

Mikohn SIB2 Firmware, MS27 to SAS Converter

Subject	SIB2 firmware v5.05, for MS27-SAS v4.0 conversion. Checksum 6143, SCO2916.
Part Number	950-405-15 Rev. A (revised to include changes between v5.04 and v5.05)
Date	June 25, 2003



This document is intended only for regulatory and testing agencies. After the firmware described herein is approved, a separate informational bulletin will be released to customers to announce the new firmware and its function.

This bulletin describes the fault corrections made to Mikohn SIB MS27-to-SAS¹ protocol converter firmware from v5.02 to v5.05. As the firmware is new, this bulletin also includes function and configuration information.

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1. MS27 is a Mikohn proprietary serial protocol.

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Reference Documentation

The following table lists related Mikohn documentation. To order, contact Mikohn Customer Service and provide the document part number. You can access other Mikohn documents on the Mikohn extranet:

<https://extranet.mikohn.com>

Engineering Change Orders (ECO) and Software Change Orders (SCO) provide complete information about Mikohn products. ECOs and SCOs are generally for internal Mikohn use, but may also be valuable to regulatory agencies and customers.

Product	Document P.N.	ECO	SCO
SIB MS27-to-SAS protocol converter	950-405-15 Rev. A (original bulletin never released)	4316	2916
DCU firmware v1.42.4 MYS	Bulletin 950-403-26	4043	2787
DCU Mystery Setup for Yahtzee	Manual 990-242-14	4033 3950	N/A
UGM hardware and software (basic kit)	Manual 990-403-54REVA	4052 4308 4315	2800

Requirements

The SIB MS27-to-SAS converter is intended for use in the Mikohn SIB2 interface board and with DCU Mystery Controller firmware v1.43MYS or higher, which supports new MS27 jackpot hit message, described on [page 8](#), and also includes error handling fault corrections.

Improvements to SAS Implementation

- Changed the SIB's delay between polls to a machine from 150ms to 200ms, which corresponds to SAS specifications.
- It has been found during in-house testing, that some machines require longer than the SAS-specified time limit of 20ms to respond to SAS polls, and in some cases require longer than 50ms. To attempt to ensure that all machines have adequate time to respond to SAS polls, increased the SIB's SAS response timeout from 50ms to 70ms.

Fault Corrections

SIB Not Sending Implied Acknowledgements Required by Machine

Fault: After the SIB sent a disable message to the machine and the machine acknowledged the message, the machine required a SAS implied acknowledgement, such as a general poll or any poll other than the same disable message. Instead, the SIB was simply resending the disable message at intervals. Consequently, the machine would not disable.

Correction: The SIB now sends an implied acknowledgment as required by the machine.

SIB Stuck in a Loop of Repeatedly Sending Progressive Broadcasts

Fault: In the following scenario, the SIB became stuck in a loop of repeatedly sending progressive broadcasts to the machine.

1. A Mystery progressive hit and the SIB attempted to pay the bonus to the machine.
2. The machine failed to acknowledge the transfer of credits and consequently, the SIB disabled the game.
3. In the disable state (SIB does not poll machine, and DCU does not poll SIB), the SIB is powered down and both communication cables, to the machine and to the DCU, are disconnected.
4. The SIB is then powered on and the communication cables reconnected.
5. The SIB then immediately begins the loop of continuously resending progressive broadcasts to the machine.

The above loop scenario was caused by a fault in SIB logic that determine which polls it should send to the game, which could cause the SIB to get stuck in a given state.

Corrections:

- Corrected faults in the SIB logic that determined which polls to send to a machine.
- Also changed the SIB so that anytime it is not online with the DCU, the SIB will send no progressive broadcasts.

Fault corrections continue on the next page.

No Machine Response to SIB's SAS 0x8A Long Poll, SIB Does Not Notify System

Fault: On a Mystery hit, the SIB sent a SAS bonus long poll 0x8A to the game, to instruct it to pay out the hit. The SIB requires an acknowledgement from the game to the long poll. Previously, if the machine did not acknowledge the long poll, the SIB would simply continue resending it, instead of sending an error to the DCU.

Correction: Now, if the machine does not acknowledge the SIB's long poll, the SIB sends the DCU an 0xE6 error message, with the error code 0x10, and disables the game. The DCU sends the SIB an acknowledgement to the error message, stops polling the SIB, and also sends an "Error #53: Serial Machine Mystery pay is not available" to SuperLink. After the Mystery hit is cleared, the DCU resumes polling the SIB again, and the SIB enables the game and allows coin-in contributions to resume.



To re-enable the game after a Mystery hit, the hit must be cleared through PSP, in SuperLink.

On Denomination Change, SIB Continues to Use Old Denomination

Fault: If the machine's denomination was changed, without power cycling the SIB, the SIB would continue to use the old denomination setting. (When you power cycle the SIB, it automatically requested denomination, and other machine configurations).

Correction: Now, the SIB polls the game for its configurations every 30 seconds, to ensure the SIB has the current machine setting for denomination.

When System Communication Down, SIB Did Not Disable Game

Fault: When DCU communication was interrupted, the SIB would not disable the game.

Correction: Now, the SIB correctly disables the game until communication resumes.

If Machine SAS Address Wrong, SIB Did Not Disable Game

Fault: Previously, the SIB was hard-coded to require the machine to use a SAS address of 1. However, if the machine was incorrectly addressed, the SIB did not disabled the machine, and the machine could not contribute to the Mystery, although it would appear to be correctly operating.

Correction: Now, if the machine does not respond to the SIB's long polls five times consecutively, the SIB stops polling the machine and waits for the machine to send its SAS address chirp. When the SIB receives the chirp, it will then use the address from the chirp to poll the machine.

Hardware Setup

SIB Connections

- J3 port: controller communication
- J2 port: machine communication

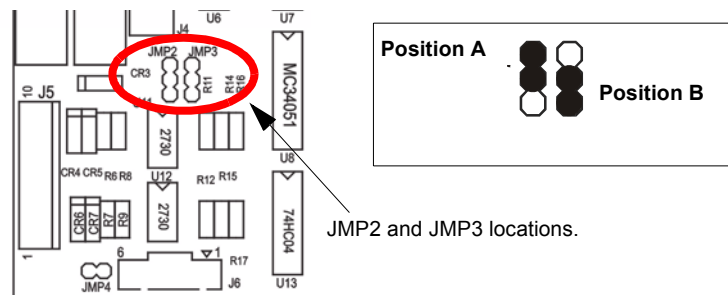
Configuration



Also refer to your progressive system documentation for installation and configuration guidelines.

On the SIB:

- SIB firmware EPROM is installed at U3.
- Refer to the figure below and check the jumper settings:
 - JMP2 must be set for the correct communication standard between the machine and the SIB (Position A = RS232, Position B = RS422).
 - JMP3 must be set to Position B for RS422 communication standard between the SIB and DCU. Jumper information is also provided on [page 7](#).



- Check DIP switch SW1 (settings listed on next page):
 - Switches 1 – 5, for the MS27 machine address, a unique value on the channel to which the machine is linked.
 - Switches 6 – 8, if on a multi-domination game, for the denomination setting. These define how the SIB will round up Mystery payouts on multi-denomination machines. Settings for these switches are on the next page. Also see [page 9](#).

On the machine:

- For Mystery progressives, SAS bonusing mode must be turned on.

DIP Switch Settings

Switches 1 – 5

DIP Switch					Machine Address
1	2	3	4	5	
OFF	OFF	OFF	OFF	OFF	1
ON	OFF	OFF	OFF	OFF	2
OFF	ON	OFF	OFF	OFF	3
ON	ON	OFF	OFF	OFF	4
OFF	OFF	ON	OFF	OFF	5
ON	OFF	ON	OFF	OFF	6
OFF	ON	ON	OFF	OFF	7
ON	ON	ON	OFF	OFF	8
OFF	OFF	OFF	ON	OFF	9
ON	OFF	OFF	ON	OFF	10
OFF	ON	OFF	ON	OFF	11
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OFF	ON	ON	OFF	ON	23
ON	ON	ON	OFF	ON	24
OFF	OFF	OFF	ON	ON	25
ON	OFF	OFF	ON	ON	26
OFF	ON	OFF	ON	ON	27
ON	ON	OFF	ON	ON	28
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OFF	ON	ON	ON	ON	31
ON	ON	ON	ON	ON	undefined

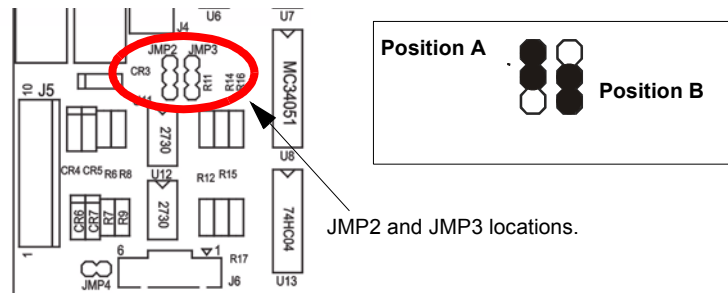
Switches 6 – 8

Dip Switch			Denom
6	7	8	
OFF	OFF	OFF	Penny
OFF	OFF	ON	Dollar
OFF	ON	OFF	Quarter
OFF	ON	ON	Penny
ON	OFF	OFF	Nickel
ON	OFF	ON	Half Dollar
ON	ON	OFF	Dime
ON	ON	ON	Penny

LED, Jumper, and IC Chip Functions

The following table lists the LED, jumper, and main chip functions for the SIB.

LED	Description	Jumper	Description	Chip	Description
LED1	Power	JMP1	Reset board without powering off and on	U2	MPU (Main Processor Unit)
LED2	Transmit to machine	JMP2	Machine to SIB communications: (see figure below) Position A = RS232 Position B = RS422	U3	SIB Firmware
LED3	Receive from machine			U4	RAM
LED4	Transmit to controller	JMP3	DCU to SIB communications: Always set to position B (see figure below) Position A = RS232 Position B = RS422		
LED5	Receive from controller				



Using the MS27-to-SAS Converter Firmware

SIB v5.05 firmware allows communication between Mikohn progressive controllers that use MS27 and devices that use SAS v4.0 protocol. SIBs with this firmware can also be used in systems that include the Mikohn Universal Game Module, or UGM.

If SIB Machine Comm Line is Disconnected SIB MUST BE POWER CYCLED!



WARNING!

Anytime the machine communication line is disconnected from the SIB for any length of time, you **must power cycle the SIB board**.

Anytime a SIB is moved from one machine to another, you **must power cycle the SIB board**.

Anytime a machine is RAM cleared, you **must power cycle the SIB board**.

If the SIB is not power cycled in either of the circumstances described in the above Warning, when the machine communication line is reconnected, it is possible for the SIB to receive very large coin-in meter deltas from the machine. These deltas can cause invalid Mystery jackpot hits, and potentially cause the machine to hit every subsequent Mystery jackpot until the machine is disabled.

Machine Communication via the UGM

With previously released SIB firmware that supports SAS, if the progressive controller stops polling the SIB, the SIB stops polling the machine. Because the machine is not receiving updates from the SIB, the machine disables. However, if a UGM is installed between the SIB and machine, the UGM continues to poll the machine, even if communication stops from the SIB. Consequently, the machine is not disabled as it should be.

The new MS27-to-SAS converter firmware includes machine disable and enable commands to ensure proper machine response regardless of whether a UGM is used. If the controller is polling the SIB, the SIB sends the machine an enable command every five seconds. If the progressive controller stops polling the SIB, the SIB sends the machine a disable command every 200ms.

New MS27 Jackpot Hit Message

A new message had to be added to the MS27 protocol to support SAS progressives. When a machine using the SAS protocol awards a jackpot, it does so from the last broadcast. When the controller is informed of a SAS progressive jackpot, it has already been paid. The new Jackpot Hit message added to the MS27 protocol includes the hit value. The old Jackpot Hit message did not include this value.

Mystery Payouts on Multi-Denomination Games

This release of SIB firmware allows you to set DIP switches 6 through 8 to define how to round up mystery payouts, on multi-denomination games. The first two sections below provide background information and a description of previous SIB and machine behavior on Mystery payouts. The third and last section, explains how the new DIP switch functionality is implemented in this release of SIB firmware.

Background

For consistency, communication about currency between a multi-denomination machine and the system (and SIB) is sent in the form of 1¢ denomination, regardless of the actual game denomination. Meters increment once per each cent, so that for a quarter (25¢) denomination, meters increment 25 times per each coin. The SIB's instructions for jackpot payouts are also in 1¢ denomination.

Examples of Previous SIB and Machine Behavior for Mystery Payouts

If a Mystery of \$1.00 hits on a multi-denomination machine with a game denomination of 25¢, the SIB instructs the machine to payout 100 coins. The machine must correctly interpret the value 100 as being \$1.00 rather than 100 quarters, and pay out four quarters to the player.

In the above example, the machine has only to calculate that 100 1¢ coins translates to four 25¢ coins, and pay out the four quarters. However, with previous SIB versions, if a Mystery of \$1.01 hit on the above described machine, the machine would convert the 101 coins into four quarters and find a one cent remainder. Because it could not pay in one cent increments, it would lock up for a handpay (either for the whole amount, or for only the remaining cent).

New DIP Switch Settings for Multi-Denomination Machines

In this SIB firmware, you can configure DIP switches 6 – 8 to determine how to round up Mystery payouts, based on denomination (see note). This means that on multi-denomination machines, the machine will not have to lock up for Mystery jackpot payouts, due to a remainder value that does not match with the machine denomination.



DIP switches 6 – 8 can be set to one of the following: penny, nickel, dime, quarter, half-dollar, or dollar. Settings are listed on [page 6](#).

In the example given earlier, in which a Mystery of \$1.01 is hit, the SIB DIP switches are set for a 25¢ denomination. Instead of a \$1.01 payout, the SIB rounds up the payout and instructs the machine to pay out 125 coins, which the machine will interpret as a payout of \$1.25. With the rounded up value, the machine pays the player five quarters, without having to lock up over a 1¢ remainder. This round up configuration functions only on multi-denomination games, and only for denominations up to a dollar.