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Mattice et al.

(54) PORTABLE GAMING MACHINE EMERGENCY SHUT DOWN CIRCUITRY

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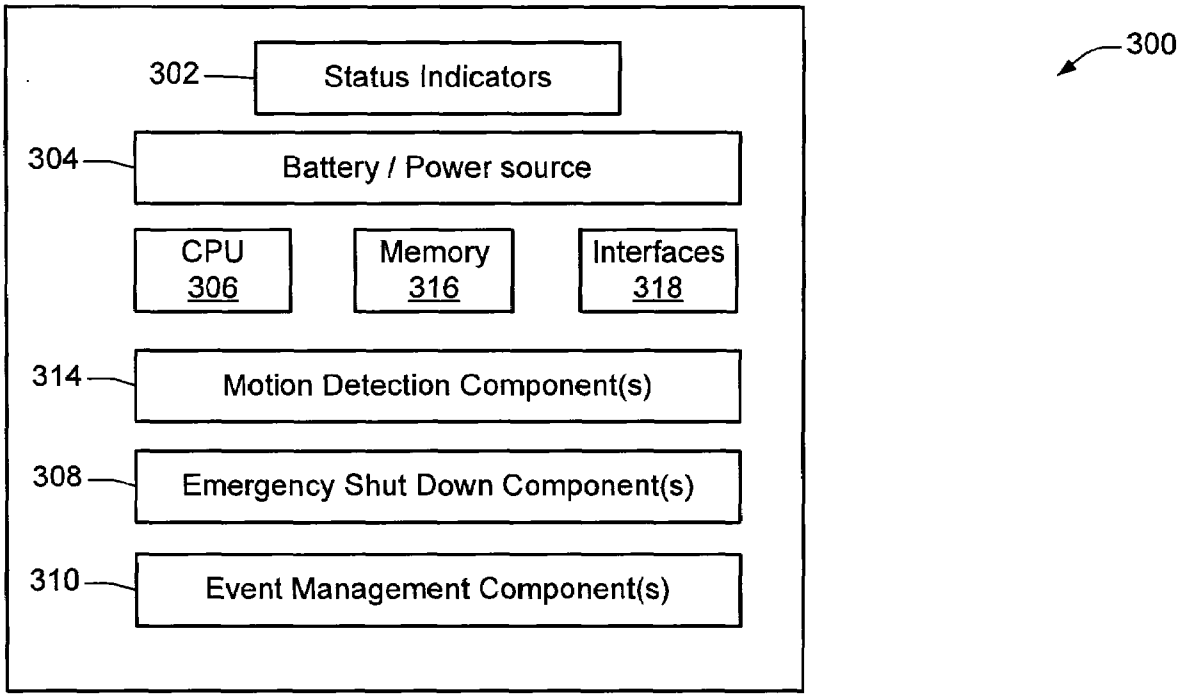
(52) **U.S. Cl.** **463/24**

(57) **ABSTRACT**

A portable casino gaming device includes a data preservation system and is operable to monitor movement activity relating to the portable gaming device, and generate movement information relating to movements of the portable gaming device. In at least one embodiment, the movement information includes at least one of: data relating to rotation of the portable gaming device, data relating to displacement of the portable gaming device, data relating to velocity of the portable gaming device, data relating to acceleration of the portable gaming device, and/or data relating to an orientation of the portable gaming device. The portable gaming device may also be operable to analyze the movement information with respect to a first set of threshold criteria in order to detect an occurrence of a first critical condition or event at the portable gaming device, and to initiate at least one action in response to detection of the first critical condition or event. In at least one embodiment, the at least one action includes automatically initiating at least one operation to save selected gaming information in non-volatile memory, wherein the selected gaming information includes information relating to game play conducted at the portable gaming device.



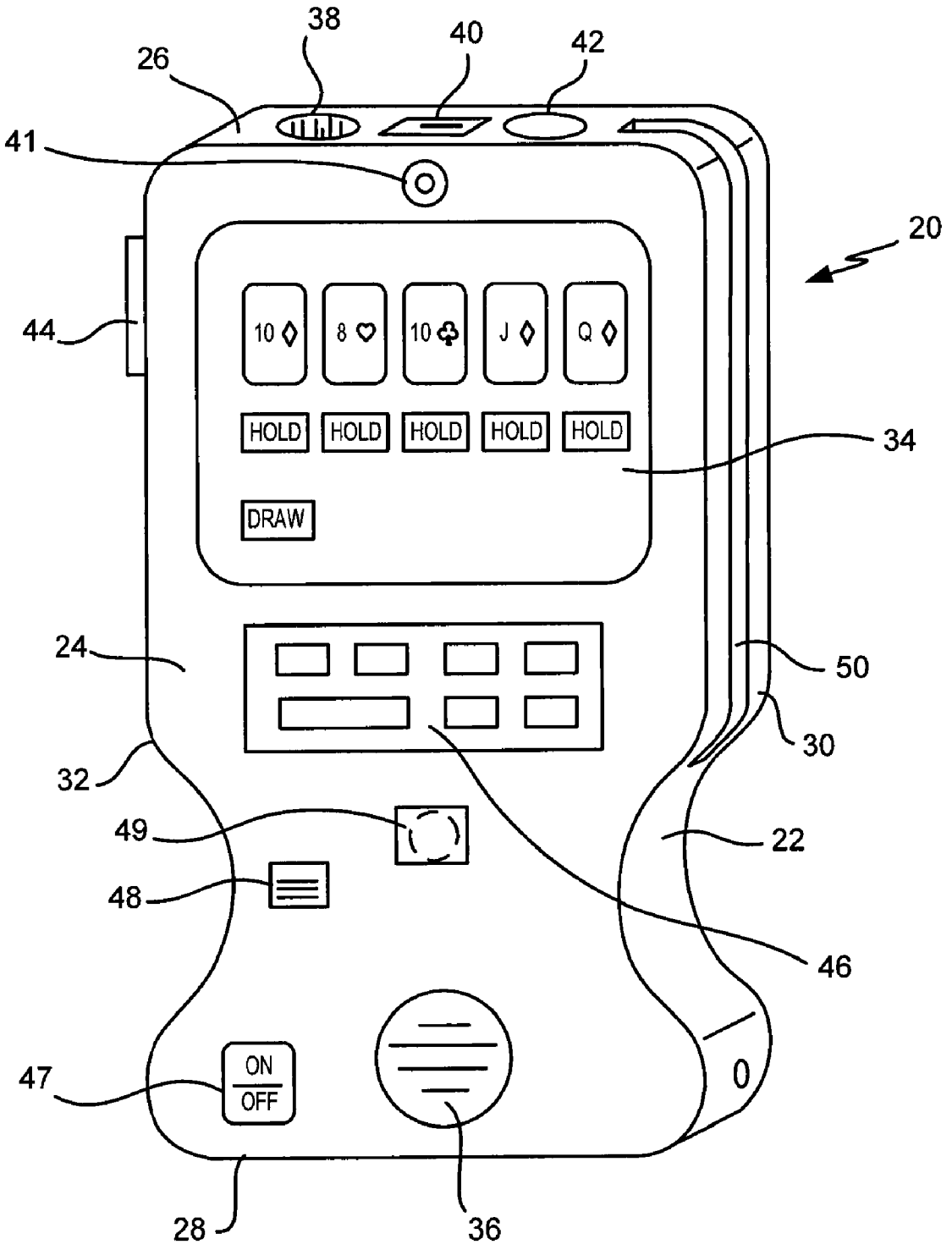

38
40
42
26
41
20
44
10 ♦
8 ♥
10 ♣
J ♦
Q ♦
HOLD
HOLD
HOLD
HOLD
HOLD
34
DRAW
24
50
30
32
49
22
48
46
47
ON
OFF
0
28
36

Fig. 1A

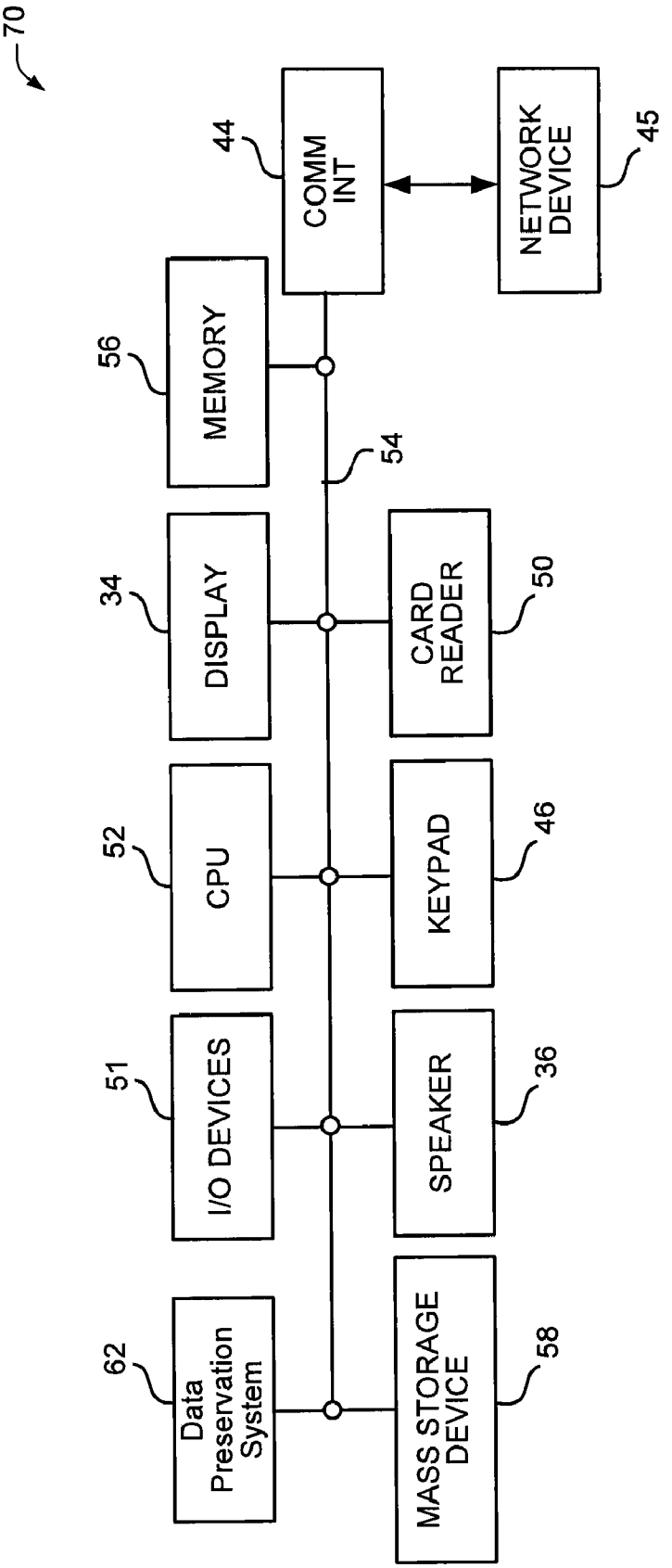

70
COMM INT
44
NETWORK DEVICE
45
MEMORY
56
54
DISPLAY
34
CARD READER
50
CPU
52
KEYPAD
46
I/O DEVICES
51
SPEAKER
36
Data Preservation System
62
MASS STORAGE DEVICE
58

Fig. 1B

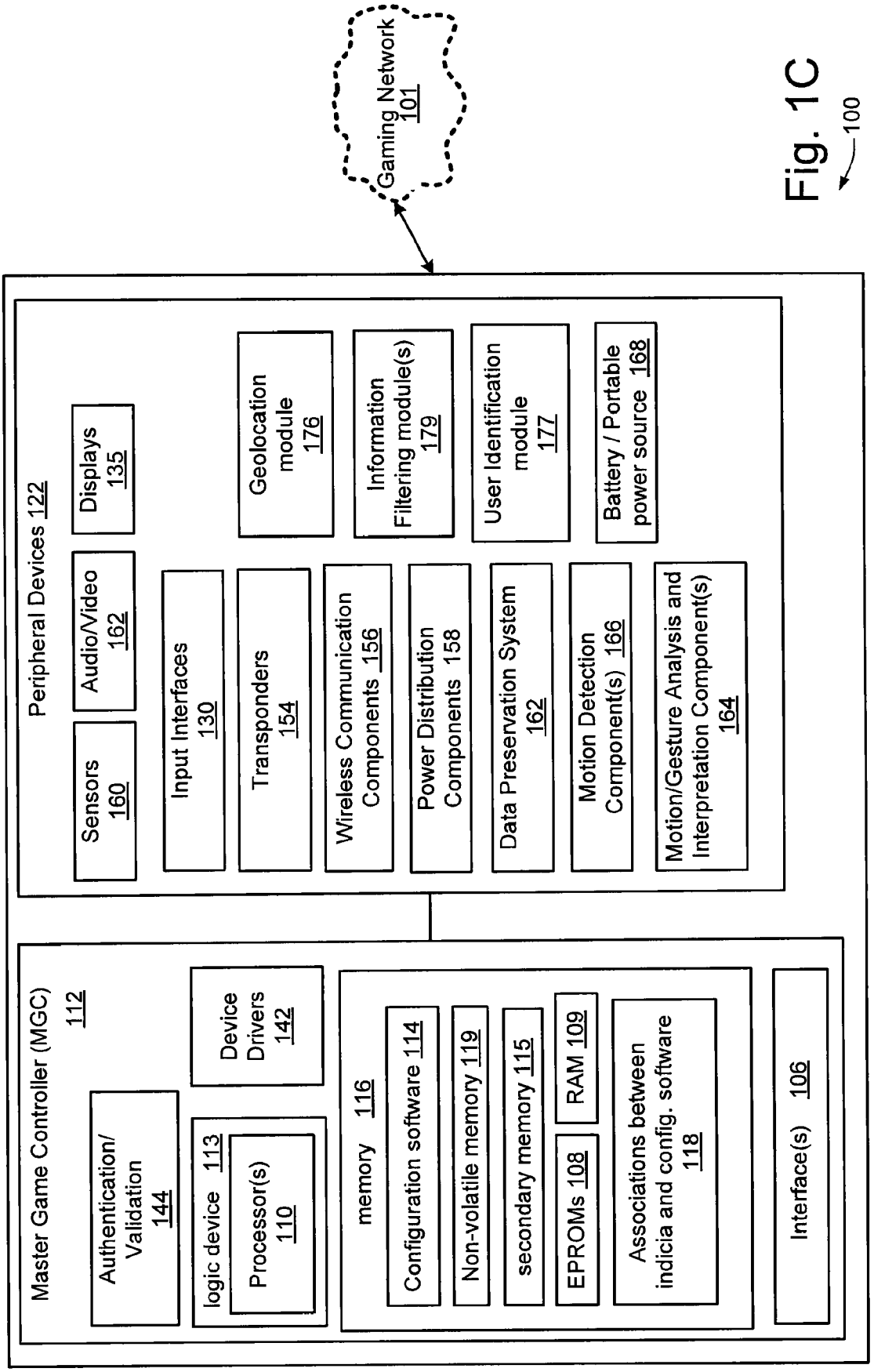

Gaming Network 101
Master Game Controller (MGC) 112
Authentication/ Validation 144
logic device 113
Processor(s) 110
Device Drivers 142
memory 116
Configuration software 114
Non-volatile memory 119
secondary memory 115
EPROMs 108
RAM 109
Associations between indicia and config. software 118
Interface(s) 106
Peripheral Devices 122
Sensors 160
Audio/Video 162
Displays 135
Input Interfaces 130
Transponders 154
Wireless Communication Components 156
Power Distribution Components 158
Data Preservation System 162
Motion Detection Component(s) 166
Motion/Gesture Analysis and Interpretation Component(s) 164
Geolocation module 176
Information Filtering module(s) 179
User Identification module 177
Battery / Portable power source 168

Fig. 1C

100

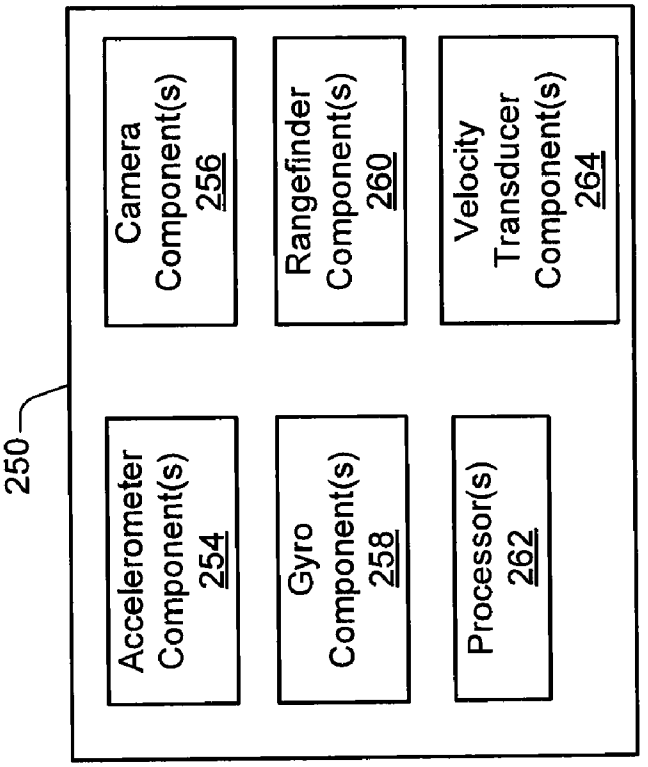

250
Accelerometer Component(s) 254
Gyro Component(s) 258
Processor(s) 262
Camera Component(s) 256
Rangefinder Component(s) 260
Velocity Transducer Component(s) 264

Fig. 2B

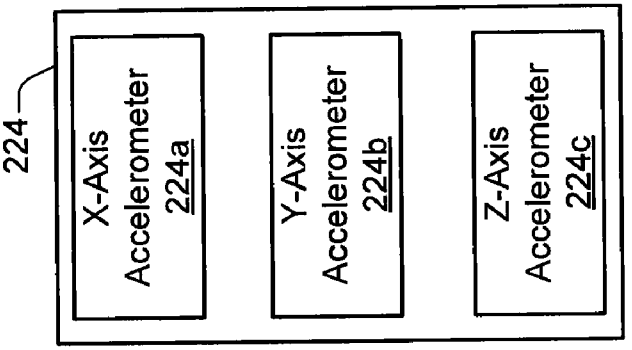

224
X-Axis Accelerometer 224a
Y-Axis Accelerometer 224b
Z-Axis Accelerometer 224c

Fig. 2A

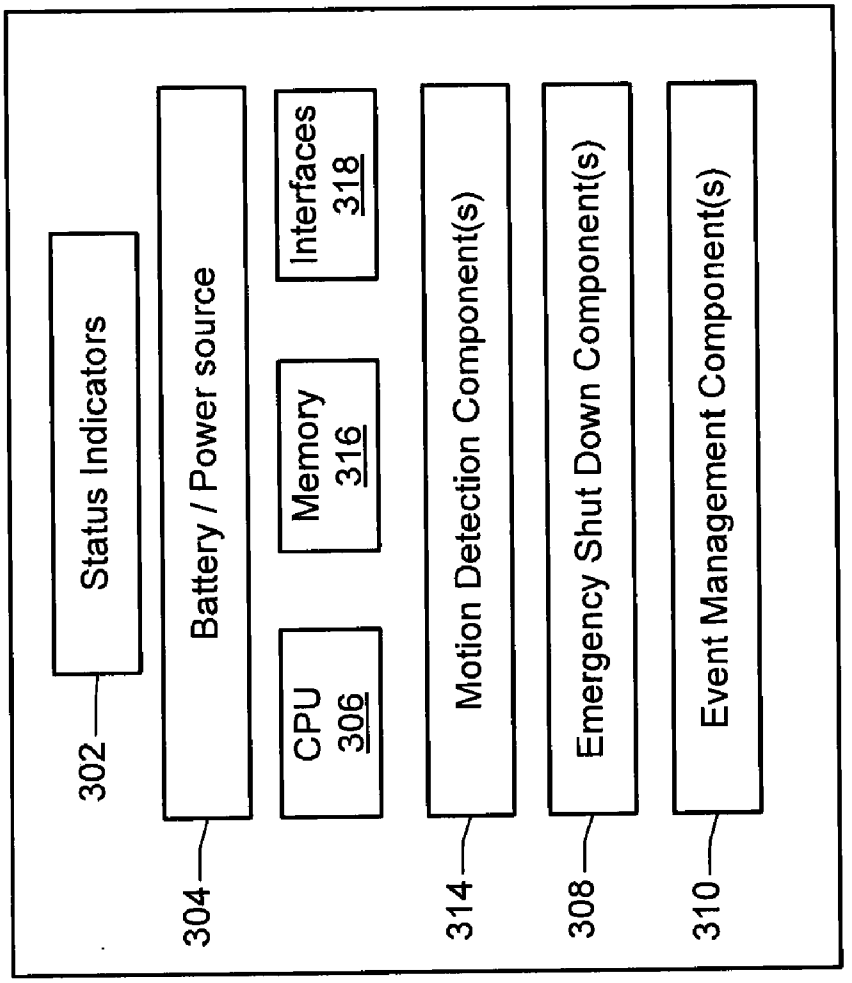

300
Status Indicators
302
Battery / Power source
304
CPU 306
Memory 316
Interfaces 318
Motion Detection Component(s)
314
Emergency Shut Down Component(s)
308
Event Management Component(s)
310

Fig. 3

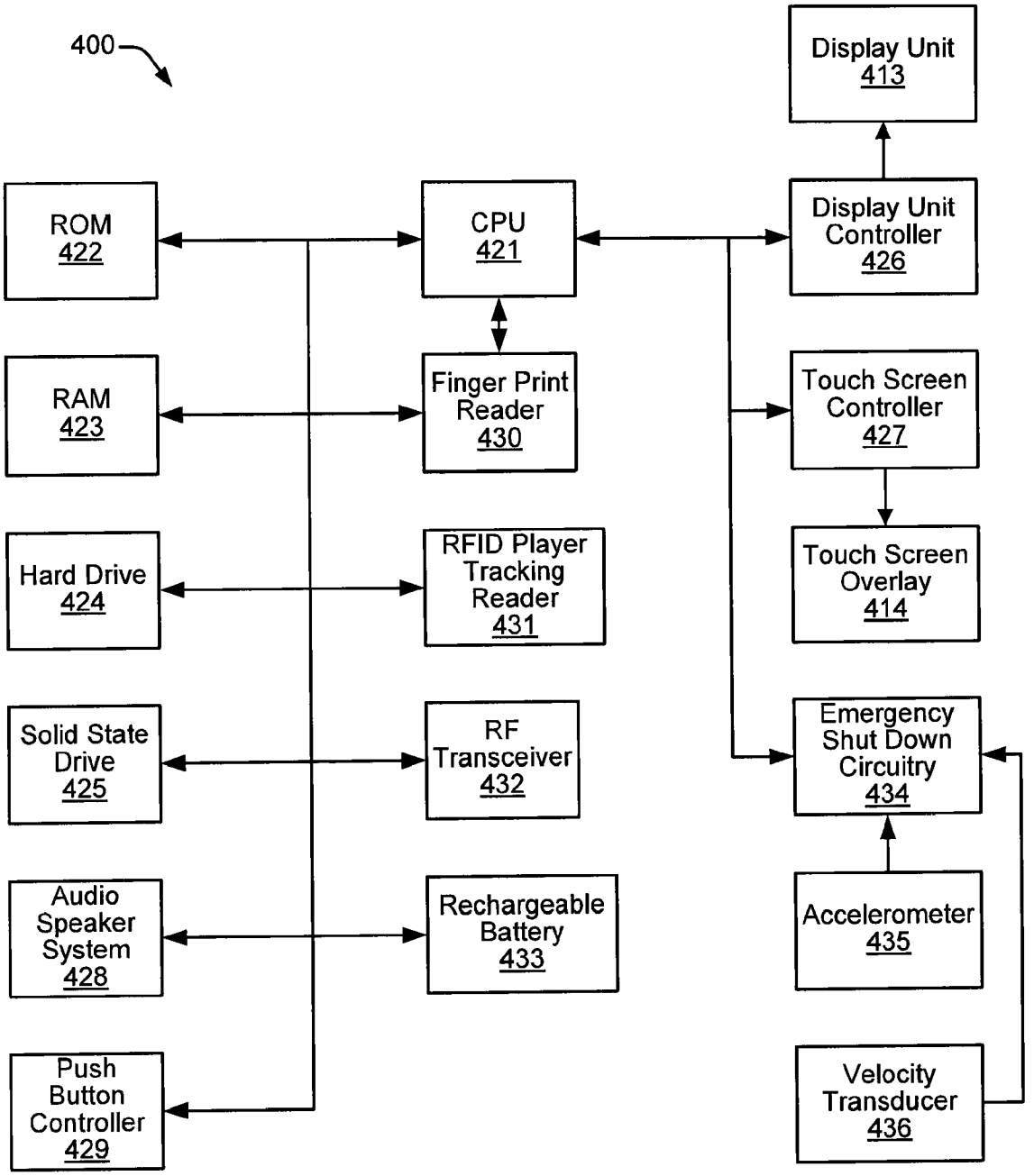

400
Display Unit 413
ROM 422
CPU 421
Display Unit Controller 426
RAM 423
Finger Print Reader 430
Touch Screen Controller 427
Hard Drive 424
RFID Player Tracking Reader 431
Touch Screen Overlay 414
Solid State Drive 425
RF Transceiver 432
Emergency Shut Down Circuitry 434
Audio Speaker System 428
Rechargeable Battery 433
Accelerometer 435
Push Button Controller 429
Velocity Transducer 436

Fig. 4

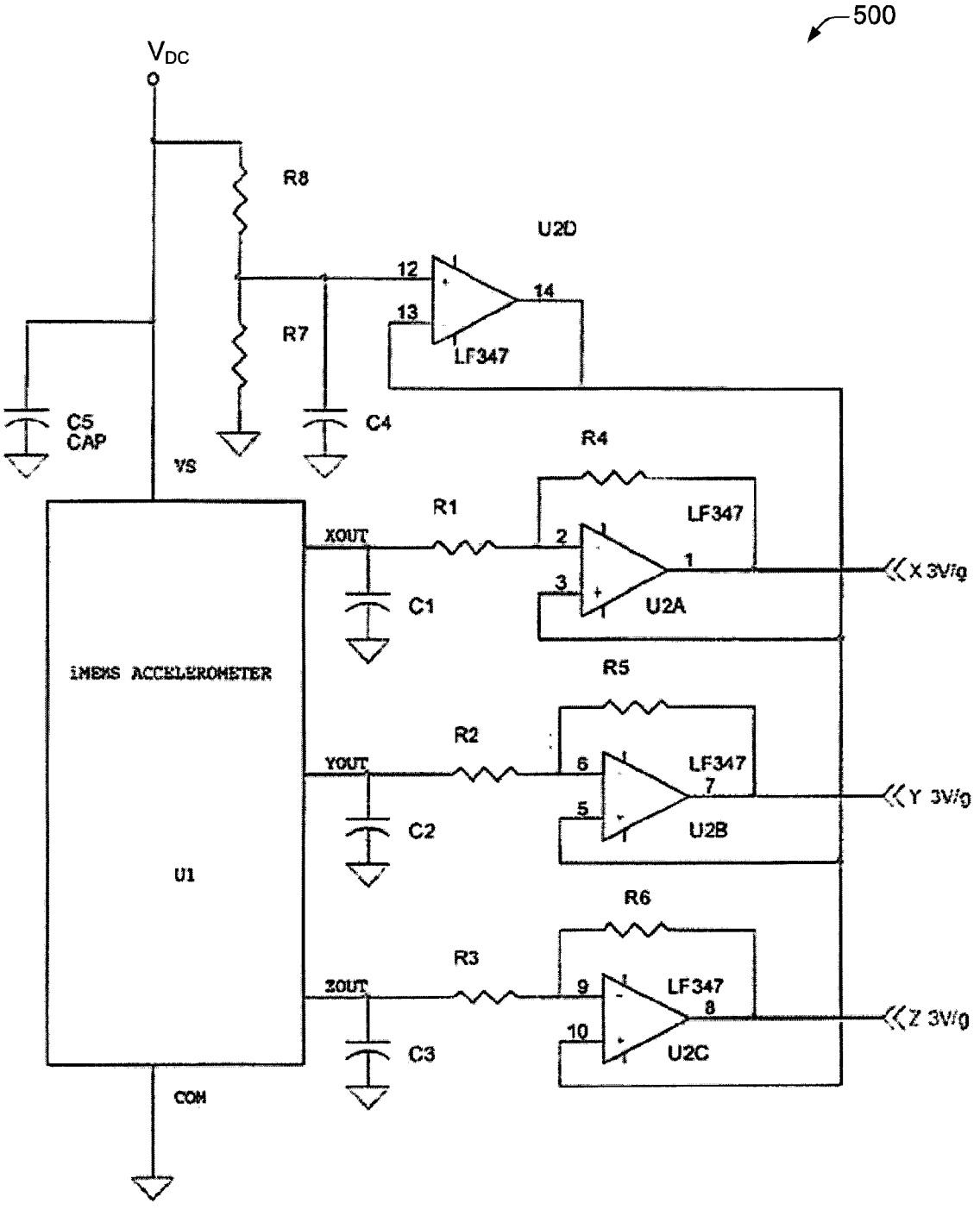

500
V_{DC}
R8
U2D
12
14
13
LF347
R7
C5
CAP
C4
VS
R4
R1
LF347
XOUT
2
1
3
U2A
X 3V/g
C1
iMEMS ACCELEROMETER
R5
R2
YOUT
6
LF347
7
5
U2B
Y 3V/g
C2
U1
R6
R3
ZOUT
9
LF347
8
10
U2C
Z 3V/g
C3
COM

Fig. 5

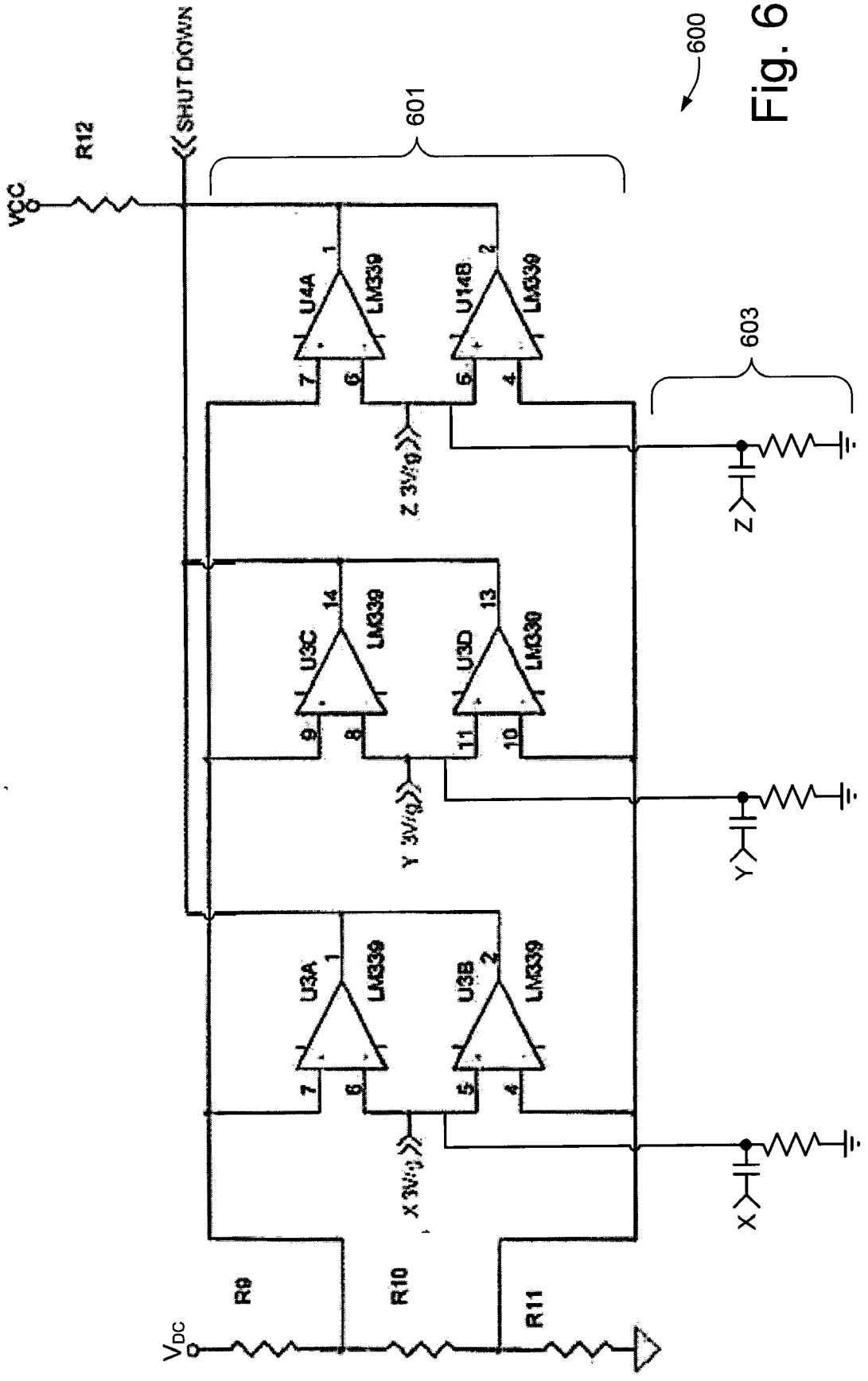

600
601
603
SHUT DOWN
R12
VCC
U4A
U14B
U3C
U3D
U3A
U3B
LM339
Z
Y
X
R9
R10
R11
VDC

Fig. 6

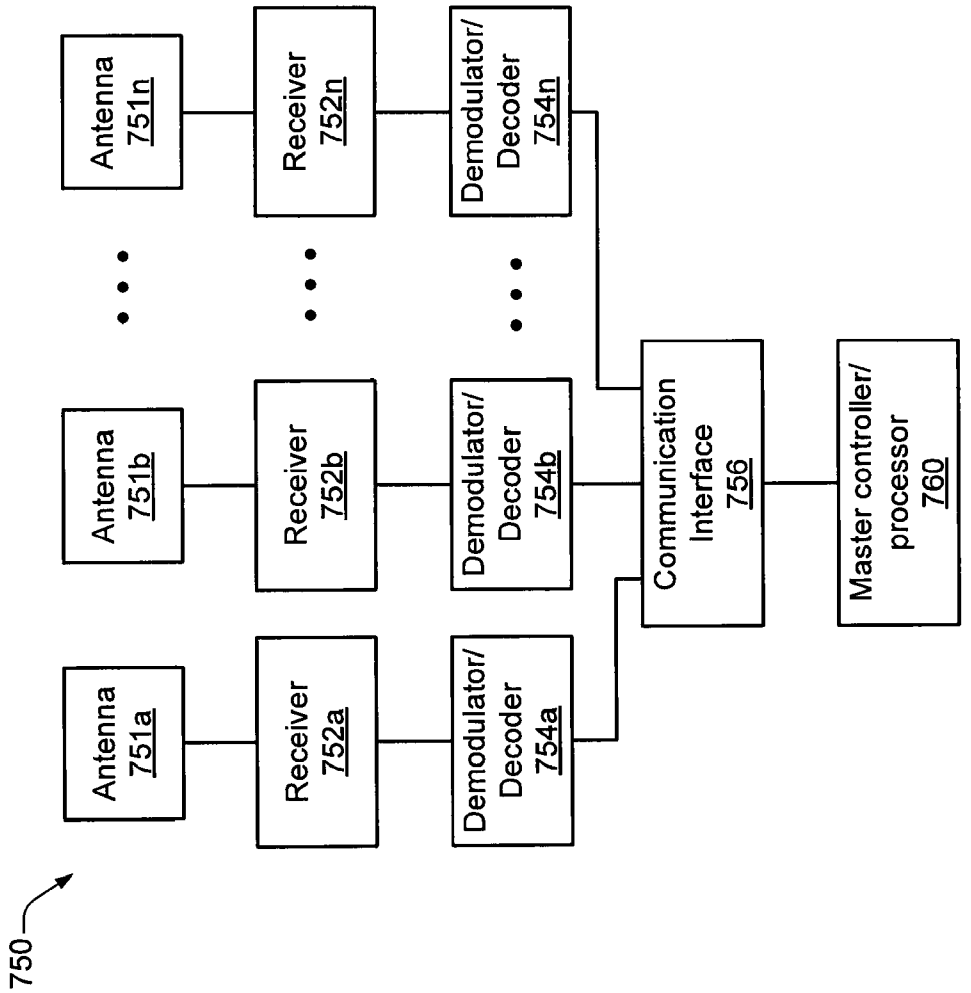

750
Antenna 751a
Antenna 751b
Antenna 751n
Receiver 752a
Receiver 752b
Receiver 752n
Demodulator/ Decoder 754a
Demodulator/ Decoder 754b
Demodulator/ Decoder 754n
Communication Interface 756
Master controller/ processor 760

Fig. 7B

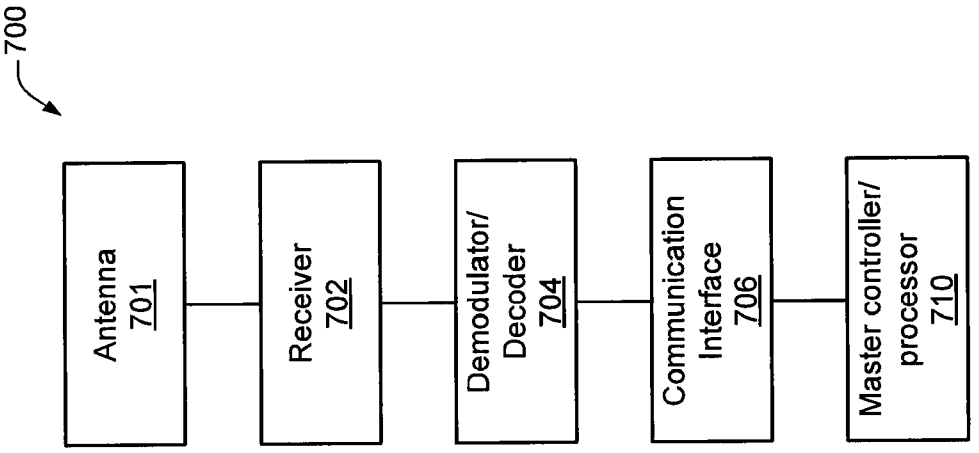

700
Antenna 701
Receiver 702
Demodulator/ Decoder 704
Communication Interface 706
Master controller/ processor 710

Fig. 7A

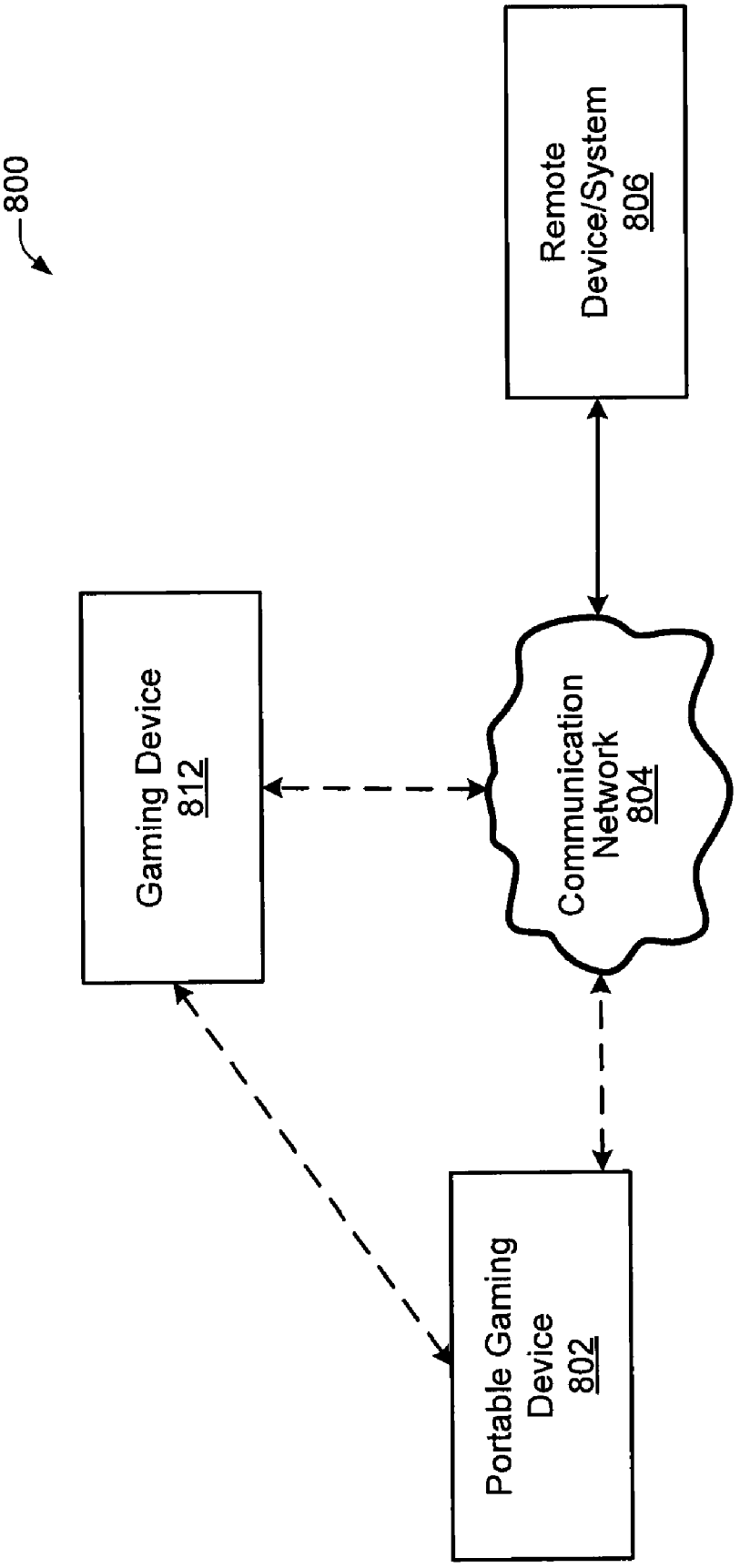

800
Remote Device/System 806
Gaming Device 812
Communication Network 804
Portable Gaming Device 802

Fig. 8

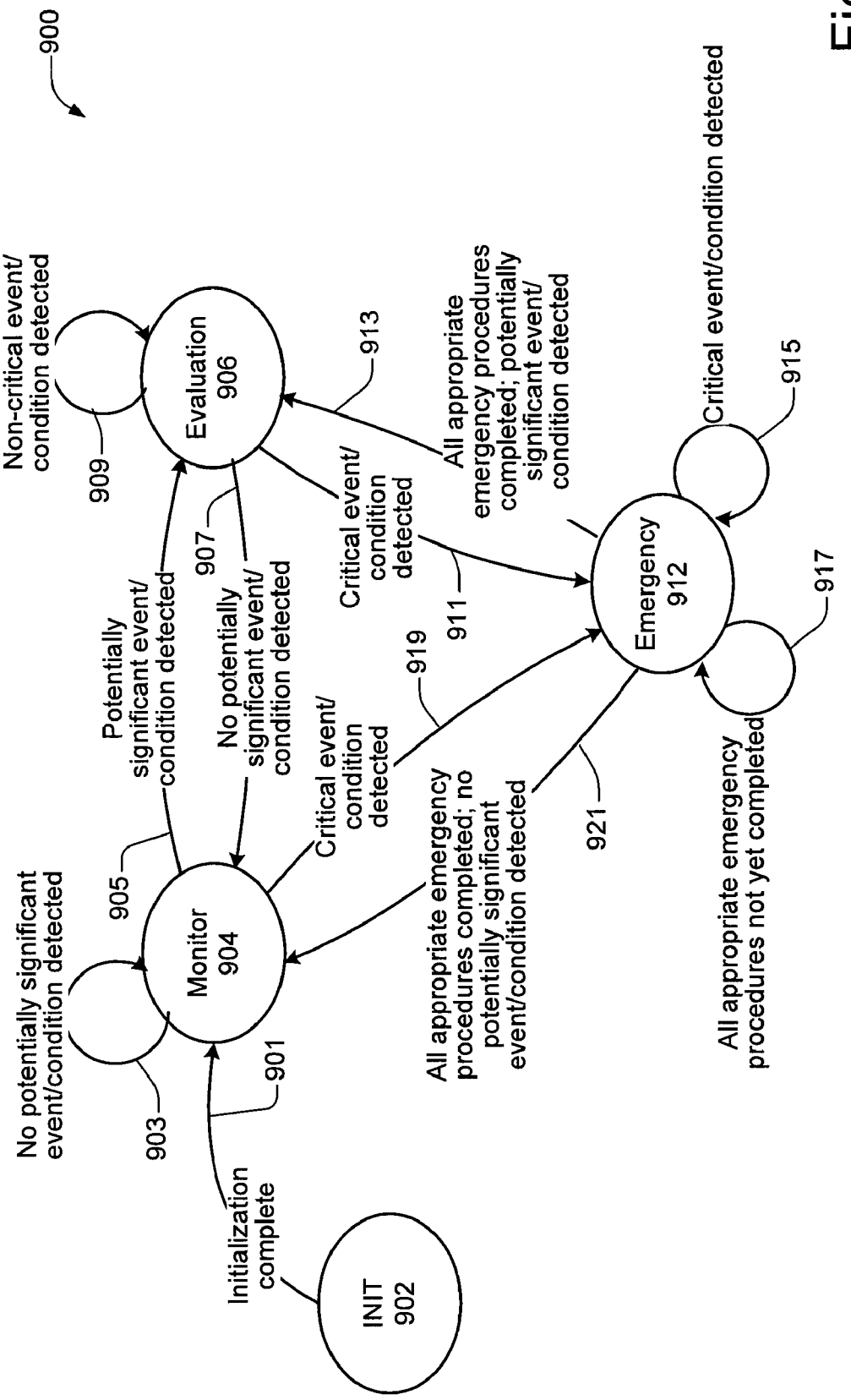

900
INIT 902
Initialization complete
901
Monitor 904
903
No potentially significant event/condition detected
905
Potentially significant event/ condition detected
No potentially significant event/ condition detected
907
Evaluation 906
909
Non-critical event/ condition detected
913
Critical event/ condition detected
911
All appropriate emergency procedures completed; potentially significant event/ condition detected
Emergency 912
915
Critical event/condition detected
917
All appropriate emergency procedures not yet completed
921
All appropriate emergency procedures completed; no potentially significant event/condition detected
919
Critical event/ condition detected

Fig. 9

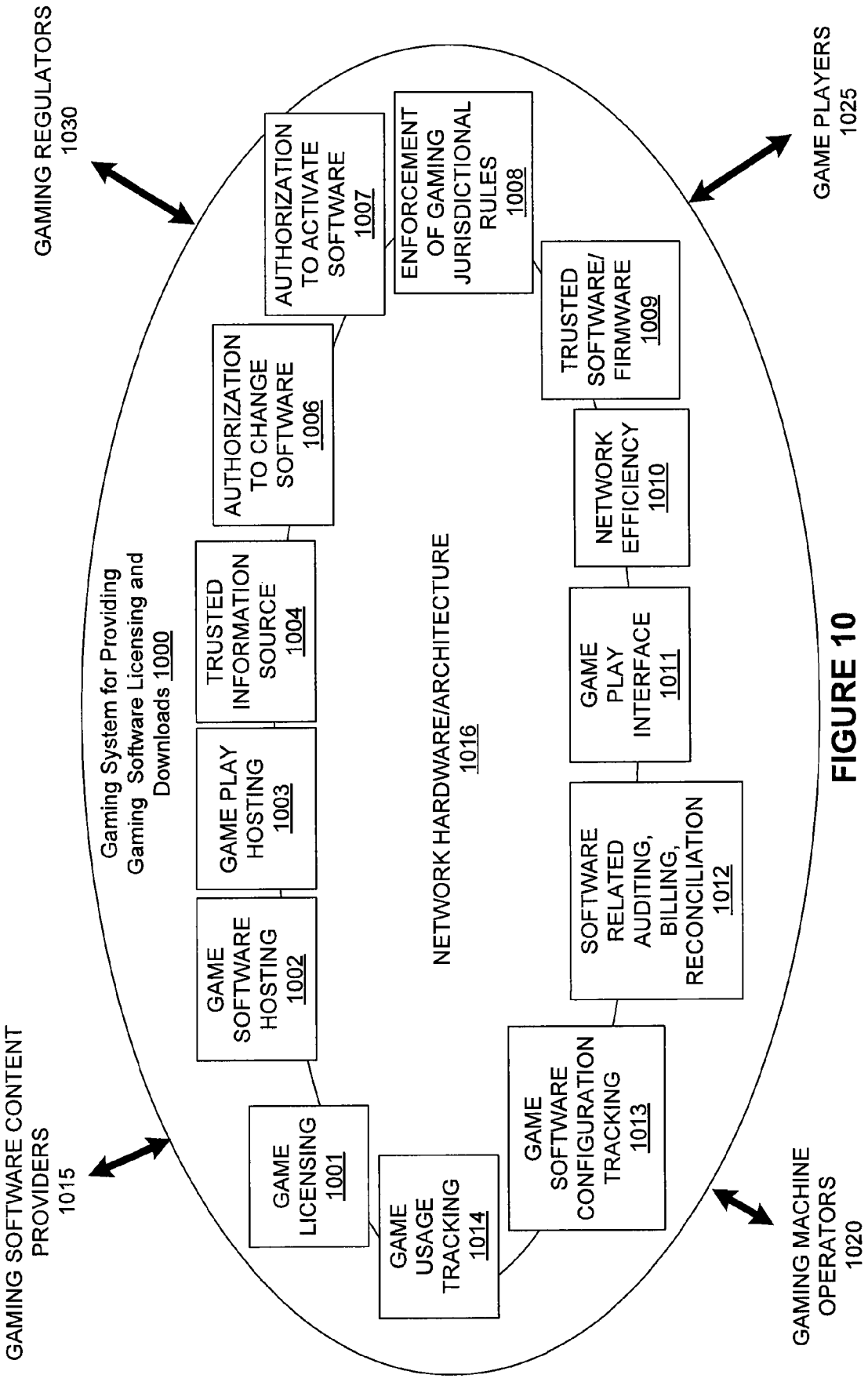

GAMING REGULATORS
1030
GAME PLAYERS
1025
GAMING SOFTWARE CONTENT PROVIDERS
1015
GAMING MACHINE OPERATORS
1020
Gaming System for Providing Gaming Software Licensing and Downloads 1000
NETWORK HARDWARE/ARCHITECTURE
1016
GAME LICENSING
1001
GAME SOFTWARE HOSTING
1002
GAME PLAY HOSTING
1003
TRUSTED INFORMATION SOURCE
1004
AUTHORIZATION TO CHANGE SOFTWARE
1006
AUTHORIZATION TO ACTIVATE SOFTWARE
1007
ENFORCEMENT OF GAMING JURISDICTIONAL RULES
1008
TRUSTED SOFTWARE/ FIRMWARE
1009
NETWORK EFFICIENCY
1010
GAME PLAY INTERFACE
1011
SOFTWARE RELATED AUDITING, BILLING, RECONCILIATION
1012
GAME SOFTWARE CONFIGURATION TRACKING
1013
GAME USAGE TRACKING
1014

FIGURE 10

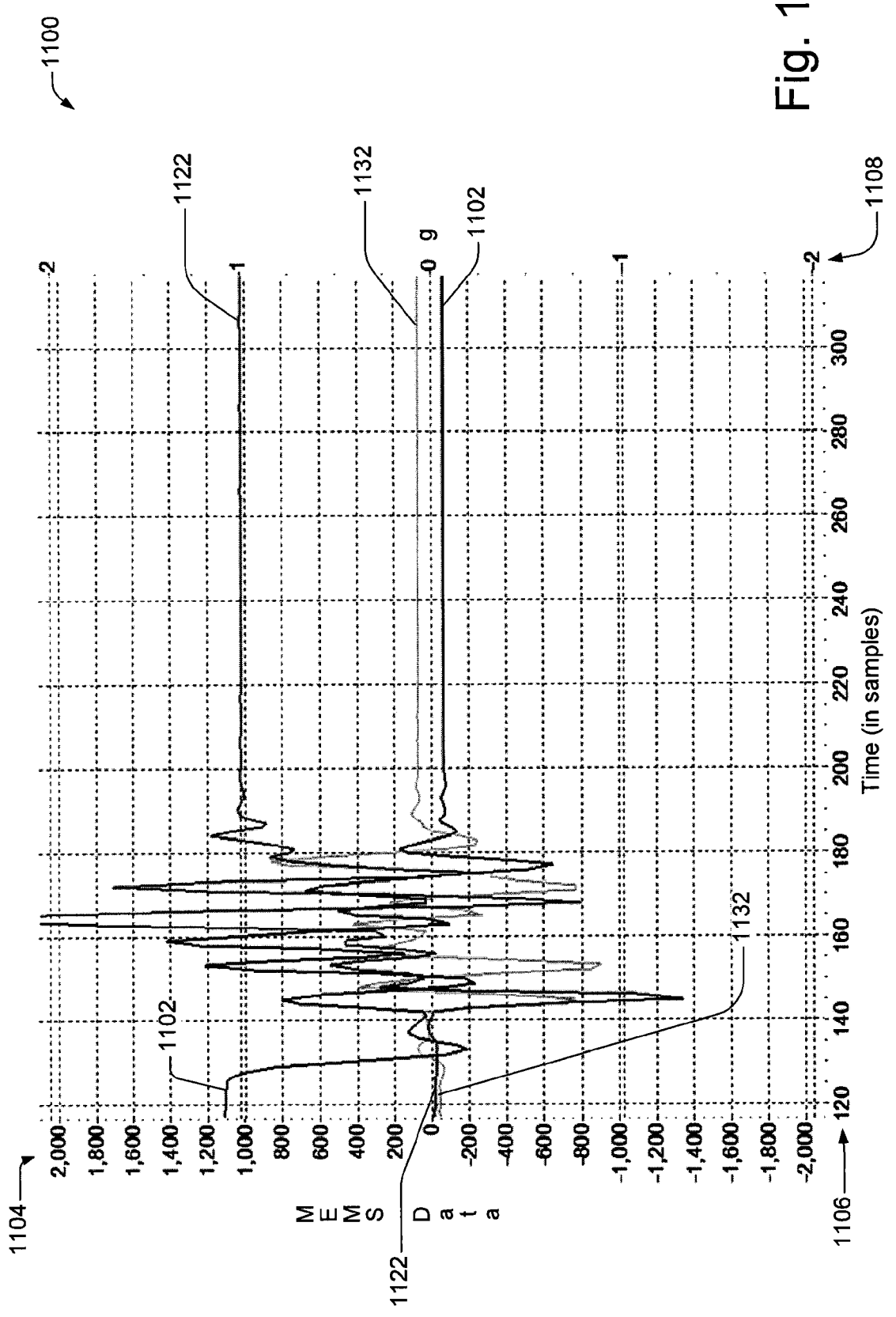

1100
1122
1132
1102
1108
1104
1106
1102
1132
1122
MEMS Data
Time (in samples)
0 g
2
1
-1
-2
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
120
140
160
180
200
220
240
260
280
300

Fig. 11A

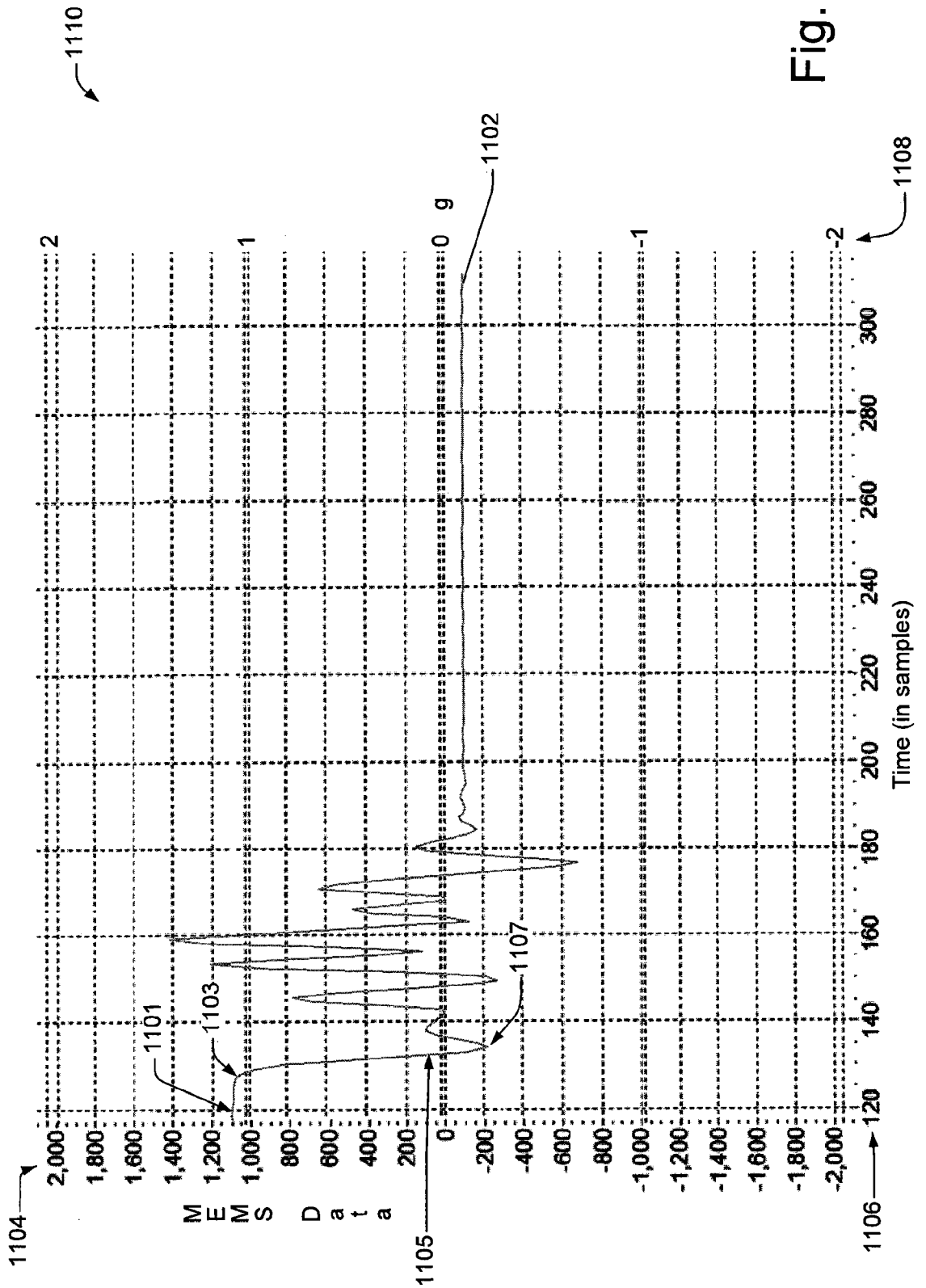

1110
1104
1105
1106
1108
1101
1102
1103
1107
MEMS Data
g
Time (in samples)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
2
1
0
-1
-2
120
140
160
180
200
220
240
260
280
300

Fig. 11B

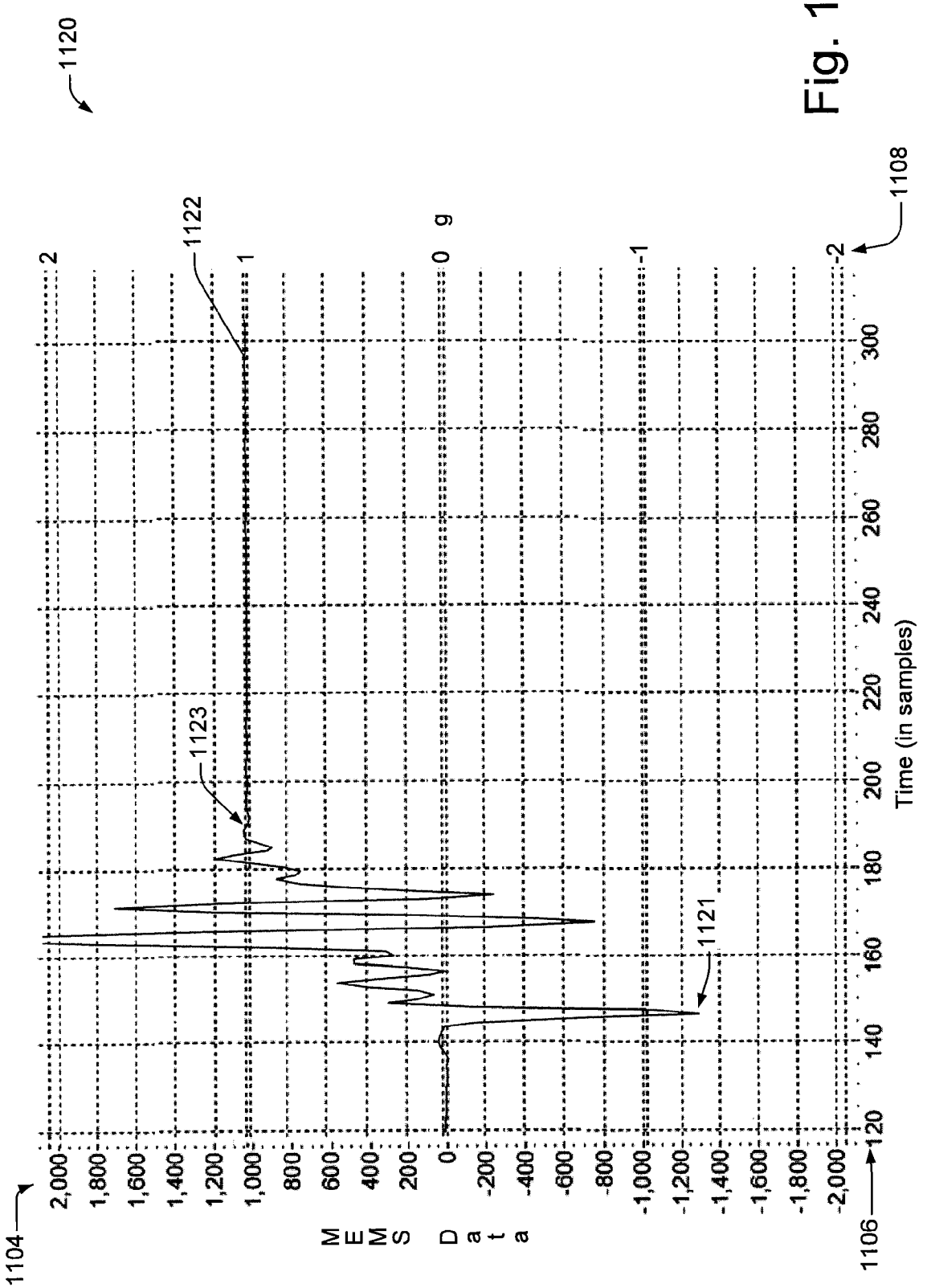

1120
1122
1123
1121
1104
1106
1108
MEMS Data
g
Time (in samples)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
2
1
0
-1
-2
120
140
160
180
200
220
240
260
280
300

Fig. 11C

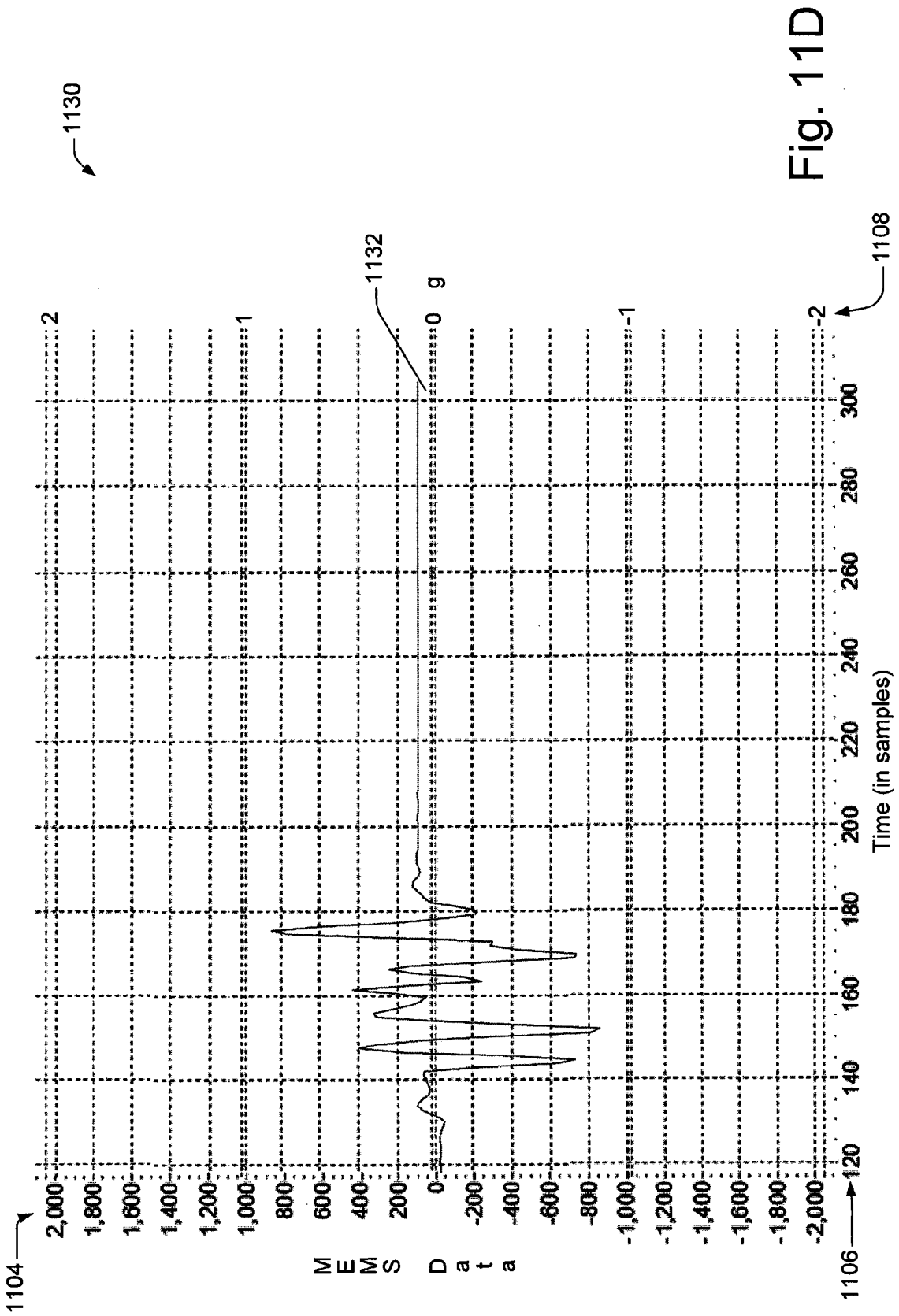
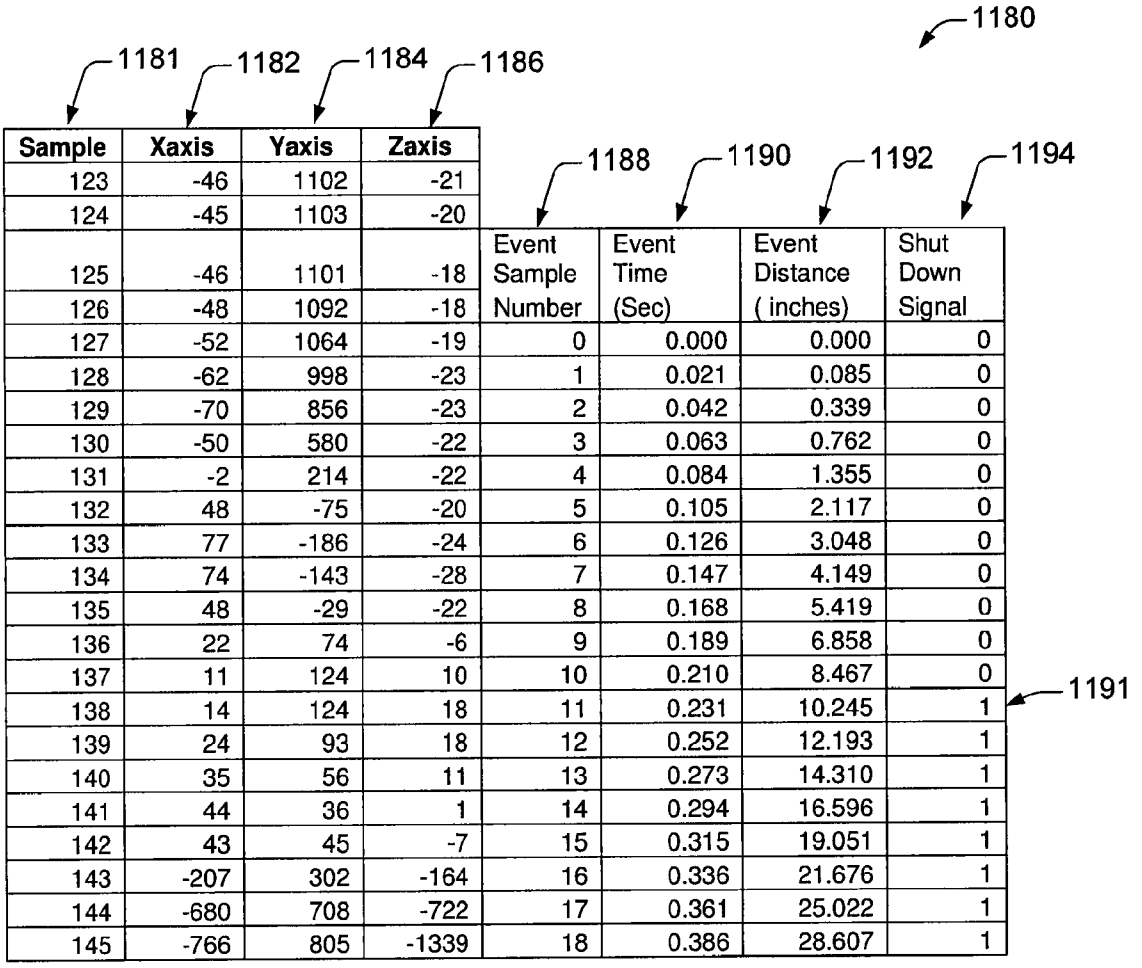

1130
1132
1104
1106
1108
MEMS Data
Time (in samples)
0 g
2
1
-1
-2
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
120
140
160
180
200
220
240
260
280
300

Fig. 11D



Sample	Xaxis	Yaxis	Zaxis	Event Sample Number	Event Time (Sec)	Event Distance (inches)	Shut Down Signal
123	-46	1102	-21				
124	-45	1103	-20				
125	-46	1101	-18				
126	-48	1092	-18				
127	-52	1064	-19	0	0.000	0.000	0
128	-62	998	-23	1	0.021	0.085	0
129	-70	856	-23	2	0.042	0.339	0
130	-50	580	-22	3	0.063	0.762	0
131	-2	214	-22	4	0.084	1.355	0
132	48	-75	-20	5	0.105	2.117	0
133	77	-186	-24	6	0.126	3.048	0
134	74	-143	-28	7	0.147	4.149	0
135	48	-29	-22	8	0.168	5.419	0
136	22	74	-6	9	0.189	6.858	0
137	11	124	10	10	0.210	8.467	0
138	14	124	18	11	0.231	10.245	1
139	24	93	18	12	0.252	12.193	1
140	35	56	11	13	0.273	14.310	1
141	44	36	1	14	0.294	16.596	1
142	43	45	-7	15	0.315	19.051	1
143	-207	302	-164	16	0.336	21.676	1
144	-680	708	-722	17	0.361	25.022	1
145	-766	805	-1339	18	0.386	28.607	1

Fig. 11E

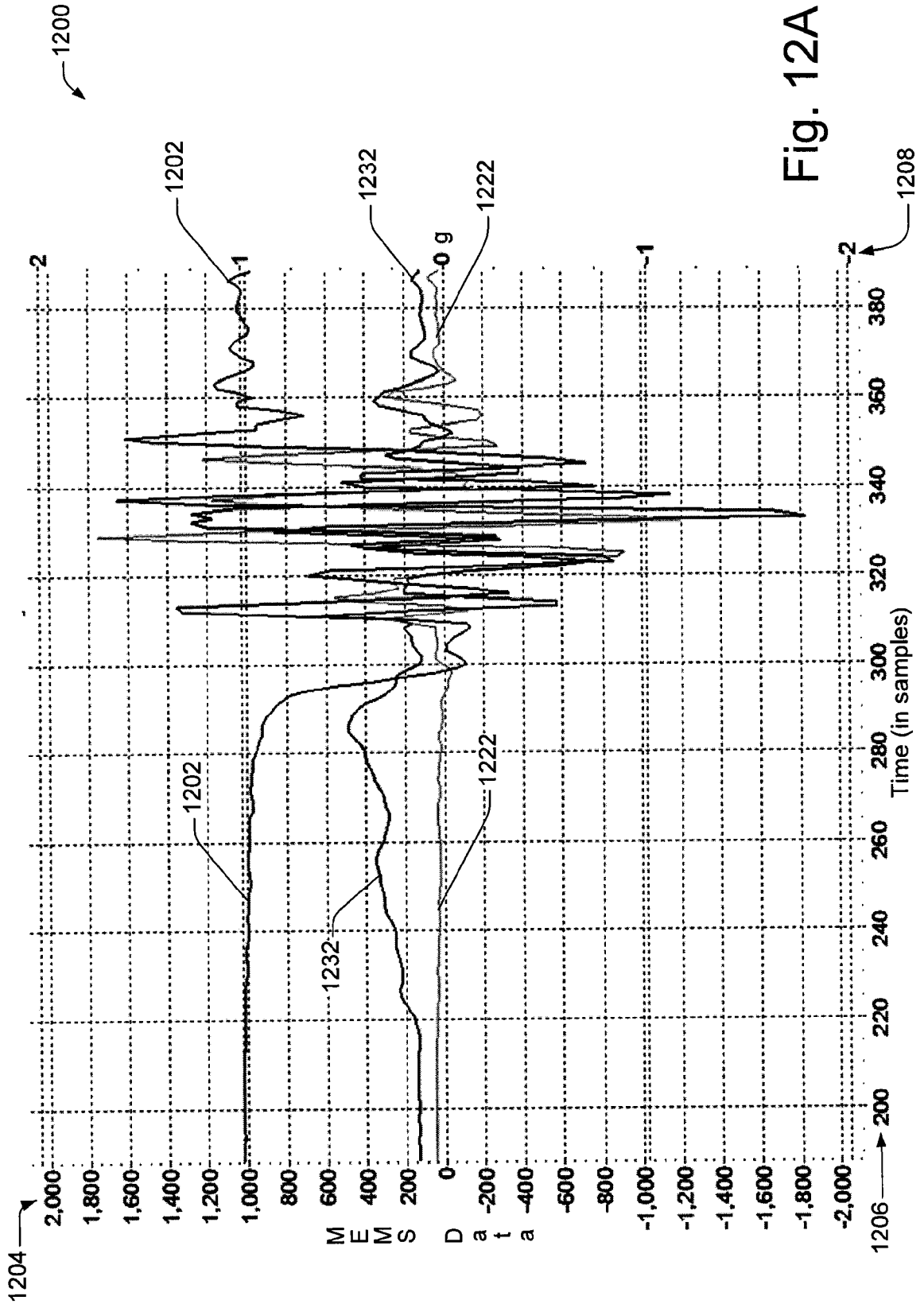

1200
1202
1232
1222
1208
1204
1206
MEMS Data
Time (in samples)
0 g
1
2
-1
-2

Fig. 12A

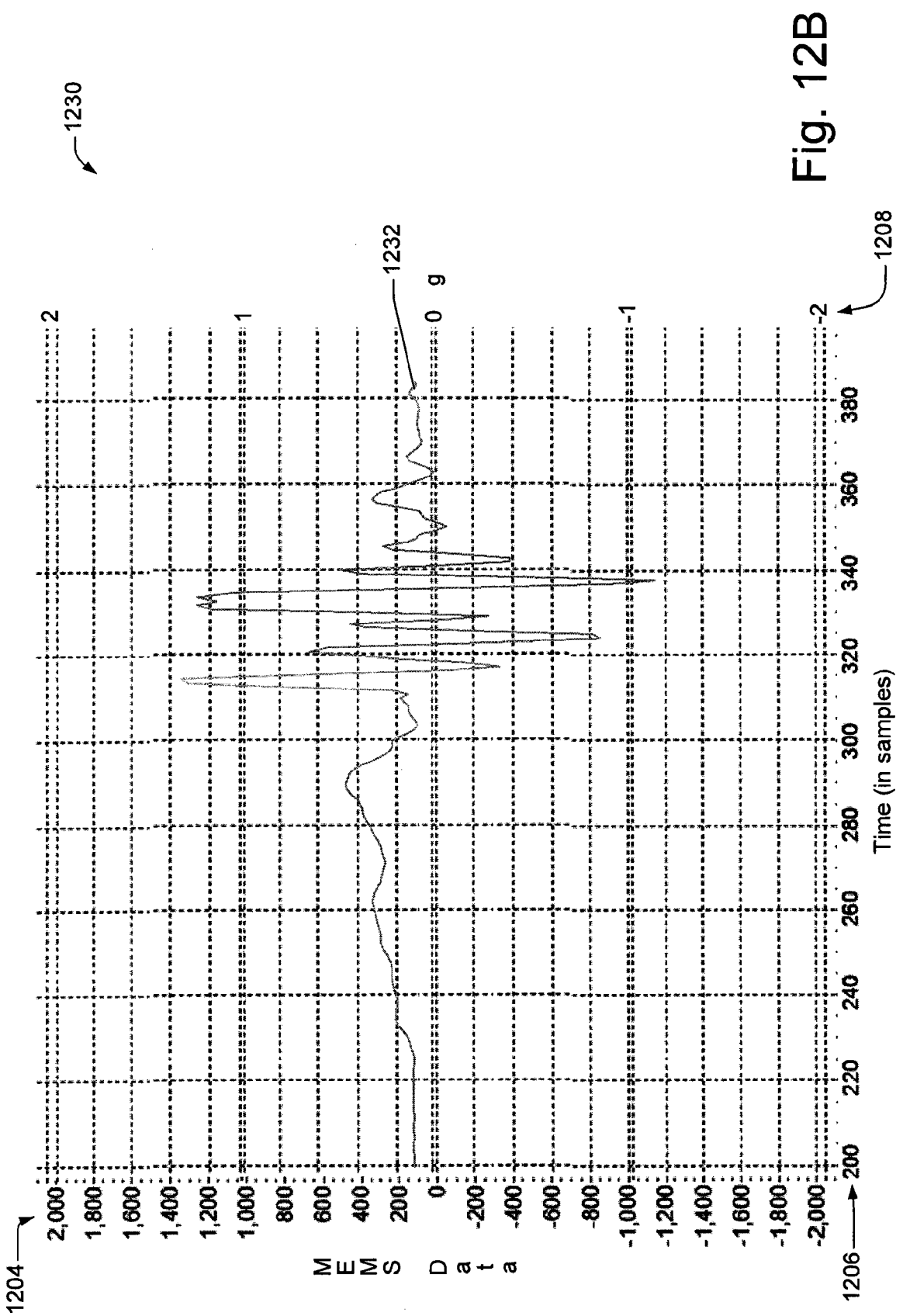

1230
1232
1204
1206
1208
MEMS Data
Time (in samples)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
2
1
0 g
-1
-2
200
220
240
260
280
300
320
340
360
380

Fig. 12B

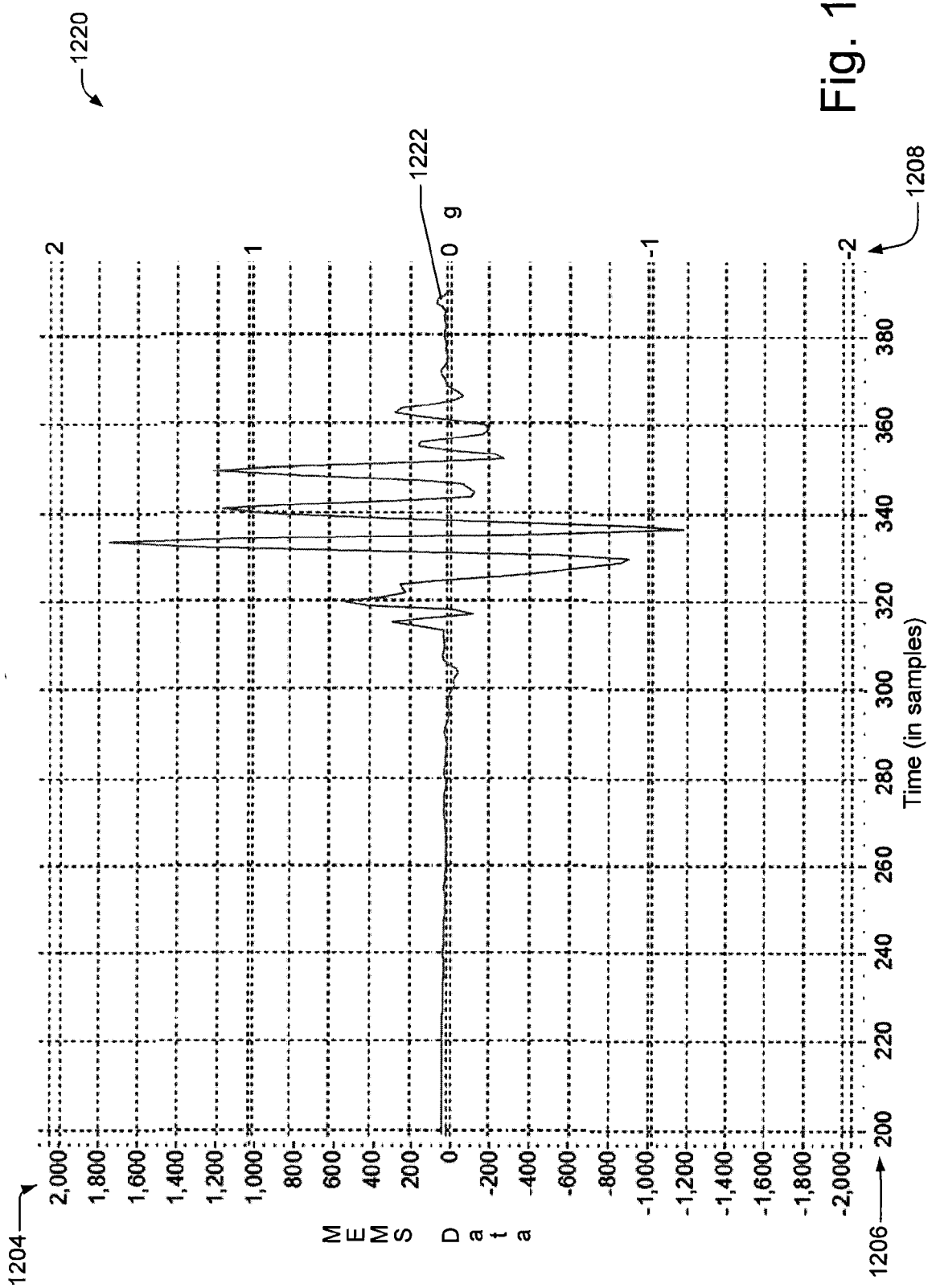

1220
1222
1208
1204
1206
MEMS Data
Time (in samples)
0 g
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
2
1
-1
-2
200
220
240
260
280
300
320
340
360
380

Fig. 12C

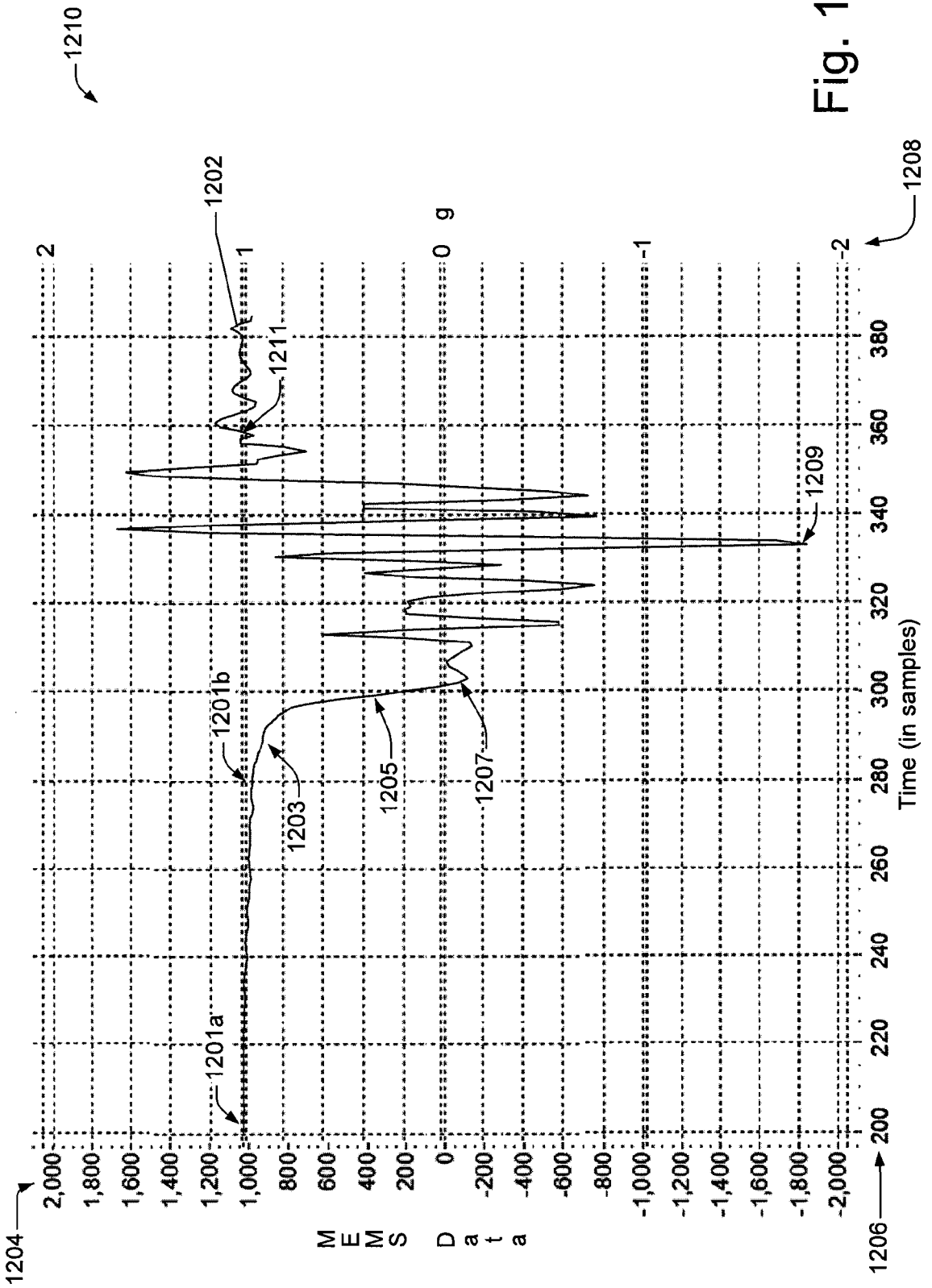
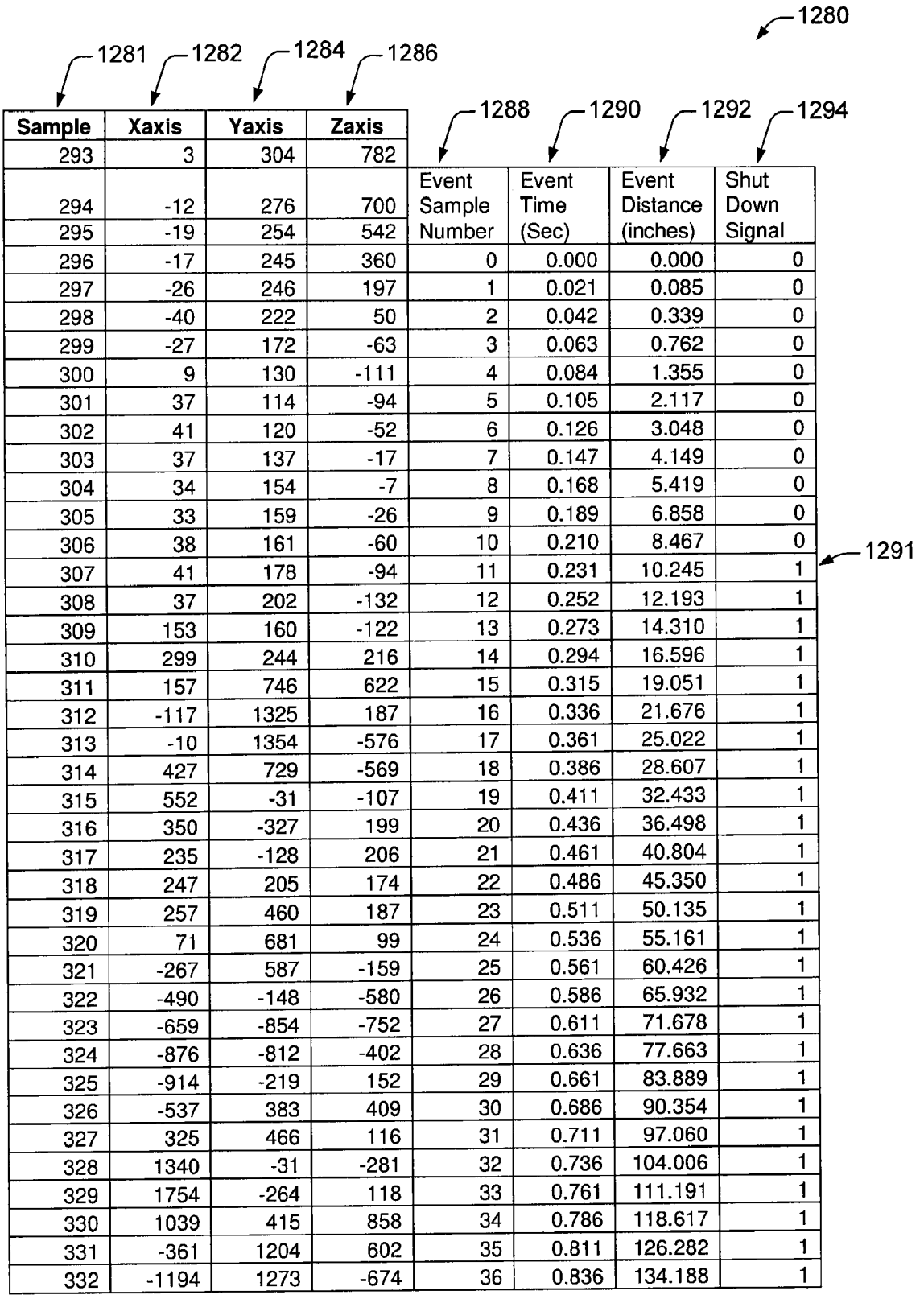

1210
1202
1211
1201b
1201a
1203
1205
1207
1209
1204
1206
1208
MEMS Data
0 g
Time (in samples)
2,000
1,800
1,600
1,400
1,200
1,000
800
600
400
200
0
-200
-400
-600
-800
-1,000
-1,200
-1,400
-1,600
-1,800
-2,000
2
1
0
-1
-2
200
220
240
260
280
300
320
340
360
380

Fig. 12D



Sample	Xaxis	Yaxis	Zaxis	Event Sample Number	Event Time (Sec)	Event Distance (inches)	Shut Down Signal
293	3	304	782				
294	-12	276	700				
295	-19	254	542				
296	-17	245	360	0	0.000	0.000	0
297	-26	246	197	1	0.021	0.085	0
298	-40	222	50	2	0.042	0.339	0
299	-27	172	-63	3	0.063	0.762	0
300	9	130	-111	4	0.084	1.355	0
301	37	114	-94	5	0.105	2.117	0
302	41	120	-52	6	0.126	3.048	0
303	37	137	-17	7	0.147	4.149	0
304	34	154	-7	8	0.168	5.419	0
305	33	159	-26	9	0.189	6.858	0
306	38	161	-60	10	0.210	8.467	0
307	41	178	-94	11	0.231	10.245	1
308	37	202	-132	12	0.252	12.193	1
309	153	160	-122	13	0.273	14.310	1
310	299	244	216	14	0.294	16.596	1
311	157	746	622	15	0.315	19.051	1
312	-117	1325	187	16	0.336	21.676	1
313	-10	1354	-576	17	0.361	25.022	1
314	427	729	-569	18	0.386	28.607	1
315	552	-31	-107	19	0.411	32.433	1
316	350	-327	199	20	0.436	36.498	1
317	235	-128	206	21	0.461	40.804	1
318	247	205	174	22	0.486	45.350	1
319	257	460	187	23	0.511	50.135	1
320	71	681	99	24	0.536	55.161	1
321	-267	587	-159	25	0.561	60.426	1
322	-490	-148	-580	26	0.586	65.932	1
323	-659	-854	-752	27	0.611	71.678	1
324	-876	-812	-402	28	0.636	77.663	1
325	-914	-219	152	29	0.661	83.889	1
326	-537	383	409	30	0.686	90.354	1
327	325	466	116	31	0.711	97.060	1
328	1340	-31	-281	32	0.736	104.006	1
329	1754	-264	118	33	0.761	111.191	1
330	1039	415	858	34	0.786	118.617	1
331	-361	1204	602	35	0.811	126.282	1
332	-1194	1273	-674	36	0.836	134.188	1

Fig. 12E

PORTABLE GAMING MACHINE EMERGENCY SHUT DOWN CIRCUITRY

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] This disclosure relates generally to gaming machines and systems, and more specifically to portable gaming machine devices and control systems.

[0003] 2. Background

[0004] Casino gaming machines are well known in the art. Such devices may be embodied as spinning reel slot machines, video slot machines or portable gaming machine.

[0005] The spinning reel slot machine is a combination of spinning mechanical components and electrical controlling components in addition to the standard hardware and firmware components that are needed for the game. An example of this type of casino gaming machine is the IGT "S2000 Slot" machine, manufactured by IGT of Reno, Nev. This type of machine is centered on one game theme. An example of such a game-type specific casino gaming machine is the IGT "Red White and Blue" spinning reel slot machine, manufactured by IGT of Reno, Nev.

[0006] The video slot machine and the portable gaming machine are different in that there are no spinning reels to control, and also in that that may have many different games available for the player to play. An example of one type of video slot machine is IGT's "Game King Video Slot" gaming machine. This type of machine may offer different games for the player to select and play, such as, for example, keno, five card poker, Double Diamond 2000, and/or Little Green Men.

[0007] It has become popular to provide, for gaming devices such as video slot machines, one or more bonus game features. For example, conventional gaming devices may allow a player to make a wager and to play a base game, obtaining winnings and losing outcomes. When a trigger condition is obtained, a bonus feature is enabled. The bonus feature may entail the display of bonus outcome selections where the player makes a selection to reveal a bonus, for example. Examples of such gaming devices are described, for example, in U.S. Pat. Nos. 7,156,397 and 6,800,026, each of which is herein incorporated by reference in its entirety for all purposes.

[0008] Portable or mobile gaming machines are also known in the art, and are becoming more popular with casinos and players since, for example, a portable gaming machine could be operated on the floor of the casino, pool side, at a table in a bar, at a sports book location or any other location where gaming is allowed. An example of a mobile gaming machine is disclosed in U.S. Pat. No. 6,676,522, herein incorporated by reference in its entirety for all purposes.

SUMMARY OF THE INVENTION

[0009] Various aspects of the present invention are directed to different methods, systems, and computer program products for operating a portable gaming device for use in a casino gaming network. In at least one embodiment, the portable gaming device comprises a gaming controller, memory, a first display, at least one interface, and a data preservation system. In at least one embodiment, the portable gaming device is operable to control a wager-based game played at the portable gaming device. Additionally, in at least one embodiment, the portable gaming device is operable to: monitor movement activity relating to the portable gaming device, and generate movement information relating to movements of the portable gaming device. In at least one embodiment, the movement information includes at least one of: data relating to rotation of the portable gaming device, data relating to displacement of the portable gaming device, data relating to velocity of the portable gaming device, data relating to acceleration of the portable gaming device, and/or data relating to an orientation of the portable gaming device. The portable gaming device may also be operable to analyze the movement information with respect to a first set of threshold criteria in order to detect an occurrence of a first critical condition or event at the portable gaming device, and to initiate at least one action in response to detection of the first critical condition or event. In at least one embodiment, the at least one action includes automatically initiating at least one operation to save selected gaming information in non-volatile memory, wherein the selected gaming information includes information relating to game play conducted at the portable gaming device.

[0010] In some embodiments, the at least one action includes automatically initiating at least one operation to identify and save selected information in non-volatile memory, wherein the selected information includes at least one of: portable gaming device movement information associated with the first critical event or condition, historical game data relating to game play conducted at the portable gaming device, game state data relating to game play conducted at the portable gaming device, and/or wager data relating to game play conducted at the portable gaming device.

[0011] In some embodiments, the portable gaming device is operable to identify selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory in response to detection of the first critical condition or event, and to automatically initiate, in response to detection of the first critical condition or event, at least one action to cause the identified information to be saved in non-volatile memory.

[0012] In some embodiments, the portable gaming device is operable to identify selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory in response to detection of the first critical condition or event, and to automatically initiate, in response to detection of the first critical condition or event, at least one action to cause the identified information to be transmitted to an external or remote device.

[0013] In some embodiments, the portable gaming device is operable automatically initiate other operations in response to detection of the first critical condition or event such as, for example: updating a sampling interval value relating to a time interval for taking sample measurements of movement activity relating to the portable gaming device; transmitting selected information to a first external or remote device; providing instructions for shutting down one or more components of the portable gaming device; automatically powering-up one or more selected components of the portable gaming device; recording movement information relating to a maximum velocity of the portable gaming device during one or more time intervals; recording movement information relating to a maximum displacement of the portable gaming device during a one or more time intervals; recording movement information relating to a maximum acceleration of the portable gaming device one or more time intervals.

[0014] Additional objects, features and advantages of the various aspects of the present invention will become apparent

from the following description of its preferred embodiments, which description should be taken in conjunction with the accompanying drawings.

BRIEF DESCRIPTION OF THE DRAWINGS

[0015] FIG. **1**A is a perspective drawing of an exemplary mobile gaming device in accordance with one embodiment of the present invention.

[0016] FIG. **1**B shows an example of a functional block diagram of a portion **70** of a portable gaming device system in accordance with one embodiment.

[0017] FIG. **1**C is a simplified block diagram of an exemplary portable gaming device **100** in accordance with a specific embodiment.

[0018] FIGS. **2**A and **2**B illustrate different embodiments of various motion detection components which may be used for implementing various aspects and/or features described herein.

[0019] FIG. **3** shows a simplified block diagram of various components which may be used for implementing a data preservation system in accordance with a specific embodiment.

[0020] FIG. **4** is a simplified block diagram of an alternate example of a portable gaming device **400** in accordance with a specific embodiment.

[0021] FIG. **5** shows an example schematic diagram of shut down comparator circuitry in accordance with a specific embodiment.

[0022] FIG. **6** shows an example schematic diagram of a shut down intentional comparator circuitry in accordance with a specific embodiment.

[0023] FIGS. **7**A and **7**B illustrate different example embodiments of receiver systems which may be utilized in one or more systems described herein.

[0024] FIG. **8** illustrates an example of network portion **800**, which may be used for illustrating various aspects and/or features described herein.

[0025] FIG. **9** shows an example embodiment of a state diagram **900** which may be used for implementing various aspects or features described herein.

[0026] FIG. **10** shows a block diagram illustrating components of a gaming system **1000** which may be used for implementing various aspects of example embodiments.

[0027] FIGS. **11**A-E and **12**A-E illustrate example embodiments of different types of data patterns (and/or associated data values) which include portable gaming device movement data relating to different example events and/or conditions which may occur at a portable gaming device.

DESCRIPTION OF EXAMPLE EMBODIMENTS

[0028] One or more different inventions may be described in the present application. Further, for one or more of the invention(s) described herein, numerous embodiments may be described in this patent application, and are presented for illustrative purposes only. The described embodiments are not intended to be limiting in any sense. One or more of the invention(s) may be widely applicable to numerous embodiments, as is readily apparent from the disclosure. These embodiments are described in sufficient detail to enable those skilled in the art to practice one or more of the invention(s), and it is to be understood that other embodiments may be utilized and that structural, logical, software, electrical and other changes may be made without departing from the scope of the one or more of the invention(s). Accordingly, those skilled in the art will recognize that the one or more of the invention(s) may be practiced with various modifications and alterations. Particular features of one or more of the invention (s) may be described with reference to one or more particular embodiments or figures that form a part of the present disclosure, and in which are shown, by way of illustration, specific embodiments of one or more of the invention(s). It should be understood, however, that such features are not limited to usage in the one or more particular embodiments or figures with reference to which they are described. The present disclosure is neither a literal description of all embodiments of one or more of the invention(s) nor a listing of features of one or more of the invention(s) that must be present in all embodiments.

[0029] Headings of sections provided in this patent application and the title of this patent application are for convenience only, and are not to be taken as limiting the disclosure in any way.

[0030] Devices that are in communication with each other need not be in continuous communication with each other, unless expressly specified otherwise. In addition, devices that are in communication with each other may communicate directly or indirectly through one or more intermediaries.

[0031] A description of an embodiment with several components in communication with each other does not imply that all such components are required. To the contrary, a variety of optional components are described to illustrate the wide variety of possible embodiments of one or more of the invention(s).

[0032] Further, although process steps, method steps, algorithms or the like may be described in a sequential order, such processes, methods and algorithms may be configured to work in alternate orders. In other words, any sequence or order of steps that may be described in this patent application does not, in and of itself, indicate a requirement that the steps be performed in that order. The steps of described processes may be performed in any order practical. Further, some steps may be performed simultaneously despite being described or implied as occurring non-simultaneously (e.g., because one step is described after the other step). Moreover, the illustration of a process by its depiction in a drawing does not imply that the illustrated process is exclusive of other variations and modifications thereto, does not imply that the illustrated process or any of its steps are necessary to one or more of the invention(s), and does not imply that the illustrated process is preferred.

[0033] When a single device or article is described, it will be readily apparent that more than one device/article (whether or not they cooperate) may be used in place of a single device/article. Similarly, where more than one device or article is described (whether or not they cooperate), it will be readily apparent that a single device/article may be used in place of the more than one device or article.

[0034] The functionality and/or the features of a device may be alternatively embodied by one or more other devices that are not explicitly described as having such functionality/features. Thus, other embodiments of one or more of the invention(s) need not include the device itself.

[0035] As mentioned previously, use of portable or mobile gaming devices is becoming more popular with casinos and players. As the popularity and use of mobile gaming devices increases, it is anticipated that new and/or additional issues may arise as a result of the portable nature of such gaming

devices. Examples of such issues may include, for example: accidental dropping of a portable casino gaming machine, theft of a portable gaming machine, use of a portable gaming machine (e.g., for wager-based game play) in regions or locations where such use is prohibited, abuse of a portable gaming machine, intentional tampering of a portable casino gaming machine, etc. For example, it is contemplated that situations may arise in which it may be necessary to determine whether a damaged portable casino gaming machine was accidentally dropped by a player and/or whether it was intentionally dropped, thrown, and/or otherwise abused by the player.

[0036] Accordingly, various aspects described herein are directed to different methods, systems, and computer program products for detecting or sensing one or more events and/or conditions which, for example, may result in damage to a portable gaming device and/or which may result in loss of information associated with the portable gaming device. Additional aspects described herein are directed to different methods, systems, and computer program products for initiating one or more appropriate action(s) in response to detection of such events/conditions. According to different embodiments, various examples of different types of actions which may be initiated in response to a detected event or condition relating to a portable gaming device may include, but are not limited to, one or more of the following (or combinations thereof):

[0037] Recoding details relating to time, location, acceleration/deceleration, velocity, displacement, orientation, etc. of the portable gaming device;

[0038] Taking appropriate action to prevent damage to one or more components or systems of the portable gaming device (such as, for example, suspending or shutting down one or more systems or components, parking hard drive heads, etc.).

[0039] Taking appropriate action to preserve selected data generated and/or stored at the portable gaming device such as, for example, historical game data, critical information, game state data, wager related data, and/or other data or information which may be desired and/or used for reconstructing conditions and/or events at the portable gaming device before, during and/or after the detected event or condition.

[0040] Taking appropriate action to identify and transmit selected data from the portable gaming device to an external system in anticipation of an event which may result in damage to the portable gaming device (such as, for example, damage caused by impact as a result of the portable gaming device being dropped or thrown).

[0041] Etc.

[0042] FIG. **1**A illustrates an example of a portable gaming device (PGD) **20** in accordance with one embodiment. In general, PGD **20** includes a body or housing **22**. Body **22** may be constructed from a wide variety of materials and be in one of many shapes. In one embodiment, the body **22** is constructed from one or more molded polypropylene or other plastic components. The body **22** may be constructed of metal or a wide variety of other materials. As illustrated, the body **22** is generally rectangular in shape, having a front side or face **24**, a rear side or face (not visible), a top end **26**, a bottom end **28**, a first side **30** and a second side **32**. Preferably, the body **22** defines an enclosed interior space (not shown) in which a variety of components are located as described below.

[0043] In a preferred embodiment, PGD **20** is adapted to present video and sound game data to a player. As illustrated, PGD **20** includes a display **34**. The display is located in the front face **24** of the body **22**, thus facing upwardly towards a player. In a preferred embodiment, the display **34** comprises a liquid crystal display ("LCD"), and in particular, an LCD permitting touch-screen input. It will be appreciated that other types of displays may be provided such as, for example, EL displays, OLED displays, multi-layer displays, etc. Portable gaming device **20** also includes a sound-generating device in the form of at least one speaker **36**. In one embodiment, the speaker **36** is positioned beneath a top or cover portion of the body **22** having one or more perforations or apertures therein through which the sound may readily travel. As illustrated, the speaker **36** is located near the bottom end **28** of the body **22**, generally opposite the display **34**. It will be appreciated that the speaker **36** or additional speakers may be provided in a wide variety of locations, such as at one or both sides **30**, **32** of the body **22**.

[0044] In a preferred embodiment, PGD **20** is adapted to send and/or receive data from another device. As such, PGD **20** includes one or more data input and/or output devices or interfaces. In one embodiment, PGD **20** includes an RS-232 data port **38** for transmitting and accepting data, such as through a cable extending between PGD **20** and another device, such as a computer. In one embodiment, PGD **20** includes a USB data port **40** for transmitting and accepting data, also through a cable. In one embodiment, PGD **20** includes an infrared data transmitter/receiver **42** for transmitting information in wireless, infrared light form. In a preferred embodiment, PGD **20** includes another wireless communication device **44**, such as a wireless communication device/interface operating at radio frequency, such as in accordance with the IEEE-802.11x or the Bluetooth standard, or operating according to NFM standards as described above.

[0045] A user provides input to PGD **20**, such as for playing a wagering game or for a non-gaming service. As stated above, one means of input may be through the display **34**. The display **34** may also be arranged to accept input via a stylus or other device. In one embodiment, PGD **20** includes a keypad **46**. In one or more embodiments, the keypad **46** is a sealed keypad having one or more keys or buttons. PGD **20** can include a microphone **48** arranged to accept voice input from a player. A smart card reader, optical reader or other input device may be provided for reading information from another element, such as a card, ticket or the like. Portable gaming device may also include a keyboard or mouse.

[0046] Other input interfaces may alternatively be provided or be provided in addition to those input devices described. For example, the portable gaming device may be configured or designed to allow a user to provide input via one or more physical gestures and/or via the use of a wireless user input device. Various examples of such alternate input interfaces are described, for example, in U.S. patent application Ser. No. 11/825,481, (Attorney Docket No. IGT1P090X1/P-795CIP1), by Mattice, et al., entitled "GESTURE CONTROLLED CASINO GAMING SYSTEM," filed Jul. 6, 2007, the entirety of which is incorporated herein by reference for all purposes.

[0047] In one embodiment, PGD **20** includes an image collection device **41**, such as a camera. The image collection device **41** may be used, for example, to capture the image of a user or player of PGD **20**. This image information may be used for security or authentication purposes, as set forth in greater detail below. PGD **20** may also include a fingerprint scanner **49** and/or other types of bio-information/authentica-

tion component(s). In one embodiment, as illustrated, the fingerprint scanner **49** may be located behind or beneath a user input button, such as a "spin" or "draw" button. In this manner, a player's fingerprint may be obtained without the user or player having to be consciously aware that a fingerprint is being provided participate (although informed, for example during device registration and check out, that a fingerprint can be taken when the buttons are pressed). In one embodiment, a player's scanned fingerprint information may be used for authentication purposes. PGD **20** may also include a card reader **50**. As illustrated, the card reader **50** is located in a side **30** of the body **22** of PGD **20**. In a preferred embodiment, the card reader **50** comprises a magnetic stripe reader for reading information from a magnetic stripe of a card. The card reader may also be adapted to write or store data to a smart card or portable memory module.

[0048] As illustrated, the card reader **50** includes a slot that is positioned in the side **30** of PGD **20**. PGD **20** may be battery-powered, such as with a rechargeable battery pack. An ON/OFF button **47** may be provided for controlling the power to PGD **20**. As described in greater detail below, PGD **20** may be docked at or otherwise associated with a free-standing electronic gaming machine or other gaming device. At such times that PGD **20** is docked, the internal battery of the device can be recharged for later use in an undocked or "remote" mode, as will be readily appreciated. Appropriate detection provisions, warnings and safeguards for a low battery status in portable gaming device **20** while in such a remote mode can also be provided.

[0049] Preferably, portable gaming device **20** includes control mechanisms for controlling the operation of the device, including accepting input and providing output. One embodiment of such a control mechanisms are illustrated in FIG. **1**B.

[0050] FIG. **1**B shows an example of a simplified functional block diagram of a portion **70** of a portable gaming device system in accordance with one embodiment. As illustrated in the example of FIG. **1**B, portable gaming device preferably includes a computing environment comprising a central processing unit **52**. The central processing unit **52** preferably comprises a microprocessor. The central processing unit **52** is associated with a bi-directional system bus **54**. The system bus **54** may contain, for example, address lines for addressing a video memory or main memory. In addition, the system bus **54** preferably includes a data bus for transferring data between and among components associated with the bus **54**. Alternatively, multiplex data/address lines may be used instead of separate data and address lines.

[0051] The display **34** is coupled to the bus **54**. In one embodiment, a video memory (not shown) is provided in association with the bus **54**. The video memory may be dual-ported video random access memory. The video memory is preferably coupled to and arranged to drive the display **34**. A memory **56** is associated with the system bus **54**. In one embodiment, the memory **56** comprises dynamic random access memory ("DRAM"), synchronous DRAM or other forms of random access memory. The memory **56** may have other forms as well, such as electronically erasable programmable read only memory ("EEPROM"), non-volatile RAM (NV-RAM), flash memory, etc. Preferably, the memory **56** is of the type that permits data to be written thereto and read there from. A mass storage device **58** is preferably also accessible via the bus **54**. The mass storage device **58** may be of the read-only type (such as a CD or DVD optical drive) or may be of the read-and-write variety such as flash memory, compact flash, or CD/DVD-R/W drives.

[0052] As illustrated in FIG. **1**B, the variety of input and output devices can be associated with the system bus **54**, and thus the other components associated with the bus. As illustrated, the speaker **36**, keypad **46** and card reader **50** are associated with the system bus **54**. A variety of data input/output devices ("I/O Devices") may also associated with the system bus **54**, such as, though not specifically illustrated, the RS-232 port **38**, the USB **40**, and the infrared communication transmitter/receiver **42**. As will be appreciated, these devices/elements may operate in accordance with different protocols and have different architectures, and have appropriate interfaces provided for communicating with the system bus **54**. For example, the infrared transmitter/receiver may have different layers, including a physical layer including the light-emitting device, and link and other layers which include software and/or hardware, as is known. A variety of other input/output devices may be associated with PGD **20**, as now known or later developed.

[0053] Preferably, as stated above, PGD **20** includes a wireless, radio frequency communication interface **44** operating in accordance with the IEEE 802.11x or Bluetooth standards. In another embodiment, communication interface **44** operates according to near-field magnetic communication standards that enables device **20** to receive and transmit NFM signals. The architectures and protocols of these and other wireless communication interfaces are well known in the wireless technology field. In general, however, interface **44** permits two-way data communication. As described in detail, PGD **20** may be permitted to communicate with a wide variety of devices/systems, including at least one device associated with a gaming network, such as an RF transmitter or an NFM antenna. In accordance with the invention, PGD **20** can send data and receive data, including program code, through the communication interface **44** (or the other input/output devices, such as the infrared transmitter/receiver). As one example described in more detail below, a gaming server may transmit requested code for an application via a transceiver to the communication interface **44** of PGD **20**. The received code may be executed by the central processing unit **52** as it is received and/or be stored in the memory **56** for later execution. In one embodiment, PGD **20** may include a mass data storage device **58** such as a hard drive, CD-ROM or the like. In one or more embodiments, the memory **56** may comprise a smart card or similar easily removable (and replaceable) device. In such event, data, such as operating code, may be associated with PGD **20** via a CD-ROM placed in a CD-ROM drive or by insertion of a coded smart card or portable memory module.

[0054] Additionally, as illustrated in the example of FIG. **1**B, portable gaming device may include a data preservation system **62** which is configured or designed to detect or sense one or more events and/or conditions which, for example, may result in damage to the portable gaming device and/or which may result in loss of information associated with the portable gaming device. Additionally, the data preservation system **62** may be operable to initiate one or more appropriate action(s) in response to the detection of such events/conditions. For example, in at least one embodiment, the data preservation system may be operable to detect that the portable gaming device is currently in a freefall condition (e.g., in which the portable gaming device is falling to the ground), and in response, may be operable to implement one or more

actions (e.g., before the portable gaming device impacts the ground) in order to preserve selected data and/or minimize damage to the portable gaming device. Examples of such actions may include, but are not limited to, one or more of the following (or combinations thereof):

[0055] provide instructions for shutting down one or more components of the portable gaming device,

[0056] provide notification (and/or cause the portable gaming device to provide notification) of the unit's free-fall condition to an external system,

[0057] transmit (and/or cause the portable gaming device to transmit) current game state information (and/or other game/wager related information) to an external system,

[0058] record (and/or cause the portable gaming device to record) various data relating to the event/condition such as, for example: the maximum distance the unit has fallen, the unit's maximum velocity at impact, details relating to the impact event, conditions or events which occurred at the portable gaming device before the impact event (which, for example, may be used to determine or reconstruct how the unit impacted the floor),

[0059] etc.

[0060] Additional details relating to the data preservation system and/or components/features associated therewith are described in greater detail below.

[0061] Although the foregoing exemplary portable gaming device **20** is fairly specific with respect to many details, it will be readily appreciated that a wide variety of similarly suitable devices can also be used as a portable gaming device. Other exemplary portable gaming devices and features thereof are provided in commonly owned U.S. Pat. No. 6,846,238, issued to Wells, and entitled "Portable Game Player," which is incorporated herein by reference in its entirety. Additional features and applications for a suitable portable gaming device can also be found in commonly owned U.S. patent application Ser. No. 10/937,990 by Nguyen, et al., entitled "Apparatus and Methods for Wireless Gaming Communications," which is incorporated herein by reference in its entirety for all purposes.

[0062] It will be appreciated that not all items and features of the above and incorporated portable gaming devices may be required for a given portable gaming device or associated system, and that other items and features not disclosed may also be included. In some cases, a portable gaming device can be provided by the casino or gaming operator, such as through sales, rentals or checkout procedures, while in other instances, a suitable portable gaming device can be an outside device that is provided by the player or another third party. Such a privately owned outside portable gaming device can be, for example, a personal desk or digital assistant ("PDA"), laptop, tablet PC, MP-3 players, cell phone (e.g., a Blackberry® or Treo® type phones), video gaming consoles, or any other similarly suitable device. As discussed herein, it will be understood that use of the term "portable gaming device" can refer to the exemplary portable gaming device **20** disclosed above, as well as any other suitable device that can serve as a portable gaming device for any purpose of the present invention, and that such a device or devices may or may not be portable or hand-held. Further, while use of the terms "portable" and "mobile" gaming device are used, it is understood that use of other suitable non-portable portable gaming devices may be substituted in relevant instances.

[0063] In a preferred embodiment, enforced associations and rules among users, portable gaming devices, and zones are used to perform verification and authentication in the portable gaming device tracking and zone network of the present invention. These associations and rules can be described collectively as a "virtual leash". A repeated checking of a PGD, its location, and biometric data of the user holding the device can be performed, whereby wager-based gaming at the personal gaming device is suspended or terminated if such items cannot be authenticated or verified on a repeated basis. Such repeated checking can be considered another type of "heartbeat," with system alerts, alarms, player warnings and/or termination or suspension of a gaming session taking place depending upon the nature of a heartbeat violation.

[0064] As described, this comprises a system in which activation information is transmitted to PGD, and where if the information is not received or confirmed, PGD will not present games for play and/or may even emit an alarm or other alert signal, or disable. This prevents, for example, a user from taking PGD or attempting to use it in unauthorized zones or areas. This can also prevent the illegal or unauthorized use of PGD, such as by a minor. Further details of such a virtual leash type configuration are provided below.

[0065] In a preferred embodiment, a portable gaming device includes features adapted to detect that an authorized or proper player is currently holding PGD. As noted above, this might be accomplished by using capacitive touch sensing devices embedded into the edges of PGD. Such devices could be similar to touch-style light switches and would be used by the software operating on PGD to detect that the player is still in possession of PGD. Should the player set PGD down or otherwise lose physical connection to the device, the operating software will sense this, notify the system via a wireless RF or NFM connection that the user is no longer in possession of the unit, and revert to an idle mode or disable. Should the player pick up PGD again, the device might require a complete re-authentication of the user, such as via one or more biometric sensing methods. Also, at periodic events determined by the operating software, PGD may ask the player to re-authenticate herself in order to continue with a particular gaming session.

[0066] Another method that might be used to determine that only a properly authorized player is playing PGD is to use some form of secondary identification and an associated detection device. Such secondary player identification can involve, for example, an RFID player tracking card or other suitable RFID item and an RFID reading device and system. Details for such personally identifying RFID related gaming devices and features thereof are provided in commonly owned and co-pending U.S. patent application Ser. No. 10/897,822, by Benbrahim, filed Jul. 22, 2004, and entitled "Remote Gaming Eligibility System And Method Using RFID Tags," which is incorporated herein by reference in its entirety and for all purposes. In practice, rather than require the player to continually provide his or her fingerprint or other biometric identification on a regular basis, PGD or other system device could periodically "ping" the secondary player identification item, such as an RFID card, token, bracelet or the like, and expect a correct response. In effect, this pinging of the secondary identification device can then become the effective heartbeat of the virtual leash or leashes. If no response or an incorrect response is received (i.e., no heartbeat or improper heartbeat), then PGD could be adapted to

suspend game play immediately and require an actual biometric authentication for the authorized player.

[0067] In some embodiments, the determination of a proper or authorized user or player may depend on a previously established list of one or more users or players who are authorized to play according to a variety of potential factors, such as for a given game, a given portable gaming device, or at a given area or zone. Such pre-approved users or players may be limited to the user who owns or checks out PGD, or the user who buys the game seeds, for example. In other embodiments, a group of players may be listed as those who are authorized to play a given game, on a given portable gaming device, or at a set location. For example, while a husband might be the person who checks out a portable gaming device and/or purchases games seeds for the play of games on PGD, both the husband and wife might be listed as authorized or proper players for those games on that portable gaming device. As such, a first user might buy the game seeds or otherwise determine what games or how many games are to be played on a portable gaming device, while a second user might be the one to actually play or request play of the games. As noted, in some instances, it may be preferable to restrict the second user to be the same person as the first user; while in others, a group of users may be eligible to be such a second user. In still further embodiments, it may be possible for the second user to be separate from the first user, such as where a person might want to buy games for another person or group of people not including the buyer, and a restriction is created that the recipient or recipients be the only proper or authorized players.

[0068] Another form of virtual leash can be created with respect to an appropriate zone for PGD in order to conduct wager based gaming activities on the device. As described in detail above, NFM or RF transmitters or other sensing means can be used to allow gaming operation only when PGD is located in specific zones. As in the above embodiments involving a player-specific virtual leash, PGD can be rendered non-operational when it is removed beyond the boundary of a zone, such as a legal gaming area, particularly with respect to wager based gaming activities.

[0069] In some embodiments, such a location based virtual leash can also provide a means for ensuring that gaming operator-owned proprietary portable gaming devices are returned and not stolen. For example, where a casino owned or other non-player owned portable gaming device is removed from an authorized zone, detection of such a removal could be made immediately, and one or more security measures could be activated. Such security measures might include an alert to the system and/or various casino personnel or security, as well as a loud audible signal. Such a signal could be a warning message to a player, as well as to nearby security, and could be emitted from PGD itself and/or external system speakers. Additional security measures might involve the memory of PGD being erased, such that reverse engineering could not take place at some uncontrolled location.

[0070] As will be appreciated, the task of limiting play of a portable gaming device to a particular "authorized" gaming zone using radio frequency, as opposed to near field magnetic induction, may involve a number of considerations given the typical RF hostile casino environment. One method of determining location could involve the implementation of a number of "pico cells." As is generally known, such pico cells can comprise wireless system access points having a limited amount of power and range. Such limited power and range can be compensated for by using a large number of pico cells, with the overall result being that tighter controls can be had with respect to the exact shape and size of a defined restricted area. Whereas more powerful access points might emit signals that could be detected and used at significant distances, pico cells tend to have such a limited range that detection or communication at distances of more than a few feet or yards might not be possible. Of course, pico cell signal strength and receiver sensitivity on PGD could also be controlled, such that a definite operational range for the pico cells could be set. Once set, PGD would then be operable with respect to gaming only when it is able to detect a signal from a system pico cell. Once PGD is moved from an authorized zone, resulting in no pico cells being within a few feet or yards of PGD, then no pico cell signal could be heard, and gaming on PGD could be suspended or terminated.

[0071] Additional details relating to various aspects of mobile device gaming technology are described, for example, in U.S. patent application Ser. No. 11/518,342, (Attorney Docket No. IGT1P294/P-1096), by Nguyen et al., entitled "MOBILE GAMING DEVICES FOR USE IN A GAMING NETWORK HAVING GAMING AND NON-GAMING ZONES", filed Sep. 8, 2006, the entirety of which is incorporated herein by reference for all purposes.

[0072] FIG. **1**C is a simplified block diagram of an example portable gaming system **100** in accordance with a specific embodiment. According to different embodiments, different portable gaming devices may be implemented using one or more components of the portable gaming system **100** of FIG. **1**C.

[0073] As illustrated in the embodiment of FIG. **1**C, portable gaming system **100** includes at least one processor **110**, at least one interface **106**, and memory **116**.

[0074] In one implementation, processor **110** and master game controller **112** are included in a logic device **113** enclosed in a logic device housing. The processor **110** may include any conventional processor or logic device configured to execute software allowing various configuration and reconfiguration tasks such as, for example: a) communicating with a remote source via communication interface **106**, such as a server that stores authentication information or game information; b) converting signals read by an interface to a format corresponding to that used by software or memory in the portable gaming system; c) accessing memory to configure or reconfigure game parameters in the memory according to indicia read from the device; d) communicating with interfaces, various peripheral devices **122** and/or I/O devices; e) operating peripheral devices **122** such as, for example, card readers, paper ticket readers, etc.; f) operating various I/O devices such as, for example, displays **135**, input devices **130**; etc. For instance, the processor **110** may send messages including game play information to the displays **135** to inform players of cards dealt, wagering information, and/or other desired information.

[0075] The portable gaming system **100** also includes memory **116** which may include, for example, volatile memory (e.g., RAM **109**), non-volatile memory **119** (e.g., disk memory, FLASH memory, EPROMs, etc.), unalterable memory (e.g., EPROMs **108**), etc. The memory may be configured or designed to store, for example: 1) configuration software **114** such as all the parameters and settings for a game playable on the portable gaming system; 2) associations **118** between configuration indicia read from a device with

one or more parameters and settings; 3) communication protocols allowing the processor **110** to communicate with peripheral devices **122** and I/O devices **111**; 4) a secondary memory storage device **115** such as a non-volatile memory device, configured to store gaming software related information (the gaming software related information and memory may be used to store various audio files and games not currently being used and invoked in a configuration or reconfiguration); 5) communication transport protocols (such as, for example, TCP/IP, USB, Firewire, IEEE1394, Bluetooth, IEEE 802.11x (IEEE 802.11 standards), hiperlan/2, HomeRF, etc.) for allowing the portable gaming system to communicate with local and non-local devices using such protocols; etc. In one implementation, the master game controller **112** communicates using a serial communication protocol. A few examples of serial communication protocols that may be used to communicate with the master game controller include but are not limited to USB, RS-232 and Netplex (a proprietary protocol developed by IGT, Reno, Nev.).

[0076] A plurality of device drivers **142** may be stored in memory **116**. Example of different types of device drivers may include device drivers for portable gaming system components, device drivers for peripheral components **122**, etc. Typically, the device drivers **142** utilize a communication protocol of some type that enables communication with a particular physical device. The device driver abstracts the hardware implementation of a device. For example, a device drive may be written for each type of card reader that may be potentially connected to the portable gaming system. Examples of communication protocols used to implement the device drivers include Netplex, USB, Serial, Ethernet 175, Firewire, I/O debouncer, direct memory map, serial, PCI, parallel, RF, Bluetooth™, near-field communications (e.g., using near-field magnetics), 802.11 (WiFi), etc. Netplex is a proprietary IGT standard while the others are open standards. According to a specific embodiment, when one type of a particular device is exchanged for another type of the particular device, a new device driver may be loaded from the memory **116** by the processor **110** to allow communication with the device. For instance, one type of card reader in portable gaming system **100** may be replaced with a second type of card reader where device drivers for both card readers are stored in the memory **116**.

[0077] In some embodiments, the software units stored in the memory **116** may be upgraded as needed. For instance, when the memory **116** is a hard drive, new games, game options, various new parameters, new settings for existing parameters, new settings for new parameters, device drivers, and new communication protocols may be uploaded to the memory from the master game controller **112** or from some other external device. As another example, when the memory **116** includes a CD/DVD drive including a CD/DVD designed or configured to store game options, parameters, and settings, the software stored in the memory may be upgraded by replacing a first CD/DVD with a second CD/DVD. In yet another example, when the memory **116** uses one or more flash memory **119** or EPROM **108** units designed or configured to store games, game options, parameters, settings, the software stored in the flash and/or EPROM memory units may be upgraded by replacing one or more memory units with new memory units which include the upgraded software. In another embodiment, one or more of the memory devices, such as the hard-drive, may be employed in a game software download process from a remote software server.

[0078] In some embodiments, the portable gaming system **100** may also include various authentication and/or validation components **144** which may be used for authenticating/validating specified portable gaming system components and/or information such as, for example, hardware components, software components, firmware components, peripheral device components, user input device components, information received from one or more user input devices, information stored in the portable gaming system memory **116**, etc. Examples of various authentication and/or validation components are described in U.S. Pat. No. 6,620,047, entitled, "ELECTRONIC GAMING APPARATUS HAVING AUTHENTICATION DATA SETS," incorporated herein by reference in its entirety for all purposes.

[0079] Peripheral devices **122** may include several device interfaces such as, for example, one or more of the following (or combinations thereof): transponders **154**, wire/wireless power distribution components **158**, input interface(s) **130** (which, for example, may include contact and/or non-contact interfaces), sensors **160**, audio and/or video devices **162** (e.g., cameras, speakers, etc.), wireless communication components **156**, motion/gesture analysis and interpretation component(s) **164**, data preservation components **162**, motion detection components **166**, geolocation components **176**, information filtering components **179**, user identification components **177**, one or more portable power sources **168**, etc.

[0080] Sensors **160** may include, for example, optical sensors, pressure sensors, RF sensors, Infrared sensors, image sensors, thermal sensors, biometric sensors, etc. Such sensors may be used for a variety of functions such as, for example: detecting movements and/or gestures of various objects within a predetermined proximity to the portable gaming system; detecting the presence and/or identity of various persons (e.g., players, casino employees, etc.), devices (e.g., user input devices), and/or systems within a predetermined proximity to the portable gaming system.

[0081] In one implementation, at least a portion of the sensors **160** and/or input devices **130** may be implemented in the form of touch keys selected from a wide variety of commercially available touch keys used to provide electrical control signals. Alternatively, some of the touch keys may be implemented in another form which are touch sensors such as those provided by a touchscreen display. For example, in at least one implementation, the portable gaming system player displays may include contact input interfaces and/or non-contact input interfaces for allowing players to provide desired information (e.g., game play instructions and/or other input) to the portable gaming system and/or other devices in the casino gaming network (such as, for example, player tracking systems, side wagering systems, etc.).

[0082] Wireless communication components **156** may include one or more communication interfaces having different architectures and utilizing a variety of protocols such as, for example, 802.11 (WiFi), 802.15 (including Bluetooth™), 802.16 (WiMax), 802.22, Cellular standards such as CDMA, CDMA2000, WCDMA, Radio Frequency (e.g., RFID), Infrared, Near Field Magnetic communication protocols, etc. The communication links may transmit electrical, electromagnetic or optical signals which carry digital data streams or analog signals representing various types of information.

[0083] Power distribution components **158** may include, for example, components or devices which are operable for providing wired or wireless power to other devices. For

example, in one implementation, the power distribution components **158** may include a magnetic induction system which is adapted to provide wireless power to one or more user input devices near the portable gaming system. In one implementation, a user input device docking region may be provided which includes a power distribution component that is able to recharge a user input device without requiring metal-to-metal contact. In at least one embodiment, power distribution components **158** may be operable to distribute power to one or more internal components such as, for example, one or more rechargeable power sources (e.g., rechargeable batteries) located at the portable gaming device.

[0084] In at least one embodiment, the portable gaming system may include a geolocation module **176** which, for example, may be configured or designed to acquire geolocation information from remote sources and use the acquired geolocation information to determine information relating to a relative and/or absolute position of the portable gaming system. For example, in one implementation, the geolocation module **146** may be adapted to receive GPS signal information for use in determining the position or location of the portable gaming system. In another implementation, the geolocation module **146** may be adapted to receive multiple wireless signals from multiple remote devices (e.g., gaming machines, servers, wireless access points, etc.) and use the signal information to compute position/location information relating to the position or location of the portable gaming system.

[0085] In at least one embodiment, the portable gaming system may include a user identification module **177**. In one implementation, the user identification module may be adapted to determine the identity of the current user or current owner of the portable gaming system/device. For example, in one embodiment, the current user may be required to perform a log in process at the portable gaming device in order to access one or more features. Alternatively, the portable gaming device may be adapted to automatically determine the identity of the current user based upon one or more external signals such as, for example, an RFID tag or badge worn by the current user which provides a wireless signal to the portable gaming device for determining the identity of the current user. In at least one implementation, various security features may be incorporated into the portable gaming device to prevent unauthorized users from accessing confidential or sensitive information.

[0086] In at least one embodiment, the portable gaming system may include an Information filtering module(s) **179**.

[0087] In at least one embodiment, the portable gaming system may include at least one power source **168**. In at least one implementation, the power source may include at least one mobile power source for allowing the portable gaming system to operate in a mobile environment. For example, in one implementation, the portable gaming system **100** may include one or more rechargeable batteries which, for example, may be implemented using a rechargeable, thin-film type battery.

[0088] In at least one embodiment, the portable gaming system may include at least one motion detection component **166** for detecting motion or movement of the portable gaming system and/or for detecting motion, movement, gestures from the user. In at least one embodiment, motion detection component(s) may include one or more of the following (or combinations thereof): accelerometer component(s), gyro component(s), camera component(s), rangefinder component(s), velocity transducer component(s), etc. In one embodiment, the motion detection component(s) may be operable to detect gross motion of a user (e.g., player, dealer, etc.).

[0089] In at least one embodiment, motion/gesture analysis and interpretation component(s) **164** may be operable to analyze and/or interpret information relating to detected player movements and/or gestures in order, for example, to determine appropriate player input information relating to the detected player movements and/or gestures. For example, in at least one embodiment, motion/gesture analysis and interpretation component(s) **164** may be operable to perform one or more functions such as, for example: analyze the detected gross motion or gestures of a participant; interpret the participant's motion or gestures (e.g., in the context of a casino game being played) in order to identify instructions or input from the participant; utilize the interpreted instructions/input to advance the game state; etc. In other embodiments, at least a portion of these additional functions may be implemented at a remote system or device.

[0090] For example, during play of a game of blackjack at a conventional game table, a player may signal "hit me" to the dealer by the player flicking or moving his cards in a sweeping motion towards the player. In at least one embodiment where the player is performing the "hit me" gesture using a portable gaming device, the portable gaming device may be adapted to automatically detect the player's gesture (e.g., gross motion) by sensing motion or movement (e.g., rotation, displacement, velocity, acceleration, etc.) using, for example, one or more motion detection sensors. In one embodiment, the portable gaming device may also be adapted to analyze the detected motion data in order to interpret the gesture (or other input data) intended by the player. Once interpreted, the portable gaming device may then provide the interpreted player input data (e.g., "hit me") to the portable gaming device (and/or other devices/systems) for advancement of the game state. Alternatively, the portable gaming device may be adapted to transmit information relating to the detected motion data to an external gaming system, and the external game system may be adapted to analyze the detected motion data in order to interpret the gesture (or other input data) intended by the player.

[0091] According to different embodiments, other criteria may also be used when analyzing the detected motion data for proper interpretation of the player's gestures and/or other input instructions. For example, the interpretation of the detected motion data may be constrained based on one or more of the following criteria (or combination thereof): type of game being played (e.g., craps, blackjack, poker, slots, etc.), location of the player/portable gaming device; current portable gaming device operating mode (e.g., table game operating mode, gaming machine operating mode, bonus game operating mode, restaurant operating mode, theater operating mode, lounge operating mode, hotel operating mode, parking service operating mode, room service operating mode, news magazine operating mode, etc.); game rules; time; player ID; player preferences; previous motion interpretation/analysis; and/or other criteria described herein.

[0092] In at least one embodiment, the portable gaming system may include a data preservation system **162** which is configured or designed to detect or sense one or more events and/or conditions which, for example, may result in damage to the portable gaming system and/or which may result in loss of information associated with the portable gaming system. Additionally, the data preservation system **162** may be oper-

able to initiate one or more appropriate action(s) in response to the detection of such events/conditions.

[0093] In other embodiments (not shown) other peripheral devices include: player tracking devices, card readers, bill validator/paper ticket readers, etc. Such devices may each comprise resources for handling and processing configuration indicia such as a microcontroller that converts voltage levels for one or more scanning devices to signals provided to processor **110**. In one embodiment, application software for interfacing with peripheral devices **122** may store instructions (such as, for example, how to read indicia from a portable device) in a memory device such as, for example, non-volatile memory, hard drive or a flash memory.

[0094] In at least one embodiment, the portable gaming system may include user input device control components may be operable to control operating mode selection functionality, features, and/or components associated with one or more user input devices which communication with the portable gaming device. For example, in at least one embodiment, the user input device control components may be operable to remotely control and/or configure components of one or more user input devices based on various parameters and/or upon detection of specific events or conditions such as, for example: time of day, player activity levels; location of the user input device; identity of user input device user; user input; system override (e.g., emergency condition detected); proximity to other devices belonging to same group or association; proximity to specific objects, regions, zones, etc.

[0095] In at least one implementation, the portable gaming system may include card readers such as used with credit cards, or other identification code reading devices to allow or require player identification in connection with play of the card game and associated recording of game action. Such a user identification interface can be implemented in the form of a variety of magnetic card readers commercially available for reading user-specific identification information. The user-specific information can be provided on specially constructed magnetic cards issued by a casino, or magnetically coded credit cards or debit cards frequently used with national credit organizations such as VISA™, MASTERCARD™, banks and/or other institutions.

[0096] The portable gaming system may include other types of participant identification mechanisms which may use a fingerprint image, eye blood vessel image reader, or other suitable biological information to confirm identity of the user. Still further it is possible to provide such participant identification information by having the dealer manually code in the information in response to the player indicating his or her code name or real name. Such additional identification could also be used to confirm credit use of a smart card, transponder, and/or player's user input device.

[0097] It will be apparent to those skilled in the art that other memory types, including various computer readable media, may be used for storing and executing program instructions pertaining to the operation of various portable gaming systems described herein. Because such information and program instructions may be employed to implement the systems/methods described herein, example embodiments may relate to machine-readable media that include program instructions, state information, etc. for performing various operations described herein. Examples of machine-readable storage media include, but are not limited to, magnetic media such as hard disks, floppy disks, and magnetic tape; optical media such as CD-ROM disks; magneto-optical media such as floptical disks; and hardware devices that are specially configured to store and perform program instructions, such as read-only memory devices (ROM) and random access memory (RAM). Example embodiments may also be embodied in transmission media such as a carrier wave traveling over an appropriate medium such as airwaves, optical lines, electric lines, etc. Examples of program instructions include both machine code, such as produced by a compiler, and files including higher level code that may be executed by the computer using an interpreter.

[0098] According to specific embodiments, at least some embodiments of various gaming devices, gaming machines, and/or portable gaming devices described herein (collectively referred to herein as "gaming devices"), may be implemented with special features and/or additional circuitry that differentiate such gaming devices from general-purpose portable computers (e.g., portable PC computers, PDAs, etc., collectively be referred to herein as "PCs").

[0099] For example, gaming devices are highly regulated to ensure fairness and, in many cases, gaming devices are operable to dispense monetary awards of multiple millions of dollars. Therefore, to satisfy security and regulatory requirements in a gaming environment, hardware and software architectures may be implemented in gaming devices that differ significantly from those of general-purpose computers. For purposes of illustration, a description of gaming devices relative to general-purpose computing machines and some examples of the additional (or different) components and features found in gaming devices are described below. It is noted that such description may also be applicable for describing differences between general-purpose computing devices/systems, and gaming devices/systems described herein.

[0100] At first glance, one might think that adapting PC technologies to the gaming industry would be a simple proposition because both PCs and gaming devices employ microprocessors that control a variety of devices. However, because of such reasons as 1) the regulatory requirements that are placed upon gaming devices, 2) the harsh environment in which gaming devices operate, 3) security requirements and 4) fault tolerance requirements, adapting PC technologies to a gaming device can be quite difficult. Further, techniques and methods for solving a problem in the PC industry, such as device compatibility and connectivity issues, might not be adequate in the gaming environment. For instance, a fault or a weakness tolerated in a PC, such as security holes in software or frequent crashes, may not be tolerated in a gaming device because in a gaming device these faults can lead to a direct loss of funds from the gaming device, such as stolen cash or loss of revenue when the gaming device is not operating properly.

[0101] For the purposes of illustration, a few differences between PC systems and gaming devices will be described. A first difference between gaming devices and common PC based computers systems is that gaming devices are designed to be state-based systems. In a state-based system, the system stores and maintains its current state in a non-volatile memory, such that, in the event of a power failure or other malfunction the gaming device will return to its current state when the power is restored. For instance, if a player was shown an award for a game of chance and, before the award could be provided to the player the power failed, the gaming device, upon the restoration of power, would return to the state where the award is indicated. As anyone who has used a

PC, knows, PCs are not state machines and a majority of data is usually lost when a malfunction occurs. This requirement affects the software and hardware design on a gaming device.

[0102] A second important difference between gaming devices and common PC based computer systems is that for regulation purposes, the software on the gaming device used to generate the game of chance and operate the gaming device has been designed to be static and monolithic to prevent cheating by the operator of gaming device. For instance, one solution that has been employed in the gaming industry to prevent cheating and satisfy regulatory requirements has been to manufacture a gaming device that can use a proprietary processor running instructions to generate the game of chance from an EPROM or other form of non-volatile memory. The coding instructions on the EPROM are static (non-changeable) and must be approved by a gaming regulators in a particular jurisdiction and installed in the presence of a person representing the gaming jurisdiction. Any changes to any part of the software required to generate the game of chance, such as adding a new device driver used by the master gaming controller to operate a device during generation of the game of chance can require a new EPROM to be burnt, approved by the gaming jurisdiction and reinstalled on the gaming device in the presence of a gaming regulator. Regardless of whether the EPROM solution is used, to gain approval in most gaming jurisdictions, a gaming device must demonstrate sufficient safeguards that prevent an operator or player of a gaming device from manipulating hardware and software in a manner that gives them an unfair and some cases an illegal advantage. The gaming device should have a means to determine if the code it will execute is valid. If the code is not valid, the gaming device must have a means to prevent the code from being executed. The code validation requirements in the gaming industry affect both hardware and software designs on gaming devices.

[0103] A third important difference between gaming devices and common PC based computer systems is the number and kinds of peripheral devices used on a gaming device are not as great as on PC based computer systems. Traditionally, in the gaming industry, gaming devices have been relatively simple in the sense that the number of peripheral devices and the number of functions the gaming device has been limited. Further, in operation, the functionality of gaming devices were relatively constant once the gaming device was deployed, i.e., new peripherals devices and new gaming software were infrequently added to the gaming device. This differs from a PC where users will go out and buy different combinations of devices and software from different manufacturers and connect them to a PC to suit their needs depending on a desired application. Therefore, the types of devices connected to a PC may vary greatly from user to user depending in their individual requirements and may vary significantly over time.

[0104] Although the variety of devices available for a PC may be greater than on a gaming device, gaming devices still have unique device requirements that differ from a PC, such as device security requirements not usually addressed by PCs. For instance, monetary devices, such as coin dispensers, bill validators and ticket printers and computing devices that are used to govern the input and output of cash to a gaming device have security requirements that are not typically addressed in PCs. Therefore, many PC techniques and methods developed to facilitate device connectivity and device compatibility do not address the emphasis placed on security in the gaming industry.

[0105] To address some of the issues described above, a number of hardware/software components and architectures are utilized in gaming devices that are not typically found in general purpose computing devices, such as PCs. These hardware/software components and architectures, as described below in more detail, include but are not limited to watchdog timers, voltage monitoring systems, state-based software architecture and supporting hardware, specialized communication interfaces, security monitoring and trusted memory.

[0106] For example, a watchdog timer is normally used in International Game Technology (IGT) gaming devices to provide a software failure detection mechanism. In a normally operating system, the operating software periodically accesses control registers in the watchdog timer subsystem to "re-trigger" the watchdog. Should the operating software fail to access the control registers within a preset timeframe, the watchdog timer will timeout and generate a system reset. Typical watchdog timer circuits include a loadable timeout counter register to enable the operating software to set the timeout interval within a certain range of time. A differentiating feature of the some preferred circuits is that the operating software cannot completely disable the function of the watchdog timer. In other words, the watchdog timer always functions from the time power is applied to the board.

[0107] IGT gaming computer platforms preferably use several power supply voltages to operate portions of the computer circuitry. These can be generated in a central power supply or locally on the computer board. If any of these voltages falls out of the tolerance limits of the circuitry they power, unpredictable operation of the computer may result. Though most modem general-purpose computers include voltage monitoring circuitry, these types of circuits only report voltage status to the operating software. Out of tolerance voltages can cause software malfunction, creating a potential uncontrolled condition in the gaming computer. Gaming devices of the present assignee typically have power supplies with tighter voltage margins than that required by the operating circuitry. In addition, the voltage monitoring circuitry implemented in IGT gaming computers typically has two thresholds of control. The first threshold generates a software event that can be detected by the operating software and an error condition generated. This threshold is triggered when a power supply voltage falls out of the tolerance range of the power supply, but is still within the operating range of the circuitry. The second threshold is set when a power supply voltage falls out of the operating tolerance of the circuitry. In this case, the circuitry generates a reset, halting operation of the computer.

[0108] One standard method of operation for IGT slot machine game software is to use a state machine. Different functions of the game (bet, play, result, points in the graphical presentation, etc.) may be defined as a state. When a game moves from one state to another, critical data regarding the game software is stored in a custom non-volatile memory subsystem. This is critical to ensure the player's wager and credits are preserved and to minimize potential disputes in the event of a malfunction on the gaming device.

[0109] In general, the gaming device does not advance from a first state to a second state until critical information that allows the first state to be reconstructed has been stored. This feature allows the game to recover operation to the current

state of play in the event of a malfunction, loss of power, etc that occurred just prior to the malfunction. In at least one embodiment, the gaming device is configured or designed to store such critical information using atomic transactions.

[0110] Generally, an atomic operation in computer science refers to a set of operations that can be combined so that they appear to the rest of the system to be a single operation with only two possible outcomes: success or failure. As related to data storage, an atomic transaction may be characterized as series of database operations which either all occur, or all do not occur. A guarantee of atomicity prevents updates to the database occurring only partially, which can result in data corruption.

[0111] In order to ensure the success of atomic transactions relating to critical information to be stored in the gaming device memory before a failure event (e.g., malfunction, loss of power, etc.), it is preferable that memory be used which includes one or more of the following criteria: direct memory access capability; data read/write capability which meets or exceeds minimum read/write access characteristics (such as, for example, at least 5.08 Mbytes/sec (Read) and/or at least 38.0 Mbytes/sec (Write)). Devices which meet or exceed the above criteria may be referred to as "fault-tolerant" memory devices, whereas it is which the above criteria may be referred to as "fault non-tolerant" memory devices.

[0112] Typically, battery backed RAM devices may be configured or designed to function as fault-tolerant devices according to the above criteria, whereas flash RAM and/or disk drive memory are typically not configurable to function as fault-tolerant devices according to the above criteria. Accordingly, battery backed RAM devices are typically used to preserve gaming device critical data, although other types of non-volatile memory devices may be employed. These memory devices are typically not used in typical general-purpose computers.

[0113] Thus, in at least one embodiment, the gaming device is configured or designed to store critical information in fault-tolerant memory (e.g., battery backed RAM devices) using atomic transactions. Further, in at least one embodiment, the fault-tolerant memory is able to successfully complete all desired atomic transactions (e.g., relating to the storage of gaming device critical information) within a time period of 200 milliseconds (ms) or less. In at least one embodiment, the time period of 200 ms represents a maximum amount of time for which sufficient power may be available to the various gaming device components after a power outage event has occurred at the gaming device.

[0114] As described previously, the gaming device may not advance from a first state to a second state until critical information that allows the first state to be reconstructed has been atomically stored. This feature allows the game to recover operation to the current state of play in the event of a malfunction, loss of power, etc that occurred just prior to the malfunction. After the state of the gaming device is restored during the play of a game of chance, game play may resume and the game may be completed in a manner that is no different than if the malfunction had not occurred. Thus, for example, when a malfunction occurs during a game of chance, the gaming device may be restored to a state in the game of chance just prior to when the malfunction occurred. The restored state may include metering information and graphical information that was displayed on the gaming device in the state prior to the malfunction. For example, when the malfunction occurs during the play of a card game after the cards have been dealt, the gaming device may be restored with the cards that were previously displayed as part of the card game. As another example, a bonus game may be triggered during the play of a game of chance where a player is required to make a number of selections on a video display screen. When a malfunction has occurred after the player has made one or more selections, the gaming device may be restored to a state that shows the graphical presentation at the just prior to the malfunction including an indication of selections that have already been made by the player. In general, the gaming device may be restored to any state in a plurality of states that occur in the game of chance that occurs while the game of chance is played or to states that occur between the play of a game of chance.

[0115] Game history information regarding previous games played such as an amount wagered, the outcome of the game and so forth may also be stored in a non-volatile memory device. The information stored in the non-volatile memory may be detailed enough to reconstruct a portion of the graphical presentation that was previously presented on the gaming device and the state of the gaming device (e.g., credits) at the time the game of chance was played. The game history information may be utilized in the event of a dispute. For example, a player may decide that in a previous game of chance that they did not receive credit for an award that they believed they won. The game history information may be used to reconstruct the state of the gaming device prior, during and/or after the disputed game to demonstrate whether the player was correct or not in their assertion. Further details of a state based gaming machine, recovery from malfunctions and game history are described in U.S. Pat. No. 6,804,763, titled "High Performance Battery Backed RAM Interface", U.S. Pat. No. 6,863, **608**, titled "Frame Capture of Actual Game Play," U.S. application Ser. No. 10/243,104, titled, "Dynamic NV-RAM," and U.S. application Ser. No. 10/758, 828, titled, "Frame Capture of Actual Game Play," each of which is incorporated by reference and for all purposes.

[0116] Another feature of gaming devices, such as IGT gaming computers, is that they often include unique interfaces, including serial interfaces, to connect to specific subsystems internal and external to the gaming device. The serial devices may have electrical interface requirements that differ from the "standard" EIA serial interfaces provided by general-purpose computers. These interfaces may include, for example, Fiber Optic Serial, optically coupled serial interfaces, current loop style serial interfaces, etc. In addition, to conserve serial interfaces internally in the gaming device, serial devices may be connected in a shared, daisy-chain fashion where multiple peripheral devices are connected to a single serial channel.

[0117] The serial interfaces may be used to transmit information using communication protocols that are unique to the gaming industry. For example, IGT's Netplex is a proprietary communication protocol used for serial communication between gaming devices. As another example, SAS is a communication protocol used to transmit information, such as metering information, from a gaming device to a remote device. Often SAS is used in conjunction with a player tracking system.

[0118] IGT gaming devices may alternatively be treated as peripheral devices to a casino communication controller and connected in a shared daisy chain fashion to a single serial interface. In both cases, the peripheral devices are preferably assigned device addresses. If so, the serial controller circuitry

must implement a method to generate or detect unique device addresses. General-purpose computer serial ports are not able to do this.

[0119] Security monitoring circuits detect intrusion into an IGT gaming device by monitoring security switches attached to access doors in the gaming device cabinet. Preferably, access violations result in suspension of game play and can trigger additional security operations to preserve the current state of game play. These circuits also function when power is off by use of a battery backup. In power-off operation, these circuits continue to monitor the access doors of the gaming device. When power is restored, the gaming device can determine whether any security violations occurred while power was off, e.g., via software for reading status registers. This can trigger event log entries and further data authentication operations by the gaming device software.

[0120] Trusted memory devices and/or trusted memory sources are preferably included in an IGT gaming device computer to ensure the authenticity of the software that may be stored on less secure memory subsystems, such as mass storage devices. Trusted memory devices and controlling circuitry are typically designed to not enable modification of the code and data stored in the memory device while the memory device is installed in the gaming device. The code and data stored in these devices may include authentication algorithms, random number generators, authentication keys, operating system kernels, etc. The purpose of these trusted memory devices is to provide gaming regulatory authorities a root trusted authority within the computing environment of the gaming device that can be tracked and verified as original. This may be accomplished via removal of the trusted memory device from the gaming device computer and verification of the secure memory device contents is a separate third party verification device. Once the trusted memory device is verified as authentic, and based on the approval of the verification algorithms included in the trusted device, the gaming device is enabled to verify the authenticity of additional code and data that may be located in the gaming computer assembly, such as code and data stored on hard disk drives. A few details related to trusted memory devices that may be used in at least one embodiment described herein are described in U.S. Pat. No. 6,685,567 from U.S. patent application Ser. No. 09/925,098, filed Aug. 8, 2001 and titled "Process Verification," which is incorporated herein in its entirety and for all purposes.

[0121] In at least one embodiment, at least a portion of the trusted memory devices/sources may correspond to memory which cannot easily be altered (e.g., "unalterable memory") such as, for example, EPROMS, PROMS, Bios, Extended Bios, and/or other memory sources which are able to be configured, verified, and/or authenticated (e.g., for authenticity) in a secure and controlled manner.

[0122] According to a specific implementation, when a trusted information source is in communication with a remote device via a network, the remote device may employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source and the remote device may exchange information using public and private encryption keys to verify each other's identities. In another embodiment of at least one embodiment described herein, the remote device and the trusted information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities.

[0123] Gaming devices storing trusted information may utilize apparatus or methods to detect and prevent tampering. For instance, trusted information stored in a trusted memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing trusted information might be designed to detect tampering attempts and clear or erase itself when an attempt at tampering has been detected.

[0124] Additional details relating to trusted memory devices/sources are described in U.S. patent application Ser. No. 11/078,966, entitled "Secured Virtual Network in a Gaming Environment", naming Nguyen et al. as inventors, filed on Mar. 10, 2005, herein incorporated in its entirety and for all purposes.

[0125] Mass storage devices used in a general purpose computer typically enable code and data to be read from and written to the mass storage device. In a gaming device environment, modification of the gaming code stored on a mass storage device is strictly controlled and would only be enabled under specific maintenance type events with electronic and physical enablers required. Though this level of security could be provided by software, IGT gaming computers that include mass storage devices preferably include hardware level mass storage data protection circuitry that operates at the circuit level to monitor attempts to modify data on the mass storage device and will generate both software and hardware error triggers should a data modification be attempted without the proper electronic and physical enablers being present. Details using a mass storage device that may be used with at least one embodiment described herein are described, for example, in U.S. Pat. No. 6,149,522, herein incorporated by reference in its entirety for all purposes.

[0126] In at least one embodiment, different methods, processes and/or apparatus may be provided which are operable to sense, calculate and/or record movement activity relating to a portable gaming device such as, for example, acceleration/deceleration, velocity, displacement, orientation, etc. In at least one embodiment, activity relating to the movements of a given portable gaming device along one or more dimensional axes (e.g., x-axis, y-axis, and/or z-axis) may be separately and/or independently tracked and/or recorded.

[0127] As used in this application, the term "acceleration" is intended to include both positive acceleration and negative acceleration (e.g., deceleration). Additionally, as used in this application, the terms "unit" and "device" may be used interchangeably.

[0128] For example, in one embodiment, the portable gaming device may be configured or designed to include one or more mechanisms for monitoring the unit's acceleration, evaluating the acceleration, and causing an emergency shut down of specific components if the unit's acceleration is detected as being within a predetermined or predefined range of values. In some embodiments, at least a portion of these mechanisms may be deployed in one or more systems which are external to the portable gaming device.

[0129] In at least one embodiment, one or more mechanisms may be provided for converting the portable gaming device acceleration data to velocity measurement(s) for analysis and/or evaluation. In addition, the velocity measurements may be converted to displacement measurements for analysis and/or evaluation.

[0130] For example, in at least one embodiment, one or more processes, components and/or systems (e.g., implemented at the portable gaming device) may be operable record real-time data relating to various parameters associated with the portable gaming device such as, for example, one or more of the following (or combinations thereof):

[0131] Current time of day.

[0132] Current state of the portable gaming device.

[0133] Acceleration values.

[0134] Impact velocity.

[0135] Displacement traveled by the portable casino gaming unit before impact. (which, for example, may be determined or approximated based on other parameters such as, for example, acceleration, initial velocity, duration of freefall, etc.).

[0136] Time of fall.

[0137] Location of gaming device (e.g., hotel lobby, casino floor, bar, pool side etc.). In at least one embodiment, the floor construction (e.g., concrete, wood, carpeted, steps, tabletop etc.) may be a factor of the evaluation.

[0138] Movement of device and/or user prior to the occurrence of an event (such as, for example, a freefall event). For example, was the player walking with the portable gaming device prior to the event, or was the portable gaming device stationary?

[0139] Etc.

[0140] In at least one embodiment, one or more mechanisms may be employed to monitor various parameters associated with the portable gaming device in order to detect a condition or event which may result in damage to the portable gaming device (such as, for example, detection of a freefall condition at portable gaming device). In at least one embodiment, when such an event or condition is detected, one or more mechanisms may be configured or designed to respond by initiating one or more actions such as, for example:

[0141] Disabling the portable gaming device from play.

[0142] Monitoring and recording real-time data relating to the movements (e.g., freefall) of the portable gaming device.

[0143] Causing the portable gaming device to transmit (e.g., in real-time or at periodic intervals) real-time data relating to the movements of the portable gaming device (e.g., before, during and/or after impact).

[0144] Causing the portable gaming device to transmit (e.g., via an RF transceiver) selected information to an external computer system before damage occurs at the portable gaming device (e.g., before the portable gaming device impacts the floor).

[0145] Etc.

[0146] In at least one embodiment, one or more motion sensing devices such as, for example, MEMS accelerometer (s), MEMS Gyroscope(s), or the like may be operatively coupled (e.g., via interconnect wiring) to the portable gaming device's emergency shut down circuitry and CPU. In at least one embodiment, information generated by or provided by the motion sensing devices may be used to evaluate the movements of the portable gaming device (such as, for example, acceleration, velocity, displacement, changes in orientation, etc.), for example, in order to determine if the unit has suffered abuse or mistreatment by a user.

[0147] For example, in one embodiment, an event management process running at the portable gaming device may periodically or continuously monitor and analyze acceleration data (and/or other movement data) relating to the portable gaming device. In at least one embodiment, if the process detects that the portable gaming device is currently in a freefall condition which meets or exceeds a predefined threshold criteria (e.g., continuous freefall condition exceeding 0.2 seconds, displacement of unit exceeds 10 inches during free fall condition), the process may respond by initiating one or more actions such as, for example one or more of the following (or combinations thereof):

[0148] provide a shutdown signal to the CPU,

[0149] provide notification (and/or cause the portable gaming device to provide notification) of the unit's freefall condition to an external system,

[0150] transmit (and/or cause the portable gaming device to transmit) current game state information (and/or other game/wager related information) to an external system,

[0151] record (and/or cause the portable gaming device to record) various data relating to the event/condition such as, for example: the maximum distance the unit has fallen, the unit's maximum velocity at impact, details relating to the impact event, conditions or events which occurred at the portable gaming device before the impact event (which, for example, may be used to determine or reconstruct how the unit impacted the floor),

[0152] etc.

[0153] In at least one embodiment, the event management process may be embodied in an independent, self-supporting data preservation system (or data preservation unit) which may be installed at the portable gaming device. In at least one embodiment, the data preservation system, when installed at the portable gaming device may be analogized to that of a Black Box system which is installed at an airplane. For example, in at least one embodiment, the data preservation system may be configured or designed to include its own processor, portable power source, and memory, and may be further configured or designed to be able to continue to perform its programmed functions and/or operations (such as, for example, those associated with the event management process) even after the occurrence of a partial or complete failure of the portable gaming device and/or one or more of its associated components/devices.

[0154] In at least one embodiment, recorded data relating the movements of the portable gaming device during one or more time intervals may be subsequently analyzed and/or reconstructed (e.g., using forensic analysis techniques) in order to assess whether or not the unit has suffered abuse or mistreatment by a user (e.g., did an accident caused the unit to fall, or was the unit intentionally dropped, thrown, or otherwise abused by the user). In at least one embodiment, at least a portion of such recorded data may be obtained from data stored in the memory of the data preservation system associated with that portable gaming device.

[0155] In at least one embodiment, the phrase "portable gaming device movement data" may include different types of data relating to the movements and/or locations of the portable gaming device such as, for example, one or more of the following (or combinations thereof): acceleration data, velocity data, displacement data, orientation data, location data, time data, etc.

[0156] In at least one embodiment, an accident-related event (such as, for example, the portable gaming device being accidentally knocked off a tabletop and onto the floor) may provide a different pattern of event-related data than an abuse-

related event (such as, for example, a user intentionally throwing the unit on the ground). In at least one embodiment, one or more patterns of event-related data may be characterized or expressed, for example, using histogram data relating to one or more of the following: acceleration data, velocity data, displacement data, orientation data, etc. associated with the portable gaming device.

[0157] For example, a standard tabletop is about 30 inches above the floor. Thus, a portable gaming device accidentally falling off of such a tabletop will only fall about 30 inches before it impacts the floor. Since the portable gaming device can accelerate only so fast under the influence of gravity, it is possible to calculate predicted data relating to the portable gaming device at the time of impact such as, for example: the amount of time it will take the unit to fall the 30 inches, the velocity of the unit at the time of impact, etc. In at least one embodiment, calculation of the predicted data values may vary depending upon different assumptions made about the initial starting conditions of the event. For example, in the accidental "tabletop fall" example above, it may be assumed that the initial velocity of the portable gaming device (e.g., with respect to the vertical axis) is zero. Based on this assumption, it is possible to calculate one or more profiles or patterns of event data which are representative of predicted and/or actual conditions relating to the portable gaming device (e.g., before, during and/or after the impact).

[0158] For instance, in the above example, a first "accidental tabletop fall" event data profile may be provided which includes specific values and/or specific ranges of values (relating to various parameters associated with the portable gaming device) that one would expect to see if the portable gaming device were to accidentally fall from a tabletop or other location which is about 30 inches above the floor. An example of such an "accidental tabletop fall event" data profile might specify freefall duration of the unit to be within the range of 0.40-0.39 seconds, and might also specify a velocity of the unit at the time of impact to be within the range of 12.9-12.4 ft/sec. According to different embodiments, these parameter values may be based on actual data, may be based on predicted or calculated data, and/or may be based on some combination thereof.

[0159] In contrast, if a player were to first throw the portable gaming device up in the air, or drop the unit from a height that is greater than 30 inches, the unit may accelerate to a higher speed, may impact the floor with a higher velocity, and may take more time to fall. As a result, the patterns of event-related data corresponding to either of these two events may be different from the "accidental tabletop fall" event data profile.

[0160] Additional details relating to patterns and/or profiles of event-related data are illustrated and described, for example, with respect to FIGS. **11** and **12** of this application.

[0161] In at least one embodiment, when a specific event (such as, for example, an impact-related event) has been detected as occurring at a portable gaming device, actual event data relating to the specific event (such as, for example, movement data corresponding to real-time conditions of the portable gaming device during the specific event) may be accessed and used to generate a specific event data pattern characterizing that specific event. In one embodiment, the specific event data pattern may include histogram data representing real-time conditions relating to the acceleration, velocity, displacement, and/or orientation of the portable gaming device during the specific event. In one embodiment, a comparison or analysis may be made between the specific event data pattern and one or more other event data patterns (and/or event data profiles) in order to assess, for example: whether the cause of the specific event was accident related or intentional, whether or not the portable gaming device has suffered abuse or mistreatment by a user, etc.

[0162] In at least one embodiment, the term "event" may be used to characterize conditions and/or activities relating to a portable gaming device during a selected time interval. For example, in the accidental "tabletop fall" example above, the time interval for this "drop" event may be selectively defined as a continuous time interval which begins at a starting time Ts (which, for example, may correspond to a time when the portable gaming device was at rest on the tabletop before being knocked off), and which ends at an ending time Te (which, for example, may correspond to a time when the portable gaming device is at rest on the casino floor). Based on this example time interval, the event data relating to the "accidental tabletop fall" event may include portable gaming device movement data corresponding to conditions associated with the portable gaming device: before freefall, during freefall, during impact, and after impact.

[0163] It will be appreciated, however, that different time intervals may be used to characterize different desired events or sub-events which may occur at the portable gaming device. For example, in one embodiment, the time interval relating to a portable gaming device "freefall" event (such as, for example, when the portable gaming device is falling or experiencing a freefall condition) may be defined, for example, as the continuous time interval during which the portable gaming device was experiencing a freefall condition (e.g., zero-gravity or substantially zero-gravity condition with respect to the vertical axis). In another embodiment, an "impact" event (such as, for example, when the portable gaming device experiences an impact or experiences a rapid deceleration which exceeds a minimum defined threshold value) may be defined, for example, as a time interval (or a specific point in time) when the portable gaming device experienced the impact.

[0164] According to different embodiments, various different techniques may be used for generating and/or evaluating information relating to the acceleration, velocity, displacement, and/or orientation which a portable gaming device experienced during a fall/impact. One technique, for example, may include evaluation of the acceleration of the portable gaming device. For example, according to one embodiment, if it is detected that the portable gaming device has undergone acceleration which meets or exceeds one or more specified minimum threshold criteria (such as, for example, a continuous acceleration condition which exceeds 0.2 seconds, a continuous acceleration condition which exceeds a specified amount of time corresponding to an amount of time that is required for an object to fall 10 inches under normal gravitational force, etc.), then emergency shut down circuitry at the portable gaming device may trigger a first trigger mode to initiate saving of all or selected data (e.g., game state data, wager data, critical data, and/or other data which may exist at the portable gaming device) in non-volatile memory. Upon detecting an impact event, the emergency shut down circuitry may trigger a second trigger mode to initiate the recording of the maximum acceleration (e.g., with respect to the x-axis, y-axis, and/or z-axis), impact velocity (e.g., with respect to the x-axis, y-axis, and/or z-axis), and/or

to calculate the approximate displacement (e.g., with respect to the x-axis, y-axis, and/or z-axis) of the portable gaming device during the fall.

[0165] In at least one embodiment, the emergency shut-down circuitry may be included or implemented as part of the data preservation system.

[0166] In at least one embodiment, a least one mechanism may be provided for tracking and evaluating various aspects relating to the handling of a portable gaming device. For example, in one embodiment, an event tracking process may be provided for tracking and recording various information relating to one or more portable gaming devices such as, for example, one or more of the following (or combinations thereof):

[0167] the number of times a given portable gaming device has fallen;

[0168] the number of times a given portable gaming device has experienced an impact event;

[0169] velocity of the portable gaming device at impact;

[0170] the maximum velocity recorded by the device;

[0171] location information;

[0172] timestamp information;

[0173] information relating to damage (e.g., current and/or prior damage) to the portable gaming device;

[0174] information relating to repair(s) to the portable gaming device;

[0175] etc.

[0176] According to different embodiments, the event tracking process may be implemented as a process running at the portable gaming device, may be implemented as a process running at the data preservation system, or may be implemented as a process running at an external or remote system or server. In some embodiments, multiple different event tracking processes may be concurrently implemented at different devices and/or systems of the casino network. In at least one embodiment, the information which is tracked by the event tracking process may be used to evaluate weak components, weak mounting of components and the like. Additionally, such information may also be used to facilitate the redesign process of the portable gaming device.

[0177] In at least one embodiment, a portable gaming device may be operable to automatically and dynamically select an appropriate mode of operation based on various parameters and/or upon detection of specific events or conditions such as, for example, one or more of the following (or combinations thereof):

[0178] the portable gaming device's current location;

[0179] identity of current user;

[0180] user input;

[0181] system override (e.g., emergency condition detected);

[0182] proximity to other portable gaming devices belonging to same group or association;

[0183] proximity to specific objects, regions, zones, etc.;

[0184] etc.

[0185] Additionally, the portable gaming device may be operable to automatically update or change its current operating mode to the selected mode of operation. The portable gaming device may also be adapted to automatically modify accessibility of user-accessible features and/or information in response to the updating of its current mode of operation.

[0186] According to specific embodiments, associations may be made between portable gaming devices and players (and/or player positions at a game table) such that each active portable gaming device is associated with a unique player or user during a given time period.

[0187] According to specific embodiments, the portable gaming device may also be adapted to perform other functions such as, for example, one or more of the following (or combination thereof):

[0188] allowing a player conduct game play activities;

[0189] allowing a player to input game play instructions;

[0190] allowing a player to perform wagering activities (e.g., increasing bets, checking bets, performing side wagering/back betting activities, etc.);

[0191] retrieving and/or displaying player tracking data;

[0192] retrieving and/or displaying player account data;

[0193] displaying game play assistance information;

[0194] displaying casino layout information;

[0195] displaying promotional information;

[0196] notify a player of messages;

[0197] displaying multimedia information from external sources;

[0198] displaying player's current location;

[0199] etc.

[0200] For example, in one implementation, a portable gaming device may be adapted to communicate with a remote server to access player account data, for example, to know how much funds are available to the player for betting/wagering.

[0201] In at least one implementation, the portable gaming device may also include other functionality such as that provided by PDAs, cell phones, and/or other mobile computing devices. Further, in at least one implementation, the portable gaming device may be adapted to automatically and/or dynamically change its functionality depending on various conditions such as, for example: type of game being played; user input; current location or position; detection of local electronic gaming tables/devices; etc.

[0202] In at least one embodiment, a portable gaming device may be implemented using conventional mobile electronic devices (e.g., PDAs, cell phones, etc.) which have been specifically adapted to implement at least a portion of the portable gaming device functionalities described herein.

[0203] According to a specific embodiment, the portable gaming device may be adapted to implement at least a portion of the features associated with the mobile game service system described in U.S. patent application Ser. No. 10/115,164, which is now U.S. Pat. No. 6,800,029, issued Oct. 4, 2004, which is hereby incorporated by reference in its entirety for all purposes. For example, in one embodiment, the portable gaming device may be comprised of a hand-held game service user interface device (GSUID) and a number of input and output devices. The GSUID may include a display screen which may display a number of game service interfaces. These game service interfaces may be generated on the display screen by a microprocessor of some type within the GSUID. Examples of a hand-held GSUID which may accommodate the game service interfaces are manufactured by Symbol Technologies, Incorporated of Holtsville, N.Y.

[0204] In addition to the features described above, the portable gaming device of the present invention may also include additional functionality for displaying, in real-time, filtered information to the user based upon a variety of criteria such as, for example, geolocation information, casino data information, player tracking information, game play information, wager information, motion detection information, gesture interpretation information, etc.

[0205] As used herein, the term "portable gaming device" may be used to describe and variety of different types of electronic devices which may include, but are not limited to, one or more of the following (or combination thereof): mobile devices, wireless devices, portable devices, handheld devices, etc.

[0206] FIGS. **2**A and **2**B illustrate different embodiments of various motion detection components which may be used for implementing various aspects and/or features described herein.

[0207] For example, as shown in the example of FIG. **2**A, motion detection device **224** may include a plurality of accelerometers (e.g., **224***a*, **224***b* and **224***c*). In one embodiment, motion detection device **224** may include three single axis accelerometers. In another embodiment, motion detection device **224** may include a dual axis accelerometer and a single axis accelerometer.

[0208] In at least one embodiment, accelerometers **224***a*, **224***b* and **224***c* may be operable to detect movement of the portable gaming device by detecting acceleration along one or more respective sensing axes. For example, in one embodiment, a particular movement of the portable gaming device may comprise a series, sequence and/or pattern of accelerations detected by the accelerometers. In one embodiment, when the portable gaming device is tilted along a sensing axis of a particular accelerometer, the gravitational acceleration along the sensing axis may dynamically change. This change in gravitational acceleration may be detected by the accelerometer and reflects the tilt of the device. Similarly, translation of the portable gaming device, or movement of the device without rotation or tilt may also produce changes in acceleration along one or more sensing axes, which may be detected by one or more of the accelerometers.

[0209] In an example embodiment of FIG. **2**A, motion detection device **224** comprises: an x-axis accelerometer **224***a* operable to detect movement of the device along an x-axis; a y-axis accelerometer **224***b* operable to detect movement of the device along a y-axis, and a z-axis accelerometer **224***c* operable to detect movement of the device along a z-axis. According to different embodiments, the accelerometers they be implemented using single-axis, double-axis, and/or triple-axis accelerometers. In combination, accelerometers **224***a*, **224***b* and **224***c* are able to detect rotation and/or translation of a portable gaming device such as portable gaming device **20**. In at least one embodiment, rotation and/or translation of device **20** may also serve as an input from a user to operate the device.

[0210] The use of three accelerometers for motion detection provides certain advantages. For example, if only two accelerometers were used, the motion detector may not be able to disambiguate translation of the portable gaming device from tilt in the plane of translation. However, using a third, z-axis accelerometer (an accelerometer with a sensing axis at least approximately perpendicular to the sensing axes of the other two accelerometers) enables many cases of tilt to be disambiguated from many cases of translation.

[0211] FIG. **2**B shows an alternate embodiment of various motion detection components which may be used for implementing various aspects and/or features described herein. For example, as shown in the example of FIG. **2**B, motion detection device **250** may include, for example, accelerometer component(s) **254**, gyro component(s) **258**, camera component(s) **256**, rangefinder component(s) **260**, velocity transducer component(s) **264**, etc.

[0212] In at least one embodiment, the velocity transducer component(s) **264** may be used to calculate the acceleration of the portable gaming device. For example, according to different embodiments, electronic circuitry and/or algorithmic processes applied to the output of the velocity transducer may be used to produce an acceleration output that is proportional to the acceleration of the portable gaming device, for example. For instance, by computing the derivative of the output of the velocity transducer, an acceleration data may be generated. In at least one embodiment, such computed acceleration data may be compared to (or may be used in place of) the output from an acceleration transducer. In another example, the output of a velocity transducer may be integrated to compute displacement data that may be used to calculate the displacement that the portable gaming device may have traveled during a given time interval.

[0213] According to one embodiment, camera component (s) **256** may include a plurality of cameras which may comprise charge coupled device (CCD) cameras or other optical sensors. In one embodiment, the cameras may provide another way to detect movement of the portable gaming device (both tilt and translation). Additionally, by using at least two cameras, tilt and translation may be distinguished from each other.

[0214] In at least one embodiment, when the portable gaming device is rotated, the magnitude of the movement of the external world to the cameras may be directly related to the magnitude of the rotation of the device. Thus, for example, in one embodiment, the amount of the rotation can accurately be determined based on such movement of the external world from the perspective of the cameras.

[0215] However, in at least one embodiment, when the device is translated, the magnitude of the translation may be related to both the magnitude of the movement of the external world to the cameras and to the distance to the objects in the field of view of the cameras. Accordingly, in at least some embodiments, in order to accurately determine the amount of translation using cameras alone, it may be desirable to obtain some form of information concerning the distance to objects in the camera fields of view. In at least some embodiments, one or more rangefinder component(s) **260** may be used for this purpose (and/or for other desired purposes).

[0216] It will be appreciated that, even without such distance information, the optical information provided by the cameras may be of significant value, for example, when correlated against the information from accelerometers and/or other sensors. For example, optical camera input may be used to inform the portable gaming device that no significant motion is taking place. This could provide a solution to problems of drift which may be inherent in using acceleration data to determine absolute position information for certain device functions.

[0217] As discussed above, distance information may be useful to determine amount of translation when cameras are being used to detect movement. In the example of FIG. **2**B, such distance information may be provided via one or more rangefinder components **260**. According to specific embodiments, rangefinder component(s) **260** may comprise, for example, ultrasound rangefinders, laser rangefinders and/or any other suitable distance measuring components. Other components may also be used to determine distance information. For example, cameras with range finding capabilities may be used. In one embodiment, multiple cameras may be utilized on the same side of the portable gaming device to

function as a range-finder using stereopsis. In at least one embodiment, determined distance information may allow for improved accuracy and/or explicit computation of detected translation and/or rotation.

[0218] As shown in the example of FIG. **2**B, motion detection device **250** may additionally include one or more gyro component(s) **258** such as, for example, one or more MEMS gyroscopes. In at least one embodiment, gyro component(s) **258** may be used in combination with the other components of motion detection device **250** to provide increased accuracy in detecting movement of the portable gaming device.

[0219] In at least one embodiment, the motion detection device may include one or more processors (e.g., **262**), which, for example, may be operable to processes data from the various motion detection components (e.g., accelerometers, cameras, gyros, rangefinders, etc.) to produce an output indicative of the motion of the portable gaming device. Processor **232** may comprise a microprocessor, controller or any other suitable computing device or resource, such as a video analysis module for receiving a video stream from each camera. In some embodiments, the processing described herein with respect to processor **232** of motion detection device **250** may be performed by processor **16** of portable gaming device **10** or any other suitable processor, including processors located remote to the portable gaming device.

[0220] It will be appreciated that, in other embodiments, one or more motion detection devices may include additional, fewer, or different components than those illustrated in FIGS. **2**A and **2**B. For example, some embodiments may include a motion detector device with two or three accelerometers and one or more gyros; two or three accelerometers and one or more cameras; or two or three accelerometers and one or more rangefinders, etc. In addition, the location of the motion detection components on the portable gaming device may vary for different embodiments. For example, some embodiments may include cameras on different surfaces of a device, while other embodiments may include two cameras on the same surface.

[0221] Altering the type, number and location of components of motion detection device **250** may affect the ability of motion detector to detect or accurately measure various types of movement. As indicated above, the type and number of components of motion detectors may vary in different embodiments in order to fulfill particular needs. Fewer or less accurate components may be used in particular embodiments when it is desired to sacrifice accuracy to reduce manufacturing cost of a portable gaming device with motion detection capabilities. For example, some portable gaming devices may only need to detect that the portable gaming device has been translated and may not need to detect exact amount of such translation to perform desired functions of the portable gaming device. Such portable gaming devices may thus include a motion detector with accelerometer and/or camera components but without rangefinder or other component providing distance information. In particular embodiments, components described above, such as cameras and rangefinders, may also be used for other purposes by the portable gaming device than those described above relating to motion detection functionality.

[0222] FIG. **3** shows a simplified block diagram of various components which may be used for implementing a data preservation system **300** in accordance with a specific embodiment. In at least one embodiment, the data preservation system **300** may be implemented as an integrated, self-contained device which is configured or designed to operate independently from other systems/components of a portable gaming device. For example, in at least one embodiment, the data preservation system **300** may be configured or designed to include its own processor, portable power source, and memory, and may be further configured or designed to be able to perform its programmed functions and/or operations even during times when the portable gaming device is in a powered off state and/or even after the occurrence of a partial or complete failure of the portable gaming device and/or one or more of its associated components/devices.

[0223] As illustrated in the example of FIG. **3**, data preservation system **300** may include a variety of components, modules and/or systems for providing functionality relating to one or more aspects described herein. Other data preservation system embodiments (not shown) may include different or other components than those illustrated in FIG. **3**. For example, data preservation system **300** may include, but not limited to, one or more of the following (or combination thereof):

[0224] At least one processor or CPU (**306**). In at least one implementation, the processor(s) **306** may be operable to implement features and/or functionality similar to other processors described herein.

[0225] Memory **316**, which, for example, may include volatile memory (e.g., RAM), non-volatile memory (e.g., NV-RAM, disk memory, FLASH memory, EPROMs, etc.), unalterable memory, and/or other types of memory. In at least one implementation, the memory **316** may be operable to implement features and/or functionality similar to other memory described herein.

[0226] Interface(s) **318** which, for example, may include wired interfaces and/or wireless interfaces. In at least one implementation, the interface(s) **318** may be operable to implement features and/or functionality similar to other interfaces described herein. For example, in at least one embodiment, interface(s) **318** may include one or more interfaces for communicating with other systems, processes, components and/or devices of the portable gaming device in at least one embodiment, interface(s) **318** may include one or more one or more wireless communication interfaces, which, for example, may be configured or designed to communicate with components of the portable gaming device and/or with other external devices and/or systems such as, for example, one or more of the following (or combinations thereof): remote servers, electronic gaming machines, other wireless devices (e.g., PDAs, other portable gaming devices, cell phones, player tracking transponders, etc.), base stations, etc. According to different embodiments, such wireless communication may be implemented using one or more wireless interfaces/protocols such as, for example, 802.11 (WiFi), 802.15 (including Bluetooth™), 802.16 (WiMax), 802.22, Cellular standards such as CDMA, CDMA2000, WCDMA, Radio Frequency (e.g., RFID), Infrared, Near Field Magnetics, etc.

[0227] At least one power source **304**. In at least one implementation, the power source may include at least one mobile power source for allowing the data preservation system to operate in a mobile environment. For example, in one implementation, the battery **304** may be implemented using a rechargeable type battery. Additionally, in at least one embodiment, data preservation

system **300** may include a battery recharging system which, for example, may be configured or designed to recharge the portable gaming device's rechargeable battery. In one embodiment, the battery recharging system may be configured or designed to utilize power from an external power source (such as, for example, power from the portable gaming device's battery, power from other AC and/or DC power sources, etc.) for recharging the data preservation system's power source **304**.

[0228] One or more display(s) **308** (if desired). According to various embodiments, such display(s) may be implemented using, for example, LCD display technology, OLED display technology, and/or other types of conventional display technology. In at least one implementation, display(s) **308** may be adapted to be flexible or bendable. Additionally, in at least one embodiment the information displayed on display(s) **308** may utilize e-ink technology (such as that available from E Ink Corporation, Cambridge, Mass., www.eink.com), or other suitable technology for reducing the power consumption of information displayed on the display(s) **308**. In some embodiments, it may be desirable to not include a display at the data preservation system.

[0229] One or more user I/O Device(s) such as, for example, touch keys/buttons, DIP switches, scroll wheels, cursors, touchscreen sensors, etc.

[0230] One or more status indicators **302**. For example, in one implementation, one or more colored status indicators (such as, for example, LEDs) may be included on one or more regions of the data preservation system, and adapted to provide various information such as, for example: communication status; data preservation system health status; data preservation system operating mode or state; battery power status; battery charging status; error detection status; etc.

[0231] At least one motion detection component **314** for detecting motion or movement of the data preservation system and/or for detecting motion, movement, gestures and/or other input data from user. In at least one embodiment, motion detection component(s) **314** may include one or more of the following (or combinations thereof): accelerometer component(s), gyro component(s), camera component(s), rangefinder component(s), velocity transducer component(s), etc.

[0232] Emergency shut down component(s) **308**. In at least one embodiment, the emergency shut down component(s) may be configured or designed to analyze movement data relating to the unit's movements (e.g., acceleration, velocity, displacement, orientation, etc.), and initiate an emergency shut down of specific components of the portable gaming device if the unit's movement data is detected as meeting or exceeding predetermined or predefined threshold criteria.

[0233] Event management components **310**. In at least one embodiment, event management components **310** may be configured or designed to manage tracking and/or recording various information relating to real-time events and/or conditions associated with the portable gaming device. In at least one embodiment, event management components **310** may also be operable to track and/or record historical information relating to events and/or conditions which have occurred at the portable gaming device such as, for example, the number of times the portable gaming device has experienced a freefall event/condition, the number of times a given portable gaming device has experienced an impact event, peak acceleration data (which, for example, may also include associated timestamp data), etc.

[0234] etc.

[0235] In at least one embodiment, the data preservation system **300** may be operable to periodically or continuously monitor and analyze acceleration data (and/or other movement data) relating to the portable gaming device. Additionally, in at least one embodiment, if the data preservation system detects that the portable gaming device is currently in a freefall condition which meets or exceeds a predefined threshold criteria (e.g., continuous freefall condition exceeding 0.2 seconds, displacement of unit exceeds 10 inches during free fall condition), it may respond by initiating one or more actions such as, for example one or more of the following (or combinations thereof):

[0236] provide a shutdown signal to the CPU and/or other components of the portable gaming device;

[0237] provide notification (and/or cause the portable gaming device to provide notification) of the unit's freefall condition to an external system;

[0238] transmit (and/or cause the portable gaming device to transmit) current game state information (and/or other game/wager related information) to an external system;

[0239] record (and/or cause the portable gaming device to record) various data relating to the event/condition such as, for example: the maximum distance the unit has fallen, the unit's maximum velocity at impact, details relating to the impact event, conditions or events which occurred at the portable gaming device before the impact event (which, for example, may be used to determine or reconstruct how the unit impacted the floor);

[0240] etc.

[0241] In some embodiments, the portable gaming device (and/or data preservation system) may be configured or designed to periodically transmit selected information (such as, for example, movement information, gaming-related information, wager-related information, etc.) to an external or remote device/system, whereupon the information may then be preserved (e.g., stored in remote memory) and used for subsequent analysis, if desired. In some embodiments, the portable gaming device (and/or data preservation system) may be configured or designed to transmit a continuous stream of desired information (e.g., information relating to real-time conditions/events/states associated with the portable gaming device) to an external or remote device/system, whereupon the information may then be preserved (e.g., stored in remote memory) and used for subsequent analysis, if desired.

[0242] In at least one embodiment, recorded data relating the movements of the portable gaming device during one or more time intervals may be subsequently analyzed and/or reconstructed (e.g., using forensic analysis techniques) in order to assess whether or not the unit has suffered abuse or mistreatment by a user (e.g., did an accident caused the unit to fall, or was the unit intentionally dropped, thrown, or otherwise abused by the user). In at least one embodiment, at least a portion of such recorded data may be obtained from data stored in the memory of the data preservation system associated with that portable gaming device.

[0243] In at least one embodiment, by recording or otherwise preserving the state of a game as the portable gaming

device is falling, the system will know the outcome of the game before the unit impacts the floor. This will eliminate a player receiving money that he/she does not deserve. An example of this would be; if a player plays a game and he loses the game. He gets mad at the portable gaming device and throws it on the floor, or throws it up in the air. After impact, he returns it to the cash out area and states that he won the game and got excited and accidentally dropped the unit. Now the cash out area can then evaluate the state of the game because the state of the game was transmitted via RF to the system computer and the state of the game was also stored before the portable gaming device hit the floor. The portable gaming device or the system computer may evaluate the acceleration, velocity and the displacement that the portable gaming device experienced in the fall.

[0244] In at least one embodiment, the motion detection component **314** may include one or more motion detection sensors such as, for example, MEMS (Micro Electro Mechanical System) accelerometers, that can detect the acceleration and/or other movements of the data preservation system and/or portable gaming device. Examples of suitable MEMS accelerometers may include, but are not limited to, one or more of the following (or combination thereof): Si-Flex™ SF1500L Low-Noise Analog 3 g Accelerometer (available from Colibrys, Inc., Stafford, Tex.); MXC6202 Dual Axis Accelerometer (available from MEMSIC, Inc. 800, North Andover, Mass.); ADXL330 iMEMS Accelerometer (available from Analog Devices, Norwood, Mass.); etc.

[0245] In at least some embodiments, other types of motion detection components may be used such as, for example, inertial sensors, MEMS gyros, and/or other motion detection components described herein. For example, MEMS accelerometers may be particularly suited for applications involving relatively large degrees of vibration, impact, and/or fast motion. MEMS gyros are great for may be particularly suited for applications involving orientation sensing and/or slow movements.

[0246] In some embodiments the portable gaming device and the data preservation system (e.g., installed at the portable gaming device) may each include their own respective motion detection components which function and operate independently from each other. In some embodiments, the data preservation system may be operable to utilize motion data provided by external motion detected in components (such as, for example, the portable gaming device's motion detection components).

[0247] In at least one embodiment, motion detection component **314** may include at least one "Spring Board Accelerometer". One embodiment of the Spring Board Accelerometer may be implemented in a manner similar to that of a diving board, in that it may be attached at one end and may be allowed to bend (under the influence of gravity). If desired, a specified amount of mass may be added to the free end.

[0248] In at least one embodiment, the free end of the "spring board" may be implemented as movable plate of a capacitor with the other plate of the capacitor being fixed (e.g., to a frame or body). Such a Spring Board Accelerometer embodiment may be used to measure the influence of gravity. For example, according to one embodiment, as gravity bends the board, the distance between the plates of the capacitor decreases (e.g., the plates get closer to each other), and the capacitance increases [e.g., Capacitance=(k*Area of plates)/distance between plates]. For example, if the accelerometer is stationary (e.g., lying on a table with the spring board parallel with the table top) then the output of that board may be +1 g and a first output signal (e.g., DC voltage signal) may be output from the device (e.g., using electronics operable to measure the capacitance of the plates, and/or to generate the DC output signal(s)). If the spring board is subsequently turned over, the output of that board will be at −1 g, and the DC voltage output signal will also change polarity. As the board is rotated about an axis parallel to the board, the output may dynamically change from +1 g to −1 g, with 0 g being the point where the board is perpendicular to the force of gravity. In one embodiment, a graph of this function may be expressed as a cosine function from 0 to pi.

[0249] According to specific embodiments, spring board accelerometers may be suitable for use as sensors of vibration. For example, in one embodiment the spring board accelerometer(s) may be optimized to detect vibration frequencies of less than 400 Hz for use in motion detection/interpretation analysis. In one embodiment, it may be preferable that the frequency of detected vibration(s) (e.g., for use in gesture interpretation analysis) is below the resonance frequency of the spring board. For example, in at least one embodiment, the length of the spring board and the mass of the spring board may be configured or designed such that the frequency of resonance of the board is greater than 400 Hz.

[0250] Spring board accelerometers may also be suitable for use as sensors of impacts since, for example, such devices may be configured or designed to detect and withstand relatively fast accelerations (e.g., resulting from free fall conditions) in one or more planes. For example, fast acceleration in one plane may result in the board bending until its limits are encountered. Such devices may be suitable for use as sensors for measuring tilt of an object. For example, in one embodiment, a spring board accelerometer may be configured or designed to provide an output DC voltage that is proportional to the angle of tilt, acceleration, rotation of an object such as, for example, a portable gaming device or a player's hand or arm.

[0251] In at least one embodiment, the data preservation system may be further adapted to transmit various types of information to external devices/systems such as, for example: portable gaming devices, gaming machines, game tables, and/or other devices or systems of the gaming network. Examples of the various types of different information which may be transmitted by the data preservation system may include, but are not limited to, one or more of the following (or combinations thereof):

[0252] portable gaming device state information;

[0253] historical game data;

[0254] critical information;

[0255] game state data;

[0256] wager related data;

[0257] information relating to events, conditions and/or movements occurring at the portable gaming device (such as, for example, time data, location data, acceleration/deceleration data, velocity data, displacement data, orientation data, etc);

[0258] information which may be desired and/or used for reconstructing conditions and/or events at the portable gaming device before, during and/or after the detected event or condition;

[0259] data preservation system device ID;

[0260] portable gaming device ID (e.g., for use in identifying the portable gaming device which transmitted information);

[0261] user ID information (e.g., for use in identifying the user operating the portable gaming device);

[0262] According to one implementation, analog acceleration data output from the accelerometers may be digitized and fed into a multiplexer and transmitted to an external device or system such as, for example, a gaming machine, a game table, a remote server, etc.

[0263] According to various embodiments, game tables, gaming machines, and/or other devices which are operable to receive communication from the data preservation system and/or portable gaming device may include at least one receiver for receiving information transmitted from the data preservation system and/or portable gaming device. In one embodiment, the receiver may be implemented as a multi-channel multi-frequency receiver adapted to receive signals from a plurality of different portable gaming devices.

[0264] In at least one embodiment, a portable gaming device may be an extension of an existing video slot casino machine such as, for example, IGT's "Game King Video Slot" gaming machine, or it may be a stand alone casino gaming machine.

[0265] The difference would be that in the extended mode of operation the portable gaming device would reflect the functions that are being preformed on the IGT "Game King Video Slot" machine and provide inputs back to the stand alone gaming machine. In the stand alone mode it would perform all the same functions that the IGT "Game King Video Slot" machine would perform and would not need the support of the stand alone gaming machine.

[0266] FIG. **4** is a simplified block diagram of an alternate example of a portable gaming device **400** in accordance with a specific embodiment. As illustrated in the example of FIG. **4**, portable gaming device **400** may include a variety of components, modules and/or systems for providing functionality relating to one or more aspects described herein. For example, as illustrated in FIG. **4**, portable gaming device **400** may include one or more of the following:

[0267] memory storage units such as ROM **422**, RAM **423**, hard drives **424**, solid state drives **425**, etc.;

[0268] a display unit controller **426** operable to generate a video images;

[0269] a touch screen controller **427** that controls a touch sensitive overlay **414** for a touch input device;

[0270] audio speaker system **428** for generating sound;

[0271] push button controller **429** for control and game state changes;

[0272] a finger print reader **430** (and/or other biometric reader) for user identification;

[0273] a wireless player tracking reader **431** for player accounting;

[0274] a wireless transceiver **432** for communication purposes;

[0275] a rechargeable battery **433** for a power source;

[0276] emergency shut down circuitry **434**;

[0277] one or more accelerometers **435**;

[0278] one or more velocity transducers **436**.

[0279] etc.

[0280] FIG. **5** shows an example schematic diagram of shut down comparator circuitry in accordance with a specific embodiment.

[0281] FIG. **6** shows an example schematic diagram of a shut down intentional comparator circuitry in accordance with a specific embodiment.

[0282] In at least one embodiment, the data preservation system may include some or all of the circuitry illustrated in the schematic diagrams of FIG. **5** and/or FIG. **6**.

[0283] In at least one embodiment, the shut down comparator circuitry of FIG. **5** and/or FIG. **6** may be configured or designed to perform one or more operations described or referenced herein, such as, for example, one or more operations which may be performed or initiated by data preservation system and/or portable gaming device.

[0284] In the example of FIG. **5**, iMEMS accelerometer U**1** may be implemented using an iMEMS accelerometer such as the ADXL **330** iMEMS accelerometer manufactured by Analog Devices of Norwood, Mass. In one embodiment, the iMEMS accelerometer may be powered by a power source such as, for example, a VDC +3 volt supply. In the example of FIG. **5**, the outputs of the accelerometer (e.g., one for each axis of acceleration) are represented as XOUT, YOUT, and ZOUT. Capacitors C**1**, C**2** and C**3** function as low pass filter (s) (e.g., for use with the internal resistance within accelerometer U**1**), that may be used to eliminate high frequency noise that, for example, may be generated within the iMEMS accelerometer.

[0285] According to one embodiment, the scaling of the iMEMS accelerometer may be about 300 mV/g and may be applied to one or more inverting amplifiers with a gain (e.g., in one embodiment, a gain of about 10×). Examples of such amplifiers are U**2**A, U**2**B and U**2**C. In one embodiment, the DC output from the iMEMS accelerometer is equal to about ½ the 3.0 VDC supply. In one embodiment, this DC voltage may be eliminated from the amplifier gain(s) via biasing opamp U**2**D. In one embodiment, biasing opamp U**2**D may be configured or designed to provide ½ the supply voltage to the positive pins of the gain amplifiers. In at least one embodiment, the three outputs X 3 V/g, Y 3 V/g and Z 3 V/g may have a scale factor of about 3 V/g with an offset of ½ of the supply voltage. In one embodiment, these outputs may be supplied to AC and/or DC comparators such as those shown, for example, in FIG. **6**.

[0286] In the example embodiment of FIG. **6**, circuit portion **600** may be configured or designed to include two circuits which may function as window comparators. In at least one embodiment, one of the window comparator circuits (e.g., **601**) may be configured or designed as a DC window comparator, which, for example, may be connected to the outputs X 3 V/g, Y 3 V/g and Z 3 V/g represented in FIG. **5**. In at least one embodiment, another window comparator circuit (e.g., **603**) may be configured or designed as an AC window comparator, which, for example, may be connected to the outputs (e.g., X 3 V/g, Y 3 V/g and Z 3 V/g) of FIG. **5** via one or more capacitors.

[0287] In at least one embodiment, the reference voltage for the window comparators is supplied by a voltage divider circuit which includes resistors R**9**, R**10**, and R**11**. These resistors that may be adjusted by the gaming processor provide desired threshold levels for the window comparators.

[0288] In at least one embodiment, the window comparators may be configured or designed to operate in such a way that if one or more specified inputs (e.g., X 3 V/g, Y 3 V/g and/or Z 3 V/g) are at 1.5 volts (and/or have a value which indicates a zero g condition), the SHUTDOWN output signal may be set to high, which, for example, may result in one or more of the following (or combinations thereof): signaling the processor to initiate an emergency state of operation;

causing recording and/or storing of desired data which, for example, may be used for evaluation of the falling portable gaming device; etc.

[0289] FIGS. **7**A and **7**B illustrate different example embodiments of receiver systems which may be utilized in one or more systems described herein such as, for example, a portable gaming device, a gaming system, a communication relay, and/or other systems/devices of a casino gaming network.

[0290] For example, as illustrated in FIG. **7**A, receiver system portion **700** may include an antenna **701** and receiver **702** operable for receiving wireless data communications from one or more portable gaming devices (and/or other wireless devices). According to different embodiments, receiver **702** may be operable to receive wireless data which has been transmitted using a variety of different wireless communication protocols and/or modulation schemes (such as those described herein). In one embodiment, output from receiver **702** may be provided to demodulator/decoder **704**, which may be operable to identify and/or extract various types of data which have been embedded or encoded in received wireless communication signals. In one embodiment, output from demodulator/decoder **704** may be provided, e.g., via communication interface **706**, to a master controller **710** (and/or other processor(s)) of a desired gaming system. In at least one embodiment, wireless communication with receiver system portion **700** may be achieved using one or more of the following types of protocols and/or modulation schemes (and/or combinations thereof): CDMA, TDMA, FDMA, frequency modulation, amplitude modulation, baseband modulation, etc. As illustrated in FIG. **7**B, receiver system portion **750** may include one or more antennas **751***a-n* and one or more receivers **752***a-n* operable for receiving wireless data communications from one or more portable gaming devices (and/or other wireless devices). According to different embodiments, receivers **752***a-n* may be operable to receive wireless data which has been transmitted using a variety of different wireless communication protocols and/or modulation schemes (such as those described herein). Additionally, the use of multiple receivers allows for simultaneous reception of multiple different wireless communication signals (e.g., sent from different portable gaming devices).

[0291] In one embodiment, output from receivers **752***a-n* may be provided to demodulator/decoders **754***a-n,* which may be operable to identify and/or extract various types of data which have been embedded or encoded in received wireless communication signals. In one embodiment, output from demodulator/decoder **754***a-n* may be provided, e.g., via communication interface **756**, to a master controller **760** (and/or other processor(s)) of a desired gaming system. In at least one embodiment, wireless communication with receiver system portion **750** may be achieved using one or more of the following types of protocols and/or modulation schemes (and/or combinations thereof): CDMA, TDMA, FDMA, frequency modulation, amplitude modulation, baseband modulation, etc.

[0292] It will be appreciated that the various components features and capabilities of the different receiver system embodiments described herein may also be incorporated into different gaming system embodiments in order to provide such gaming system and embodiments with similar features and/or capabilities.

[0293] FIG. **8** illustrates an example of network portion **800**, which may be used for illustrating various aspects and/or features described herein. In at least one embodiment, portable gaming device **802** may be operable to communicate with one or more gaming systems, gaming devices, game tables, portable gaming devices, and/or other systems/devices of a gaming network.

[0294] As shown in the example of FIG. **8**, portable gaming device **802** may communicate with one or more gaming device(s)/system(s) **812** and/or one or more remote device/system(s) **806** (e.g., via communication network **804**).

[0295] According to one embodiment, portable gaming device **802** may detect motion of the portable gaming device, and may generate movement data via one or more motion detection components, such as, for example, accelerometers, cameras, rangefinders, gyros, etc. In at least one embodiment, movement data relating to a portable gaming device may be processed at the portable gaming device and/or at remote devices/systems. Particular databases (such as, for example, gesture and gesture mapping databases, event-related profile databases, etc.) may be accessed to determine any appropriate actions to be implemented in response to the analyzed movement data.

[0296] In at least one embodiment, portable gaming device may also be operable to transmit, to one or more other devices/systems, various other types of data or information such as, for example: historical game data, critical information, game state data, wager related data, portable gaming device state information, and/or other data or information which may be desired and/or used for reconstructing conditions and/or events at the portable gaming device (e.g., before, during and/or after a given event or condition).

[0297] In at least some embodiments, gaming device/system **812** and/or remote device/system **806** may be operable to process the information received from portable gaming device **802**, for example, in order to determine one or more intended functions or operations to be performed based on the movement data. In some embodiments, the information transmitted by portable gaming device **802** may include information indicating or identifying the other device(s)/system(s) which are intended to receive specific portions of information transmitted from the portable gaming device. It will be appreciated that other embodiments may include different number (s) of devices and/or system(s) of varying types which may be responsive to instructions/information received from portable gaming device **802**.

[0298] In some embodiments, the intended recipient (e.g., gaming device/system **812**, remote device/system **806**, etc.) of the information transmitted from the portable gaming device may be dynamically and/or automatically selected based upon predetermined criteria such as, for example: proximity, authentication, user identity, device/system identity, user preferences, etc.

[0299] According to specific embodiments, portable gaming device **802** may be operable to detect its movements or motion activities via its motion detection components, and may be operable to modify its behavior in some way according to the motion detected. Further, in at least some embodiments, at least some portable gaming devices may be operable to model of their particular environments and subsequently modify their behaviors based on such environments.

[0300] As an example, if a portable gaming device changes its behavior when moved according to a particular gesture that may be considered sensing or detecting a particular motion and reacting based on the motion detected. However,

in at least some embodiments, the interpretation of the portable gaming device motion (and subsequent responses/reactions) may be dependent upon the particular environment in which the portable gaming device is located.

[0301] In at least one embodiment, the portable gaming device may be operable to detect environmental conditions associated with a location of the portable gaming device. Additionally, the portable gaming device may be operable to initiate environmental modeling behaviors based upon detected environmental events and/or conditions. In at least one embodiment, modeling an environment may involve sensing or detecting a pattern of motion (or lack thereof), matching it to a predefined set of environmental conditions, and/or modifying the behavior of the portable gaming device based on the modeled environment. The behavior implemented based on the environment modeled may also change based on a particular application in use or in focus. In some cases, the portable gaming device may change its sensitivity to particular motions based on the environment modeled.

[0302] As an example, a portable gaming device may recognize (e.g., through accelerometers and/or other motion detection components) that it is at rest on an approximately horizontal surface. Such recognition may result from a determination that the portable gaming device is not moving, or still, with a static 1 g of acceleration orthogonal to a surface. The portable gaming device may be able to differentiate resting on a table from resting in a user's hand, for example, because a user's hand typically will not be able to hold the portable gaming device perfectly still. The portable gaming device may, in response, behave in a certain manner according to the recognition that it is at rest on an approximately horizontal surface.

[0303] In at least one embodiment, if portable gaming device **802** recognized that it was lying at rest on a table, it may power off (or go into standby mode or power save mode) in response to determining that it has been lying in such position for a specified amount of time. As another example, a cellular phone in a vibrate mode may vibrate more gently if it recognizes it is on a table upon receipt of a call or upon any other event that may trigger vibration of the phone. In some embodiments, the portable gaming device may recognize its orientation while lying on a table such that it may behave in one manner when lying in a "face down" position (e.g., it may power off the display), while it may behave in a different manner when lying in a non-face down position. For example, if portable gaming device **802** includes cellular phone functionality, it may enter a speaker mode when it is on a call, and may recognize that it has been placed by a user in a "face up" position on a table while on the call. If, on the other hand, the cellular phone is engaged in an active call and is placed face down on the table, it may enter a mute mode.

[0304] As another example, portable gaming device **802** may recognize through a brief period of approximately 0 g that it is in free-fall, and in response may behave accordingly to reduce damage and/or to prevent loss of data, which, for example, may be caused as a result of the portable gaming device impacting with the ground or other surface. Such behavior may include, for example, powering down chips and/or hard drives, retracting lenses, applying covers, preserving data in non-volatile memory, transmitting selected data or information to one or more external or remote devices, etc.

[0305] In particular embodiments, other devices that do not otherwise detect motion for input may also be able to model their environment and to behave based on the environment modeled. As an additional example, acceleration patterns may be detected to recognize that a portable gaming device **802** is in a moving environment (e.g., being held by a user who is moving about the casino) and may adjust various sensitivities, threshold and/or other characteristics to enable better performance of the portable gaming device in that environment.

[0306] FIG. **9** shows an example embodiment of a state diagram **900** which may be used for implementing various aspects or features described herein. In at least one embodiment, a least a portion of the operations and/or activities associated with state diagram **900** may be performed or implemented by one or more systems or components of a portable gaming device. In some embodiments, a least a portion of the operations and/or activities associated with state diagram **900** may be performed or implemented by a data preservation system such as, for example, data preservation system **300** of FIG. **3**. Additionally, according to different embodiments, the various operations and/or activities associated with state diagram **900** may be implemented via hardware, software, and/or some combination thereof.

[0307] For purposes of illustration, a description of state diagram **900** will now be provided by way of example. In this particular example it is assumed that a least a portion of the operations and/or activities associated with state diagram **900** are performed or implemented by a portable gaming device which includes a data preservation system. For purposes of illustration, it is assumed in the example below that the operations and/or activities associated with state diagram **900** are performed or implemented by a portable gaming device. However, it will be appreciated that, in at least some embodiments, the operations and/or activities associated with state diagram **900** may be performed or implemented by a data preservation system.

[0308] As illustrated in the example of FIG. **9**, state diagram **900** may include a plurality of different states including, for example, an initialization state **902**, a monitor state **904**, an evaluation state **906**, an emergency state **912**, etc. In at least one embodiment, each of the different states **902**, **904**, **906**, **912**, may relate to (or be descriptive of) a different state of operation of the portable gaming device (and/or data preservation system).

[0309] In at least one embodiment, the portable gaming device may be configured or designed to allow for multiple different states of operation to be concurrently active. For example, during a given time interval, the portable gaming device may have associated therewith a currently active game state (e.g., relating to a current game state of a game being played at the portable gaming device), and a currently active event management state (e.g., which may correspond to one of the different states **902**, **904**, **906**, **912** illustrated in the example state diagram of FIG. **9**). Additionally, in at least one embodiment, each different active state at the portable gaming device may be independent from the other concurrently active states at the portable gaming device.

[0310] According to one embodiment, during initialization state **902**, the portable gaming device (and/or data preservation system) may perform any desired initialization procedures.

[0311] In one embodiment, the successful completion of the initialization procedures may trigger **901** advancement to monitor state **904**.

[0312] In at least one embodiment, while in the monitor state **904**, the portable gaming device (and/or selected systems, devices, components associated therewith) may be operable to perform one or more of the following (or combinations thereof):

[0313] Set or update a current sampling interval value relating to the time period or time interval for taking periodic sample measurements of movement activity relating to the portable gaming device. According to different embodiments, while in the monitor state **904**, the motion detection sampling interval value may be set to a value within the range of 25 milliseconds to 5 seconds. For example, in one embodiment, while in the monitor state **904**, the motion detection sampling interval value may be set to a value of 0.5 seconds, which may result in sample measurements of movement activity of the portable gaming device being taken every 0.5 seconds. In at least one embodiment, the sample measurements of movement activity may be used to generate portable gaming device movement data, which, for example, may include one or more of the following (or combinations thereof): acceleration data, velocity data, displacement data, orientation data, location data, time data, etc.

[0314] Monitor the portable gaming device movement data for detection of any potentially significant events and/or conditions.

[0315] Monitor the portable gaming device movement data for detection of any critical events and/or conditions.

[0316] Periodically record selected portions of the portable gaming device movement data.

[0317] Compare different samples of the portable gaming device movement data (e.g., which were taken at different time intervals) to identify or determine any changes or differences (e.g., deltas) between the data samples.

[0318] Capture acceleration data within the Monitor state in a rolling buffer (e.g., so that pre-event information may be recorded and linked to an appropriate event information profile if/when a critical or potentially significant event is detected. In one embodiment, this information may be used in determining the acceleration state of the portable gaming device before the event (e.g., before the occurrence of a free fall event). In at least one embodiment, a rolling buffer may be operable to allow new information to be continuously (or periodically) recorded concurrently while previously recorded information is continuously (or periodically) deleted from the buffer.

[0319] Etc.

[0320] In at least one embodiment, potentially significant events and/or conditions may include, for example, any detected events and/or conditions: which meet or exceed specified threshold criteria; which may result in damage to the portable gaming device; and/or which may result in loss of information associated with the portable gaming device. In at least one embodiment, the portable gaming device movement data may include real-time or substantially real-time movement data relating to the portable gaming device.

[0321] In at least one embodiment, the portable gaming device may continue to remain in the monitor state **904** while no potentially significant events and/or conditions are detected (**903**). For example, while the portable gaming device is at rest on a table or other surface, it is likely that, under normal circumstances, there will be no potentially significant events and/or conditions which are detected at the portable gaming device. Accordingly, in at least one embodiment, during such times the portable gaming device may remain in the monitor state **904**.

[0322] In at least one embodiment, while in the monitor state **904**, the detection of a potentially significant event or condition may trigger **905** a change to evaluation state **906**. Additionally, in at least one embodiment, while in the monitor state **904**, the detection of a critical event or condition may trigger **919** a change to emergency state **912**.

[0323] In at least one embodiment, potentially significant events or conditions may include, but are not limited to, one or more of the following events/conditions (or combinations thereof):

[0324] A detected change of an acceleration value (e.g., with respect to the x, y, and/or z-axis) meeting or exceeding a predetermined non-critical threshold value, but not meeting or exceeding a critical threshold value. For example, in one embodiment, if all (or selected) acceleration values of outputs X, Y, and Z are at a level of about 1.5 volts and/or not greater than about 0.75 volts (e.g., with a scale factor of 3 V/g) then a non-critical event/condition may be indicated, and one or more action(s) may be initiated in response. For example, in at least one embodiment, output levels meeting such criteria may indicate that the device may have fallen or was dropped a small distance. In one embodiment, data relating to the levels of acceleration may be saved and/or transmitted to a remote system and used for further analysis. In at least one embodiment, an audio and/or visual signal may be produced by the portable gaming device, for example, to provide warning the user of the detected event/condition. In one embodiment, this signal may be in the form of audio beeps, sirens and the like. Visual signals may be in the form of warning lights, blinking lights, blinking LEDs, screen blanking, screen blinking, screen dimming, and the like. In one embodiment, such signaling events may last for one or more predetermined time intervals.

[0325] A detected change of an acceleration value (e.g., with respect to an x, y, or z-axis) from a substantially 1 g value to a substantially 0 g value. For example, if all (or selected) acceleration values X, Y, and Z are at or less than a level of about 0.75 volts (e.g., with a scale factor of 3 V/g), then a potentially significant or critical event may be indicated and one or more action(s) may be initiated in response. For example, in at least one embodiment, output levels meeting such criteria may indicate that the device is falling (but may not yet have fallen a sufficient amount of time and/or distance to qualify as a critical event). In one embodiment, the duration of this event/condition (and/or duration of the time the device is in this mode or state of operation) may be used to determine the distance that the unit has fallen. When a predetermined amount of time has elapse (e.g., such as, for example, the amount of time it would take for the portable gaming device to fall a distance of about

10 inches), this may trigger re-classification of the event/condition as a critical event/condition.

[0326] Etc.

[0327] In at least one embodiment, a critical event or condition may include, but are not limited to, one or more of the following events/conditions (or combinations thereof):

[0328] A detected change of an acceleration value (e.g., with respect to the x, y, and/or z-axis) meeting or exceeding a predetermined critical threshold value (e.g., acceleration value exceeding 1 g detected on x, y, and/or z-axis).

[0329] Detection of a 0 g (or substantially 0 g) acceleration condition (e.g., with respect to the x, y, and/or z-axis) having a duration which exceeds a minimum threshold time interval (e.g., continuous 0 g acceleration condition duration exceeding about 0.2 seconds)

[0330] Etc.

[0331] In at least one embodiment, while in the evaluation state **906**, the portable gaming device (and/or selected systems, devices, components associated therewith) may be operable to perform one or more of the following (or combinations thereof):

[0332] Set or update a current sampling interval value relating to the time period or time interval for taking sample measurements of movement activity relating to the portable gaming device. According to different embodiments, while in the evaluation state **906**, the motion detection sampling interval value may be increased (relative to the monitor state), for example, in order to obtain additional data points for more accurate analysis of the current events/conditions at the portable gaming device. For example, while in the evaluation state **906**, the motion detection sampling interval value may be set to a value within the range of 20-35 milliseconds such as, for example, about 25 msec.

[0333] Monitor the portable gaming device movement data for detection of any potentially significant events and/or conditions.

[0334] Monitor the portable gaming device movement data for detection of any critical events and/or conditions.

[0335] Periodically store selected portions of the portable gaming device movement data in non-volatile memory.

[0336] Acquire and/or store selected information relating to portable gaming device in non-volatile memory. According to specific embodiments, the selected information may include, but are not limited to, one or more of the following (or combinations thereof): historical game data, critical information, game state data, wager related data, portable gaming device state information, portable gaming device movement data, and/or other data or information which may be desired and/or used for reconstructing prior conditions, events, and/or states at the portable gaming device.

[0337] Transmit selected information to one or more remote or external devices. According to specific embodiments, the selected information may include, but are not limited to, one or more of the following (or combinations thereof): historical game data, critical information, game state data, wager related data, portable gaming device state information, portable gaming device movement data, and/or other data or information which may be desired and/or used for reconstructing prior conditions, events, and/or states at the portable gaming device.

[0338] Compare different samples of the portable gaming device movement data (e.g., which were taken at different time intervals) to identify or determine any changes or differences (e.g., deltas) between the data samples.

[0339] Compare samples of the portable gaming device movement data to one or more predefined event data profiles.

[0340] Automatically power-up the portable gaming device (e.g., if portable gaming device is in power-off, hibernate and/or standby mode).

[0341] Automatically power-up selected components/devices of the portable gaming device.

[0342] Etc.

[0343] In at least one embodiment, the portable gaming device may continue to remain in the evaluation state **906** while one or more potentially significant events and/or conditions are detected (**909**). For example, while the portable gaming device is being held or carried by a user, it is likely that will be detected one or more potentially significant events and/or conditions. Accordingly, in at least one embodiment, during such times the portable gaming device may remain in the evaluation state **906**.

[0344] In at least one embodiment, while in the evaluation state **906**, the detection of a critical event or condition may trigger **911** a change to emergency state **912**. Additionally, in at least one embodiment, while in the evaluation state **906**, non-detection of any potentially significant events and/or conditions may trigger **907** a change to monitor state **904**.

[0345] In at least one embodiment, while in the emergency state **912**, the portable gaming device (and/or selected systems, devices, components associated therewith) may be operable to perform one or more of the following (or combinations thereof):

[0346] Set or update a current sampling interval value relating to the time period or time interval for taking sample measurements of movement activity relating to the portable gaming device. According to different embodiments, while in the emergency state **912**, the motion detection sampling interval value may be increased (relative to the monitor state), for example, in order to obtain additional data points for more accurate analysis of the current events/conditions at the portable gaming device. For example, while in the emergency state **912**, the motion detection sampling interval value may be set to a value within the range of 20-35 milliseconds, such as, for example, about 20 msec.

[0347] Monitor the portable gaming device movement data for detection of any potentially significant events and/or conditions.

[0348] Monitor the portable gaming device movement data for detection of any critical events and/or conditions.

[0349] Periodically store selected portions of the portable gaming device movement data in non-volatile memory.

[0350] Acquire and/or store selected information relating to portable gaming device in non-volatile memory. According to specific embodiments, the selected information may include, but are not limited to, one or more of the following (or combinations thereof): historical

game data, critical information, game state data, wager related data, portable gaming device state information, and/or other data or information which may be desired and/or used for reconstructing prior conditions, events, and/or states at the portable gaming device.

[0351] Transmit (e.g., periodically, at specified times, in real-time, etc.) selected information to one or more remote or external devices. According to specific embodiments, the selected information may include, but are not limited to, one or more of the following (or combinations thereof): historical game data, critical information, game state data, wager related data, portable gaming device state information, portable gaming device movement data, and/or other data or information which may be desired and/or used for reconstructing prior conditions, events, and/or states at the portable gaming device.

[0352] Compare different samples of the portable gaming device movement data (e.g., which were taken at different time intervals) to identify or determine any changes or differences (e.g., deltas) between the data samples.

[0353] Compare samples of the portable gaming device movement data to one or more predefined event data profiles.

[0354] Take appropriate action to prevent damage to one or more components or systems of the portable gaming device (such as, for example, suspending or shutting down one or more systems or components, parking hard drive heads, etc.).

[0355] Provide instructions for shutting down one or more components of the portable gaming device.

[0356] Provide notification of the unit's freefall condition to an external system.

[0357] Record various data relating to the event/condition such as, for example: the maximum distance the unit has fallen, the unit's maximum velocity at impact, details relating to the impact event, conditions or events which occurred at the portable gaming device before the impact event (which, for example, may be used to determine or reconstruct how the unit impacted the floor).

[0358] Disabling the portable gaming device from play.

[0359] Automatically power-up the portable gaming device (e.g., if portable gaming device is in power-off, hibernate and/or standby mode).

[0360] Automatically power-up selected components/devices of the portable gaming device.

[0361] Etc.

[0362] In at least one embodiment, the portable gaming device may continue to remain in the emergency state **912** while one or more critical events and/or conditions are detected (**915**). For example, while the portable gaming device continues to remain in a freefall condition (which has exceeded 0.20 seconds), a critical event/condition will be detected. Accordingly, in at least one embodiment, during such times the portable gaming device may remain in the emergency state **912**.

[0363] Additionally, in at least one embodiment, while in emergency state **912**, the portable gaming device may continue to remain in the emergency state **912** until all appropriate emergency procedures/operations have been completed (**917**).

[0364] In at least one embodiment, while in the emergency state **912**, if it has been detected that all appropriate emergency procedures have been completed, and at least one potentially significant event and/or condition is detected, a state change to the evaluation state **906** may be triggered **913**. Additionally, in at least one embodiment, while in the emergency state **912**, if it has been detected that all appropriate emergency procedures have been completed, and no potentially significant events and/or conditions are detected, a state change to the monitor state **904** may be triggered **921**.

[0365] In at least one alternate embodiment (not shown), the portable gaming device (and/or data preservation system) may be configured or designed to omit one or more states of operations, such as, for example, the evaluation state (**906**) of operation.

[0366] In some embodiments, one or more portable gaming devices may include functionality for implementing at least a portion of the features associated with other mobile devices such as those described, for example, in one or more of the following references, each of which being incorporated herein by reference in its entirety for all purposes: U.S. patent application Ser. No. 11/472,585 (Attorney Docket No. IGT1P231) entitled "MOBILE DEVICE FOR PROVIDING FILTERED CASINO INFORMATION BASED ON REAL TIME DATA"; and U.S. patent application Ser. No. 10/062,002 (Attorney Docket No. IGT1P341/P-481) for "GAMING SYSTEM AND GAMING METHOD."

[0367] According to a specific embodiment, one or more portable gaming device may be adapted to implement at least a portion of the features associated with the mobile game service system described in U.S. patent application Ser. No. 10/115,164, which is now U.S. Pat. No. 6,800,029, issued Oct. 4, 2004, which is hereby incorporated by reference in its entirety for all purposes. For example, in one embodiment, the portable gaming device **20** (FIG. **1**A) may be comprised of a hand-held game service user interface device (GSUID) and a number of input and output devices. The GSUID may include a display screen which may display a number of game service interfaces. These game service interfaces may be generated on the display screen by a microprocessor of some type within the GSUID. Examples of a hand-held GSUID which may accommodate the game service interfaces are manufactured by Symbol Technologies, Incorporated of Holtsville, N.Y.

[0368] FIG. **10** shows a block diagram illustrating components of a gaming system **1000** which may be used for implementing various aspects of example embodiments. In FIG. **10**, the components of a gaming system **1000** for providing game software licensing and downloads are described functionally. The described functions may be instantiated in hardware, firmware and/or software and executed on a suitable device. In the system **1000**, there may be many instances of the same function, such as multiple game play interfaces **1011**. Nevertheless, in FIG. **10**, only one instance of each function is shown. The functions of the components may be combined. For example, a single device may comprise the game play interface **1011** and include trusted memory devices or sources **1009**.

[0369] The gaming system **1000** may receive inputs from different groups/entities and output various services and or information to these groups/entities. For example, game players **1025** primarily input cash or indicia of credit into the system, make game selections that trigger software downloads, and receive entertainment in exchange for their inputs. Game software content providers **1015** provide game software for the system and may receive compensation for the

content they provide based on licensing agreements with the gaming machine operators. Gaming machine operators select game software for distribution, distribute the game software on the gaming devices in the system **1000**, receive revenue for the use of their software and compensate the gaming machine operators. The gaming regulators **1030** may provide rules and regulations that must be applied to the gaming system and may receive reports and other information confirming that rules are being obeyed.

[0370] In the following paragraphs, details of each component and some of the interactions between the components are described with respect to FIG. **10**. The game software license host **1001** may be a server connected to a number of remote gaming devices that provides licensing services to the remote gaming devices. For example, in other embodiments, the license host **1001** may 1) receive token requests for tokens used to activate software executed on the remote gaming devices, 2) send tokens to the remote gaming devices, 3) track token usage and 4) grant and/or renew software licenses for software executed on the remote gaming devices. The token usage may be used in utility based licensing schemes, such as a pay-per-use scheme.

[0371] In another embodiment, a game usage-tracking host **1014** may track the usage of game software on a plurality of devices in communication with the host. The game usage-tracking host **1014** may be in communication with a plurality of game play hosts and gaming machines. From the game play hosts and gaming machines, the game usage tracking host **1014** may receive updates of an amount that each game available for play on the devices has been played and on amount that has been wagered per game. This information may be stored in a database and used for billing according to methods described in a utility based licensing agreement.

[0372] The game software host **1002** may provide game software downloads, such as downloads of game software or game firmware, to various devious in the game system **1000**. For example, when the software to generate the game is not available on the game play interface **1011**, the game software host **1002** may download software to generate a selected game of chance played on the game play interface. Further, the game software host **1002** may download new game content to a plurality of gaming machines via a request from a gaming machine operator.

[0373] In one embodiment, the game software host **1002** may also be a game software configuration-tracking host **1013**. The function of the game software configuration-tracking host is to keep records of software configurations and/or hardware configurations for a plurality of devices in communication with the host (e.g., denominations, number of paylines, paytables, max/min bets). Details of a game software host and a game software configuration host that may be used with example embodiments are described in co-pending U.S. Pat. No. 6,645,077, by Rowe, entitled, "Gaming Terminal Data Repository and Information System," filed Dec. 21, 2000, which is incorporated herein in its entirety and for all purposes.

[0374] A game play host device **1003** may be a host server connected to a plurality of remote clients that generates games of chance that are displayed on a plurality of remote game play interfaces **1011**. For example, the game play host device **1003** may be a server that provides central determination for a bingo game play played on a plurality of connected game play interfaces **1011**. As another example, the game play host device **1003** may generate games of chance, such as slot games or video card games, for display on a remote client. A game player using the remote client may be able to select from a number of games that are provided on the client by the host device **1003**. The game play host device **1003** may receive game software management services, such as receiving downloads of new game software, from the game software host **1002** and may receive game software licensing services, such as the granting or renewing of software licenses for software executed on the device **1003**, from the game license host **1001**.

[0375] In particular embodiments, the game play interfaces or other gaming devices in the gaming system **1000** may be portable devices, such as electronic tokens, cell phones, smart cards, tablet PC's and PDA's. The portable devices may support wireless communications and thus, may be referred to as wireless mobile devices. The network hardware architecture **1016** may be enabled to support communications between wireless mobile devices and other gaming devices in gaming system. In one embodiment, the wireless mobile devices may be used to play games of chance.

[0376] The gaming system **1000** may use a number of trusted information sources. Trusted information sources **1004** may be devices, such as servers, that provide information used to authenticate/activate other pieces of information. CRC values used to authenticate software, license tokens used to allow the use of software or product activation codes used to activate to software are examples of trusted information that might be provided from a trusted information source **1004**. Trusted information sources may be a memory device, such as an EPROM, that includes trusted information used to authenticate other information. For example, a game play interface **1011** may store a private encryption key in a trusted memory device that is used in a private key-public key encryption scheme to authenticate information from another gaming device.

[0377] When a trusted information source **1004** is in communication with a remote device via a network, the remote device will employ a verification scheme to verify the identity of the trusted information source. For example, the trusted information source and the remote device may exchange information using public and private encryption keys to verify each other's identities. In another example of an embodiment, the remote device and the trusted information source may engage in methods using zero knowledge proofs to authenticate each of their respective identities. Details of zero knowledge proofs that may be used with example embodiments are described in US publication no. 2003/0203756, by Jackson, filed on Apr. 25, 2002 and entitled, "Authentication in a Secure Computerized Gaming System, which is incorporated herein in its entirety and for all purposes.

[0378] Gaming devices storing trusted information might utilize apparatus or methods to detect and prevent tampering. For instance, trusted information stored in a trusted memory device may be encrypted to prevent its misuse. In addition, the trusted memory device may be secured behind a locked door. Further, one or more sensors may be coupled to the memory device to detect tampering with the memory device and provide some record of the tampering. In yet another example, the memory device storing trusted information might be designed to detect tampering attempts and clear or erase itself when an attempt at tampering has been detected.

[0379] The gaming system **1000** of example embodiments may include devices **1006** that provide authorization to download software from a first device to a second device and

devices **1007** that provide activation codes or information that allow downloaded software to be activated. The devices, **1006** and **1007**, may be remote servers and may also be trusted information sources. One example of a method of providing product activation codes that may be used with example embodiments is describes in previously incorporated U.S. Pat. No. 6,264,561.

[0380] A device **1006** that monitors a plurality of gaming devices to determine adherence of the devices to gaming jurisdictional rules **1008** may be included in the system **1000**. In one embodiment, a gaming jurisdictional rule server may scan software and the configurations of the software on a number of gaming devices in communication with the gaming rule server to determine whether the software on the gaming devices is valid for use in the gaming jurisdiction where the gaming device is located. For example, the gaming rule server may request a digital signature, such as CRC's, of particular software components and compare them with an approved digital signature value stored on the gaming jurisdictional rule server.

[0381] Further, the gaming jurisdictional rule server may scan the remote gaming device to determine whether the software is configured in a manner that is acceptable to the gaming jurisdiction where the gaming device is located. For example, a maximum bet limit may vary from jurisdiction to jurisdiction and the rule enforcement server may scan a gaming device to determine its current software configuration and its location and then compare the configuration on the gaming device with approved parameters for its location.

[0382] A gaming jurisdiction may include rules that describe how game software may be downloaded and licensed. The gaming jurisdictional rule server may scan download transaction records and licensing records on a gaming device to determine whether the download and licensing was carried out in a manner that is acceptable to the gaming jurisdiction in which the gaming device is located. In general, the game jurisdictional rule server may be utilized to confirm compliance to any gaming rules passed by a gaming jurisdiction when the information needed to determine rule compliance is remotely accessible to the server.

[0383] Game software, firmware or hardware residing a particular gaming device may also be used to check for compliance with local gaming jurisdictional rules. In one embodiment, when a gaming device is installed in a particular gaming jurisdiction, a software program including jurisdiction rule information may be downloaded to a secure memory location on a gaming machine or the jurisdiction rule information may be downloaded as data and utilized by a program on the gaming machine. The software program and/or jurisdiction rule information may used to check the gaming device software and software configurations for compliance with local gaming jurisdictional rules. In another embodiment, the software program for ensuring compliance and jurisdictional information may be installed in the gaming machine prior to its shipping, such as at the factory where the gaming machine is manufactured.

[0384] The gaming devices in game system **1000** may utilize trusted software and/or trusted firmware. Trusted firmware/software is trusted in the sense that is used with the assumption that it has not been tampered with. For instance, trusted software/firmware may be used to authenticate other game software or processes executing on a gaming device. As an example, trusted encryption programs and authentication programs may be stored on an EPROM on the gaming machine or encoded into a specialized encryption chip. As another example, trusted game software, i.e., game software approved for use on gaming devices by a local gaming jurisdiction may be required on gaming devices on the gaming machine.

[0385] In example embodiments, the devices may be connected by a network **1016** with different types of hardware using different hardware architectures. Game software can be quite large and frequent downloads can place a significant burden on a network, which may slow information transfer speeds on the network. For game-on-demand services that require frequent downloads of game software in a network, efficient downloading is essential for the service to viable. Thus, in example embodiments, network efficient devices **1010** may be used to actively monitor and maintain network efficiency. For instance, software locators may be used to locate nearby locations of game software for peer-to-peer transfers of game software. In another example, network traffic may be monitored and downloads may be actively rerouted to maintain network efficiency.

[0386] One or more devices in example embodiments may provide game software and game licensing related auditing, billing and reconciliation reports to server **1012**. For example, a software licensing billing server may generate a bill for a gaming device operator based upon a usage of games over a time period on the gaming devices owned by the operator. In another example, a software auditing server may provide reports on game software downloads to various gaming devices in the gaming system **1000** and current configurations of the game software on these gaming devices.

[0387] At particular time intervals, the software auditing server **1012** may also request software configurations from a number of gaming devices in the gaming system. The server may then reconcile the software configuration on each gaming device. In one embodiment, the software auditing server **1012** may store a record of software configurations on each gaming device at particular times and a record of software download transactions that have occurred on the device. By applying each of the recorded game software download transactions since a selected time to the software configuration recorded at the selected time, a software configuration is obtained. The software auditing server may compare the software configuration derived from applying these transactions on a gaming device with a current software configuration obtained from the gaming device. After the comparison, the software-auditing server may generate a reconciliation report that confirms that the download transaction records are consistent with the current software configuration on the device. The report may also identify any inconsistencies. In another embodiment, both the gaming device and the software auditing server may store a record of the download transactions that have occurred on the gaming device and the software auditing server may reconcile these records.

[0388] There are many possible interactions between the components described with respect to FIG. **10**. Many of the interactions are coupled. For example, methods used for game licensing may affect methods used for game downloading and vice versa. For the purposes of explanation, details of a few possible interactions between the components of the system **1000** relating to software licensing and software downloads have been described. The descriptions are selected to illustrate particular interactions in the game system **1000**. These descriptions are provided for the purposes of explana-

tion only and are not intended to limit the scope of example embodiments described herein.

[0389] FIGS. **11**A-E and **12**A-E illustrate example embodiments of different types of data patterns (and/or associated data values) which include portable gaming device movement data relating to different example events and/or conditions which may occur at a portable gaming device.

[0390] More specifically, FIGS. **11**A-E illustrate an example embodiment of different types of data patterns (e.g., FIGS. **11**A-D) and associated data values (e.g., FIG. **11**E) which include actual portable gaming device movement data relating to a first experimental "drop test" event in which a portable gaming device was dropped straight down onto the floor. This test was intended to simulate the dropping of a portable gaming device as it is being carried by the user.

[0391] In this particular example, the motion detection components of the portable gaming device being tested included a 4th order low pass filter with a cutoff frequency of about 5 Hz, which was configured to filter out unwanted high frequency acceleration data. Additionally, for purposes of conducting this first experimental "drop test" the portable gaming device was held at a height of about 20 inches above the floor. The floor was covered with bubble wrap to minimize damage to the portable gaming device.

[0392] FIG. **11**A shows a composite graphical data pattern **1100** graphically representing actual X-axis (**1122**), Y-axis (**1102**), and Z-axis (**1132**) accelerometer data relating to the first experimental "drop test" event of the portable gaming device. More specifically, the data which is graphically illustrated in the graph of FIG. **11**A represents actual X-axis (**1122**), Y-axis (**1102**), and Z-axis (**1132**) accelerometer data (e.g., generated from the portable gaming device) plotted as a function of time, wherein the units of the vertical axis corresponds to MEMS data values (e.g., **1104**), and wherein the units **1106** of the horizontal axis correspond to sample-based time units (e.g., representing sequential periodic samples which were taken over a given time interval). As shown in the example of FIG. **11**A, the MEMS data values may be correlated to corresponding values of gravitational acceleration units (g) **1108**.

[0393] In at least one embodiment, the graphical data presented in FIG. **11**A may utilize different colors and/or patterns for presenting the composite data in a manner which allows a reader to more easily distinguish between the different data sets/data patterns being displayed.

[0394] FIG. **11**B shows a graph **1110** which include a graphical data pattern **1102** graphically representing the Y-axis portion of accelerometer data relating to the first experimental "drop test" event of the portable gaming device.

[0395] FIG. **11**C shows a graph **1120** which include a graphical data pattern **1122** graphically representing the Z-axis portion of accelerometer data relating to the first experimental "drop test" event of the portable gaming device.

[0396] FIG. **11**D shows a graph **1130** which include a graphical data pattern **1132** graphically representing the X-axis portion of accelerometer data relating to the first experimental "drop test" event of the portable gaming device.

[0397] As illustrated in FIG. **11**B, the Y-axis portion of accelerometer data accelerometer data is plotted as a function of acceleration vs. time, wherein the units of the vertical axis corresponds to MEMS data values **1104** or gravitational acceleration unit values **1108**, and wherein the units **1106** of the horizontal axis correspond to sample-based time units (e.g., representing sequential periodic samples which were taken over a given time interval).

[0398] As shown in the example of FIG. **11**B, reference point **1101** represents an initial condition of the portable gaming device before being dropped. Thus, for example, as shown at **1101** (approximately corresponding to time sample **120**), the Y-axis accelerometer indicates about a 1 g downward force. Similarly, as illustrated in FIG. **11**A, at approximately time sample **120**, the X-axis and Z-axis accelerometers both indicate about 0 g force.

[0399] Returning to FIG. **11**B, at reference point **1103**, the portable gaming device is dropped, and begins to fall. In this particular embodiment, the data preservation system has been configured or designed to monitor the freefall condition of the portable gaming device, and to initiate or activate a "shut down" signal after it has been detected that the unit has fallen more than 10 inches. In this particular example, reference point **1105** indicates the approximate location where/when the "shut down" signal was activated.

[0400] FIG. **11**E shows an example embodiment of a data table **1180** which includes numeric data values representing actual X-axis, Y-axis, and Z-axis accelerometer data relating to the first experimental "drop test" event of the portable gaming device.

[0401] In the example of FIG. **11**E, data table **1180**, column **1181** shows the sample-based time values which correspond to the sample-based time units (e.g., **1106**) of the horizontal axis of each of the graphs illustrated in FIGS. **11**A-D. Column **1182** shows MEMS data values which correspond to X-axis accelerometer data generated during the first experimental "drop test." Column **1184** shows MEMS data values which correspond to Y-axis accelerometer data generated during the first experimental "drop test." Column **1186** shows MEMS data values which correspond to Z-axis accelerometer data generated during the first experimental "drop test."

[0402] Additionally, as shown in the example of FIG. **11**E, columns **1188**, **1190**, **1192**, and **1194** relate to a subset of the portable gaming device movement data generated during the first experimental "drop test." In one embodiment, this subset of portable gaming device movement data may be used to characterize the relative boundaries (e.g., start, middle, end) of an "event" such as, for example, a "freefall" event.

[0403] Thus, for example, as shown in the example of FIG. **11**E, column **1188** includes relative sample-based time values relating to the "freefall" event. For example, it is assumed in the example of FIG. **11**E that the "freefall" event begins at event sample number **0** (corresponding to absolute sample number **127**). Thus, in this particular example, it is assumed that the portable gaming device begins it's freefall at event sample number **0** (corresponding to absolute sample number **127**). Column **1190** shows the relative elapsed time values (in seconds) relating to the falling portable gaming device during the "freefall" event. Column **1192** shows the relative displacement or distance values (in inches) relating to the falling portable gaming device during the "freefall" event.

[0404] Column **1194** indicates the relative state of the "shut down" signal (e.g., 0=inactive, 1=active) relating to the falling portable gaming device during the "freefall" event. As shown in the example of FIG. **11**E, the state of the "shut down" signal remains inactive during a first interval of the "freefall" event. At reference location **1191** (corresponding to a relative freefall duration time of 0.231 seconds, and a relative freefall displacement of 10.245 inches), the "shut down"

signal becomes active, and remains active during the remainder portion of the "freefall" event.

[0405] In at least one embodiment, it may be assumed that at least one critical event/condition has been detected at the portable gaming device at event sample number **11**, corresponding to reference location **1191**. Accordingly, in one embodiment, the portable gaming device (and/or data preservation system) may enter an emergency state of operation at event sample number **11**, which, in turn, may cause the portable gaming device (and/or data preservation system) to automatically perform one or more appropriate actions in response. As discussed previously, one such action may include sending one or more "shut down" signals to one or more components/devices of the portable gaming device. In another embodiment, the activation of the "shut down" signal at event sample number **11** may trigger or cause the portable gaming device (and/or data preservation system) to enter the emergency state of operation.

[0406] FIGS. **12**A-E illustrate an example embodiment of different types of data patterns (e.g., FIGS. **12**A-D) and associated data values (e.g., FIG. **12**E) which include actual portable gaming device movement data relating to a second experimental "table fall" event in which a portable gaming device was made to slide off a table **29** inches to the floor.

[0407] In this particular example, the motion detection components of the portable gaming device being tested included a 4th order low pass filter with a cutoff frequency of about 5 Hz, which was configured to filter out unwanted high frequency acceleration data. Additionally, the floor was covered with bubble wrap to minimize damage to the portable gaming device.

[0408] FIG. **12**A shows a composite graphical data pattern **1200** graphically representing actual X-axis (**1222**), Z-axis (**1202**), and Y-axis (**1232**) accelerometer data relating to the second experimental "table fall" event of the portable gaming device. More specifically, the data which is graphically illustrated in the graph of FIG. **12**A represents actual X-axis (**1222**), Z-axis (**1202**), and Y-axis (**1232**) accelerometer data (e.g., generated from the portable gaming device) plotted as a function of time, wherein the units of the vertical axis corresponds to MEMS data values (e.g., **1204**), and wherein the units **1206** of the horizontal axis correspond to sample-based time units (e.g., representing sequential periodic samples which were taken over a given time interval). As shown in the example of FIG. **12**A, the MEMS data values may be correlated to corresponding values of gravitational acceleration units (g) **1208**.

[0409] In at least one embodiment, the graphical data presented in FIG. **12**A may utilize different colors and/or patterns for presenting the composite data in a manner which allows a reader to more easily distinguish between the different data sets/data patterns being displayed.

[0410] FIG. **12**B shows a graph **1230** which include a graphical data pattern **1232** graphically representing the Y-axis portion of accelerometer data relating to the second experimental "table fall" event of the portable gaming device.

[0411] FIG. **12**C shows a graph **1220** which include a graphical data pattern **1222** graphically representing the X-axis portion of accelerometer data relating to the second experimental "table fall" event of the portable gaming device.

[0412] FIG. **12**D shows a graph **1210** which include a graphical data pattern **1202** graphically representing the Z-axis portion of accelerometer data relating to the second experimental "table fall" event of the portable gaming device.

[0413] As illustrated in FIG. **12**D, the Z-axis portion of accelerometer data accelerometer data is plotted as a function of acceleration vs. time, wherein the units of the vertical axis corresponds to MEMS data values **1204** or gravitational acceleration unit values **1208**, and wherein the units **1206** of the horizontal axis correspond to sample-based time units (e.g., representing sequential periodic samples which were taken over a given time interval).

[0414] As shown in the example of FIG. **12**D, reference point **1201** represents an initial condition of the portable gaming device before being dropped. Thus, for example, as shown at **1201***a* (approximately corresponding to time sample **200**), the Z-axis accelerometer indicates about a 1 g downward force. Similarly, as illustrated in FIG. **12**A, at approximately time sample **200**, the X-axis and Y-axis accelerometers both indicate about 0 g force.

[0415] Returning to FIG. **12**D, at reference point **1201***b*, the Z-axis accelerometer still indicates about a 1 g downward force. Accordingly, in one embodiment, the relative changes in the Z-axis accelerometer values between data points **1201***a* and **120***b* may not be sufficient to meet or exceed predetermined threshold criteria relating to the detection of a potentially significant event or condition.

[0416] For example, in one embodiment, the predetermined threshold criteria may specify that change in acceleration (e.g., for a given axis) must exceed ±0.2 g relative to its current value in order to qualify as a potentially significant event or condition. In another embodiment, the predetermined threshold criteria may specify that the absolute acceleration (e.g., for a given axis) exceed ±0.6 g in order to qualify as a potentially significant event or condition. In at least one embodiment, the threshold criteria may be adjusted, for example, by a controlling computer or processor (such as, for example, the portable gaming machine processor).

[0417] Returning to FIG. **12**D, at about reference point **1203**, it is assumed that the portable gaming device begins its fall from the table. In this particular embodiment, the data preservation system has been configured or designed to monitor the freefall condition of the portable gaming device, and to initiate or activate a "shut down" signal after it has been detected that the unit has fallen more than 10 inches. In this particular example, reference point **1207** indicates the approximate location where/when the "shut down" signal was activated.

[0418] FIG. **12**E shows an example embodiment of a data table **1280** which includes numeric data values representing actual X-axis, Z-axis, and Y-axis accelerometer data relating to the second experimental "table fall" event of the portable gaming device.

[0419] In the example of FIG. **12**E, data table **1280**, column **1281** shows the sample-based time values which correspond to the sample-based time units (e.g., **1206**) of the horizontal axis of each of the graphs illustrated in FIGS. **12**A-D. Column **1282** shows MEMS data values which correspond to X-axis accelerometer data generated during the second experimental "table fall." Column **1284** shows MEMS data values which correspond to Y-axis accelerometer data generated during the second experimental "table fall." Column **1286** shows MEMS data values which correspond to Z-axis accelerometer data generated during the second experimental "table fall."

[0420] Additionally, as shown in the example of FIG. **12**E, columns **1288**, **1290**, **1292**, and **1294** relate to a subset of the portable gaming device movement data generated during the

second experimental "table fall." In one embodiment, this subset of portable gaming device movement data may be used to characterize the relative boundaries (e.g., start, middle, end) of an "event" such as, for example, a "freefall" event.

[0421] Thus, for example, as shown in the example of FIG. **12**E, column **1288** includes relative sample-based time values relating to the "freefall" event. For example, it is assumed in the example of FIG. **12**E that the "freefall" event begins at event sample number **0** (corresponding to absolute sample number **296**). Thus, in this particular example, it is assumed that the portable gaming device begins it's freefall at event sample number **0** (corresponding to absolute sample number **296**). This is generally indicated at reference location **1205** of FIG. **12**D.

[0422] Returning to FIG. **12**E, Column **1290** shows the relative elapsed time values (in seconds) relating to the falling portable gaming device during the "freefall" event. Column **1292** shows the relative displacement or distance values (in inches) relating to the falling portable gaming device during the "freefall" event.

[0423] Column **1294** indicates the relative state of the "shut down" signal (e.g., 0=inactive, 1=active) relating to the falling portable gaming device during the "freefall" event. As shown in the example of FIG. **12**E, the state of the "shut down" signal remains inactive during a second interval of the "freefall" event. At reference location **1291** (corresponding to a relative freefall duration time of 0.231 seconds, and a relative freefall displacement of 10.245 inches), the "shut down" signal becomes active, and remains active during the remainder portion of the "freefall" event.

[0424] In at least one embodiment, it may be assumed that at least one critical event/condition has been detected at the portable gaming device at event sample number **11**, corresponding to reference location **1291**. Accordingly, in one embodiment, the portable gaming device (and/or data preservation system) may enter an emergency state of operation at event sample number **11**, which, in turn, may cause the portable gaming device (and/or data preservation system) to automatically perform one or more appropriate actions in response. As discussed previously, one such action may include sending one or more "shut down" signals to one or more components/devices of the portable gaming device. In another embodiment, the activation of the "shut down" signal at event sample number **11** may trigger or cause the portable gaming device (and/or data preservation system) to enter the emergency state of operation.

[0425] Additional details relating to various aspects of gaming technology are described in one or more of the following references:

[0426] U.S. patent application Ser. No. 11/515,184, (Attorney Docket No. IGT1P266A/P-1085A), by Nguyen et al., entitled "INTELLIGENT CASINO GAMING TABLE AND SYSTEMS THEREOF", filed on Sep. 1, 2006, the entirety of which is incorporated herein by reference for all purposes;

[0427] U.S. patent application Ser. No. 11/155,702, (Attorney Docket No. IGT1P114X3/P-305CIP3), by Nguyen et al., entitled "VIRTUAL LEASH FOR PERSONAL GAMING DEVICE", filed on Jun. 16, 2005, the entirety of which is incorporated herein by reference for all purposes.

[0428] Techniques and mechanisms of the present invention will sometimes be described in singular form for clarity. However, it should be noted that particular embodiments include multiple iterations of a technique or multiple instantiations of a mechanism unless noted otherwise.

[0429] Although several preferred embodiments of this invention have been described in detail herein with reference to the accompanying drawings, it is to be understood that the invention is not limited to these precise embodiments, and that various changes and modifications may be effected therein by one skilled in the art without departing from the scope of spirit of the invention as defined in the appended claims.

It is claimed:

1. A portable gaming device for use in a casino gaming network, comprising:

a gaming controller;

memory;

a first display;

at least one interface for communicating with at least one other device in the gaming network; and

a data preservation system;

the portable gaming device being operable to:

control a wager-based game played at the portable gaming device;

monitor movement activity relating to the portable gaming device;

generate movement information relating to movements of the portable gaming device, wherein the movement information includes data selected from a group consisting of: data relating to rotation of the portable gaming device, data relating to displacement of the portable gaming device, data relating to velocity of the portable gaming device, data relating to acceleration of the portable gaming device, and data relating to an orientation of the portable gaming device;

analyze the movement information with respect to a first set of threshold criteria in order to detect an occurrence of a first critical condition or event at the portable gaming device;

initiate at least one first action in response to detection of the first critical condition or event, wherein the at least one first action includes automatically initiating at least one first operation to save selected gaming information in non-volatile memory, wherein the selected gaming information includes information relating to game play conducted at the portable gaming device.

2. The portable gaming device of claim **1** wherein the non-volatile memory corresponds to local memory of the portable gaming device.

3. The portable gaming device of claim **1** wherein the non-volatile memory corresponds to remote memory located at a remote device different from the portable gaming device.

4. The portable gaming device of claim **1** wherein the at least one first action includes:

automatically initiating at least one second operation to identify and save selected information in non-volatile memory, wherein the selected information includes information selected from a group consisting of: portable gaming device movement information associated with the first critical event or condition, historical game data relating to game play conducted at the portable gaming device, game state data relating to game play conducted at the portable gaming device, and wager data relating to game play conducted at the portable gaming device.

5. The portable gaming device of claim **1** being further operable to:

identify selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory in response to detection of the first critical condition or event; and

automatically initiate, in response to detection of the first critical condition or event, at least one second action to cause the identified information to be saved in non-volatile memory.

6. The portable gaming device of claim **1** being further operable to:

identify, in response to detection of the first critical condition or event, selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

automatically initiate, in response to detection of the first critical condition or event, at least one second action to cause the identified information to be saved in non-volatile memory;

wherein the selected information includes information selected from a group consisting of: portable gaming device movement information associated with the first critical event or condition, historical game data relating to game play conducted at the portable gaming device, game state data relating to game play conducted at the portable gaming device, and wager data relating to game play conducted at the portable gaming device.

7. The portable gaming device of claim **1** being further operable to:

identify, in response to detection of the first critical condition or event, selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

automatically initiate, in response to detection of the first critical condition or event, at least one second action to cause the identified information to be transmitted to an external or remote device.

8. The portable gaming device of claim **1** wherein the at least one first action includes:

identifying selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

initiating at least one second operation to cause the identified information to be transmitted to an external or remote device.

9. The portable gaming device of claim **1** wherein the at least one action further includes automatically initiating at least one second operation selected from a group consisting of:

updating a sampling interval value relating to a time interval for taking sample measurements of movement activity relating to the portable gaming device;

transmitting selected information to a first external or remote device;

providing instructions for shutting down one or more components of the portable gaming device;

automatically powering-up one or more selected components of the portable gaming device;

recording movement information relating to a maximum velocity of the portable gaming device during a first time interval;

recording movement information relating to a maximum displacement of the portable gaming device during a second time interval; and

recording movement information relating to a maximum acceleration of the portable gaming device during a third time interval.

10. The portable gaming device of claim **1** being further operable to perform at least one action selected from a group consisting of:

recording movement information relating to a maximum velocity of the portable gaming device during a first time interval;

recording movement information relating to a maximum displacement of the portable gaming device during a second time interval; and

recording movement information relating to a maximum acceleration of the portable gaming device during a third time interval.

11. The portable gaming device of claim **1** being further operable to:

determine and record information relating to a maximum velocity of the portable gaming device during a first time interval.

12. The portable gaming device of claim **1** being further operable to:

monitor and record information relating to a total number of times portable gaming device has been dropped.

13. The portable gaming device of claim **1** being further operable to:

monitor and record information relating to each event where the portable gaming device has experienced a free fall which exceeds specified minimum threshold criteria.

14. The portable gaming device of claim **1** being further operable to:

monitor and record information relating to a number of times the portable gaming device has experienced an impact event which exceeds specified minimum threshold criteria.

15. The portable gaming device of claim **1**, wherein the first condition or event corresponds to a freefall condition at the portable gaming device which results in an occurrence of an impact event at the portable gaming device, the portable gaming device being further operable to:

determine and record information relating to a velocity of the portable gaming device at a time of the impact event.

16. The portable gaming device of claim **1**, wherein the first condition or event corresponds to a freefall condition at the portable gaming device, the portable gaming device being further operable to:

determine displacement information relating to a distance which the portable gaming device has fallen during a first time interval.

17. The portable gaming device of claim **1** wherein the data preservation system includes a three axis accelerometer.

18. The portable gaming device of claim **1** being further operable to:

determine acceleration data relating to an acceleration of the portable gaming device during one or more time intervals; and

record the acceleration data as a function of time.

19. A method of operating a portable gaming device for use in a casino gaming network, the portable gaming device including memory and a data preservation system, the method comprising:

controlling a wager-based game played at the portable gaming device;

monitoring movement activity relating to the portable gaming device, wherein at least a portion of the monitoring performed by the data preservation system;

generating movement information relating to movements of the portable gaming device, wherein the movement information includes data selected from a group consisting of: data relating to rotation of the portable gaming device, data relating to displacement of the portable gaming device, data relating to velocity of the portable gaming device, data relating to acceleration of the portable gaming device, and data relating to an orientation of the portable gaming device;

analyzing the movement information with respect to a first set of threshold criteria in order to detecting an occurrence of a first critical condition or event at the portable gaming device, wherein at least a portion of the analyzing is performed by the data preservation system;

initiating at least one first action in response to detection of the first critical condition or event, wherein at least a portion of the initiating is performed by the data preservation system;

wherein the at least one first action includes automatically initiating at least one first operation to save selected gaming information in non-volatile memory, wherein the selected gaming information includes information relating to game play conducted at the portable gaming device.

20. The method of claim **19** wherein the non-volatile memory corresponds to local memory of the portable gaming device.

21. The method of claim **19** wherein the non-volatile memory corresponds to remote memory located at a remote device different from the portable gaming device.

22. The method of claim **19** wherein the at least one first action includes:

automatically initiating at least one second operation to identify and save selected information in non-volatile memory, wherein the selected information includes information selected from a group consisting of: portable gaming device movement information associated with the first critical event or condition, historical game data relating to game play conducted at the portable gaming device, game state data relating to game play conducted at the portable gaming device, and wager data relating to game play conducted at the portable gaming device.

23. The method of claim **19** further comprising:

identifying selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory in response to detection of the first critical condition or event; and

automatically initiating, at the portable gaming device and in response to detection of the first critical condition or event, at least one second action to cause the identified information to be saved in non-volatile memory.

24. The method of claim **19** further comprising:

identifying, at the portable gaming device and in response to detection of the first critical condition or event, selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

automatically initiating, at the portable gaming device and in response to detection of the first critical condition or event, at least one second action to cause the identified information to be saved in non-volatile memory;

wherein the selected information includes information selected from a group consisting of: portable gaming device movement information associated with the first critical event or condition, historical game data relating to game play conducted at the portable gaming device, game state data relating to game play conducted at the portable gaming device, and wager data relating to game play conducted at the portable gaming device.

25. The method of claim **19** further comprising:

identifying, at the portable gaming device and in response to detection of the first critical condition or event, selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

automatically initiating, at the portable gaming device and in response to detection of the first critical condition or event, at least one second action to cause the identified information to be transmitted to an external or remote device.

26. The method of claim **19** wherein the at least one first action includes:

identifying selected information residing in volatile memory at the portable gaming device which is to be saved in non-volatile memory; and

initiating at least one second operation to cause the identified information to be transmitted to an external or remote device.

27. The method of claim **19** wherein the at least one action further includes automatically initiating at least one second operation selected from a group consisting of:

updating a sampling interval value relating to a time interval for taking sample measurements of movement activity relating to the portable gaming device;

transmitting selected information to a first external or remote device;

providing instructions for shutting down one or more components of the portable gaming device;

automatically powering-up one or more selected components of the portable gaming device;

recording movement information relating to a maximum velocity of the portable gaming device during a first time interval;

recording movement information relating to a maximum displacement of the portable gaming device during a second time interval; and

recording movement information relating to a maximum acceleration of the portable gaming device during a third time interval.

28. The method of claim **19** further comprising:

determining and recording, at the portable gaming device, information relating to a maximum velocity of the portable gaming device during a first time interval.

29. The method of claim **19** further comprising:

monitoring and recording, at the portable gaming device, information relating to each event where the portable gaming device has experienced a free fall which exceeds specified minimum threshold criteria.

30. The method of claim **19** further comprising:

monitoring and recording, at the portable gaming device, information relating to a number of times the portable gaming device has experienced an impact event which exceeds specified minimum threshold criteria.

31. The method of claim **19**, wherein the first condition or event corresponds to a freefall condition at the portable gaming device which results in an occurrence of an impact event at the portable gaming device, the method further comprising:

determining and recording, at the portable gaming device, information relating to a velocity of the portable gaming device at a time of the impact event.

32. The method of claim **19**, wherein the first condition or event corresponds to a freefall condition at the portable gaming device, the method further comprising:

determining, at the portable gaming device, displacement information relating to a distance which the portable gaming device has fallen during a first time interval.

33. The method of claim **19** further comprising:

determining, at the portable gaming device, acceleration data relating to an acceleration of the portable gaming device during one or more time intervals; and

recording, at the portable gaming device, the acceleration data as a function of time.

34. A portable gaming device for use in a casino gaming network, comprising:

a gaming controller;

memory;

a first display;

at least one interface for communicating with at least one other device in the gaming network;

means for controlling a wager-based game played at the portable gaming device;

means for monitoring movement activity relating to the portable gaming device, wherein at least a portion of the monitoring performed by the data preservation system;

means for generating movement information relating to movements of the portable gaming device, wherein the movement information includes data selected from a group consisting of: data relating to rotation of the portable gaming device, data relating to displacement of the portable gaming device, data relating to velocity of the portable gaming device, data relating to acceleration of the portable gaming device, and data relating to an orientation of the portable gaming device;

means for analyzing the movement information with respect to a first set of threshold criteria in order to detecting an occurrence of a first critical condition or event at the portable gaming device, wherein at least a portion of the analyzing is performed by the data preservation system; and

means for initiating at least one first action in response to detection of the first critical condition or event, wherein at least a portion of the initiating is performed by the data preservation system;

wherein the at least one first action includes automatically initiating at least one first operation to save selected gaming information in non-volatile memory, wherein the selected gaming information includes information relating to game play conducted at the portable gaming device.

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