

IGP 2 extended Board documentation

Features

- 16 independent games, each of them is a five-reel video slot machine game with bonus and super bonus games (not all of them), with an additional possibility of increasing reward in a risk-game
- Player can choose games available
- Operator can select games, available to players
- Credit and accounting are common for all the games
- Independent game statistics
- Two channels of SAS 6.02 are supported (control, accounting, legacy bonusing, AFT and TITO)
- Installing the bill acceptors using the protocols Pulse (up to 8 channels), ID-003 (BDP) and S.S.P. is supported
- Installing coin slots using the protocol Pulse (up to 8 channels)
- Installing the hopper using the protocol Pulse
- Support of ticket printers (currently printers FutureLogic GEN2 and Ithaca Epic 950 are supported)
- Support of credit charging via TITO (bill acceptor supporting Bar Code is required)
- Support of accounting denomination from 0.01 to 100.00
- Support of up to 5 door sensors that work even if the power is off
- Full electrical and physical compatibility of the connectors with the IGROSOFT IGP 1 boards (legacy board)
- Support of the second screen
- Control of connecting two counters
- Support of touch screen devices (currently General Touch compatible)

Table of contents

FEATURES.....	1
TABLE OF CONTENTS.....	2
INSTRUCTIONS FOR GAMING MACHINE OPERATOR.....	3
SWITCHING ON AND OFF OF THE MACHINE.....	3
CREDIT ADDING AND CANCELING.....	3
SHORT STATISTICS.....	4
INSTRUCTIONS ON SERVICE AND SETUP OF THE MACHINE.....	5
OPERATION STATISTICS (LONG STATISTICS).....	5
GLOBAL SETTINGS.....	6
<i>Main Parameters.....</i>	6
<i>Equipment Settings.....</i>	6
<i>Game Selection.....</i>	7
<i>SAS Settings.....</i>	8
<i>Ticket settings.....</i>	8
<i>Security.....</i>	9
INITIALIZATION OF THE MACHINE (INIT).....	9
EVENT LOGS.....	9
SET CLOCK.....	10
GAME STATISTIC.....	10
GAME OPTIONS.....	10
TESTS.....	10
GAME SELECTION.....	11
TOUCHSCREEN.....	11
APPENDIX I: PROBLEM SOLUTION.....	12
APPENDIX II: EVENTS.....	13
APPENDIX III: POSSIBLE SETTINGS VALUES.....	14
GLOBAL SETTINGS.....	14
<i>Main Parameters.....</i>	14
<i>Equipment.....</i>	15
<i>SAS Settings.....</i>	16
<i>Ticket Settings.....</i>	16
<i>Security.....</i>	16
GAME OPTIONS.....	16
APPENDIX IV: CONNECTION DIAGRAMS.....	17
<i>Connector X1.....</i>	17
<i>Connector X2.....</i>	17
<i>Socket X11.....</i>	18
<i>Socket RS232-1.....</i>	19
<i>Socket RS232-2.....</i>	19
<i>Cable scheme for connecting to RS-232.....</i>	19
APPENDIX V: ERRORS OF THE BILL ACCEPTOR.....	20
APPENDIX VI: ERRORS OF THE TICKET PRINTER.....	21
APPENDIX VII: SUPPORTED PRINTER VERSIONS.....	22
APPENDIX VIII: TITO SETTING UP.....	23
REQUIREMENTS.....	23
INSTALLATION.....	23
SETTING.....	23
TEST.....	23
APPENDIX IX: SUPPORTED SAS EXCEPTIONS.....	24
APPENDIX X: SUPPORTED SAS COMMANDS.....	26
APPENDIX XI: SUPPORTED SAS METERS.....	28
APPENDIX XII: CONNECTING BILL ACCEPTORS.....	30
HISTORY OF CHANGES.....	31

Instructions for gaming machine operator

Switching on and off of the machine

To set up the board it is necessary to connect it to the direct current with the +5 V and +12 V voltage. After giving power supply the board the system condition check will start. It will be accompanied by illumination of game-machine buttons. That is necessary for preliminary diagnosis of board faultiness. If testing is successful, an inscription “**HARD TEST PASSED**” will appear which means that the board is in order and is ready to work.

After the accomplishment of actions stated above the machine should launch a playing or demonstration mode. If that does not occur, go to appendix 1: problems solution. **It is strongly prohibited to allow customers to use the machine that have not launched a playing or demonstration mode!**

If there is an inscription “**CALL ATTENDANT**” on the screen, probably, one of the buttons is “sticked”. To enter the buttons test mode, one should push the button (turn the key) “short statistics”. Exiting the text is in a few seconds after the releasing all the buttons or after resetting.

If the credit has been equal to zero before the machine switching off, after the switching on it should launch a demonstration mode. Besides, the machine enters this mode if there is a zero credit during some period of time. Playing mode is launched just after entering credit. If after the machine switching off the prize is not taken away, after switching on the machine launches the previous game.

If a three-color indicator of working mode is connected to the machine, then:

- red** – technical mode (setup and statistics);
- yellow** – an attendant interference is required;
- green** – demonstration mode; a credit entering is awaited;
- all are extinguished** – playing mode.

The game machine can be switched off at any moment – after switching it on the gaming machine returns to mode, in which it was before switching off, but state of machine will be lost. If gaming machine was powered off in the bonus game then player may lose his win not shown in Total Win field. **So if the machine needs to be switched off, it is recommended to do in demonstration mode.**

If at least one of the doors of the machine is opened or serious errors are made by the acceptor (protocol connected), the game is stopped immediately and the corresponding message is displayed. To launch the play mode it is necessary not only to close the doors but to turn the service key.

Credit adding and canceling

Credit can be added by a coin acceptor (only pulse protocol is supported), bill acceptor (protocols supported: ID-003 (BDP), S.S.P. and pulse), credit key, tickets and AFT.

A credit key has two work modes – direct (appointed in settings value is added to credit when key activated) or key-driven (the amount of credit entered while the key is activated depends on player button, pressed by the operator: **1LINE**=1000, **3LINES**=100, **5LINES**=10, **7LINES**=1, **9LINES** – canceling of the credit; there is a mode, in which the canceling is only working). For each bill acceptor or coin slot there is a setting – a value of a bill (a coin) in credits.

The canceling of credit is accomplished with the service button “**KEY OUT**”, a credit key in a key-driven mode by the **9LINES** button, or a button **PAYOUT**, which is used by player for a payout by a hopper, cashless, or ticket.

Short statistics

The short statistics is entered with a short statistics key. In this mode some information is displayed on the screen:

MACHINE#	– machine number (can be set in settings);
CREDIT	– current credit value;
TOTAL IN	– total number of credits added;
TOTAL OUT	– total number of credits canceled;
PROFIT	– the machine income (Total_In - Total_Out - Credit);
KEY IN	– credits, added by credit key;
KEY OUT	– credits, canceled by credit key (handpay canceled credits);
COINS IN	– credits, added in all coin slots;
HOPPER OUT	– credits, canceled by hopper;
BILL IN	– credits, added in all bill acceptors, and coin slots, installed under the protocol;
TICKET IN	– credits, added via TITO;
TICKET OUT	– credits, canceled via TITO;
AFT IN	– credits, added via SAS Advanced Funds Transfer (cashless);
AFT OUT	– credits, canceled via SAS Advanced Funds Transfer (cashless);
BONUS IN	– credits, added via external bonus;
SLOT DOOR OPEN	– counter and date of the last slot door opening;
CARD CAGE OPEN	– counter and date of the last card cage opening;
DROP DOOR OPEN	– counter and date of the last coin box opening;
CASHBOX OPEN	– counter and date of the last cash box opening;
BELLY DOOR OPEN	– counter and date of the last belly door opening;
SHORT STAT. CLEAR	– counter and date of the last short statistics clearing;
LAST VIEW SHORT	– date of the last statistics view;
HOPPER LEVEL	– amount of coins available for payout by hopper if it is connected

Besides, important data from the operation statistics, such as **TOTAL IN**, **TOTAL OUT**, **TOTAL BET**, **TOTAL WON**, **TOTAL GAMES**, **PAYOUT RATE** are added below.

The statistics is zeroed, if it is permitted in settings. To do this it is necessary to press and hold for five seconds the button **BET**. The zeroing of short statistics will not change the condition of long statistics and will not affect the percentage of payout of the machine.

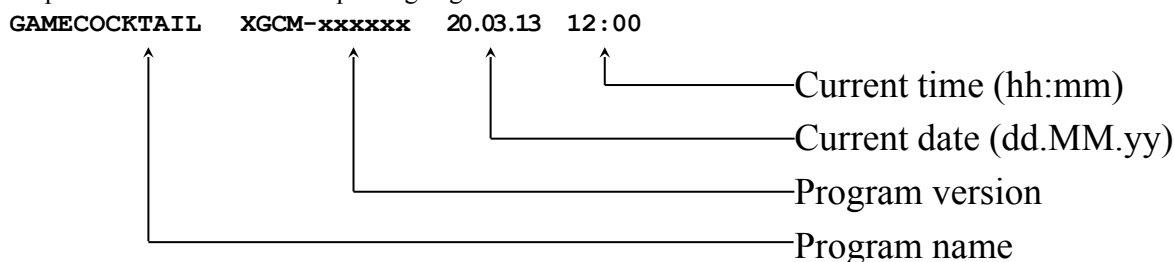
Instructions on service and setup of the machine

To enter the service mode an operation statistics key should be used. The offsetting over the main menu is accomplished with buttons **HOLD1**¹ – up and **HOLD2** – down. The changing of settings is accomplished with buttons **HOLD3** (the previous meaning) and **HOLD4** (the following one). The necessary entry is chosen with the button **START**, exit – with the button **CANCEL (BET)**. Below the screen there is always a clue about working buttons and their purpose.

The main menu contains the following entries:

OPERATION STATISTIC	– long statistics;
GLOBAL SETTINGS	– total settings;
INIT	– machine initialization;
EVENT LIST	– register of events;
SET CLOCK	– date and time adjustment;
GAME STATISTIC	– the statistics of plays;
GAME OPTIONS	– game adjustment;
TESTS	– tests of sound, connector contacts and event register;
EXIT	– exit to playing or demonstration mode (depends on credits available);
MACHINE LOCKED	– lock/unlock the machine (similar to the operation SAS Lock Out Play)

At the very top of the screen there is an information line with the title and version of the game, and current date. Below an example of information line deciphering is given:



If support of devices which require authorization prior to usage (e.g. bill acceptor using protocol S.S.P) is turned on and the device connected at the moment is not authorized, instead of the main menu there will be the requirement to confirm the device. The identifier of this device and the protocol used will be indicated. The operator is to choose one of two items: **CONFIRM** or **INHIBIT**. After this the main menu will be opened and the question will not be set anymore. In addition, the operator has the opportunity to get to the main menu without having to decide whether to allow or ban the device work - for this just click on the button **BET**. In this case the request will appear at the next entry into service mode.

Operation Statistics (Long Statistics)

Operation statistics, or long statistics, consists of two pages.

On the first there is information about credit (how much and where it is entered and where it is paid out, see short statistics), and besides:

HOPPER UNLOAD – amount of coins, given out by hopper, being unloaded.

On the second page there is information about the system events like setting changes and door openings (see short statistics):

INIT MACHINE	– board initialization;
CHANGED TOT. SET.	– changing general parameters;
CHANGED GM. PREF.	– changing game options;
PREVIOUS SERVICE	– turning on the service mode;
SHORT STAT. CLEAR	– clearing short statistics;
POWER ON	– switching on the machine;
LAST VIEW SHORT	– last view of short statistics;
LAST VIEW OPER.	– last view of operation statistics.

After a title of the events their amounts are given since the last machine initialization and the date of the last event.

On the third page the information from the short statistics is shown.

¹ Hereinafter **HOLD1** corresponds to the button **1LINES**, **HOLD2** – **3LINES**... **HOLD5** – **9LINES**

Global Settings

Entering this section of the main menu, you will get to a sub menu, which contains seven entries:

MAIN PARAMETERS	– options for the main parameters;
EQUIPMENT	– options for coin- and bill acceptor and other equipment;
GAME SELECTION	– selection of games, available to the player;
SAS SETTINGS	– SAS parameter settings;
TICKET SETTINGS	– ticket parameter settings;
SECURITY	– security setting (access to the statistics entries);
EXIT	– exit to the main menu.

Main Parameters

General parameters of the machine can be set in this section.

MACHINE NUMBER	– machine number printed on all tickets;
ASSET NUMBER	– property number of the machine used in AFT;
COUNTRY/CURRENCY	– current country (currency), if it is set, it is displayed on the screen of game selection;
DENOMINATION*	– and back), it is possible to change only after initialization and before credit entering ; denomination of the machine (for transference of monetary items into credits;
SHOW DENOMINATION	– enables or disables machine denomination showing on game selection screen;
CREDIT LIMIT	– maximum amount of credit, if it is exceeded, the corresponding announcement will be displayed on the screen and the machine will not let play until the credit is loaded. It is used for limiting maximum winning prize, paid out to a player according to the game arcade rules.
EVENT LIST BARRIER	– game events with credit parameters which are less than ones specified by this setting are not fixated in the journal. Do not set the amount of this setting very low – this can lead to fouling of journal with excess information.
MAX TOTAL BET	– maximum bet. Limits the diapason of changing of other parameters, which assign possible amounts of bets. Changing of this parameter can lead to modification of other parameters;
BILL RECEPTION LIMIT	– credit amount which exceeding blocks coin and bill acceptors (if it is off, they are blocked when the credit reaches the field CREDIT LIMIT);
KEY IN AND HANDPAY	– settings related to handpay and credit key;
SPEAKER VOLUME	– volume of the speaker;
SWITCH GAME MODE	– means of switching to the select game display (there are always two way available: SWITCH GAME button and BET in the reference mode; but in addition the regime can be activated by simultaneous pressing of the two buttons HOLD2 and HOLD4 on the main screen);
DEMO TYPE	– demo type mode: standard or game selection screen only.

Key in and handpay settings

CREDIT KEY FUNCTION	– credit key takes several numerical and two special values. Credit key can operate in two modes: direct and button. By default the button mode is set (" BUTTONS "), but it can be changed to any other;
EVEN HANDPAY	– the multiplicity of handpaid credit (if 20 is set, after hand payout of 153 credit, 13 left and the statistics will indicate payout of 140 credits);
HANDPAY LIMIT	– limit of credit cancel by handpay operation;
PERMIT HANDPAY CANCEL	– permits player to cancel handpay mode by pressing PAYOUT button.

Equipment Settings

In this section the equipment the board works with can be set. Each type of equipment is set in its own section:

BILL ACCEPTOR	– bill acceptor settings;
COIN ACCEPTOR	– coin acceptor settings;
TICKET PRINTER	– ticket printer settings;
HOPPER	– hopper settings;
MECHANICAL COUNTERS	– mechanical counter settings;
TOUCHSCREEN	– touchscreen settings.

*Hereinafter parameters highlighted by *italic font* requires initialization for changing.

Bill Acceptor Settings

This section is intended for bill acceptor settings. To do this it is necessary to choose work protocol and port (at pulse connection port does not matter). Then it is possible to specify the denomination and stacker number for each channel.

PROTOCOL	– used protocol;
SERIAL PORT	– used serial port;
DENOMINATION SETTINGS	– denomination of channels (all values are in credits; if the advanced parameter auto-denomination is turned on, the original denomination of bill acceptor has priority);
STACKER SETTINGS	– setting of used stacker for each channel (only ID-003);
ADVANCED SETTINGS	– advanced settings depending on selected protocol.

Coin Acceptor Settings

This section is intended for coin acceptor settings. To do this it is necessary to choose work protocol. Then it is possible to specify the denomination for each channel.

PROTOCOL	– used protocol (only pulse protocol is available);
DENOMINATION SETTINGS	– denomination of channels (set in credits , but not in currency!);
ADVANCED SETTINGS	– advanced settings depending on selected protocol

Ticket Printer Settings

To activate the device it is necessary to select protocol and a serial port that is connected to the printer.

PROTOCOL	– used protocol;
SERIAL PORT	– used serial port;
PRINT TEST TICKET	– printing the ticket of chosen type for checking the printer.

Hopper Settings

PROTOCOL	– used protocol (only pulse protocol is available);
COIN CHANNEL	– coin acceptor channel number, whose coins get to the hopper;
CAPACITY	– maximum amount of coins which the hopper can pay out without replenishment;
COIN OUT PULSE EDGE	– pulse front according to that coin output from the hopper must be accounted;
HOPPER REFILL	– this function must be selected at direct inserting coins in the hopper (for adequate account of available coins number);
HOPPER DUMP	– this function must be selected at direct dumping from the hopper (for adequate account of available coins number);
HOPPER UNLOAD	– automatic unloading of all coins from the hopper (the hopper turns on and works until it unloads all or the operation is not stopped by the operator).

In addition in this section the number of coins that are in the hopper (computed value) is displayed for convenience. If coins are inserted or dumped directly, the actual number of coins may be different. To do this it is necessary to use the functions Refill or Dump.

Mechanical Counters Settings

COUNTERS RATE	– settings for two mechanical counters of entered credits (credit key and general one) and two taken credits (key and general one);
BET COUNTER RATE	– settings for the counter of lost bets;
CNT#n DISCONNECTED	– action at disconnection of counter n (see diagram connector X2).

Parameters set the price of counter item in credits. I.e., if **BET COUNTER RATE** is set equal to 50, the corresponding counter rate increases by an item only after the sum of stored bets increase not less than by 50.

Touchscreen Settings

PROTOCOL	– used protocol;
SERIAL PORT	– used serial port;
CALIBRATE	– device calibration – it is necessary to touch in turn the two red crosses on the screen.

Game Selection

This section of parameters is intended for selecting games available to the player. By default all the games are available. At any moment it is possible to start any number of games, as long as at least one game is available. Excluded games will be highlighted in red on the main screen and unavailable to the player. If only one game is left included, the select game screen will not be available.

SAS Settings

This section of parameters is intended for SAS settings (IGT Slot Accounting System). Some items may not be available depending on the board configuration.

SASn MACHINE ADDRESS	– SAS channel address (at setting different address from 0 for the second channel, port COM4 is not available for connected devices);
SASn FEATURES	– setting of supported modes for each SAS channel;
ADVANCED FUNDS TRANSFER	– turn on/off SAS AFT support;
HANDPAY REPORTING TYPE	– type of handpay reporting (old or with turn);
BONUSING	– turn on/off supporting external bonus;
ADD BONUS TO TOTAL WIN	– turn on/off adding external bonus to Total Won number in the statistics;
START AFT REGISTRATION	– start AFT registration (if while registration the operator's confirmation is needed, the item will be called CONFIRM AFT REGISTRATION — confirm AFT registration. After successful completing registration, the item changes its name to CANCEL AFT REGISTRATION — cancel AFT registration).

SASn features

MANAGEMENT	– turn on/off management support for selected SAS channel;
HANDPAY REPORTING	– turn on/off handpay reporting support for selected SAS channel;
BONUSING	– turn on/off bonusing support for selected SAS channel;
ADVANCED FUNDS TRANSFER	– turn on/off AFT support for selected SAS channel;
TICKET IN, TICKET OUT	– turn on/off TITO support for selected SAS channel;
LOCK WHEN LINK IS DOWN	– turn on/off locking machine when connection loses on selected SAS channel.

Ticket settings

This section is intended for setting parameters necessary for work with tickets.

CASHOUT TO TICKET MODE	– mode of creating ticket validation code (necessary for ticket printing);
REDEEM TICKETS	– permission/ban of ticket reception;
EXPIRATION (DAYS)	– the number of days that the ticket is valid;
ESTABLISHMENT	– the name of establishment that hands out tickets (e.g. casino name);
ADDRESS #1	– local address (building, street);
ADDRESS #2	– general address (city, district, postcode);
MAJOR CURRENCY UNIT	– the full name of base currency in singular (e.g. “EURO”, “DOLLAR”);
MINOR CURRENCY UNIT	– the full name of currency for change in singular (e.g. “CENT”);
VALUE PREFIX	– text preceding sum of money (e.g. “\$”);
VALUE SUFFIX	– text following sum of money (e.g. “USD”);
ADVANCED SETTINGS	– this sub-menu includes the following additional settings:
DATE FORMAT	– date format (some printer firmware can change date format);
DATE FIELDS SEPARATOR	– date fields separator;
THOUSAND SEPARATOR	– thousand separator;
DECIMAL MARK	– separator of integer and decimal;
MAJOR CURRENCY UNIT (PLURAL)	– the name of base currency in plural (e.g. “DOLLARS”);
MINOR CURRENCY UNIT (PLURAL)	– the name of currency for change in plural (e.g. “CENTS”);
TITLE FOR CASHOUT RECEIPT	– title for cashout receipt (a ticket not accepted by the bill acceptor);
TITLE FOR RESTRICTED TICKET	– title for restricted ticket (means which cannot be cased from);
TITLE FOR DEBIT TICKET	– title for debit ticket;
MACHINE# TEXT	– text of the ticket “MACHINE# ”;
TICKET# TEXT	– text of the ticket “TICKET# ”;
VALIDATION TEXT	– text of the ticket “Validation”;
EXPIRATION TEXT	– text of the ticket “Ticket Void after”;
NEVER EXPIRATION TEXT	– text of the ticket “Ticket never expire”;
DAYS TEXT	– plural form of the word “day” (used to specify the expiration date);
DAY TEXT	– singular form of the word “day” (used to specify the expiration date).

Security

Set-up of the permissions and passwords to the system screens.

CLEAR SHORT	– permission to clear short statistics;
MAKE INIT	– type of access to the initialization;
SET TIME	– type of access to the time set;
CHANGE TOTAL SCALES	– type of access to the screen of installing coin slot and bill acceptor and counters;
CHANGE TOTAL PARAMETERS	– type of the access to the general settings screen;
ENABLE/DISABLE GAMES	– type of access to selection screen of games available to players;
CHANGE GAME OPTIONS	– type of access to the game setting screen;
CHANGE COM PORT SETTINGS	– type of access to the serial port setting screen;
CHANGE SAS SETTINGS	– type of access to the SAS setting screen;
HOST CAN CHANGE ASSET NUMBER	– the computer is permitted to change asset number or house-id (used by AFT);
HOST CAN CHANGE FLOOR LOCATION	– the computer is permitted to change machine location;
RESET ERRORS BY CREDIT KEY	– permission to reset error condition by the means of the credit key;
PASSWORD	– setting of the password that will be asked while trying to access a protected page. Password reset is accomplished by entering an empty password.
DOOR SETTINGS	– setting menu of door security.

If there is a serious failure and initialization is required to fix it, the access will be free. After an initialization of the board there is no password.

To restrict the access to any of the entries it is necessary to set the type of access to it “**PASSWORD**” and to enter the password, different from empty.

Password is not more than eight digits (from 1 to 5), entered by **HOLD1**, **HOLD2**, ... **HOLD5** buttons.

Door Security Settings

xxxxx DOOR LATENCY	– latency to the opening/closure of the corresponding door;
RESUME ON CLOSE xxxxx DOOR	– if it is on, after closing the corresponding door the machine starts the play mode, otherwise the operator is to start the play mode.

Initialization of the machine (INIT)

Before the receipt into the sale every board is initialized by the manufacturer and therefore customers does not need to conduct this operation themselves. But in case of some errors, caused by wrong adjustment or influence of external factors, it can be necessary.

Initialization (memory clear) – is a reset of all settings by default values and a complete clearance of game statistics and accounting.

Initialization is invoked from the main menu of the service mode (some boards requires to open Door #2: card cage or logic door). It is possible to null the board by pressing button **BET** and holding it for about five seconds.

Attention! All the information about settings, credit and winnings is lost at the same time. All settings drop by default.

Event Logs

Event logs are intended to control the work of the machine. All events, meeting some standards, for example game events, numerical parameter of which is not less than a value assigned, are fixated in them.

It is possible to view four types of lists:

ALL EVENTS	– all happened events;
PAYOUT EVENTS	– entering and canceling of credit;
PAY AND SYSTEM EVENTS	– entering and canceling of credit and system events;
GAME EVENT	– register of game events;
xxxx DOOR EVENTS	– last 50 events of the corresponding door;
TICKET IN EVENTS	– detailed log of last accepted tickets;
TICKET OUT EVENTS	– detailed log of last printed tickets, operator can print copy of any ticket in it;
EXIT	– exit to the main menu.

All events except door and ticket events in separate logs has the following structure:

[<game>] <event title> [<numerical parameter>] <date> <time>

Uncleared door events have the following structure:

<date> <time> - <event title>

Numerical parameter can be lacking for some types of events (for example: switching on/ off of the machine). The whole list of events and their deciphering is described in [Appendix II: events](#).

Set Clock

In this menu time and date are set.

The position of editing is changed with **HOLD1** and **HOLD2** buttons, forward and backward correspondingly. The value is changed with the **HOLD3** and **HOLD4** buttons— previous and next value. The changes are canceled with the **BET** button. Exit with the saving of adjusted time is accomplished with the button **START**.

Game statistic

Menu contains the list of games, which has statistics, and in the heading there is the following information:

TOTAL BETS	– amount of all bets made;
TOTAL WON	– sum of winnings taken by the player and percentage ratio of WIN/BET;
TOTAL GAMES	– amount of played games

Each entry in the menu allows access to the statistics of the corresponding game. The first page contains the following items (depending on the game, counters can vary):

TOTAL GAMES	– amount of games;
TOTAL BET	– amount of all bets made;
MAIN GAME WIN	– sum of all winnings in the main game;
TOTAL WON	– sum of taken winnings (including risk and bonus games);
RISK IN	– sum of winnings, with which the doubling was entered;
RISK OUT	– sum of winnings in doubling;
BONUS QUANTITY	– quantity of bonuses hit;
BONUS WINNING	– sum of all winnings in the bonus-game;
SBONUS QUANTITY	– quantity of super bonuses;
SUPER BONUS WIN	– sum of all winnings in the super bonus game;
SBNS WIN COUNT	– amount of winning super bonuses.

On the pages from 2nd to 4th the information about winnings is given: an amount, sum of winnings, date and time of the last hit.

Game options

In this menu each game can be selected and adjusted. There are the following settings:

PAYOUT RATE	– generosity of the game (very low – very greedy, low, normal , high, very high – very generous; some boards has this settings in percents);
MIN BET	– minimum bet;
MAX BET	– maximum bet;
BET FOR xxxx	– minimum bet for the special equipment (helmet, fire extinguisher, umbrella, mushroom) to appear;
APPLY CHANGES	– apply changes to all games (without it settings of games are not changed) – present in COMMON SETTINGS only.

Tests

After entering this unit of the menu, you get to the sub menu, there you can choose:

KEYS TEST	– inputs test;
SOUND TEST	– sound test;
20 LAST ERRORS	– list of the last twenty errors;
FIRMWARE CRC32	– account of the control sum of the firmware (CRC32 method);
EXIT	– exit to the main menu.

Choosing the **keys test**, you will get to the screen, where all board ports are listed (title and location on the connector), and also their current condition. If you assume, that you have some external device or button unable to work, then after entering this mode, you will be able to check your supposition.

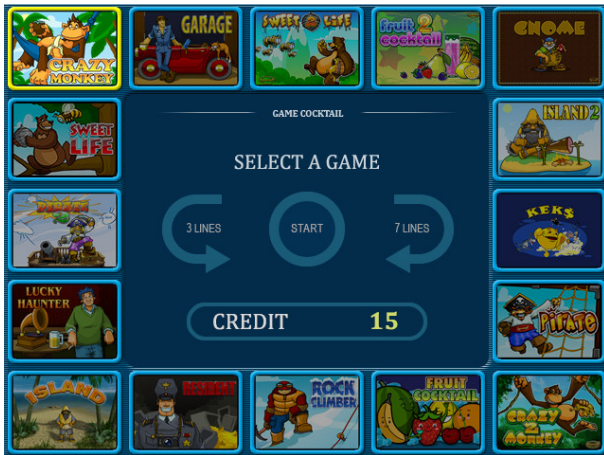
After choosing the **sound test**, there will be three inscriptions: “**CHANNEL 1**”, “**CHANNEL 2**” and “**CHANNEL 3**” appearing consequently on the screen. At that time the sound will be given through the first, the second and the third channels respectively.

Error list is needed for the registration of non standard situations. If the machine operates in a “strange” way or suddenly demands an initialization, then, probably, a situation of that type has occurred. A type of the error can be learned from this list. This list is necessary only for the producer. If there is no serious reason, do not pay attention to errors.

Initialization does not clear this list. To clear it, it is necessary while the list is on the screen, to press the button **BET** and then hold it for five seconds.

Attention! If some inscription has appeared in your error list, that is a ground for contacting with the support service of the machine/board seller.

Game Selection



If more than one game is switched on in the settings, the player can choose. There is a screen with 16 game icons. With the buttons **3LINES** and **7LINES**, the player can sequentially go over them clockwise and counterclockwise. When a game is selected it is necessary to press **START**, to launch the game.

If denomination of gaming machine is differs from 1:1, currency is not default or denomination showing is forced then user can see current denomination and balance in units of machine currency.



Touchscreen

If touchscreen is turned on the player can play without using buttons.

To start a game it is necessary to touch the corresponding icon on the screen. If it is necessary to cancel a credit by the means of TITO or the hopper, the sign CREDIT should be touched on the screen.

1. **Main game**
 - rotation launch – touch the reels field
 - bet change – touch the value of bet
 - line quantity change – touch a line number
 - maximum bet setting – touch the sign “**TOTAL BET**” at the top of the screen
 - credit payout via AFT, TITO or hopper – touch the sign “**CREDIT**”
 - game exit – touch the logotype “Igrosoft”
 - open help – touch a game character or an empty field below reels
2. **Display of main game winning**
 - take the winning – touch the reels field
 - enter the risk game – touch the sign “**TAKE OR RISK**”
 - open help – touch a game character or an empty field below reels
3. **Risk game**
 - open the card/item – touch the corresponding card or item
 - take the winning – touch the field “**CREDIT**” or bottom third of the screen
4. **Bonus game**
 - choose the item – touch the corresponding item
5. **Super bonus game**
 - choose the item – touch the corresponding item
 - take the winning – touch the winning (Crazy Monkey 2)
6. **Help**
 - control is performed by touching the button, displayed on the screen

Appendix I: problem solution

Q: The machine does not enter the demonstration or the game modes. It writes constantly “INIT MACHINE”.

A: Probably, a serious error has occurred. It is necessary to initialize the board. It is possible to learn about the error from the error list (see “Instruction on service support” chapter “Tests”).

Q: The machine gave out an inscription “HARD TEST PASSED” and one or several more from the list: “SHORT STATISTIC ERROR”, “LONG STATISTIC ERROR”, “MAIN SETTINGS ERROR”, “INTERNAL ERROR”, “ERROR: FAILED MEMORY! INIT NEEDED!”, etc., but it did not enter the game/demonstration mode.

A: A memory failure has occurred in the corresponding domain of data. It is recommended to clear the corresponding statistics, if an error occurred in it, or, having entered the service menu, change damaged settings. But in any case, it is better to accomplish an initialization of the board and if it repeats again, contact the company that sold the board/machine.

Q: After switching on there is an inscription: “CALL ATTENDANT” at the bottom of the black screen.

A: Probably, one or several game buttons are out of order or got “sticked”. It is necessary to use the “short statistic” key. The machine will enter the mode of button test, an exit from which is accomplished in a few seconds after all the buttons are pressed or after a reset (switching off and repeated switching on the machine).

Q: A just bought machine gives a large amount of winnings. Its percentage of payout exceeds 100%.

A: Such behavior is typical of any new machine. That is kind of advertising and attracts customers. In some time it will start to maintain specified percentage. But if that does not suit you, play yourself and when the machine reaches the necessary percentage, start its usual exploitation.

Q: Players do not play some games on this machine.

A: Probably, too low percentage of winnings was established. Increase it to the maximum value. If after that people do not play, obviously, the game does not suit their taste.

Q: A new bill acceptor was connected to COM1, but it does not work.

A: Make sure that the protocol which corresponds the configuration of this device is selected in settings.

Q: The screen has become blue and there appears an inscription about the bill acceptor problem.

A: There is the problem with the bill acceptor. This error is still displayed on the screen even after its elimination. To reset this screen it is necessary to use the service key or statistics key.

Q: The screen has become blue and there appears an inscription about the printer problem.

A: There is the problem with the ticket printer. The screen is reset after eliminating the cause.

Q: The screen has become blue and there appears an inscription “xxxx DOOR WAS OPENED”.

A: One or more service doors are opened. The error is rectified by the service key or statistics key.

Q: The screen has become blue and there appears an inscription “DISCONNECTED COUNTER #n”.

A: One of the controlled mechanical counters is disconnected. The error is removed after fixing the problem by the service key or statistics key.

Q: During an attempt to give out the credit by the hopper, an inscription “HOPPER ERROR” appeared.

A: The sum demanded was too high. The inscription is removed with any service key, including the credit one.

Q: The hopper started to give out money, but did not give all. An inscription “CALL ATTENDANT” appeared.

A: The hopper has run out of coins. It is necessary to add them there. The inscription is removed with any service key.

Q: One or several players win constantly more, than lose.

A: Probably, these players have found a method of breaking through the game security system. Check, if the producer has new versions of micro programs. If not or the upgrade has not solved the problem, it is highly recommended to observe the players' actions (playing manner, bets made, lines used, etc.), contact the seller and give your observations. The earlier and the more accurate information will get the developers, the faster they will be able solve the problem, usually during 7 days after the localization of the error (i.e. if the exact error reason was discovered). If for some reason update cannot be installed for a long time, the problem game is recommended to be excluded in the settings.

Appendix II: events

System events

POWER ON/OFF	– switching on/off of the machine
INIT MACHINE	– initialization of the machine
CLOCK CHANGED	– time and date setting
TIME BEFORE CLOCK CHANGED	– time before changing the current time;
<door name> WAS OPENED	– the door was opened;
<door name> WAS CLOSED	– the door was closed;
SETTINGS CHANGED	– the settings were changed in the corresponding section;
SHORT STATISTIC CLEARED	– short statistics were cleared;
EVENT LIST CLEARED	– emergency clearance of the event list;
HOPPER UNLOAD	– hopper was unloaded;
START GAME <gm>	– the game <gm> was launched;
SAS SETTINGS CHANGED	– SAS settings were changed;
SERVICE MENU ENTERED	– service menu was entered;
SERVICE MENU EXITED	– service menu was exited;
SHORT STATISTIC ENTERED	– short statistics was entered;
SHORT STATISTIC EXITED	– short statistics was exited;
SAS SETTINGS CHANGED	– SAS settings were changed;
ACCEPTOR HW FAILURE	– an error in the bill acceptor work;
PERIPHERALS LIST CHANGED	– a set of connected devices was changed
FIRMWARE VERSION CHANGED	– firmware version was changed;
EXT. BONUS WIN	– an external bonus on the indicated amount has come;
EXT. BONUS WIN / 100 =	– a big external bonus has come, the indicated amount is less than the real one by 100 times;
DISCONNECTED COUNTER #<n>	– the mechanical counter was disconnected (see the connector X2 diagram).

Events of the entering/canceling of the credit

COIN IN	– credit is entered through the coin slot;
HOPPER OUT	– credit gave out by the hopper;
KEY IN	– credit entered with the credit key;
KEY OUT	– credit canceled with the credit key;
TICKET IN	– credit entered with the ticket;
TICKET OUT	– credit canceled with the ticket;
AFT IN	– credit entered with SAS AFT;
AFT OUT	– the whole credit or its half is canceled with SAS AFT;
BILL IN	– credit is entered through the bill acceptor.

Game events

<gm>: □□□□ LINE #<n>	– winning on the line <n> is a specified combination and compiles the specified number;
<gm>: SEVERAL LINES	– winning on several lines;
<gm>: FREE GAMES	– free games produced a winning, which compile the specified number;
<gm>: RISK WIN STEP <n>	– winning in a risk-game on the <n> step compiles the specified number (not obligatory chosen by the player);
<gm>: BONUS WIN	– winning in a bonus game compiles the specified number;
<gm>: BOX BONUS WIN	– in a “box” bonus game (Garage) winning compiles the specified number;
<gm>: LOCK BONUS WIN	– in a “lock” bonus game (Garage) winning compiles the specified number;
<gm>: CHEST BONUS WIN	– in a “chest” bonus game (Pirate and Pirate 2) winning compiles the specified number;
<gm>: BARREL BONUS WIN	– in a “barrel” bonus game (Pirate and Pirate 2) winning compiles the specified number;
<gm>: SUPER PRIZE WIN	– super prize (Garage, Rock Climber) compiles the specified number;
<gm>: SUPER BONUS WIN	– winning in a super bonus game compiles the specified number.

Appendix III: possible settings values

Global settings

Main Parameters

Title	List of possible values
MACHINE NUMBER	0 - 4294967295
ASSET NUMBER	0 - 4294967295
COUNTRY/CURRENCY	DEFAULT , ARGENTINA, ... EURO, ... RUSSIA, ... UNITED STATES
DENOMINATION	0.01, 0.02, 0.05, 0.10, 0.20, 0.25, 0.50, 1.00 , 2.00, 2.50, 5.00, 10.00, 20.00, 25.00, 50.00, 100.00
CREDIT LIMIT	1000, 5000, 10000, 20000 , 50000, 100000, 200000, 500000, 900000
EVENT LIST BARRIER	0, 2, 5, 10, 20, 50, 100, 200 , 500, 1000, 2000, 3000, 4000, 5000, 7000, 10000, 20000, 50000
MAX TOTAL BET	10, 50, 100, 250 , 500, 1000
BILL RECEPTION LIMIT	DISABLED , 100, 200, ..., 1000, 1500, ..., 5000, 6000, ..., 10000, 20000, 50000, 100000, 200000, 500000
SPEAKER VOLUME	1%, 13%, 25%, 38%, 50%, 63%, 75% , 88%, 100%
SWITCH GAME MODE	SW GAME ONLY , 3LINES+7LINES
DEMO TYPE	STANDARD, SELECTOR ONLY

Key in and handpay settings

Title	List of possible values
CREDIT KEY FUNCTION	10, 20, 50, 100, 200, 500, 1000, BUTTONS , OUT ONLY
EVEN HANDPAY	0.01 , 0.02, 0.03, 0.04, 0.05, 0.10, 0.20, 0.25, 0.30, 0.40, 0.50, 1.00, 2.00, 2.50, 3.00, 4.00, 5.00, 10.00, 20.00, 25.00, 30.00, 40.00, 50.00, 100.00, 200.00, 250.00, 300.00, 400.00, 500.00, 1000.00, 2000.00, 2500.00, 3000.00, 4000.00, 5000.00
HANDPAY LIMIT	DISABLED , 100, 200, 300, 400, 500, 1000, 2000, 3000, 4000, 5000, 10000, 20000, 30000, 40000, 50000, 100000, 200000, 300000, 400000, 500000
PERMIT HANDPAY CANCEL	YES, NO

Equipment

Bill acceptor

Title	List of possible values
PROTOCOL	DISABLED , PULSE, ID-003, S.S.P.
SERIAL PORT	COM1 , COM2, COM3, COM4, COM5, COM6
<i>DENOMINATION</i> for each channel	0 , 1, 2, 3, 4, 5, 10, 20, 25, 30, 40, 50, 100, 200, 250, 300, 400, 500, 1000, 2000, 2500, 3000, 4000, 5000, 10000, 20000, 25000, 40000, 50000, 100000, 200000, 250000, 300000, 400000, 500000
SHOW DENOMINATION	NEVER, AUTO , ALWAYS
STACKER	STACKER-1 , STACKER-2
<i>INHIBIT LEVEL</i> ²	HIGH , LOW
<i>AUTO DENOMINATION</i> ³	ON , OFF
<i>SLAVE DEVICE ID</i> ⁴	0 - 127
<i>BEZEL COLOR</i> ⁴	DEFAULT , NAVY, GREEN, TEAL, MAROON, PURPLE, OLIVE, GRAY, SILVER, BLUE, LIME, AQUA, RED, FUCHSIA, YELLOW, WHITE
<i>TICKET DIRECTION</i> ⁴	ANY , TOP, BOTTOM

Coin acceptor

Title	List of possible values
PROTOCOL	DISABLED , PULSE, ID-003, S.S.P.
<i>DENOMINATION</i> for each channel	0 , 1, 2, 3, 5, 10, 20, 25, 30, 50, 100, 200, 250, 300, 500, 1000, 2000, 2500, 3000, 5000, 10000, 20000, 25000, 50000, 100000, 200000, 250000, 300000, 500000
INHIBIT LEVEL ²	HIGH , LOW

Ticket Printer

Title	List of possible values
PROTOCOL	DISABLED , FL TCL, ESC/P
SERIAL PORT	COM1 , COM2, COM3, COM4, COM5, COM6

Hopper

Title	List of possible values
PROTOCOL	DISABLED , PULSE
<i>COIN CHANNEL</i>	1 - 15
CAPACITY	100, 200, 300 , 400, 500, 600, ..., 3000
COIN OUT PULSE EDGE	FRONT , BACK

Mechanical counters

Title	List of possible values
<i>COUNTERS RATE</i>	1 , 10, 100
<i>BET COUNTER RATE</i>	1 , 10, 100
<i>CNT#n DISCONNECTED</i>	IGNORE, INFORM , BLOCK

Touchscreen

Title	List of possible values
PROTOCOL	DISABLED , GENERAL TOUCH
PORT	COM1 , COM2, COM3, COM4, COM5, COM6

² Only for the protocol PULSE

³ Only for the protocol ID-003

⁴ Only for the protocol S.S.P

SAS Settings

Title	List of possible values
MACHINE ADDRESS	0 (turn off), 1, 2, ... 127 (at initialization does not change)
ADV. FUNDS TRANSFER	ON , OFF
HANDPAY REPORTING TYPE	QUEUED, LEGACY
BONUSING	DISABLED, AFT , LEGACY, AFT&LEGACY
ADD BONUS TO TOTAL WIN	YES , NO

Sas Features

Title	List of possible values
MANAGEMENT	YES, NO
HANDPAY REPORTING	YES, NO
BONUSING	YES, NO
ADVANCED FUNDS TRANSFER	YES, NO
TICKET IN, TICKET OUT	YES, NO
LOCK WHEN LINK IS DOWN	YES, NO

Ticket Settings

Title	List of possible values
CASHOUT TO TICKET MODE	DISABLED , SYSTEM
REDEEM TICKETS	NO , YES
EXPIRATION (DAYS)	NEVER, 1 - 31
DATE FORMAT	DD/MM/YY, MM/DD/YY , DD/MM/YYYY, MM/DD/YYYY, “MON DD, YYYY”, “DD MON YYYY”, YY/MM/DD, YYYY/MM/DD
DATE FIELD SEPARATOR	SLASH , PERIOD, HYPHEN
THOUSAND SEPARATOR	NONE, SPACE, COLON , PERIOD, APOSTROPHE
DECIMAL MARK	PERIOD , COLON

Security

Title	List of possible values
CLEAR SHORT	YES , NO
INITIALIZE	FREE , PASSWORD
SET TIME	FREE , PASSWORD
CH. MAIN PARAMETERS	FREE , PASSWORD
ENABLE/DISABLE GAMES	FREE , PASSWORD
CH. GAME OPTIONS	FREE , PASSWORD
CH. EQUIPMENT SETTINGS	FREE , PASSWORD
CH. SAS SETTINGS	FREE , PASSWORD
HOST CAN CHANGE ASSET NUMBER	YES , NO
HOST CAN CHANGE FLOOR LOCATION	YES , NO
RESET ERRORS BY CREDIT KEY	YES, NO
PASSWORD	Any combination of not more than 8 numbers from 1 to 5 (not specified by default)

Door settings

Title	List of possible values
xxxxx DOOR LATENCY	DISABLED, 0.25 SEC, 0.50 SEC , 0.75 SEC, 1.00 SEC, 1.25 SEC, 1.50 SEC, 1.75 SEC, 2.00 SEC
RESUME ON CLOSE xxxxx DOOR	YES, NO

Game Options

Title	List of possible values
PAYOUT RATE	VERY LOW ¹ (“greedy game”), LOW, NORMAL , HIGH, VERY HIGH ¹ (“generous game”)
MIN BET	1 , 2, 3, 4, 5, 6, 7, 8, 9, 10, 15, 20, 25, 30, 35, 40, 45, 50, 60
MAX BET	8, 9, 10, 15, 20, 25 , 30, 35, 40, 45, 50, 60, 70, 80, 90
BET FOR <item>	10, 20, 30, 40 , 50, 60, 70, 80, 90, 100, 150, 200, 250, 300, 400, 500, 600, 700, 800, 900

Default values are highlighted in **bold**

In entertainment versions some parameters can have other values

¹ Available in not all game versions (e.g. disabled in XGC-xxxxxx)

Appendix IV: connection diagrams

Connector X1

Component Side (A)	Contact	Printed Side (B)
GND	1	GND
GND	2	GND
+5V	3	+5V
+5V	4	+5V
+12V	5	+12V
	6	
	7	
	8	
GND	9	GND
GND	10	GND

Connector X2

Component Side (A)		Contact	Printed Side (B)	
Description	Direction		Direction	Description
		1		
		2		
SPEAKER	OUT	3		GND
HOLD1	IN	4	IN	COIN CHANNEL #1
HOLD2	IN	5	IN	COIN CHANNEL #2
HOLD3	IN	6	IN	COIN CHANNEL #3
HOLD4	IN	7	IN	COIN CHANNEL #4
HOLD5	IN	8	IN	DROP DOOR (DOOR#3)
START	IN	9	IN	CASHBOX DOOR (DOOR#4)
BET	IN	10	IN	BELLY DOOR (DOOR#5)
SWITCH GAME	IN	11	IN	RESERVED
		12	IN	RESERVED
		13		
MAX BET	IN	14	IN	RESERVED
HELP	IN	15	IN	RESERVED
SLOT DOOR (DOOR#1)	IN	16	IN	RESERVED
CARD CAGE (DOOR#2)	IN	17	IN	CALL ATTENDANT
COIN CHANNEL #5	IN	18	IN	COIN CHANNEL #6
COIN CHANNEL #7	IN	19	IN	COIN CHANNEL #8
SHORT STATISTIC	IN	20	IN	SERVICE (LONG STATISTIC)
PAYOUT	IN	21	IN	KEY OUT
		22	IN	HOPPER COIN OUT
RESERVED	OUT	23	OUT	COIN LOCK
KEY IN COUNTER	OUT	24	OUT	BILL LOCK
TOTAL IN COUNTER (CNT#1)	OUT	25	OUT	TOP GREEN LAMP
TOTAL OUT COUNTER (CNT#2)	OUT	26	OUT	TOP RED LAMP
KEY OUT COUNTER	OUT	27	OUT	TOP YELLOW LAMP
RESERVED	OUT	28	OUT	TOTAL BET COUNTER
HOLD1 LAMP	OUT	29	OUT	BET LAMP
HOLD2 LAMP	OUT	30	OUT	MAX BET LAMP
HOLD3 LAMP	OUT	31	OUT	PAYOUT LAMP
HOLD4 LAMP	OUT	32	OUT	CHANGE GAME LAMP
HOLD5 LAMP	OUT	33	OUT	HOPPER MOTOR
START LAMP	OUT	34	OUT	HELP LAMP
CREDIT KEY	IN	35		
GND		36		GND

Socket X11

19	17	15	13	11	9	7	5	3	1
							TTL RXD6	GND	+5V
20	18	16	14	12	10	8	6	4	2
							TTL TXD6	GND	+5V

This socket is used for external devices (bill acceptors) with interface with direct TTL logic: 0 – 0V, 1 – +5V. Some manufacturers of bill acceptors (CashCode) uses name “Opto-isolated” to call it.

Attention! Please do not connect to this socket any devices with RS-232 interface (0 – +12V, 1 – -12V), because it damage whole board and cause expensive repair.

We recommend connector IDC20F for this socket. Contacts marked by gray are used for internal technical purposes and should be kept unconnected.

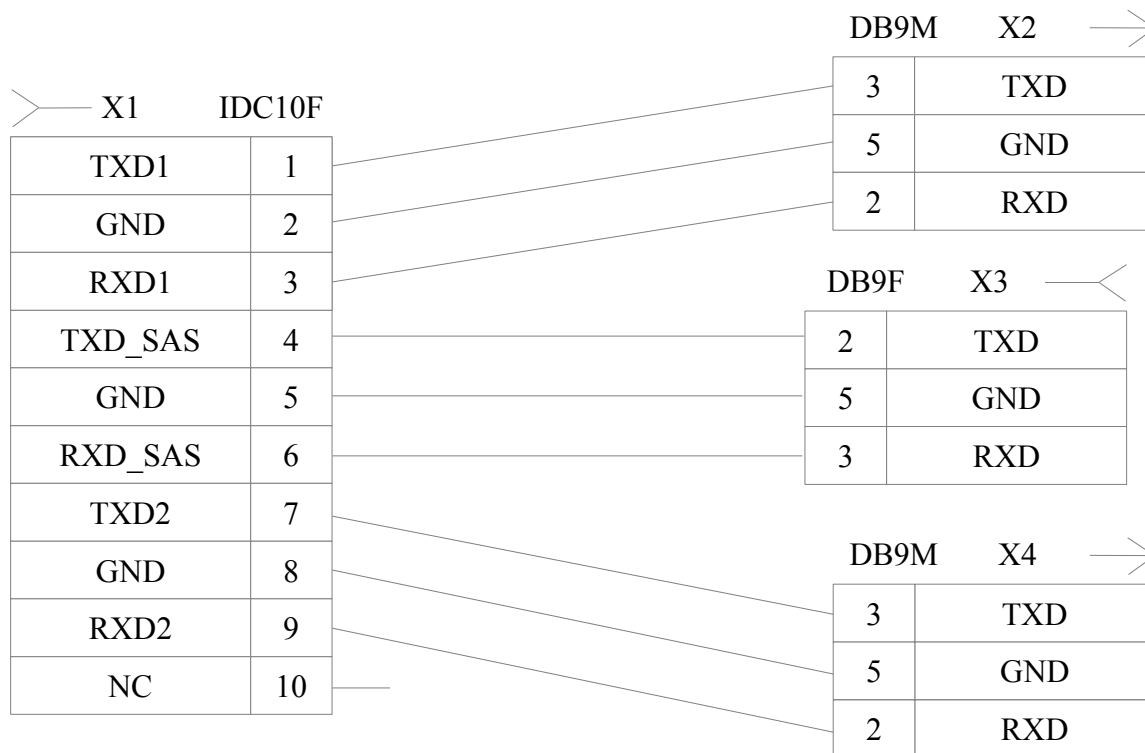
Socket RS232-1

9	7	5	3	1
RXD2	TXD2	GND	RXD1	TXD1
He исп.	GND	RXD_SAS	TXD_SAS	GND
10	8	6	4	2

Socket RS232-2

9	7	5	3	1
RXD5	TXD5	GND	RXD3	TXD3
He исп.	GND	RXD4 RXD_SAS 2	TXD4 TXD_SAS2	GND
10	8	6	4	2

Cable scheme for connecting to RS-232



In this scheme:

X1 — connects to RS-232-x of the board.

X2 — corresponding to COM1 (RS-232-1) or COM3 (RS-232-2)

X3 — corresponding to SAS1 (RS-232-1) or COM4/SAS2 (RS-232-2)

X4 — corresponding to COM2 (RS-232-1) or COM5 (RS-232-2)

Appendix V: errors of the bill acceptor

Error	Elimination of errors
ACCEPTOR DISCONNECTED	Check connection, jumpers and the selection of port and protocol
FISHING DETECTED	There was an attempt of putting back bills (fishing)
NOTE JAM DETECTED	Remove the bill
ACCEPTOR SERIAL CHANGED	Enter the service menu and confirm device change
STACKER FULL	The bill container is full, change/empty it
STACKER REMOVED	The container is removed, set it
ACCEPTOR CONNECTION ERROR	Check signal levels of the serial port of the board and bill acceptor as well as jumpers of the later one.

Appendix VI: errors of the ticket printer

Error	Elimination of errors
PRINTER DISCONNECTED	Check the connection of the printer and jumper that are in charge of data rate (should be 9600)
NO PAPER IN PRINTER	Load some paper into the printer
PRINTER MALFUNCTION	Check the printer and the protocol used by it
PAPER JAM IN PRINTER	Open the printer and remove paper, then turn it off and turn it on again
PRINTER TEMPERATURE ERROR	Check the documentation of the printer
PRINTER SOFTWARE ERROR	Check the documentation of the printer
PRINTER COMMAND ERROR	Check the printer connection
PRINTER IS OPENED	Close the printer
PRINTER IS OFFLINE	Check the documentation of the printer
PRINTER VOLTAGE ERROR	Check the documentation of the printer
PRINTER CUTTER ERROR	Check the documentation of the printer
PRINTER HARDWARE ERROR	Check the documentation of the printer
PRINTER UNKNOWN ERROR	Check the printer efficiency
PRINTER BUFFER OVERFLOW	Report to the Igrosoft company
PRINTER MEMORY OVERFLOW	Try reducing text amount printed on tickets
INVALID PRINTER VERSION	Printer version is not recognized, try replacing with a supported one or address the Igrosoft company

Appendix VII: supported printer versions

Manufacturer	Model	Proven firmware
FutureLogic	GEN2	GREUR4326
		GRPORN42
		GRUSA4100
	GEN2 Universal	GUREURGE0_9600
		GURUSAG13_9600
		GURRUSGE0_9600
TransAct Technologies	Ithaca Epic 950	TransAct M950 S01220

Appendix VIII: TITO setting up

Requirements

1. Cable for device connection via RS-232.
2. Bill acceptor using protocol ID-003 (BDP) or SSP and supporting bar code reading.
3. Printer FutureLogic GEN2 (Universal) or Ithaca Epic 950.
4. SAS-system supporting TITO with validation type System (Standard and Secure Enhanced are not supported).

Installation

1. Connect the cable with three connectors D-Sub9 to the board; attention, all the connectors have signal levels RS232 - not TTL. See appendix № 4 connector RS232-1.
2. Connect SAS system to the connector of the SAS cable.
3. Connect the bill acceptor to the connector of the COM1 cable.
4. Connect the printer to the connector of the COM2.
5. Connect power, control and monitor cables.
6. Turn on the machine, if everything is plugged in correctly, the board green LED lights up and the machine will go into one of the standard modes.

Setting

1. Activate the service key to enter the service menu.
2. If the unit requires initialization, do it in a standard way.
3. Go to the section "GLOBAL SETTINGS" - "MAIN PARAMETERS".
4. Adjust "MACHINE NUMBER" (optional, but this number will be on each ticket).
5. If it is necessary, set the parameter "DENOMINATION" (credit price), as after first credit charging the parameter blocks changes.
6. Exit from the section "MAIN PARAMETERS" and go to "EQUIPMENT".
7. Go to the section "BILL ACCEPTOR" and change the parameter "PROTOCOL" to "ID- 003" or "S.S.P.", make sure that the parameter "SERIAL PORT" corresponds to the port connected to the bill acceptor. If cash reception is not acceptable, disable "AUTO DENOMINATION" in "ADVANCED SETTINGS", if there is this option.
8. If auto-denomination is unavailable for this protocol or does not work correctly, go to the section "DENOMINATION" and set the number of credits corresponding to each channel (by default all channels are zero – bills will not accepted). Values depend on the bill acceptor firmware (see its documentation). Channel 15 setting does not matter. Please disable "AUTO DENOMINATION" in "ADVANCED SETTINGS" if it present for this protocol.
9. Exit from the section "BILL ACCEPTOR" and go to the section "TICKET PRINTER"
10. Change the parameter "PROTOCOL" to "FL TCL" (for GEN2) or "ESC/P" (for Epic 950)
11. Make sure that the parameter 'SERIAL PORT' corresponds to the one that is connected to the printer.
12. Exit from the section "EQUIPMENT" and go to the section "SAS SETTINGS".
13. Make sure the machine address is correct and SAS- system works with it.
14. Exit from the section "SAS SETTINGS" and go to "TICKET SETTINGS"
15. Change the parameter "CASHOUT TO TICKET MODE" to "SYSTEM".
16. Change the parameter "REDEEM TICKETS" to "YES".
17. By request in this section it is possible to edit any text printed on tickets as well as date and number.
18. Exit from the service menu.

Test

Just after making all the settings and exiting the service menu the demo screen is to appear. The bill acceptor is to show readiness to accept bills (e.g. a green light replaces a red one). Insert any bill in it that is supported by the firmware. If in the setting the corresponding channel is not zero or is not turned off in the stacker settings, the bill will be accepted and a credit will be added.

Make sure that SAS connection works. Then insert a standard ticket (cashout ticket that bar-code is in the middle). The bill acceptor is to accept it and the number of credits transferred by SAS is to be shown in the field 'credit'. Attention, if a number exceeding credit limits (by default 20 000) is reported to or not divisible to the current machine denomination, such a ticket will be rejected.

Now push the button Pay Out (make connection of 36A and 21A of the board connector X2). If SAS permits printing tickets, the printer will start working and in a few seconds a ticket will be ready. At the same time the field "credit" will be zeroed.

Appendix IX: supported SAS exceptions

Number (hex)	Support level	Description
11	depends on settings	Slot door was opened
12	depends on settings	Slot door was closed
13	depends on settings	Drop door was opened
14	depends on settings	Drop door was closed
15	depends on settings	Card cage was opened
16	depends on settings	Card cage was closed
17	full	AC power was applied to gaming machine
19	depends on settings	Cashbox door was opened
1A	depends on settings	Cashbox door was closed
1B	depends on settings	Cashbox was removed
1C	depends on settings	Cashbox was installed
1D	depends on settings	Belly door was opened
1E	depends on settings	Belly door was closed
20	depends on settings	General tilt
23	full	Hopper is empty
27	for ID003 and SSP	Cashbox full detected
28	for ID003 and SSP	Bill jam
29	for ID003 and SSP	Bill acceptor hardware failure
2A	for ID003 and SSP	Reverse bill detected
2B	for ID003 and SSP	Bill rejected
32	full	CMOS RAM error (no data recovered from EEPROM)
36	full	EPROM error (different checksum - version changed)
3B	full	Low backup battery detected
3C	full	Operator changed options
3D	full	A cash out ticket has been printed (may has priority)
47	full	\$1.00 bill accepted (non-RTE only)
48	full	\$5.00 bill accepted (non-RTE only)
49	full	\$10.00 bill accepted (non-RTE only)
4A	full	\$20.00 bill accepted (non-RTE only)
4B	full	\$50.00 bill accepted (non-RTE only)
4C	full	\$100.00 bill accepted (non-RTE only)
4D	full	\$2.00 bill accepted (non-RTE only)
4E	full	\$500.00 bill accepted (non-RTE only)
4F	full	Bill accepted (In non-RTE mode, for all bills without specific exception. In RTE mode, for all bill denom)
50	full	\$200.00 bill accepted (non-RTE only)
51	only canceled credits	Hand pay is pending
52	full	Hand pay was reset
57	full	System validation request (has priority)
60	full	Printer communication error
61	full	Printer paper out error
66	full	Cash out button pressed
67	full	Ticket has been inserted (has priority)
68	full	Ticket transfer complete (has priority)
69	full	AFT transfer complete (has priority)
6A	full	AFT request for host cashout (has priority)
6C	full	AFT request to register (has priority)
6D	full	AFT registration acknowledged (has priority)
6E	full	AFT registration canceled

Number (hex)	Support level	Description
6F	full	Game locked (has priority)
70	full	Exception buffer overflow (has priority)
74	full	Printer paper low
78	full	Printer carriage jammed
7A	full	Gaming machine soft (lifetime-to-date) meters reset to zero
7C	full	A legacy bonus pay awarded and/or a multiplied jackpot occurred
7E	full	Game has started
7F	full	Game has ended
82	full	Display meters or attendant menu has been entered
83	full	Display meters or attendant menu has been exited
84	full	Self test or operator menu has been entered
85	full	Self test or operator menu has been exited
8C	full	Game selected
8E	full	Component (peripheral) list changed
98	depends on settings	Power off card cage access
99	depends on settings	Power off slot door access
9A	depends on settings	Power off cashbox access
9B	depends on settings	Power off drop door access

Appendix X: Supported SAS commands

Number (hex)	Support level	Description
01	full	Shutdown (lock out play)
02	full	Startup (enable play)
03	full	Sound off
04	full	Sound on
06	full	Enable bill acceptor
07	full	Disable bill acceptor
09	full	Enable/disable game n
0A	full	Enter maintenance mode
0B	full	Exit maintenance mode
0E	full	Enable/disable Real Time Event Reporting
0F	full	Send meters 10 through 15
10	full	Send total canceled credits meter
11	full	Send total coin in meter
12	full	Send total coin out meter
13	full	Send total drop meter
14	full	Send total jackpot meter
15	full	Send games played meter
16	full	Send games won meter
17	full	Send games lost meter
18	full	Send games since last power up and games since last slot door closure meters
19	full	Send meters 11 through 15
1A	full	Send current credit
1B	only canceled credits	Send handpay information
1C	full	Send meters: total coin in, total coin out, total drop, total jackpot, games played, games won, slot door open, power reset
1E	full	Send total bill meters (# of bills)
1F	full	Send gaming machine ID & information
21	full	ROM signature verification
2A	full	Send true coin in
2B	full	Send true coin out
2D	full	Send total hand paid canceled credits
2F	full	Send selected meter for game N
31	full	Send \$1.00 bills in meter
32	full	Send \$2.00 bills in meter
33	full	Send \$5.00 bills in meter
34	full	Send \$10.00 bills in meter
35	full	Send \$20.00 bills in meter
36	full	Send \$50.00 bills in meter
37	full	Send \$100.00 bills in meter
38	full	Send \$500.00 bills in meter
39	full	Send \$1,000.00 bills in meter
3A	full	Send \$200.00 bills in meter
3B	full	Send \$25.00 bills in meter
3C	full	Send \$2,000.00 bills in meter

Number (hex)	Support level	Description
3D	full	Send cashout ticket information
3E	full	Send \$2,500.00 bills in meter
3F	full	Send \$5,000.00 bills in meter
40	full	Send \$10,000.00 bills in meter
41	full	Send \$20,000.00 bills in meter
42	full	Send \$25,000.00 bills in meter
43	full	Send \$50,000.00 bills in meter
44	full	Send \$100,000.00 bills in meter
45	full	Send \$250.00 bills in meter
46	full	Send credit amount of all bills accepted
48	full	Send last accepted bill information
4D	only the last record	Send Enhanced Validation Information
50	full	Send validation meters
51	full	Send total games implemented
52	full	Send game n meters
53	full	Send game n configuration
54	full	Send SAS version ID and gaming machine serial number
55	full	Send selected game number
56	full	Send enabled game numbers
57	full	Send pending cashout information
58	full	Receive validation number
6F	full	Send extended meters for game n
70	full	Send ticket validation data
71	only cashable ticket	Redeem ticket
72	in-house in/out + bonus	AFT transfer funds
73	full	AFT register gaming machine
74	full	AFT game lock and status request
7B	full	Extended validation status
7C	full	Set extended ticket data
7D	full	Set ticket data
7E	full	Send current date and time
7F	full	Receive date and time
8A	full	Initiate a legacy bonus pay
90	full	Send legacy bonus win amount
94	full	Reset handpay
9A	full	Send legacy bonus meters
A0	full	Send enabled features
AF	full	Send extended meters for game n (alternate)
B3	full	Send token denomination
B5	full	Send extended game n information
B7	full	Set machine numbers

Appendix XI: Supported SAS meters

Number (hex)	Support level	Description
00	full	Total coin in credits
01	full	Total coin out credits
02	always 0	Total JP credits
03	full	Total hand paid canceled credits
04	full	Total canceled credits
05	full	Games played
06	full	Games won
07	full	Games lost
08	full	Total credits from coin acceptor
09	full	Total credits paid from hopper
0A	full	Total credits from coins to drop
0B	full	Total credits from bills accepted
0C	full	Current credits
0D	full	Total SAS cashable ticket in, including non-restricted tickets (cents)
0E	full	Total SAS cashable ticket out, including debit tickets (cents)
11	full	Total SAS cashable ticket in, including non-restricted tickets (quantity)
12	full	Total SAS cashable ticket out, including debit tickets (quantity)
15	full	Total ticket in (credits)
16	full	Total ticket out (credits)
17	full	Total electronic transfers to gaming machine
18	full	Total electronic transfers to host
1C	full	Total machine paid payable win, not including progressive or external bonus amounts (credits)
1E	full	Total machine paid external bonus win (credits)
21	full	Total attendant paid external bonus win (credits)
22	full	Total won credits (sum of total coin out and total jackpot)
23	full	Total hand paid credits
24	full	Total drop
25	full	Games since last power reset
26	full	Games since slot door closure
28	full	Total cashable ticket in, including non-restricted promotional tickets (credits)
29	full	Total regular cashable ticket in (credits)
2E	full	Electronic regular cashable transfers to gaming machine, not including external bonus awards (credits)
32	full	Electronic regular cashable transfers to host (credits)
35	full	Total regular cashable ticket in (quantity)
38	full	Total regular cashable ticket out (quantity)
40	full	Total number of \$1.00 bills accepted
41	full	Total number of \$2.00 bills accepted
42	full	Total number of \$5.00 bills accepted
43	full	Total number of \$10.00 bills accepted
44	full	Total number of \$20.00 bills accepted
45	full	Total number of \$25.00 bills accepted
46	full	Total number of \$50.00 bills accepted
47	full	Total number of \$100.00 bills accepted
48	full	Total number of \$200.00 bills accepted
49	full	Total number of \$250.00 bills accepted
4A	full	Total number of \$500.00 bills accepted

Number (hex)	Support level	Description
4B	full	Total number of \$1000.00 bills accepted
4C	full	Total number of \$2000.00 bills accepted
4D	full	Total number of \$2500.00 bills accepted
4E	full	Total number of \$5000.00 bills accepted
4F	full	Total number of \$10000.00 bills accepted
50	full	Total number of \$20000.00 bills accepted
51	full	Total number of \$25000.00 bills accepted
52	full	Total number of \$50000.00 bills accepted
53	full	Total number of \$100000.00 bills accepted
54	full	Total number of \$200000.00 bills accepted
55	full	Total number of \$250000.00 bills accepted
56	full	Total number of \$500000.00 bills accepted
57	full	Total number of \$1000000.00 bills accepted
80	full	Regular ticket in (cents)
81	full	Regular ticket in (quantity)
86	full	Regular ticket out (cents)
87	full	Regular ticket out (quantity)
8A	full	Debit ticket out (cents)
8B	full	Debit ticket out (quantity)
A0	full	In-house cashable transfers to GM (cents)
A1	full	In-house transfers to GM that included cashable amounts (quantity)
A2	always 0	In-house restricted transfers to GM (cents)
A3	always 0	In-house transfers to GM that included restricted amounts (quantity)
A4	always 0	In-house non-restricted transfers to GM (cents)
A5	always 0	In-house transfers to GM that included non-restricted amounts (quantity)
A6	always 0	Debit transfers to gaming machine (cents)
A7	always 0	Debit transfers to gaming machine (quantity)
A8	always 0	In-house cashable transfers to ticket (cents)
A9	always 0	In-house transfers to ticket that included cashable amounts (quantity)
AA	always 0	In-house restricted transfers to ticket (cents)
AB	always 0	In-house transfers to ticket that included restricted amounts (quantity)
AC	always 0	Debit transfers to ticket (cents)
AD	always 0	Debit transfers to ticket (quantity)
AE	full	Bonus cashable transfers to GM (cents)
AF	full	Bonus transfers to GM that included cashable amounts (quantity)
B0	always 0	Bonus non-restricted transfers to GM (cents)
B1	always 0	Bonus transfers to GM that included non-restricted amounts (quantity)
B8	full	In-house cashable transfers to host (cents)
B9	full	In-house transfers to host that included cashable amounts (quantity)
BA	always 0	In-house restricted transfers to host (cents)
BB	always 0	In-house transfers to host that included restricted amounts (quantity)
BC	always 0	In-house non-restricted transfers to host (cents)
BD	always 0	In-house transfers to host that included non-restricted amounts (quantity)
FA	full	Regular cashable keyed-on funds
FB	always 0	Restricted promotional keyed-on funds
FC	always 0	Non-restricted promotional keyed-on funds
FD	full	Regular cashable keyed-off funds
FE	always 0	Restricted promotional keyed-off funds
FF	always 0	Non-restricted promotional keyed-off funds

Appendix XII: Connecting bill acceptors

Model	Protocol	Connection
CashCode with RS-232 interface and CC-FLBDP protocol support	ID-003	To any RS232-x socket
CashCode with “opto-isolated” interface and CC-FLBDP protocol support For example: FLP-1710	ID-003	Uses TTL mode, connect to socket X11. Combine contacts of DR1-12-2SC-FO(JAE) with X11: DR1-1 — +12V DC (device power supply) DR1-3 — X11-1 (+5V, interface power; +5V is not an error) DR1-4 — X11-3 (GND, interface power) DR1-7 — GND (device power supply) DR1-8 — X11-5 (COM6-RX) DR1-9 — X11-6 (COM6-TX)
Innovative Technologies NV200	S.S.P.	Switch to RS232 and connect to any RS232-x
Innovative Technologies NV10	S.S.P.	Switch to RS232 and connect to any RS232-x

There are more Bill Acceptors supported but we have tested only these ones.

History of changes

2013-03-25	First version for IGP2-Extended (support of 2 monitors and 6 serial ports)
2013-03-28	Added even handpay Fixed skipping pulses in collaboration with the Pulse bill acceptor Fixed other problems detected
2013-04-01	Fixed problems of handpay Fixed rare appearance of the error TOO LONG INT PROC
2013-04-08	Added the possibility of simultaneous setting change of all games Fixed counters AFT in collaboration with machine denomination different from 1:1
2013-04-18	Added support of SAS second channel Added support of touchscreen Added support of the printer FutureLogic GEN2 Universal Fixed problems detected
2013-05-15	The doors that are not assigned to, are displayed as DOOR #n OPENED Fixed the error that caused incorrect credit in response to SAS 0x74 request Fixed minor errors
2013-06-19	Added ECC support (error control and recovery) in the firmware Checked simultaneous use of COM4 and SAS2 Performed support of the light under the button Switch game Pressing the button Max Bet does not launch the drums any more Mechanical counters continue working if errors occurred do not have something to do with them Added the possibility of eliminating errors by the means of the credit key Fixed minor errors
2013-07-03	Added support of SAS 0x06 and 0x07 commands (turning on/off the bill acceptor) Information about percentage of returns in response to commands from SAS 0x1F and 0x53 depends on the firmware settings
2013-09-10	Added partial support of SAS 0x94 command Fixed the error on denomination (instead of 1:5 was 1:4)
2013-11-06	Added support for SAS commands 0x2A, 0x2B, 0x3D, 0x50 and 0xB3 Fixed responses for SAS commands 0x1F, 0x38 and 0x53 Some of settings can be changed only after initialization It is possible to enable machine locking when SAS connection loses Tito machine number separated from AFT Asset number Player can exit from handpay mode using payout button (configurable) Added support for handpay limiting Removed possibility to clear long statistic Fixed other non-critical errors
2013-11-15	Fixed error in SAS command 0x72 in case of short identifier size Added possibility to disable machine denomination showing on game selector screen
2013-11-27	Added handpay blocking in case if no games played since credit input. Fixed non-critical errors.
2014-01-16	Fixed error which causes ticket counter reset after value 99. Added separated logs for ticket input and output with possibility to print copy of each ticket. Some non-critical fixes and optimizations.
2015-01-19	Fixed non-working denominations 2, 4, 5 and some others. Added support of SAS Real Time Event Reporting. Added support of SAS meters 0x40...0x57 and 0xFB...0xFF. Some non-critical fixes and optimizations.
2015-04-13	Fixed SAS related error which causes invalid response to any long poll in some circumstances.
2015-07-21	Fixed Payout button in single game operation mode.
2015-09-16	Fixed possible lost of mechanical meter pulses Fixed clock auto-correction Fixed some rare errors
2016-01-25	Added disable of bill acceptor when handpay is pending

2016-04-18	Fixed very rare failure of Fruit Cocktail and Fruit Cocktail 2 Added keeping shown bonus winnings on power failure Removed support for currencies of Latvia and Lithuania (they are use Euro)
2016-06-03	Added support for SAS meters 2E and 32 (electronic regular cashable funds transfers) Fixed logging of null bonuses in game Resident
2016-06-23	Fixed some super bonus winnings in the Crazy Monkey game
2016-08-xx	Fixed settings breakage by SAS long poll 7D Fixed print of never expired tickets
2017-01-11	Fixed error in chest bonus of games Pirate and Pirate 2
2017-02-20	Added support for SAS Configure Bill Denominations long poll Added support for SAS AFT Bonus Coin Out and Bonus Jackpot transfers
2017-03-23	Fixed spelling errors in the help of some games Fixed the maximum bet value in responses to SAS requests 53 and B5