



UX9::GameKit

Technical Specification



February 2010

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Introduction

UX9::GameKit is a high performance, low power, small size computer kit designed for the needs of the gaming industry. All standard PC functions are performed by the PC motherboard of mini-ITX size. Communication with the majority of peripheral devices is performed through the microcontroller based Gaming IO Board.

UX9::Gaming Board is U-Run unique solution to create reliable, efficient PC based system.

UX9::Gaming Board is connected to PC motherboard by USB interface. This board offers many features developed specifically for the gaming industry: protected SRAM, intrusion logging while power off, real time clock, watchdog, real time control over peripheral devices.

UX9::GameKit offers unrivalled price/performance, combined with top quality game is the best solution for your hall.

Support service

Please feel free to contact if you have any questions or need any additional info.

Available Configurations

UX9::Standard



Includes:

- **UX9::Gaming Board** (5.25" form factor)
- Programmed game storage device
- Programmed game security device
- PC unit (single or dual monitor support)
- Mini-ITX Logic case with power supply

Target users:

- Plug'n'play solution, no extra work required
- Ready for highly regulated markets

UX9::Light



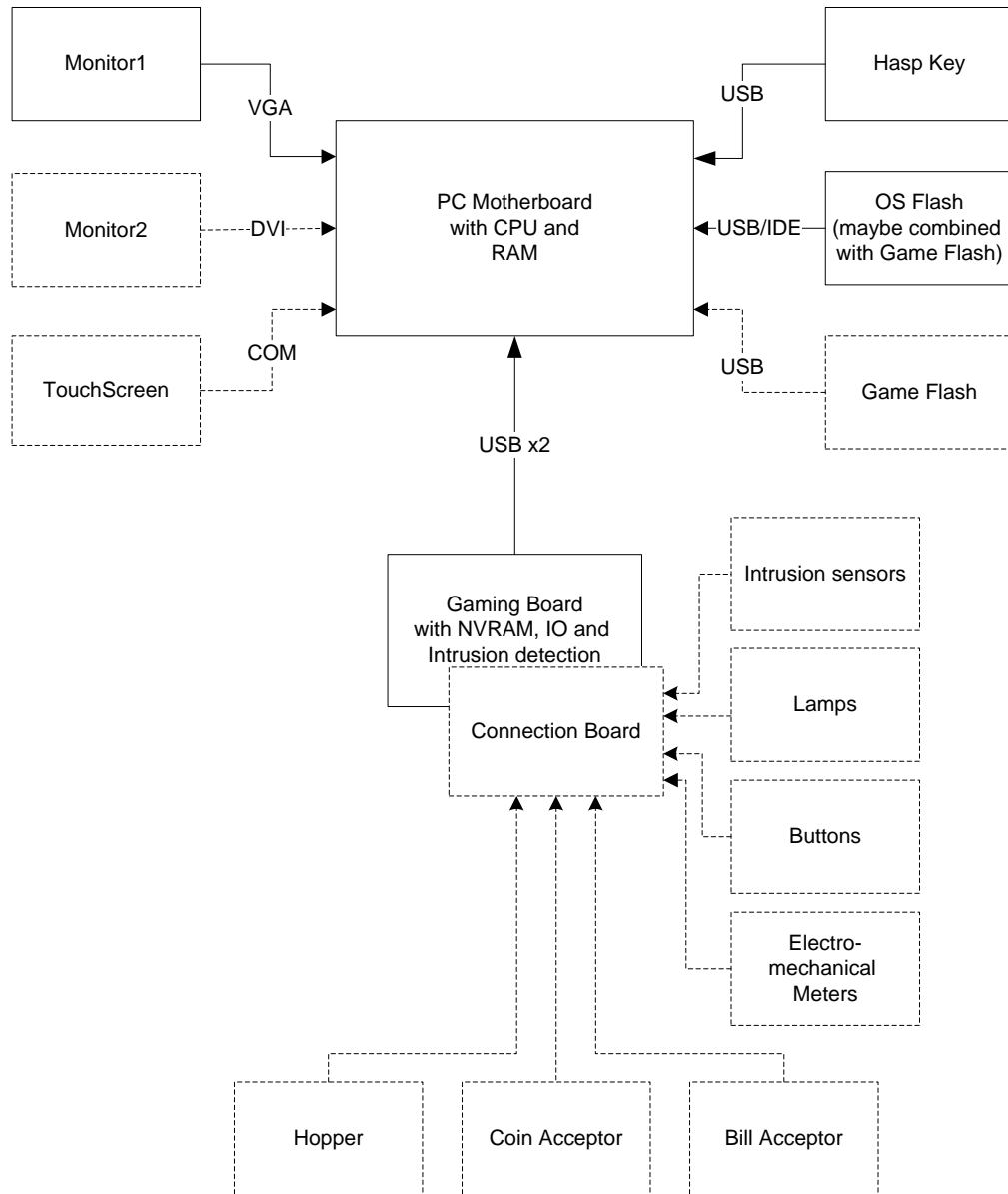
Includes:

- **UX9::Gaming Board** (5.25" or custom form factor)
- Programmed game storage device
- Programmed game security device

Target users:

- Economy solution, small customs duties and transportation costs
- No overhead if not required by jurisdiction: PC unit, logic case, power supply – up to machine manufacturer

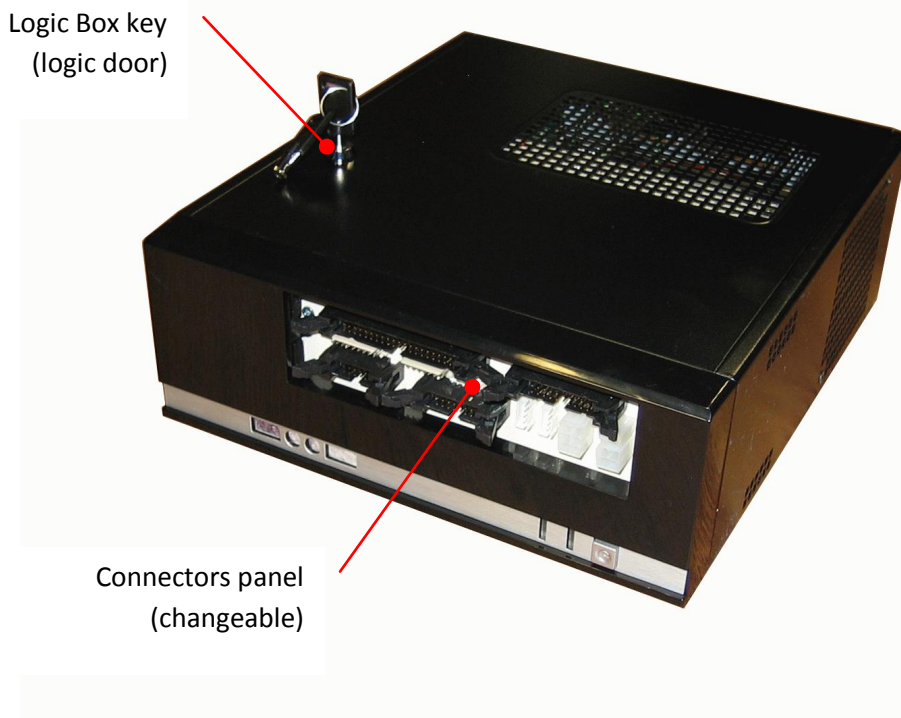
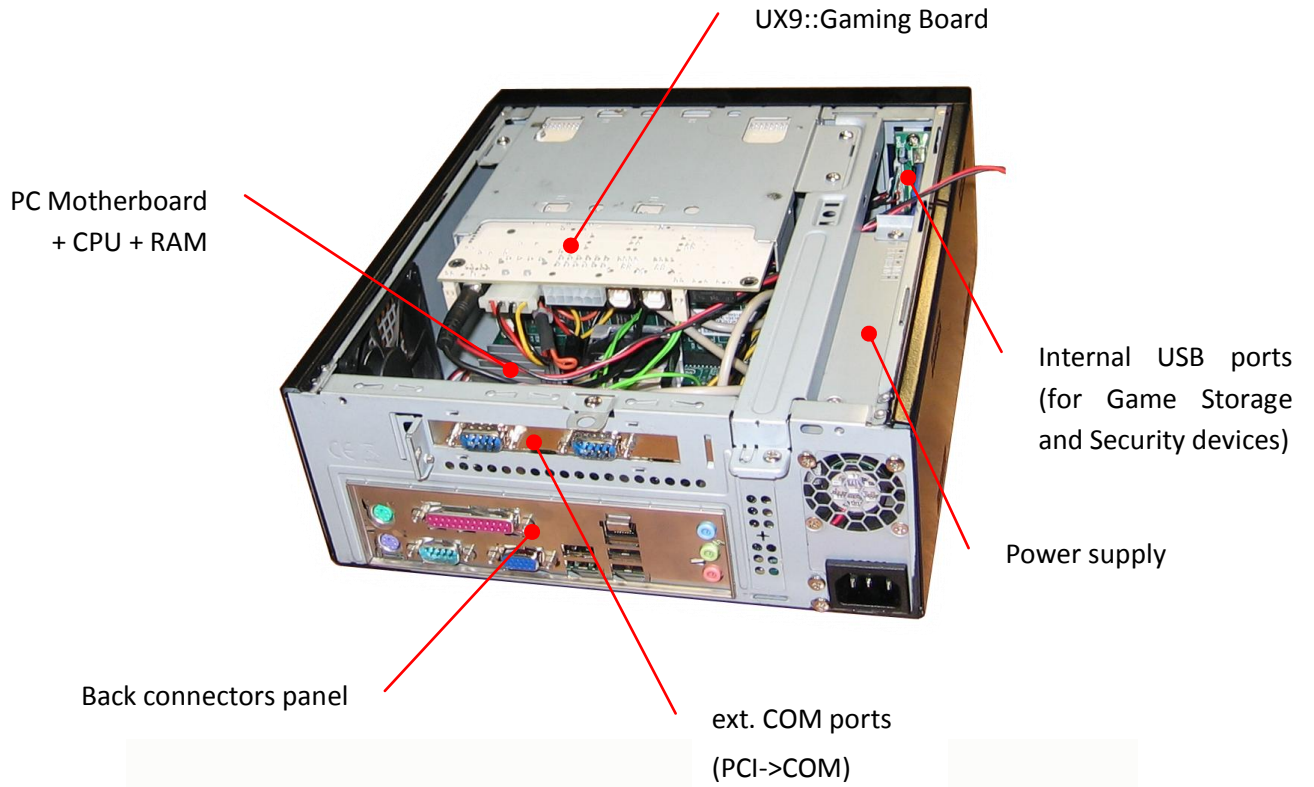
System Architecture Overview



Boxes with solid border represent devices required by **UX9::GameKit** to operate, while dashed boxes represent optional devices you may need to connect.

GameKit Components

Components Layout



Gaming Board

UX9::Gaming Board is a microcontroller operated IO board required for peripherals communications, intrusion detection and secure non-volatile memory storage. The board is connected to PC Motherboard by USB interface (2 x USB connectors).

UX9::Gaming Board includes:

- 40 digital outputs
- 24 digital inputs
- 8 x intrusion detection inputs:
 - Main door
 - Belly door
 - Logic door
 - Bill acceptor door
 - Drop box door
 - EMM cover
- FIFO log at least 48 events with back up battery
 - Log contains a time stamp
 - Logging is available during a power outage
 - Data retention time is a minimum of 30 days without external power
- Watchdog. At power on WDT is set to 255 seconds
- Real time clock
- 512Kb x 2 SRAM with 2 x independent back up batteries
 - Data retention time is a minimum of 90 days without external power
 - 3x Batteries. Battery monitoring on each battery
 - BAT1 for intrusion and RTC
 - BAT2 for SRAM bank 1
 - BAT3 for SRAM bank 2
- Audio amplifier
- 1x parallel hopper connectors
- 1x Serial coin acceptor connector
- CCTALK port x2

Functions

Intrusion inputs

UX9::Gaming Board processor performs monitoring and logging of up to 8 switch inputs. Logging is available during a power outage as the device is operated from the backup batteries.

Processor keeps at least 48 events in a FIFO log. Data retention time is a minimum of 30 days without external power.

In the event that the batteries are removed, refitting will cause the Gaming board processor reset which is also reported and storied in FIFO log.

Digital Inputs

UX9::Gaming Board supports 24 ESD protected inputs. Inputs are fitted with a series resistor and a 5V pull up resistor to protect against input overload damage between -12V to +24V.

Digital Outputs

UX9::Gaming Board supports 40 open collector outputs, 500mA sink, 12V and have integrated diode clamp overload protection.

Watch Dog Timer (WDT)

At power on the WDT is set to 255 seconds irrespective of any value previously set and the counter is restarted. This allows the system time to boot and load all of its drivers. Once operational, the WDT value can be changed to something more reasonable for run time operation.

If at any time the default WDT value or programmed value is exceeded, the WDT will generate a system reset ensuring an automatic reboot takes place.

Real Time Clock

UX9::Gaming Board is equipped with battery operating Real Time Clock.

RTC allows to log the time of intrusion triggering even in power off state.

Batteries

UX9::Gaming Board is equipped with 3 independent Li-ION accumulator batteries:

- BAT1 for intrusion monitoring, and RTC;
- BAT2 for SRAM bank 1;
- BAT3 for SRAM bank 2;

Each cell has an independent battery monitor, which performs metering of the battery voltage in power off state. If the voltage falls below the limit alarm is generated which means that accumulator battery needs charge. Recommended battery recharge cycle is ~3 days.

SRAM

To meet the requirements of most gaming regulations the **UX9::Gaming Board** is supplied with a special memory function - Battery Backed SRAM (NVRAM).

To comply the strictest regulations **UX9::Gaming Board** stores contents of NVRAM in 2 different physical SRAM banks and 3 logical copies.

The use of SRAM provides low power consumption, lower cost and improved reliability over media such as standard hard disk drives. SRAM also provides a significant benefit over Flash memory, as SRAM can be re-written an infinite number of times, whereas Flash memory always has limited write endurance.

Audio Amplifier

UX9::Gaming Board includes TDA1517 stereo sound amplifier with maximum output power 2x6W.

CCTALK

UX9::Gaming Board includes two independent CCTALK communication ports.

First CCTALK is intended for the use of Coin Acceptor while the second CCTALK port is ready to support up to 2 hoppers.

Parallel Hopper

UX9::Gaming Board supports Parallel Hopper interface with the following signal lines:

UX9::GameKit Technical Specification

- Motor On (On - 0V) - use to start hopper motor by setting this output line to 0V;
- Motor On (On - +Vpp) - use to start hopper motor by setting this output line to +Vpp;
- Coin Out sensor;
- Low level signal input;
- Full level signal input.

Motor power voltage can be set to 12V or 24V by the jumper **J7**.

Note: to power hopper motor with 24V **UX9::Gaming Board** should be connected to 24V power supply.

UX9::Gaming Board microcontroller tracks and counts all the outgoing coins in real time, providing fault protection even in case PC hardware is busy or out of order.

Parallel Coin Acceptor

UX9::Gaming Board supports Parallel Coin acceptor interface with the following signal lines:

- Credit (In);
- Tilt (In);
- Sense (In);
- Enable (Out);
- Divertor (Out);

UX9::Gaming Board microcontroller controls input lines in real time and tracks all the abnormal operation and fraud attempts, like "Yo-yo", "coin jam", and so on.

Electro Mechanical Meters

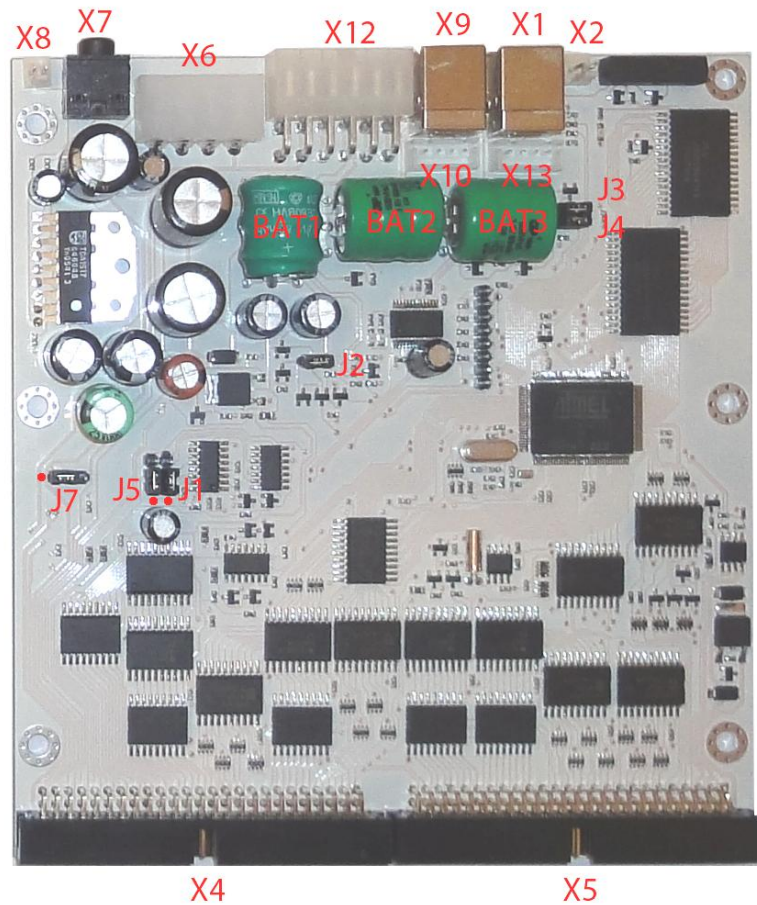
UX9::Gaming Board supports up to 8 electromechanical meters.

LAMP: EMM Light is lightened during access to service menu thus hiding meters' values from players.

Additional Intr: DOOR: Sensor of EMM unit is intended to control integrity of the EMM unit even in power off state.

Please use only specially provided +12V supply voltage to power the meters. This provide noise protection and insures that meters will be able to finish current switch even when the power is lost during rotation cycle.

Gaming board layout



X1, X13 – USB connection to PC motherboard

Connector type: PW-10-4-M / PWC-10-4-F

Pin	Signal
1	Vcc
2	D-
3	D+
4	GND

Note: only one should be connected: X1 or X13, which is most suitable for current configuration.

It is possible to use standard USB A-B cable to connect **UX9::Gaming Board** to PC motherboard through X1 connector.

X2 - Watch Dog Timer connector

Connector type: WF-2

Can be connected to the "Reset" pins on the PC Motherboard front-panel socket.

In case of software hang-up Watch Dog timer performs hardware reset of PC motherboard by emulating press of the Reset button.

Pin	Signal
1	Relay contact
2	Relay contact

X4 - Peripheral Connector 1

Connector type: BHR-50

Connectors X4 and X5 are designed to connect Connector Panel, but in cases when no logic box is required and/or number of peripheral devices used is rather small it might be convenient to connect peripherals directly to X4 and X5 connectors (without the need to use Connector Board).

Pin	Signal
1	Intr: DOOR: BillAcceptor
2	Intr: DOOR: Main
3	Intr: DOOR: Belly
4	Intr: DOOR: Cashbox (dropbox)
5	Intr: DOOR: Sensor of EMM unit
6	Intr. Reserved
7	Intr. Reserved
8	EMM: Money In
9	EMM: Money Out
10	EMM: Bills In
11	EMM: Turnover
12	EMM: Cancelled Credits
13	EMM: Total Wins
14	EMM: Coin In
15	EMM: Coin Out
16	GROUND
17	+12V, only for EMM!
18	KEY: CABINET ATTENDANT KEY
19	KEY: CABINET SERVICE KEY
20	IN, reserved
21	IN, reserved
22	IN, reserved
23	IN, reserved
24	LAMP: Tower Lamp 1
25	LAMP: Tower Lamp 2

Pin	Signal
26	LAMP: Tower Lamp 3
27	CA OUT: Divertor
28	LAMP: EMM light
29	LAMP: BA illumination green
30	LAMP: BA illumination red
31	OUT, reserved
32	OUT, reserved
33	OUT, reserved
34	OUT, reserved
35	OUT, reserved
36	OUT, reserved
37	OUT, reserved
38	CCTALK: DATA Port 0
39	CCTALK: DATA Port 1
40	BA: DATA TX
41	BA: DATA RX
42	Sound: Left Channel
43	Sound: Right Channel
44	GROUND
45	+24V
46	+24V
47	+12V
48	GROUND
49	+5V
50	GROUND

where:

- "Intr" - intrusion, input line controlled in power off state;
- "EMM" - output for the electromechanical meter;
- "KEY" - digital IN (key, switch, button);
- "LAMP" - digital OUT
- "BA" - bill acceptor;
- "CCTALK" - CCTALK protocol signal lines;
- "SOUND" - sound amplifier output lines;

X5 - Peripheral Connector 2

Connector type: BHR-50

Connectors X4 and X5 are designed to connect Connector Panel, but in cases when no logic box is required and/or number of peripheral devices used is rather small it might be convenient to connect peripherals directly to X4 and X5 connectors (without the need to use Connector Board).

Pin	Signal
1	Hopper IN: Low level
2	Hopper IN: Full level
3	Hopper IN: Coin Out signal
4	Hopper "On" (On - +Vpp)
5	Hopper "On" (On - 0V)
6	CA OUT: Enable
7	CA IN: Tilt
8	CA IN: Sense
9	CA IN: Credit
10	GND
11	BTN: Start
12	BTN: Gamble
13	BTN: Enter / Exit
14	BTN: Help
15	BTN: Service
16	BTN: Cashe Out
17	BTN: Autoplay
18	BTN: MaxBet
19	BTN: Bot 1
20	BTN: Bot 2
21	BTN: Bot 3
22	BTN: Bot 4
23	BTN: Bot 5
24	BTN: Top 1
25	BTN: Top 2

Pin	Signal
26	BTN: Top 3
27	BTN: Top 4
28	BTN: Top 5
29	GROUND
30	GROUND
31	LAMP: Start
32	LAMP: Gamble
33	LAMP: Enter / Exit
34	LAMP: Help
35	LAMP: Service
36	LAMP: Cache Out
37	LAMP: Autoplay
38	LAMP: MaxBet
39	LAMP: Bot 1
40	LAMP: Bot 2
41	LAMP: Bot 3
42	LAMP: Bot 4
43	LAMP: Bot 5
44	LAMP: Top 1
45	LAMP: Top 2
46	LAMP: Top 3
47	LAMP: Top 4
48	LAMP: Top 5
49	+12V
50	+12V

where:

- "Hopper" - parallel hopper control lines;
- "CA" - parallel Coin Acceptor control lines;
- "BTN" - digital IN used as key panel button;
- "LAMP" -digital OUT;

X6 - ATX Power connector

Connector type: Molex 4pin

This is a standard PC peripheral ATX power connector.

Pin	Signal
1	+12V
2	GND
3	GND
4	+5V

X7 - Sound Amplifier In connector

PC Audio Line In connector 3.5".

X8 - Logic Box Door connector

Connector type: WF-2

Logic Box intrusion connector is located on the **UX9::Gaming Board** and should be connected to the switch or lock which protects access to Logic Box contents.

Pin	Signal
1	Intr: DOOR: Logic Box
2	GND

X9, X10 - USB connection to PC motherboard (for bill acceptor only)

Connector type: PW-10-4-M / PWC-10-4-F

UX9::Gaming Board includes FTDI (USB->COM) adapter, which requires USB link to PC motherboard.

Pin	Signal
1	Vcc
2	D-
3	D+
4	GND

Note: only one should be connected: X9 or X10, which is most suitable for current configuration.

It is possible to use standard USB A-B cable to connect **UX9::Gaming board** (bill acceptor interface) to PC motherboard through X9 connector.

X12 - Extended Power connector

Connector type: MF-12

Optional power connector for power supplies with 24V output.

Pin	Signal
1	NC
2	+12V
3	GND
4	+24V
5	GND
6	+5V
7	NC
8	+12V
9	GND
10	+24V
11	GND
12	+5V

Jumpers

J1, J5 - Bill Acceptor Data levels selector (TTL/RS232)

Bill acceptor RX/TX lines can be configured to TTL or RS232 signal levels.

	TTL	RS-232
J1 (RX level)	1-2	2-3
J5 (TX level)	1-2	2-3

J2 - CPU Battery (On/Off)

Remove the jumper to disconnect battery chain before long-term storage.

J3 - Memory bank0 (On/Off)

Remove the jumper to disconnect battery chain before long-term storage.

J4 - Memory bank1 (On/Off)

Remove the jumper to disconnect battery chain before long-term storage.

J7 - Parallel Hopper voltage selector (12V/24V)

Hopper Vpp	J7
12V	1-2
24V	2-3

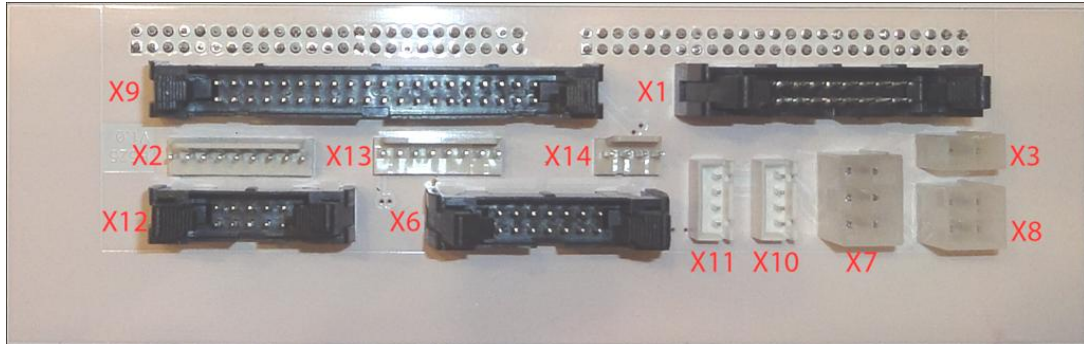
Connector Panel

Connector board is an optional passive device which is used to simplify connection of cabinet cabling with universal sockets of **UX9::Gaming Board**.

There are several types of Connector boards available: universal one (with full set of connectors), also we design connector boards compatible with the cabling of the particular machine you need to renovate or manufacture.

Please contact us to determine the most suitable for you type of the connector board.

Later in this document we provide description and pin outs of the universal connector board supplied by default.



For connector assignment and pin outs see [Peripheral devices](#) section.

Storage device

UX9::GameKit runs Windows XP Embedded.

By default Game and OS software are located on one USB Flash (2Gb).

Depending on motherboard model IDE flash or CF flash (2Gb) can be used instead of USB flash.



OS and Game storage devices (IDE flash module, USB flash)

If your jurisdiction requires, there is a possibility to separate OS and Game into different flash devices. In this case OS Flash contains only Operating System and drivers required for the particular hardware configuration. It doesn't contain any software components which in any matter can influence game logic, presentation or game outcome.

Game software is located on another USB flash. All software components which can influence game logic, presentation or outcome reside on this device. For security reason executable files, game resources and databases are encrypted by the Aladdin HASP key.

Security Device

In order to protect game software and game resources (artwork, paytables, settings, statistics ...) from modifications and unauthorized distribution **UX9::GameKit** includes by Aladdin HASP HL key.



Security device (HASP HL)

Gaming machine won't be able to start and operate up without proper HASP key installed. Changing of HASP key may require to perform FULL RAM CLEAR procedure.

PC Motherboard, CPU, RAM

For the details about currently supported PC parts models please contact us.

Minimum required configuration for single monitor mode

- CPU Intel Atom Duo 1.6 GHz
- Built in video adapter Intel GMA950
- Built in sound card
- RAM 1GB

Minimum required configuration for double monitor mode

- CPU Intel Dual Core 2 GHz
- Built in video adapter Intel GMA3100
- Built in sound card
- RAM 1GB

PCI->COM ext. board

COM ports from PC motherboard or ext. board can be used for the connection of:

- touch screen;
- communication protocol (RS232 based: SAS, Zonke, ...);
- ticket printer.

In case motherboard has no or insufficient number of COM ports additional COM port can be installed by using PCI-COM ext. board.

For the details about currently supported ext. boards models please contact us.

Case & Power supply

Standard ATX power supply is required for PC motherboard to operate. The same power supply is used to power **UX9::Game Board** and all the peripheral devices connected to the **UX9::Game Board**.

Please make sure that power supply supports your voltage (automatically or manual switch is in correct position).

Please make sure that power supply has enough output power to feed all the peripheral devices. Usually 120W should be enough (if monitor is connected to independent power supply).

In case you need to connect 24V hopper or bill acceptor additional 24V power supply might be required (standard ATX power supplies have no 24V output).

In case your jurisdiction or corporate rules require having an isolated logic box area you should use **UX9::Standard** edition or assemble logic box from the locally purchased parts and **UX9::Light**. Wide range of mini-ITX PC cases can be used to put the **UX9::GameKit** components inside.

Mini-ITX case modification required:

- install **UX9::Game Board** into full size 5.25" slot;
- install Logic Box switch/lock (required to restrict access to case interiors);
- 2 USB sockets fasten inside (if your jurisdiction requires storage and security devices to be located inside isolated logic box area).

Peripherals devices

Keypanel

UX9::GameKit supports up to 18 buttons (switch and lamp).

X9 - Keypanel connector

Connector type: LBH-40

Pin	Signal
1	BTN: Start
2	BTN: Gamble
3	BTN: Enter / Exit
4	BTN: Help
5	BTN: Service
6	BTN: Cashe Out
7	BTN: Autoplay
8	BTN: MaxBet
9	BTN: Bot 1
10	BTN: Bot 2
11	BTN: Bot 3
12	BTN: Bot 4
13	BTN: Bot 5
14	BTN: Top 1
15	BTN: Top 2
16	BTN: Top 3
17	BTN: Top 4
18	BTN: Top 5
19	GROUND
20	GROUND

Pin	Signal
21	LAMP: Start
22	LAMP: Gamble
23	LAMP: Enter / Exit
24	LAMP: Help
25	LAMP: Service
26	LAMP: Cache Out
27	LAMP: Autoplay
28	LAMP: MaxBet
29	LAMP: Bot 1
30	LAMP: Bot 2
31	LAMP: Bot 3
32	LAMP: Bot 4
33	LAMP: Bot 5
34	LAMP: Top 1
35	LAMP: Top 2
36	LAMP: Top 3
37	LAMP: Top 4
38	LAMP: Top 5
39	+12V
40	+12V

Cabinet (Keys, Tower Lamp, etc)

UX9::GameKit supports:

- 2 keys (Attendant and Service key);
- Tower Lamp (2 or 3 segments);
- Additional illumination of the bill acceptor state (green - enabled; red - disabled);

X1 - Cabinet connector

Connector type: LBH-20

Pin	Signal
1	KEY: CABINET ATTENDANT KEY
2	KEY: CABINET SERVICE KEY
3	IN, reserved
4	IN, reserved
5	IN, reserved
6	IN, reserved
7	GROUND
8	GROUND
9	LAMP: Tower Lamp 1
10	LAMP: Tower Lamp 2

Pin	Signal
11	LAMP: Tower Lamp 3
12	LAMP: BA illumination green
13	LAMP: BA illumination red
14	OUT, reserved
15	OUT, reserved
16	OUT, reserved
17	OUT, reserved
18	OUT, reserved
19	+12V
20	+12V

Electromechanical meters

X6 - Electromechanical meters connector

Connector type: LBH-14

Pin	Signal
1	LAMP: EMM light
2	EMM: Money In
3	EMM: Money Out
4	EMM: Bills In
5	EMM: Turnover
6	EMM: Cancelled Credits
7	EMM: Total Wins
8	EMM: Coin In
9	EMM: Coin Out
10	Intr: DOOR: Sensor of EMM unit
11	GROUND
12	GROUND
13	+12VS
14	+12VS

Intrusions

X12 - Intrusions connector

Connector type: LBH-10

Pin	Signal
1	Intr: DOOR: Bill Acceptor
2	Intr: DOOR: Main
3	Intr: DOOR: Belly
4	Intr: DOOR: Cashbox (dropbox)
5	GROUND
6	GROUND
7	Intr: DOOR: Sensor of EMM unit
8	Intr. Reserved
9	Intr. Reserved
10	GROUND

Sound Out

X14 - Sound Amplifier Out connector

Connector type: WF-4

Pin	Signal
1	Sound: Left Channel
2	GROUND
3	GROUND
4	Sound: Right Channel

Bill acceptor

X7 - Bill Acceptor connector

Connector type: MF-6

Pin	Signal
1	Intr: DOOR: Bill Acceptor
2	RXD
3	TXD
4	GROUND
5	+12V
6	+24V

Coin Acceptor

X13 - Parallel Coin Acceptor connector

Connector type: WF-8

Pin	Signal
1	CA IN: Credit
2	CA IN: Tilt
3	CA IN: Sense
4	CA OUT: Enable
5	+12V
6	GROUND
7	+12V
8	CA OUT: Divertor

X11 - CCTALK Coin Acceptor connector

Connector type: PW10-4

Pin	Signal
1	+24V
2	+12V
3	GROUND
4	DAT

Hopper

X2 - Parallel Hopper connector

Connector type: WF-9

Pin	Signal
1	+12V
2	+24V
3	Hopper "On" (On - 0V)
4	Hopper "On" (On - +Vpp)
5	GROUND
6	GROUND
7	Hopper IN: Low level
8	Hopper IN: Coin Out signal
9	Hopper IN: Full level

X10 - CCTALK Hopper connector

Connector type: PW10-4

Pin	Signal
1	+24V
2	+12V
3	GROUND
4	DAT

Monitor

UX9::GameKit depending on the configuration supports up to 2 monitors, each with the native resolution of 1280x1024x32bit. Monitors are connected to standard VGA/DVI connector of PC motherboard.

In case the attached monitors do not support such resolution, picture will be automatically scaled down to: 1024x768; 800x600 or 640x480. We highly recommend NOT TO USE monitors with resolution lower than 1024x768, as picture quality loss is dramatic.

Note: the main (first) monitor will become the one connected by VGA interface, and the optional top (second) monitor is the one connected by DVI interface.

Touch Screen

UX9::GameKit supports several touch screen models connected to COM or USB port.

If RS232 interface is used - by default touch screen is mapped to the first COM port available in the system (usually on PC motherboard).

For details about supported touch screen models please refer to Appendix1.

Ticket Printer

UX9::GameKit supports ticket printers connected to COM port of PC motherboard or PCI->COM extension board.

By default ticket printer is mapped to the third COM port available in the system (usually on PCI->COM ext. board).

For details about supported ticket printer models please refer to Appendix1.

Powering external devices from the kit

X8 - External Power Out connector

Connector type: MF-4

Pin	Signal
1	+5V
2	+12V
3	+24V
4	GROUND

If **UX9::Gaming Board** is powered through standard ATX power connector X6 (not extended power connector X12), additional power supply might be required in order to use 24V hopper or bill acceptor.

For this purposes additional 24V power IN connector is located on the connector board:

X2 - 24V Power In connector

Connector type: MF-2

Pin	Signal
1	IN: +24V
2	GROUND

Protocols

SAS and Zonke

U-Run products running **UX9::GameKit** support several communication protocols based on RS232 interface, including: SAS6.01 and Zonke "A".

By default the selected protocol is mapped to the second COM port either on the motherboard or on PCI->COM extension board.

SAS-Net

SAS-Net is a special version of SAS protocol developed by U-Run team. Actually this is the SAS protocol wrapped into TCP/IP. Using TCP/IP transport level instead of raw SAS on RS232 interface has a lot of advantages:

1. No need for power-supply decoupling when using long RS232 lines;
2. No need for the expensive SMIB devices that have to be installed to each EGM;
3. Plug&play solution - cheap Ethernet interface is available in each modern PC motherboard and natively supported by the U-Run products;
4. Security improvements - SAS packets are encrypted inside TCP/IP packets;
5. Possibility to use existing LAN infrastructure, minimizing installation costs;

SAN-Net protocol is widely used in other U-Run products, like Accounting and Progressive Jackpot systems.

Appendix 1: Peripheral devices passed compatibility test

Peripheral Device Type	Interface	Tested models
Touch Screen	RS232, USB	Microtouch 3M EXII-1010SC (RS232); General Touch 4001S (RS232); ELO ET-1749L (USB);
Bill Acceptor	ID:003 (RS232/TTL)	JCM EB-200; JCM WBA-23; Cash Code MFL;
Coin Acceptor	Parallel CCTALK	CoinMech MC-62 (parallel); NRI G-13 (CCTALK);
Hopper	Parallel CCTALK	Money Controls MK4, Suzo Cube MKII (Parallel); Money Controls MK4, SBB (CCTALK);
Ticket Printer	RS232	Future Logic GEN2