit.

#### **CAUTION!**

You must perform VP-60: Decontamination before you begin and after you complete servicing the analyzer.

2 Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

**Chapter Table of Contents** 

2 - 1

Manual	
Contents	

CD Main Screen

Index

ISOL	ATION PROCEDURES LIST (	pg 1 of 2)		Description		Page
IP-11 IP-12 IP-13	Description Display blank or incorrect No alarm Analyzer operates too slowly Assay results incorrect/ Controls out of range Error codes 1, 2 Error code 5 Error code 8 Error code 10 Error codes 15, 16, 25, 26 Error code 20 Error code 29 Error code 31 Error code 32 Error code 34	Page 2- 33 2- 37 2- 38 2- 40 2- 45 2- 47 2- 49 2- 50 2- 51 2- 56 2- 61 2- 63 2- 65 2- 66	IP-17 IP-18 IP-20 IP-21 IP-22 IP-23 IP-26 IP-27 IP-29 IP-33 IP-34 IP-43 IP-45 IP-45	Error code 35 Error code 36 Error code 37 Error codes 40, 4 Error codes 43, 9 Error codes 45, 4 Error codes 48, 4 Error code 53 Error code 54 Error code 56 Error code 74 Error code 84 Error code 84 Error codes 90, 9 Error codes 79, 1 Error code 103 Error code 104	18 16, 47, 52, 78, 9 19 11, 154	2- 68 2- 73 2- 80 2- 83 2- 88 97, 99 2- 90 2-100 2-103 2-105 2-111 2-115 2-119 2-124 2-127 2-129 2-130
	roubleshooting Cx <sup>®</sup> Analyzer Service Manual (Tex	t P/N 47278-1		Isolation Proc	edures List	2 - 2
			Chapter Contents	Manual Contents	CD Main Screen	Index

Isolation Procedures List (pg 2 of 2)		IP CO	Description		Page
IP Description IP-48 Error code 108 IP-49 Error code 109 IP-50 Error code 110 IP-51 Error codes 116, 118 IP-52 Error code 125 IP-53 Error codes 126, 127, 129, 132, 133 IP-54 Error code 131 IP-55 Error codes 135, 136, 137, 138, 139 IP-61 Error codes 140, 141 IP-64 Error code 162 IP-65 Error codes 163, 164 IP-66 Error code 166 IP-67 Error code 167 IP-68 Error code 142	Page 2-131 2-139 2-141 2-144 2-145 2-146 2-148 2-149 2-152 2-155 2-160 2-164 2-169 2-172	IP-70 IP-72 IP-73 IP-74 IP-75 IP-76 IP-78 IP-79 IP-80 IP-81 IP-83 IP-85	Error code 144 Error codes 145, Error codes 147, Error code 157 Error code 159 Error codes 150, Error codes 220 Error codes 229, Error codes 11, 1 Error codes 13, 2 Error codes 14, 2 Error codes 62, 6 Error codes 70, 7 Error codes 72, 7 Air Fan not runnir Carousel Lock Ar	148 151, 152, 153 230 2, 21, 22 3 4 3 1, 155 3, 156	2-176 2-179 2-186 2-189 2-192 2-194 2-197 2-205 2-211 2-213 2-217 2-222 2-224 2-228 2-229
2 Troubleshooting LCx® Analyzer Service Manual (Text P/N	I 47278-1	02)	Isolation Proc	edures List	2 - 3
		Chapter	Manual	CD Main	Index

Contents

Contents

Screen

## ERROR CODE LIST (numeric order) (pg 1 of 10)

EC	Message	Corrective action (IP/SM*)	Page number
1	Motor Driver cable disconnected	IP- 5	2- 45
2	Analog Board cable disconnected	IP- 5	2- 45
4	Bad timer device	SM-4	2- 23
5	Assay Module missing	IP- 6	2- 47
6	Invalid CMD in Mode sequence	SM-6	2- 23
7	Invalid parameters in command	SM-7	2- 23

<sup>\*</sup>IP=Isolation Procedure SM=Status Message

EC	Message	IP/SM	Pg
8	Time/date reset	IP- 7	2- 49
10	Bad values in Boom Cal file XX	IP- 8	2- 50
11	Z boom failed Home	IP- 78	2- 205
12	R boom failed Home	IP- 78	2- 205
13	Carousel failed Home	IP- 79	2- 211
14	Multivalve failed Home	IP- 80	2- 213
15	Diluent Syringe failed Home	IP- 9	2- 51
16	Sample Syringe failed Home	IP- 9	2- 51
19	Photo Cal not initialized	SM-19	2- 23
20	Carousel not locked	IP- 10	2- 56
21	Z boom missing steps	IP- 78	2- 205
22	R boom missing steps	IP- 78	2- 205

Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 2 of 10)

EC	Message	IP/SM	Pg	<u> </u>
23	Carousel missing steps	IP- 79		211
24	Multivalve missing steps	IP- 80	2-	213
25	Diluent Syringe missing steps	IP- 9	2-	51
26	Sample Syringe missing steps	IP- 9	2-	51
29	Reagent Pack not on module	IP- 11	2-	61
30	Reagent bar code mismatch	IP- 10	2-	56
31	Invalid assay on module	IP- 12	2-	63
32	NOVRAM full	IP- 13	2-	65
34	Insufficient tests left XX	IP- 15	2-	66
35	No disposables to run	IP- 16	2-	68

EC	Message	IP/SM	Pg
36	Carousel load error	IP- 17	2- 73
37	Printer error	IP- 18	2- 80
38	Carousel mismatch	SM- 38	2- 23
39	Invalid mode definition	SM- 39	2- 23
40	Carousel label read error	IP- 20	2- 83
41	Reagent label read error	IP- 20	2- 83
42	Bar code error: Reagent ID=	IP- 20	2- 83
43	Door open	IP- 21	2- 88
44	Carousel ID Error: Carousel ID=	IP- 20	2- 83
45	Wash Station overflow	IP- 22	2- 90
46	Liquid level too high	IP- 22	2- 90

2 Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Screen

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 3 of 10)

EC	Message	IP/SM	Pg
47	Reagent	IP- 22	2- 90
	insufficient/empty XXXX		
48	Diluent insufficient/empty	IP- 23	2- 100
	X		
49	Diluent bottle not found X	IP- 23	2- 100
52	Level sense not found	IP- 22	2- 90
	XXXX		
53	F to D hardware fail	IP- 26	2- 103
54	A to D hardware fail	IP- 27	2- 104
56	MEIA Lamp out	IP- 29	2- 105
60	Diluent temperature low	IP- 33	2- 111
	°C		
61	Diluent temperature high	IP- 33	2- 111
	°C		

EC	Message	IP/SM	Pg
62	Air temperature low°C	IP- 81	2-217
63	Air temperature high°C	IP- 81	2-217
70	Remote temperature low°C	IP- 83	2-222
71	Remote temperature high°C	IP- 83	2-222
72	Reagent block temperature low°C	IP- 85	2-224
73	Reagent block temperature high°C	IP- 85	2-224
74	Bad high voltage power supply	IP- 34	2-115

2 Troubleshooting Error Code List (numeric) LCx® Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Screen

### Error Code List (numeric) (pg 4 of 10)

EC	Message	IP/SM	Pg
78	No sample/reagent found XXXX	IP- 22	2- 90
79	File reloaded X Y	IP- 45	2-127
81	V to F to D overflow error	SM- 81	2- 23
83	Sample inactivation failed XXX	SM- 83	2- 23
84	MEIA stds placed incorrectly	IP- 43	2-119
90	COM 1 port error	IP- 44	2-124
91	COM 2 port error	IP- 44	2-124
92	Incompatible assay module	SM- 92	2- 23
93	Carousel lock arm not locked	IP- 87	2-229

EC	Message	IP/SM	Pg
94	Invalid system module	SM- 94	2- 24
97	Level sense range error XXXX	IP- 22	2- 90
98	Door sensor option active	IP- 21	2- 88
99	Level sense hardware	IP- 22	2- 90
	error		
100	Directory checksum error	IP- 45	2-127
101	File checksum error	IP- 45	2-127
102	Initialize database	IP- 45	2-127
103	Bad value in assay file XX	IP- 46	2-129
104	Assay revisions mismatch	IP- 47	2-130
105	File parameter out of	SM-105	2- 24
	range		

2 Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

> Chapter Manual CD Main Index Contents Screen

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 5 of 10)

EC	Message	IP/SM	Pg
108	Check MEIA Lamp	IP- 48	2- 131
	XXXXX		
109	MEIA lamp ref not	IP- 49	2- 139
	initialized		
110	Time expired for entering	IP- 50	2- 141
	temp		
111	CPU test failed	SM-111	2- 24
112	Reset test failed	SM-112	2- 24
113	CPU board configuration	SM-113	2- 24
	error		
115	Diagnostic checksum	SM-115	2- 24
	error		
116	NMI Test failed	IP- 51	2- 144

EC	Message	IP/SM	Pg
117	U25/CPU test failed	SM-117	2- 24
118	MEM error XXX:XXXX or UX	IP- 51	2- 144
119	Timer controller test failed	SM-119	2- 24
120	Master pic test failed	SM-120	2- 24
121	CPU slave pic test failed	SM-121	2- 24
122	I/O slave pic test failed	SM-122	2- 24
123	Clock device failed	SM-123	2- 24
124	Bad oscillator frequency	SM-124	2- 25
125	Motor ctrl failed UX	IP- 52	2- 145
126	System module missing	IP- 53	2- 146
127	Invalid system module	IP- 53	2- 146

2 Troubleshooting Error Code List (numeric)
 LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

	Chapter Contents	Manual Contents	CD Main Screen	Index
П	• • • • • • • • • • • • • • • • • • • •	0000	00.00	

### Error Code List (numeric) (pg 6 of 10)

EC	Message	IP/SM	Pg
129	Invalid assay module	IP- 53	2- 146
130	Ready to change modules	SM-130	2- 25
131	Barcode device test failed	IP- 54	2- 148
132	Bad checksum on system module	IP- 53	2- 146
133	Bad checksum on assay module	IP- 53	2- 146
134	Incompatible system/ assay modules	SM-134	2- 25
135	Memory board/timed out	IP- 55	2-149
136	Memory board IC timed out	IP- 55	2- 149

EC	Message	IP/SM	Pg
137	Digital board timed out	IP- 55	2-149
138	Unknown NMI contact CSC	IP- 55	2-149
139	Memory board 8255 device failed	IP- 55	2-149
140	H below threshold value	IP- 61	2-152
141	H is not linear	IP- 61	2-152
142	Slope/intercept out of range	IP- 68	2-172
144	B is out of range	IP- 69	2-176
145	M % diff out of spec	IP- 70	2-179
146	H % diff out of spec	IP- 70	2-179
147	Static precision out of spec	IP- 72	2-186

Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

> Chapter Manual CD Main Index Contents Screen

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 7 of 10)

EC	Message	IP/SM	Pg
148	Dynamic precision out of	IP- 72	2-186
	spec		
149	Level sense out of range	IP- 74	2- 192
150	Group 1 failed	IP- 75	2- 194
151	Group 2 failed	IP- 75	2- 194
152	Group 3 failed	IP- 75	2- 194
153	Group 4 failed	IP- 75	2- 194
154	Liquid heater block out of	IP- 33	2-111
	spec		
155	Remote temp out of range	IP- 83	2-222
156	Reagent heater block out	IP- 85	2- 224
	of spec		
157	Current liquid temp out of	IP- 73	2- 189
	spec		

EC	Message	IP/SM	Pg
162	Intercept high	IP- 64	2- 155
163	NRMSE too large	IP- 65	2- 160
164	Cor. coef. low	IP- 65	2- 160
166	Read error	IP- 66	2- 164
167	DI/AS X Y ZZZZ	IP- 67	2- 169
190	Negative range failed	SM-190	2- 25
191	Negative too high	SM-191	2- 25
192	Negative too low	SM-192	2- 25
193	Positive range failed	SM-193	2- 25
194	Positive too high	SM-194	2- 25
195	Positive too low	SM-195	2- 25
196	Calibrator range failed	SM-196	2- 25
197	Calibrator too high	SM-197	2- 25

2 Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Screen

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 8 of 10)

EC	Message	IP/SM	Pg	
198	Calibrator too low	SM-198	2-	25
199	Average out of range	SM-199	2-	25
200	Factory Set (A/Sys/Assay)	SM-200	2-	26
201	MEIA temperature calibration	SM-201	2-	26
202	Boom calibration	SM-202	2-	26
203	MEIA carousel calibration (pass/fail)	SM-203	2-	26
204	MEIA photo calibration (pass/fail)	SM-204	2-	26
205	Level Sense calibration (pass/fail)	SM-205	2-	26

EC	Message	IP/SM	Pg
206	CLI invocation	SM-206	2- 26
207	Assay done - remove Reagents	SM-207	2- 26
208	MEIA temperature check (pass/fail)	SM-208	2- 26
209	MEIA photo check (pass/fail)	SM-209	2- 26
210	Dispense system check (pass/fail)	SM-210	2- 26
211	Boom check	SM-211	2- 26
212	Carousel not calibrated	SM-212	2- 27
213	Error while parsing ASTM message	SM-213	2- 27

2 Troubleshooting Error Code List (numeric) 2 - 11 LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

### Error Code List (numeric) (pg 9 of 10)

	T		
EC	Message	IP/SM	Pg
214	Error processing ASTM	SM-214	2- 27
	order		
215	Spooler Run Capacity	SM-215	2-27
	(message logged)		
	Spooler capacity		
	remaining: N Run(s)		
	(displayed)		
216	ASTM COMM timeout	SM-216	2- 28
217	Reset fail	SM-217	2- 28
218	Special operation	SM-218	2- 28
220	PMT high voltage out of	IP- 76	2- 28
	range		
221	Z boom out of range	SM-221	2- 28
222	R boom out of range	SM-222	2- 28

EC	Message	IP/SM	Pg
223	Carousel out of range	SM-223	2- 28
224	Multivalve out of range	SM-224	2- 28
225	Diluent Syringe out of	SM-225	2- 28
	range		
226	Sample Syringe out of	SM-226	2- 28
	range		
229	Open thermistor XXXX	IP- 77	2-199
230	Shorted thermistor XXXX	IP- 77	2-199
231	Z boom timed out	SM-231	2- 29
232	R boom timed out	SM-232	2- 29
233	Carousel timed out	SM-233	2- 29
234	Multivalve timed out	SM-234	2- 29
235	Diluent Syringe timed out	SM-235	2- 29

Troubleshooting LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

**Error Code List (numeric)** 

### Error Code List (numeric) (pg 10 of 10)

EC	Message	IP/SM	Pg
236	Sample Syringe timed out	SM-236	2- 29
239	Clear System, ASTM, and CSC logs	SM-239	2- 29
240	Motor not homed	SM-240	2- 30
243	Motor timed out	SM-243	2- 30
244	Running	SM-244	2- 30
245	Run stopped by operator request	SM-245	2- 30
246	Not running	SM-246	2- 30
247	ASTM COMM bad message length	SM-247	2- 30
248	ASTM COMM invalid frame type	SM-248	2- 30

EC	Message	IP/SM	Pg
249	ASTM COMM NUM	SM-249	2- 30
	retries exceeded		
250	ASTM COMM invalid	SM-250	2- 31
	response		
251	ASTM COMM invalid	SM-251	2- 31
	frame		
252	ASTM spooler init	SM-252	2- 31
253	ASTM COMM bad frame	SM-253	2- 31
	num		
254	Invalid message	SM-254	2- 31
	parameters		
255	Internal error	SM-255	2- 31

2 Troubleshooting Error Code List (numeric) 2 - 13 LCx® Analyzer Service Manual (Text P/N 47278-102)

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

<b>ERROR CODE LIST (alphabetica</b>	al order	)	Descript	ion		EC	ΙP
(pg 1 of 4)		•		e in assay XX		103	46
				es in Boom Cal		10	8
Description	EC	ΙP	Bar Code	device test fai	iled	131	54
A to D hardware fail	54	27	Bar code	error		42	20
Air fan not running		86					
Air temperature high	63	81	Carousel	failed home		13	79
Air temperature low	62	81		ID error: Caro	usel ID	44	20
Analog Board cable disconnected	2	5		label read erro		40	20
Analyzer operates too slowly		3		load error		36	17
Assay Module missing	5	6		Lock Arm not	locked	93	87
Assay results incorrect/		4		missing steps		23	79
Controls out of range				not locked		20	10
Assay revisions mismatch	104	47		EIA Lamp XXX	XX	108	48
B is out of range	144	69	COM 1 P			90	44
Bad checksum on Assay Module	133	53	COM 2 P	ort error		91	44
Bad checksum on System Module	132	53	Cor. Coe	f. low		164	65
Bad High Voltage Power Supply	74	34	Current li	quid temp out	of spec	157	73
2 Troubleshooting	out D/N	47070	400)	Error Code L	ist (alpha)		2 - 14
LCx® Analyzer Service Manual (T	ext P/IN 4	4/2/8-	102)				
			Chapter	Manual	CD Main	Ind	ex
			Contents	Contents	Screen		

ERROR CODE LIST (alpha) (pg	ERROR CODE LIST (alpha) (pg 2 of 4)			<b>Description</b> F to D hardware fail			IP
<b>Description</b> DI/AS X Y ZZZZ Digital Board timed out	<b>EC</b> 167 137	<b>IP</b> 67 55		ksum error		53 101 79	26 45 45
Diluent Bottle not found Diluent insufficient/empty XXXX Diluent Syringe failed home Diluent Syringe missing steps	49 48 15 25	23 23 9 9	Group 1 f Group 2 f Group 3 f Group 4 f	ailed ailed		150 151 152 153	75 75 75 75
Diluent temperature high °C Diluent temperature low °C Directory checksum error Display blank or incorrect Door open	61 60 100	33 33 45 1 21	H below t H is not li	out of spec hreshold value near ock out of spec		146 140 141 156	70 61 61 85
Door Sensor option active Dynamic Precision out of spec	98 148	21 72	Initialize o Insufficier Intercept	nt tests left XX		102 34 162	45 15 64
2 Troubleshooting LCx® Analyzer Service Manual (1	Text P/N	47278-	102)	Error Code Li	ist (alpha)		2 - 15
			Chapter Contents	Manual Contents	CD Main Screen	Ind	ex

ERROR CODE LIST (alpha) (pg	3 of 4)		Descripti			EC	ΙP
Description Invalid Assay Module Invalid assay on module Invalid System Module Level Sense hardware error Level Sense not found XXXX Level Sense out of range Level Sense range error XXXX Liquid Heater out of spec Liquid level too high M % Diff out of spec MEIA Lamp out MEIA Lamp Ref not initialized	99 52 149 97 154 46 145 56 109	IP 53 12 53 22 22 74 22 33 22 70 29 49	Mem erro Memory E Memory E Motor CT Motor Dri Multivalve Multivalve NMI Test No alarm No dispos	or XXXXXXXXXXX Board 8255 de Board IO timed Board timed out RL failed UX ver cable discort failed home e missing steps failed sables to run le/Reagent fout I full	vice failed out it onnected	118 139 136 135 125 1 14 24 116 35 78 32 163	51 55 55 55 52 5 80 80 51 2 16 22 13 65
MEIA Stds placed incorrectly	84	43					
2 Troubleshooting LCx <sup>®</sup> Analyzer Service Manual	Text P/N	47278-	102)	Error Code L	ist (alpha)		2 - 16
			Chapter Contents	Manual Contents	CD Main Screen	Ind	lex

## ERROR CODE LIST (alpha) (pg 4 of 4)

Description	EC	IP	Description	EC	ΙP
Open thermistor XXXXXXXXXXXXX	229	77	Sample Syringe failed home	16	9
PMT High Voltage out of range XXXX Printer error	XX220 37	76 18	Sample Syringe missing steps Shorted thermistor XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX	26 230 142	9 77 68
R boom failed home	12	78	Static Precision out of spec	147	72
R boom missing steps	22	78	System Module missing	126	53
Read error XXXX Reagent block temperature high Reagent block temperature low	166 73 72	66 85 85	Time/Date reset Time expired for entering Temp	8 110	7 50
Reagent insufficient/empty XXXX	47	22	Unknown NMIContact CSC	138	55
Reagent label read error Reagent Pack not on module	41 29	20 11	Wash Station overflow	45	22
Remote temperature high	71	83	Z boom failed home	11	78
Remote temperature low	70	83	Z boom missing steps	22	78
Remote temperature out of range	155	83	ÿ .		
2 Troubleshooting LCx® Analyzer Service Manual (Te	ext P/N 4	47278-102)	Error Code List (alpha)		2 - 17

O2)

Chapter Manual CD Main Index
Contents Contents Screen

#### **CHAPTER OVERVIEW (pg 1 of 1)**

This chapter provides troubleshooting information including:

- an introduction to troubleshooting
- a generic troubleshooting flow diagram
- normal operating procedure
- a list of all messages that may appear
- for each error message, suggested corrective actions [Isolation Procedure (IP) or Status Message (SM)]

#### **CAUTION!**

You must perform VP-60: Decontamination before you begin and after you complete servicing the analyzer.

#### **WARNING!**

Procedures in this chapter require following biohazard, electrical hazard, and electrostatic discharge precautions.







#### **WARNING!**

Tools must be decontaminated before and after servicing the analyzer.

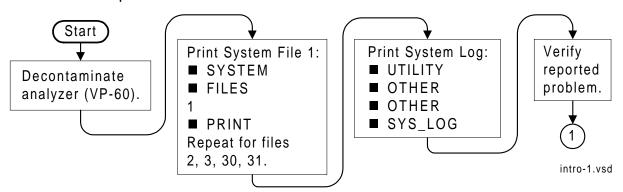
Tools must be decontaminated before they are returned to the tool kit.

2 Troubleshooting Chapter Overview 2 - 18 LCx® Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Contents Screen

## INTRODUCTION TO TROUBLESHOOTING (pg 1 of 2)

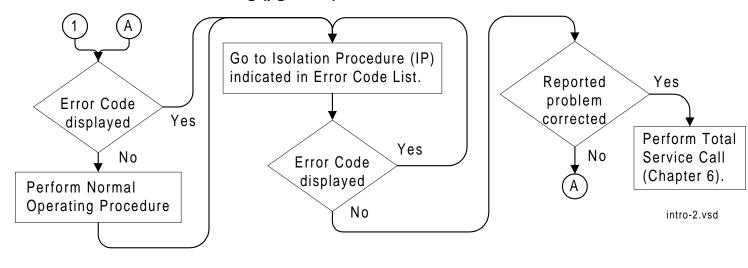
To isolate problems on the analyzer, follow these steps:



2 Troubleshooting Introduction to Troubleshooting 2 - 19 LCx® Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Screen

### Introduction to Troubleshooting (pg 2 of 2)



2 Troubleshooting Introduction to Troubleshooting 2 - 20 LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

## NORMAL OPERATING PROCEDURE (pg 1 of 2)

Procedure	Correct Indication	Corrective Action (if indication is not correct)
Power on analyzer.     Turn Power Switch ON.	All LEDs are on. SYSTEM DIAGNOSTICS displayed. All LEDs OFF except left. CPU TEST displayed Alarm sounds once. NOVRAM TEST displayed. All LEDs OFF, except second from left. SUBSYSTEM TEST displayed. PRINTING SYSTEM & ASSAY INFORMATION displayed. Printout provided. READY menu displayed.	IP-1 Replace CPU Bd (RR-7.1). Replace CPU Bd (RR-7.1). IP-2 Replace CPU Bd (RR-7.1). Replace Digital I/O Bd (RR-7.10). Replace CPU Bd (RR-7.1). Replace CPU Bd (RR-7.1). IP-18 Replace CPU Bd (RR-7.1).

Troubleshooting	Normal Operating Procedure	2 - 21
LCx <sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)		

Chapter	Manual	CD Main	Index
Contents	Contents	Screen	

### Normal Operating Procedure (pg 2 of 2)

Procedure	Correct Indication	Corrective Action
<ol> <li>Perform Total Service Call procedure (Chapter 6).</li> <li>Perform MEIA Performance Panel Run (VP-47):         <ul> <li>A. Perform setup per procedure.</li> <li>B. Press RUN.</li> </ul> </li> </ol>	RUN INITIALIZED displayed MULTI_TASK displayed (run in progress)	
<ul> <li>C. Wait for run to complete.</li> <li>D. Press EXIT.</li> <li>E. Verify correct printout.</li> <li>F. Close Reagent caps in sequence (4, 3, 2, 1).</li> <li>G. Refrigerate Reagents.</li> <li>H. Individually remove Reaction Cells from Carousel and discard into biohazard waste bag.</li> <li>CAUTION: Do not invert Carousel.</li> </ul>	Samples are within range found in MEIA Performance Panel Run (VP-47).	IP-4

Troubleshooting	Normal Operating Procedure	2 - 22
LCx <sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)		

LOX Analyzer Service Manual (Text F/N 47270-10	02)			
	Chapter Contents	Manual Contents	CD Main Screen	Index

(pg 1 o	PRETING THE STATUS MESSAGES f 9)	SM-39	<ul><li>Invalid mode definition</li><li>Reload software.</li><li>Replace software.</li></ul>
SM-4	Bad timer device Replace Digital I/O Bd (RR-7.10).	SM-81	V to F to D overflow error
SM-6	Invalid CMD in Mode sequence Call CSE.		<ul> <li>Replace MEIA Optics (RR-4.1).</li> <li>Then replace Digital I/O Bd (RR-7.1/7.10).</li> </ul>
SM-7	Invalid parameters in command Call CSE.		<ul> <li>Then replace CPU (RR-7.1/7.10).</li> <li>Then replace Analog Bd (RR-8.3).</li> </ul>
SM-19	Photo Cal not initialized Perform VP-27A.	SM-83	Sample inactivation failed XXX (displayed as a caution when any error occurs) See error code that follows.
SM-38	<ul> <li>Carousel mismatch</li> <li>Edit load list CARSL ID to match Carousel.</li> <li>Replace Carousel Bar Code ID.</li> </ul>	SM-92	Incompatible assay module Ensure that System and Assay modules match.
	Ibleshooting   Apalyzer Service Manual (Text P/N 47278-102)	Inte	erpreting the Status Messages 2 - 23

2	Troubleshooting LCx <sup>®</sup> Analyzer Service Manual (Text P/N 47278-1		rpreting the St	atus Messages	2 - 23
		Chapter Contents	Manual Contents	CD Main Screen	Index

LCx	® Analyzer	Service N	Manual (T	ext P/N	47278-1	)2

_		
Manual	CD Main	Index
Contents	Screen	

Interpre	eting the Status Messages (pg 2 of 9)	SM-115	Diagnostic ch		
SM-94	<ul><li>Invalid system module</li><li>Ensure that System and Assay modules match.</li></ul>	SM-117	Replace CPU   U25/CPU test Replace CPU	failed	•
	<ul> <li>Reload system file.</li> <li>Replace System Module.</li> <li>Replace CPU Bd (RR-7.1/7.10)</li> </ul>	SM-119	Timer control Replace CPU		10).
SM-105	File parameter out of range Call CSE.	SM-120	Master pic tes Replace CPU		10).
SM-111	CPU test failed Replace CPU Bd (RR-7.1/7.10).	SM-121	CPU slave pio Replace CPU		10).
SM-112	Reset test failed Replace CPU Bd (RR-7.1/7.10).	SM-122	I/O slave pic t Replace CPU		10).
SM-113	CPU board configuration error Replace CPU Bd (RR-7.1/7.10).	SM-123	Clock device Replace CPU		7.1/7.10).
	bleshooting Analyzer Service Manual (Text P/N 47278-		rpreting the St	atus Message	es 2 - 24
		Chapter Contents	Manual Contents	CD Main Screen	Index

Interpre	eting the Status Messages (pg 3 of 9)	SM-193	Positive range	e failed	
SM-124	Bad oscillator frequency Replace CPU or I/O Bd (RR-7.1/7.10).	SM-194	Call CSE.  Positive too h Call CSE.	igh	
SM-130	Ready to change modules No action required.	SM-195	Positive too le	ow	
SM-134	Incompatible system/assay modules Call CSE.	SM-196	Calibrator ran	ge failed	
SM-190	Negative range failed Call CSE.	SM-197	Calibrator too	high	
SM-191	Negative too high Call CSE.	SM-198	Calibrator too	low	
SM-192	Negative too low Call CSE.	SM-199	Call CSE.  Average out of range  Call CSE.		
	bleshooting Analyzer Service Manual (Text P/N 47278-1		rpreting the St	atus Message	es 2 - 25
		Chapter Contents	Manual Contents	CD Main Screen	Index

Interpre	eting the Status Messages (pg 4 of 9)	SM-206	CLI invocation		
SM-200	Factory Set (A/Sys/Assay) Status message	SM-207	Status message  77 Assay done - remove Reagents Status message  78 MEIA temperature check (pass/fa Status message  79 MEIA photo check (pass/fail) Status message  70 Dispense system check (pass/fail) Status message  71 Boom check		ents
SM-201	MEIA temperature calibration Status message	SM-208			ass/fail)
SM-202	Boom calibration Status message	SM-209			il)
SM-203	MEIA carousel calibration (pass/fail) Status message	SM-210			ıss/fail)
SM-204	MEIA photo calibration (pass/fail) Status message	SM-211			
SM-205	Level Sense calibration (pass/fail) Status message		Status messag	je	
	bleshooting Analyzer Service Manual (Text P/N 47278-1		rpreting the St	atus Message	es 2 - 26
		Chapter Contents	Manual Contents	CD Main Screen	Index

## Interpreting the Status Messages (pg 5 of 9) SM-212 Carousel not calibrated Perform MEIA Carousel Calibration (VP-30).

SM-213 Error while parsing ASTM message Format error occurred in messages sent by host system to analyzer. (only occurs when host interface is activated)

SM-214 Error processing ASTM order Error occurs while processing ASTM® orders after the complete mesage has been received. (only occurs when host interface is activated)

SM-215 Spooler capacity remaining: N Run(s) (displayed); Spooler Run Capacity (message logged) Spooler capacity is checked after reagent pack is read at start of assay run. If remaining capacity matches System Parameter 1.20, message is displayed. Respond by pressing [PROCEED] or [CANCEL]: To continue run, press [PROCEED]. If spooler is at partial capacity, results of current run will be written to the buffer. If spooler buffer is full, results of current run will overwrite oldest record in buffer. To cancel current assay run, press

> [CANCEL]. This establishes contact with host computer to dump spooler contents.

> > 2 - 27

Troubleshooting **Interpreting the Status Messages** LCx<sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)

Manual CD Main Chapter Index

Contents Contents Screen

interpreting the otatas messages (pg o or s)	0 222	Maya baara ba	alista namas :			
SM-216	ASTM COMM Timeout Specified event did not occur within		direction.	ack into range i	n opposite	
	defined time constraints. SM-22		SM-223 Carousel out of range  Move carousel back into range in oppose			
SM-217	Reset fail Cycle power, then replace CPU Bd		direction.	I Dack IIIto Tarig	ge in opposite	
	(RR-7.1).	SM-224	Multivalve ou	t of range ack into range i	n opposito	
SM-218	Special operation Indicates Reagent Pack Management		direction.	ack into range i	поррозне	
	File has been reset. SM  SM-221 Z boom out of range	SM-225	Diluent syring	•		
SM-221			Move motor back into range in oppodirection.			
	Move boom back into range in opposite direction.		Sample syring Move motor badirection.	<b>ge out of rang</b> ack into range i		
	bleshooting Analyzer Service Manual (Text P/N 47278-		rpreting the St	atus Message	es 2 - 28	
		Chapter Contents	Manual Contents	CD Main Screen	Index	

SM-222 R boom out of range

**Interpreting the Status Messages (pg 6 of 9)** 

Interpreting the Status Messages (pg 7 of 9) SM-2		Multivalve timed out	
SM-231 Z boom timed out Power off analyzer. Reseat System Module. Replace Digital I/O Board		Power off analyzer. Reseat System Module. Replace Digital I/O Board (RR-7.10).	
(RR-7.10).	SM-235	Diluent Syringe timed out	
SM-232 R boom timed out  Power off analyzer. Reseat System  Module. Replace Digital I/O Board		Power off analyzer. Reseat System Module. Replace Digital I/O Board (RR-7.10).	
(RR-7.10).	SM-236	Sample Syringe timed out	

SM-233 Carousel timed out Power off analyzer. Reseat System Module. Replace Digital I/O Board (RR-7.10).

Power off analyzer. Reseat System Module. Replace Digital I/O Board (RR-7.10).

2 - 29

SM-239 Clear System, ASTM, and CSC logs Status message

Troubleshooting	Interpreting the Status Messages
LCx <sup>®</sup> Analyzer Service Manual (Text P/N 47278-102)	

Chapter Manual CD Main Index Contents Contents Screen

Interpreting the Status Messages (pg 8 of 9)		SM-246	Not Running	
SM-240	Motor not homed Home motor, then resume HND_CTRL.		Indicates that an abort request is sent to run task, but run task is idle. Replace CPU Bd (RR-7.1), Digital I/O Bd	
SM-243	Motor timed out		(RR-7.10) or Motor Driver Bd (RR-8.5).	
	Power off analyzer. Reseat System Module. See appropriate IP for motor that failed (IPs 9, 78, 79, 80).	SM-247	ASTM COMM bad message length Message length in a frame exceeds 240 characters.	
SM-244	Running Indicates a request was made to run something while run task was not idle. Replace CPU Bd (RR-7.1), Digital I/O Bd	SM-248	ASTM COMM invalid frame The frame is not an intermediate or end type.	
		SM-249	ASTM COMM NUM retries exceeded	

SM-245	Run stopped by operator request
	Status message

SM-249 ASTM COMM NUM retries exceeded

Analyzer is unable to send a frame to the host after 6 retries.

2	Troubleshooting	Interpreting the Status Messages	2 - 30
	LCx® Analyzer Service Manual (Text P/N 47278-102)		

·-/				
Chapter	Manual	CD Main	Index	
Contents	Contents	Screen		

## Interpreting the Status Messages (pg 9 of 9)

SM-250 ASTM COMM invalid response Response sent by the host is incorrect.

SM-251 ASTM COMM invalid frame Frame checksum or format is incorrect.

SM-252 ASTM spooler init

Spooler incorporates a checksum that is updated when results are saved and released. On analyzer power-up, checksum is verified. If checksum test fails, error is logged in ASTM® error log.

SM-253 ASTM COMM bad frame num Frame number is incorrect.

SM-254 Invalid Message Parameters
Incorrect information regarding
disposables was sent to Post Processor.

SM-255 Internal error

2 Troubleshooting Interpreting the Status Messages 2 - 31 LCx® Analyzer Service Manual (Text P/N 47278-102)

., 0	102)
	Chapter

Contents

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2 Troubleshooting Interpreting the Status Messages 2 - 32 LCx® Analyzer Service Manual (Text P/N 47278-102)

Chapter Manual CD Main Index Contents Contents Screen