Hardware Error Code Namespace

Number space	Hardware Area
001-099	Playpen
100-199	Syscon
200-219	Recovery / OTA
220-299	Robot Process
300-799	Factory fixtures
800-999	Power on self check error code

OTA/Recovery Error Codes

Code	Reason
1	Switchboard: unknown status
2	Switchboard: OTA in progress
3	Switchboard: OTA completed
4	Switchboard: rebooting
5	Switchboard: Other OTA error
10	OS: Unknown system error
200	Unexpected .tar contents
201	Unhandled manifest version or feature

202	Boot Control HAL failure
203	Could not open URL
204	URL not a TAR file
205	Decompressor error
206	Block error
207	Imgdiff error
208	I/O error
209	Signature validation error
210	Decryption error
211	Wrong base version
212	Subprocess exception
213	Wrong serial number
214	Dev / Prod mismatch
215	Socket Timeout (network stall)
216	Downgrade not allowed
217	
218	
219	Other Exception

Robot Screen error codes

Code	Reason	Action
990	DISPLAY_FAILURE	
981	CAMERA_STOPPED	
980	CAMERA_FAILURE	
970	WIFI_HW_FAILURE	
960	IMU_FAILURE	
921	NO_GATEWAY	
919	SYSTEMD	
917	NO_ROBOT_COMMS	
916	NO_ROBOT_PROCESS	
915	NO_ENGINE_COMMS	
914	NO_ENGINE_PROCESS	broke down 915 errors. This was what zombie 915 was (915 on screen, robot still drove around)
913	NO_SWITCHBOARD	
911	AUDIO_FAILURE	
909	STOP_BOOT_ANIM_FAILED	

899	NO_BODY	Hand to Nathan
898	SPINE_SELECT_TIMEOUT	
895	TOUCH_SENSOR	
894	TOF	
893	CLIFF_BL	
892	CLIFF_BR	
891	CLIFF_FL	
890	CLIFF_FR	
873	MIC_BL	
872	MIC_BR	
871	MIC_FL	
870	MIC_FR	
852	CLOUD_READ_ESN	
851	CLOUD_TOKEN_STORE	
850	CLOUD_CERT	
840	NO_CAMERA_CALIB	Must run through playpen
801	DFU_FAILED	
800	NO_ANIM_PROCESS	

705	SHUTDOWN_BATTERY_CRITICAL_TEMP	Shutdown caused by critical battery temperature
702	SHUTDOWN_BATTERY_CRITICAL_VOLT	Shutdown caused by critical battery voltage
701	SHUTDOWN_GYRO_NOT_CALIBRATING	Shutdown caused by gyro calibration failure
700	SHUTDOWN_BUTTON	Shutdown caused by button push

Playpen Failure Codes

Error Code Number	Error Code Name	Reason	Action
Error Code Number	Error Code Name	Reason	Action
0	UNKNOWN	Not possible	
OK / 1	SUCCESS	Passed playpen	Test next robot
2	MISMATCHED_CLAD	Not Possible	
3	INIT_LIFT_OR_HEAD_FAILED	Not Possible	

4	CHARGER_UNDETECTED	Robot not detecting charger/ not charging	Make sure charger is plugged in Check charge contacts/charge circuit
5	CHARGER_UNAVAILABLE	Not Possible	
6	CHARGER_UNCONNECTED	Not Possible	
7	IMU_DRIFTING	Bad IMU	Check/replace IMU Maybe robot is shaking/moved while on charger
8	STILL_ON_CHARGER	Not Possible	
9	GOTO_CALIB_POSE_ACTION_FAILED	Not Possible	
10	CLIFF_UNDETECTED	Robot saw a cliff and then stopped seeing it	Check cliff sensors Check cliff slot in playpen Check playpen surface for dirt
11	CLIFF_UNEXPECTED	Robot detected a cliff	Check cliff sensors Check playpen surface for dirt
12	NOT_IN_CALIBRATION_POSE	Not Possible	

13	CALIBRATION_TIMED_OUT	Robot is seeing the calibration target but calibration taking too long Calibration failed	Check calibration target Check camera position and lens
14	CALIBRATION_VALUES_OOR	Camera calibrated but the calibration is outside normal range	Check camera position and lens
15	CAMERA_CALIB_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
16	CALIB_IMAGES_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
17	CALIB_POSE_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
18	TOO_MANY_CALIB_IMAGES	Not possible	
19	CALIB_POSE_GET_FAILED	Not Possible	
20	READ_TOOL_CODE_FAILED	Not Possible	
21	TOOL_CODE_POSITIONS_OOR	Not Possible	
22	TOOL_CODE_WRITE_FAILED	Not Possible	

23	GOTO_PRE_PICKUP_POSE_ACTION_FAILED	Not Possible	
24	NOT_IN_PRE_PICKUP_POSE	Not Possible	
25	CUBE_NOT_FOUND	Not seeing cube to pickup	Check cube is in correct spot Check camera Check wheels if robot is not facing the cube
26	CUBE_NOT_WHERE_EXPECTED	Seeing cube to pickup but robot thinks the cube is somewhere else	Check cube is in correct spot Check camera position
27	PICKUP_FAILED	Failed to pickup cube	Check cube position Check lift motor/gearbox
28	PLACEMENT_FAILED	Failed to place cube	Check lift motor/gearbox
29	UNEXPECTED_OBSERVED_OBJECT	Not Possible	
30	GOTO_PRE_MOUNT_CHARGER_POSE_ACTION_FAILED	Not Possible	
31	CHARGER_NOT_FOUND	Not Possible	
32	CHARGER_DOCK_FAILED	Not Possible	
33	QUEUE_ACTION_FAILED	Not Possible	

34	MOTOR_CALIB_UNEXPECTED	A motor randomly calibrated	Check for issue with all motors Sticky gearbox? Encoder problem?
35	TEST_RESULT_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
36	TEST_TIMED_OUT	Some step of playpen took too long and never completed	Try rerunning and email AI
37	TEST_CANCELLED	Not Possible	
38	ROBOT_PICKUP	Robot detected being picked up	Was the robot picked up during the test or lifted off the ground in some way? Check cliff sensors Check IMU
39	TOOL_CODE_IMAGES_WRITE_FAILED	Not Possible	
40	NOISY_TOUCH_SENSOR	Touch sensor readings not stable	Check touch sensor
41	CUBE_POSE_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
42	LIFT_MOTOR_CALIB_UNEXPECTED	Lift motor randomly calibrated	Check lift motor/gearbox

43	HEAD_MOTOR_CALIB_UNEXPECTED	Head motor randomly calibrated	Check head motor/gearbox
44	BACKPACK_ELECTRICAL_ERROR	Touch sensor readings too small or larger	Check touch sensor
45	ROBOT_FAILED_PREPLAYPEN_TESTS	Did not pass all previous fixtures	Run robot through previous fixtures
46	ROBOT_NOT_TESTED	Not Possible	
47	MOTORS_UNCALIBRATED	Head/lift motor failed to calibrate	Check head/lift motor/gearbox
48	BIRTH_CERTIFICATE_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
49	NVSTORAGE_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
50	NVSTORAGE_SEND_FAILED	Failed to write data to robot	Should never happen, email AI
51	TOO_MANY_TOOL_CODE_IMAGES	Not Possible	
52	CALIB_META_INFO_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI
53	IMU_INFO_WRITE_FAILED	Failed to write data to robot	Should never happen, email AI

54	NO_ACTIVE_OBJECTS_DISCOVERED	No advertising packet from a cube	Check battery of cube Check radio on robot
55	UNEXPECTED_TOUCH_DETECTED	Touch sensor readings stddev too large	Check touch sensor
56	COMPUTE_CAM_POSE_FAILED	Not Possible	
57	CAM_POSE_OOR	Not Possible	
58	PLAY_SOUND_FAILED	Not Possible	
59	PREV_TEST_RESULTS_READ_FAILED	Not Possible	
60	WRONG_FIRMWARE_VERSION	Not Possible	
61	CLIFF_VALUE_TOO_HIGH	Not Possible	
62	CLIFF_VALUE_TOO_LOW	Not Possible	
63	BACKUP_NOT_STRAIGHT	Robot did not backup straight while picking up the cube	Check wheel treads/motors/gearboxs
64	BATTERY_TOO_LOW	Battery is too low	Check battery Leave robot on a charger for a couple of minutes to charge

65	NO_IMU_DATA	Not Possible	
66	BACK_AND_FORTH_NOT_STRAIGHT	Robot did not backup straight after picking up the cube	Check wheel treads/motors/gearboxs
67	WRONG_BODY_HW_VERSION	Not Possible	
68	NO_BODY_VERSION_MESSAGE	Not Possible	
69	NVSTORAGE_ERASE_FAILED	Not Possible	
70	PARSE_HEADER_FAILED	Not Possible	
71	NO_WIFI_APS_DISCOVERED	No wifi APs found	Check radio on robot
72	UNKNOWN_BODY_COLOR	Not Possible	
73	WRITE_TO_LOG_FAILED	Failed to write data to robot	Should never happen, email AI
74	BEHAVIOR_NOT_RUNNABLE	Software bug	Try rerunning and email AI
75	NOT_SEEING_CALIB_TARGET_TIMEOUT	Robot not seeing camera calibration target	Check camera position and lens

76	UNEXPECTED_ON_CHARGER	Robot detected being on a charger randomly	Check charge contacts/circuit
77	HEAD_MOTOR_DISABLED	Head motor randomly disabled	Check head motor/gearbox
78	LIFT_MOTOR_DISABLED	Lift motor randomly disabled	Check lift motor/gearbox
79	MOTOR_DISABLED	Some motor randomly disabled	Check all motors/gearboxes
80	UNEXPECTED_MOVEMENT_DETECTED	Robot detected unexpected movement Probably ran into something in playpen	Check wheels Check IMU
81	ACTION_FAILED	Some action the robot was trying to do failed	Action depends on what the robot was trying to do
82	FRONT_CLIFFS_NOT_DETECTED	Robot failed to detect front cliffs	Check front two cliff sensors
83	BACK_CLIFFS_NOT_DETECTED	Robot failed to detect back cliffs	Check back two cliff sensors
84	FRONT_CLIFFS_NOT_UNDETECTED	Robot failed to undetect front cliffs after detecting them	Check front two cliff sensors

85	BACK_CLIFFS_NOT_UNDETECTED	Robot failed to undetect back cliffs after detecting them	Check back two cliff sensors
86	CUBE_HEIGHT_TOO_LOW	Robot thinks cube to low in the ground	Check cube position Check camera position/rotation
87	CUBE_HEIGHT_TOO_HIGH	Robot thinks cube to high above the ground	Check cube position Check camera position/rotation
88	DISTORTION_VALUES_OOR	Camera calibrated but the calibration is outside normal range	Check camera position and lens
89	DISTANCE_MARKER_NOT_FOUND	Robot not seeing distance sensor marker	Check robot position at time of failure, why wasn't it seeing the marker Check distance sensor marker
90	DISTANCE_MARKER_OOR	Robot seeing distance sensor marker to close or far away	Robot too far or close to distance sensor marker, check wheels
91	MIC_FR_NOT_WORKING	Front right mic not working	Check front right mic

92	MIC_FL_NOT_WORKING	Front left mic not working	Check front left mic
93	MIC_BR_NOT_WORKING	Back right mic not working	Check back right mic
94	MIC_BL_NOT_WORKING	Back left mic not working	Check back left mic
95	SPEAKER_NOT_WORKING	Either speaker not working or all mics not working	If robot played sound, check all mics Else check speaker
96	NO_FFT_RESULT	Never received FFT result from mic check	Email AI.
97	TOUCH_VALUES_OOR	Touch sensor reporting unexpected values	Check touch sensor
98	DISTANCE_SENSOR_OOR	Distance sensor reporting incorrect values	Check distance sensor
99	CERT_CHECK_FAILED	Invalid certs written by previous fixture	Run robot through previous fixtures