

Montana State Gambling Control Division

SAS Serial Protocol

Implementation Guide

Version 1.2.1

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Document Control

Version	Date	Author	Modification
1.0.0	6-03-2003	J. Tien	Initial release of document.
1.1.0	7-20-2003	J. Tien	Modifications and corrections based on comments gathered from industry.
1.2.0	7-22-2003	J. Tien	Added meter cross-reference table. Redefined required and optional concept.
1.2.1	7-24-2003	J. Tien	Minor editing. Added section 1.3 to acknowledge SAS Protocol Specification document.

1 Introduction

1.1 General

The Automated Accounting and Reporting System (AARS) is a central monitoring system (CMS) under implementation consideration by the Montana Gambling Control Division (GCD). The primary purpose of the AARS is to automate the meter data collection, VGM program information verification, gaming tax calculation, tax invoicing and tax collection. Montana GCD has established by rule, all VGM shall have the ability to communicate with the AARS using the SAS Serial Communication Protocol, version 6.00, with an EIA-232 physical interface.

1.2 Scope and Purpose

The scope and purpose of this implementation guide is to supplement the SAS Serial Communication Protocol document, version 6.00, hence referred to as the protocol document. This document will attempt to provide precise interpretation for the polling commands defined in the protocol document

This document will also define the minimum implementation requirement of polling commands as directed by Montana GCD.

Specific command format and data structure should come from the SAS serial communication protocol specification document.

1.3 Acknowledgement

This document is based on the SAS Protocol Specification document and should only be used as a supplemental guide when implementing the protocol for the Montana jurisdiction. The SAS Protocol Specification document describes the true and correct behavior of the protocol, any deviation in this document is unintentional and the SAS Protocol Specification document should be used as the deciding reference point if such a deviation exists. Correction will be made to this document in an expedient manner to reflect the SAS Protocol Specification document when such deviation is noted.

The SAS Protocol Specification document is the property of Gaming Standards Association and International Game Technology.

2 Overview

The SAS serial communication protocol is a host centric protocol. Data and event information are requested or polled by the host, VGMs respond to requests or polls only when the machine address used by the host matches the one configured in the VGM.

2.1 Physical Interface

The required physical interface between the host and the VGM is the EIA-232 interface.

2.2 Logical Interface

The serial data link shall operate at the speed of 19,200 bits per second (BPS), with 1 start bit, eight data bits, a wake-up bit and one stop bit. The wake-up bit should be set in the first byte of the message; the wake-up bit should be cleared for the remainder of the message. The VGM shall clear the wake-up bit when responding to the host.

2.3 Addressing

The machine address for the VGM must be configurable by the operator, 0 to 127. Use of machine address zero (0) is prohibited by the SAS protocol specification document, hence it is not recommended.

2.4 Polling

2.4.1 General Poll

The host utilizes the general poll command to acquire critical event information from the VGM, such as VGM door access and bill acceptance.

2.4.2 Long Poll

Long poll commands are used to access VGM meter accounting information. With the exception of the ROM signature long poll request, where the VGM is required to calculate the CRC of its memory based on the seed provided by the long poll command.

2.4.3 Response Timing

Upon receiving the entire host message, the VGM has 20 milliseconds to initial transmission of its response. If the host does not receive the response within the 20 milliseconds, it may time out the VGM and move on to the next polling target. Once the VGM has been timed out, further transmission by the VGM is ignored by the host.

2.4.4 Data Integrity

Command and data integrity is verified with CCITT 16-bit CRC (Cyclical Redundancy Check). The algorithm used for the CRC calculation is provided in the SAS protocol document.

2.5 Timing

Timing requirements are detailed in the protocol specification document in section 2.3; these requirements will be strictly enforced.

2.6 Acknowledgement

The SAS protocol utilizes the implied acknowledgement (ACK) concept on the host. This concept is detailed in section 3 of the protocol specification document. This concept is not followed on the VGM side; therefore the VGM must acknowledge receipt of messages from the host when required.

2.7 Error Conditions

2.7.1 VGM Busy

Refer to section 4.1 of the protocol specification document.

2.7.2 Loop Break

Refer to section 4.2 of the protocol specification document.

2.7.3 Link Down

Refer to section 4.3 of the protocol specification document.

2.7.4 Unsupported Commands

If the VGM receives a polling command that is not supported by the VGM, the VGM shall not respond to the command in any manner. Any response to such command shall constitute support of the command. Refer to section 4.4 of the protocol specification document.

2.7.5 Collision

The required physical interface for the Montana implementation is EIA-232, point-to-point interface and the fact the VGM should only respond to host polls upon detecting a matching machine address, this condition should not occur. However should the VGM detect a host transmission during its attempt to transmit, the VGM shall yield to the host and abort its transmission. Refer to section 4.5 of the protocol specification document.

3 General Poll

The host issues general polls to request event exceptions from the VGM. The VGM shall maintain all event exceptions in a first-in, first-out buffer (FIFO). Upon receiving a general poll addressed to the VGM, the VGM shall respond with a single byte exception code. If no event exception is in the buffer, the VGM shall respond with '00' byte.

If a ROM signature verification result is pending, the VGM shall transmit the result instead of an event exception in response to a general poll. Once the implied acknowledgement is determined by the VGM, the VGM shall erase the ROM signature verification result.

The minimum number of event exceptions stored in the FIFO buffer is 20.

3.1 Required Event Exceptions

Exception generation is usually a result of a feature failure. Should the feature not be present in the VGM or not within the capability of the VGM, the exception would never be generated. For example, if the VGM is not a reel type machine, the reel tilt exception would never be generated. The verification process will be based on feature implementation of the VGM, in the case of the reel tilt exception it would not be used in a video machine verification process.

Event Exception Code	Description
00	No activity
11	Slot door was just opened
12	Slot door was just closed
13	Drop door was just opened
14	Drop door was just closed
15	Card cage was just opened
16	Card cage was just closed
17	AC power was just applied to the VGM
18	AC power was just lost from the VGM
19	Cashbox door open
1A	Cashbox door closed
1B	Cashbox removed
1C	Cashbox installed
1D	Belly door was just opened
1E	Belly door was just closed
20	General tilt. Use for undetermined tilt condition
27	Cashbox full
28	Bill jam
29	Bill acceptor hardware failure
2A	Reverse bill detected
2B	Bill rejected
* 2C	Counterfeit bill detected
36	EPROM error, different checksum, version changed

- 37 EPROM error, bad checksum compare
 - 3C Operator changed configuration options, including denomination, VGM address or any gaming option specific to the VGM
 - 3D A cash out ticket has been printed
 - * 3E A handpay has been validated
 - * 3F Validation ID not configured (optional feature group event)
 - * 40 Reel tilt, reel unspecified
 - * 41 Reel 1 tilt
 - * 42 Reel 2 tilt
 - * 43 Reel 3 tilt
 - * 44 Reel 4 tilt
 - * 45 Reel 5 tilt
 - * 46 Reel mechanism disconnected
 - 47 \$1.00 bill accepted, non-RTE mode
 - 48 \$5.00 bill accepted, non-RTE mode
 - 49 \$10.00 bill accepted, non-RTE mode
 - 4A \$20.00 bill accepted, non-RTE mode
 - * 4B \$50.00 bill accepted, non-RTE mode
 - * 4C \$100.00 bill accepted, non-RTE mode
 - * 4D \$2.00 bill accepted, non-RTE mode
 - * 57 System validation request (optional feature group event)
 - 60 Printer communication error
 - 61 Printer paper out error
 - * 67 Ticket has been inserted (optional feature group event)
 - * 68 Ticket transfer complete (optional feature group event)
 - * 69 AFT transfer complete (optional feature group event)
 - * 6A AFT request for host cash out (optional feature group event)
 - * 6B AFT request for host to cash out win (optional feature group event)
 - * 6C AFT request to register (optional feature group event)
 - * 6D AFT registration acknowledged (optional feature group event)
 - * 6E AFT registration cancelled (optional feature group event)
 - 70 Exception buffer overflow
 - 73 Game reset during pay out
 - * 74 Printer paper low
 - * 75 Printer power off
 - * 76 Printer power on
 - 7A Game soft meter reset to zero
 - 7B Bill validator totals have been reset by an attendant
 - 86 Game is out of service
 - 8C Game selected
 - * 8E Component list changed (optional feature group event)
 - * 8F Authentication complete (optional feature group event)
- * - Indicates exception should only be reported if the feature which the exception was generated is implemented in the VGM.
- Optional feature group exceptions are not subject to verification if the feature group is not implemented.

4 Long Poll

Long polls are utilized by the host to obtain data from the VGM. There are four (4) types of long polls type R, type S, type M and type G. The message types are detailed in section 2.2.2 of the protocol specification document.

Minimum required and optional commands supported by the VGM are denoted in the following detailed description and format guide.

Note: All command and response examples will use machine address of 1.

4.1 Meter Cross Reference

All meter names in this document follow the meter names used in the SAS Protocol Specification document. Table 4.1 cross references the Montana meter names with the meter names referenced in the SAS Protocol Specification document.

Table 4.1: **Meter Cross Reference**

SAS Meter	Montana Meter Label	Montana Meter Name
Coin in	\$\$PL	Money Played
Coin out	\$\$WN	Money Won
Jurisdictional canceled credits	\$\$PD	Money Out
Total drop	\$\$TL	Money In

4.2 Required vs Optional

All long poll commands described in the following sections are marked as either required or optional. Implementation of long poll commands marked as optional is at the manufacturer's discretion; implementation of long poll commands marked as required is not. However, if a required long poll command is part of a feature group listed as optional and the feature group is not implemented in the VGM, the command will not be subjected to the verification process.

Here are two examples for reference:

- Command code 2F; send selected meters for game N. This command is part of the multi-game feature group, if the machine is a single game platform, this command becomes optional, and implementation of the command is at the manufacturer's discretion.
- Command codes 32, 36 and 37: send \$2, \$50 and \$100 bills in meter. If the VGM does not accept any of the bill denominations, these commands are optional and will not be part of the verification process. When the bill denomination becomes legal in the jurisdiction, the related command becomes required and will be verified.

4.3 Credit Unit

All 'credit unit' references in the following sections refer to the base denomination of the VGM. The base denomination of all VGMs in the state of Montana is one (1) cent.

1 credit unit = 1 cent

4.4 ROM Signature Verification

VGM is required to perform a calculation to verify the program content of its ROM(s) upon request. The calculation utilizes the CCITT 16-bit CRC algorithm defined in section 5 of the protocol specification document.

The host will provide a variable seed in the polling command. The seed is used to calculate the CRC value of the lowest ROM device, the resulting CRC value is used as the seed for the subsequent device.

The result of the computation is sent to the host in response to the next general poll command after the completion of the computation.

During the computation or prior to sending the result to the host, if the VGM receives a second ROM Signature Verification command, the computation shall restart with the new seed value.

4.4.1 Command code: 21 (Required)

Description: ROM Signature Verification

Poll: '01 21 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – ROM verification seed value, binary format.

Byte 5 ~ Byte 6 – 16-bit CRC.

Response: '01 21 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – ROM signature, binary format.

Byte 5 ~ Byte 6 – 16-bit CRC.

4.5 Meters and General Command

4.5.1 Command code: 0F (Required)

Description: Send Meters from command codes 10 through 15.

Poll: '01 0F'

Response:

'01 0F 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Cancelled meter value in number of credits, BCD format.

Byte 7 ~ Byte 10 – Coin in meter value in number of credits, BCD format.

Byte 11 ~ Byte 14 – Coin out meter value in number of credits, BCD format.

Byte 15 ~ Byte 18 – Total drop meter value in number of credits, BCD format.

Byte 19 ~ Byte 22 – Jackpot meter value in number of credits, BCD format.

Byte 23 ~ Byte 26 – Games played meter value in number of games, BCD format.

Byte 27 ~ Byte 28 – 16-bit CRC.

4.5.2 Command code: 10 (Required)

Description: Send Jurisdictional Cancelled Credit Meter

Poll: '01 10'

Response: '01 10 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Cancelled credit meter value in number of credits, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.3 Command code: 11 (Required)

Description: Send Coin In Meter

Poll: '01 11'

Response: '01 11 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Coin in meter value in number of credits, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.4 Command code: 12 (Required)

Description: Send Coin Out Meter

Poll: '01 12'

Response: '01 12 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Coin out meter value in number of credits, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.5 Command code: 13 (Required)

Description: Send Total Drop Meter

Poll: '01 13'

Response: '01 13 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 6 – Total drop meter value in number of credits, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.6 Command code: 14 (Required)

Description: Send Jackpot Meter

Poll: '01 14'

Response: '01 14 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 6 – Jackpot meter value in number of credits, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.7 Command code: 15 (Required)

Description: Send Games Played Meter

Poll: '01 15'

Response: '01 15 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 6 – Games played meter value in number of credits, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.8 Command code: 16 (Required)

Description: Send Games Won Meter

Poll: '01 16'

Response: '01 16 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 6 – Games won meter value in number of credits, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.9 Command code: 17 (Required)

Description: Send Game Lost Meter

Poll: '01 17'

Response: '01 17 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 6 – Games lost meter value in number of credits, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.10 Command code: 18 (Required)

Description: Send Games Since Last Power Up and Door Closure Meter

Poll: '01 18'

Response: '01 18 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
Byte 2 – Command code.
Byte 3 ~ Byte 4 – Games played meter since last power up, BCD format.

Byte 5 ~ Byte 6 – Games played meter since last door closure, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.11 Command code: 19 (Required)

Description: Send Meters 11 Through 15

Poll: '01 19'

Response: '01 19 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Coin in meter value in number of credits, BCD format.

Byte 7 ~ Byte 10 – Coin out meter value in number of credits, BCD format.

Byte 11 ~ Byte 14 – Total drop meter value in number of credits, BCD format.

Byte 15 ~ Byte 18 – Jackpot meter value in number of credits, BCD format.

Byte 19 ~ Byte 22 – Games played meter value in number of games, BCD format.

Byte 23 ~ Byte 24 – 16-bit CRC.

4.5.12 Command code: 1A (Required)

Description: Send Current Credit Meter

Poll: '01 1A'

Response: '01 1A 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Current credit meter value in number of credits, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.13 Command code: 1B (Optional)

Description: Send Hand Pay Information

Poll: '01 1B'

Response: '01 1B 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Progressive group number in binary format.

Byte 4 – Progressive level number in binary format.

Byte 5 ~ Byte 9 – Amount of hand pay in units of cents for progressive win, in units of credits for non-progressive win, BCD format.

Byte 10 ~ Byte 11 – Amount of partial pay in units of credits, BCD format.

Byte 12 – Reset ID, binary format; 00 = standard reset, 01 = reset to credit meter.

Byte 13 ~ Byte 22 – Unused, zero padded.

Byte 23 ~ Byte 24 – 16-bit CRC.

4.5.14 Command code: 1C (Optional)

Description: Send Meters

Poll: '01 1C'

Response: '01 1C 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Dollar value of all bills received, BCD format.
Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.18 Command code: 2A (Optional)

Description: Send True Coin In Meter

Poll: '01 2A'

Response: '01 2A 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of coins/tokens accepted by the VGM, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.19 Command code: 2B (Optional)

Description: Send True Coin Out Meter

Poll: '01 2B'

Response: '01 2B 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of coins/tokens paid out of the hopper by the VGM, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.20 Command code: 2C (Optional)

Description: Send Current Hopper Level

Poll: '01 2C'

Response: '01 2C 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of coins/tokens in the hopper of the VGM, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.21 Command code: 31 (Required)

Description: Send \$1.00 Bills In Meter

Poll: '01 31'

Response: '01 31 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$1.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.22 Command code: 32 (Required)

Description: Send \$2.00 Bills In Meter

Poll: '01 32'

Response: '01 32 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$2.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.23 Command code: 33 (Required)

Description: Send \$5.00 Bills In Meter

Poll: '01 33'

Response: '01 33 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$5.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.24 Command code: 34 (Required)

Description: Send \$10.00 Bills In Meter

Poll: '01 34'

Response: '01 34 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$10.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.25 Command code: 35 (Required)

Description: Send \$20.00 Bills In Meter

Poll: '01 35'

Response: '01 35 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$20.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.26 Command code: 36 (Required)

Description: Send \$50.00 Bills In Meter

Poll: '01 36'

Response: '01 36 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$50.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.27 Command code: 37 (Required)

Description: Send \$100.00 Bills In Meter

Poll: '01 37'

Response: '01 37 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of \$100.00 bills accepted, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.28 Command code: 46 (Required)

Description: Send Credit Amount of All Bills Accepted

Poll: '01 46'

Response: '01 46 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Value of all bills accepted in number of credits, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.29 Command code: 48 (Required)

Description: Send Last Accepted Bill Information

Poll: '01 48'

Response: '01 48 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Country code, BCD format.

Byte 4 – Bill denomination code, BCD format.

Byte 5 ~ Byte 8 – Number of accepted bills of this type, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.5.30 Command code: 49 (Optional)

Description: Send Number of Bills Currently in the Stacker

Poll: '01 49'

Response: '01 49 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Number of accepted bills in the stacker, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.31 Command code: 4A (Optional)

Description: Send Total Credit amount of all Bills Currently in the Stacker

Poll: '01 4A'

Response: '01 4A 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Credit amount of all bills in the stacker, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.5.32 Command code: 54 (Required)

Description: Send SAS Version ID and Gaming Machine Serial Number

Poll: '01 54'

Response: '01 54 00 00 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 ~ Byte 6 – Implemented SAS version number, ASCII format.

Byte 7 ~ Byte... – Gaming machine serial number, ASCII format, variable length.

Byte... ~ Byte... – 16-bit CRC.

4.5.33 Command code: 7E (Required)

Description: Send Current Date and Time

Poll: '01 7E'

Response: '01 7E 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Date in MMDDYYYY format, BCD format.

Byte 7 ~ Byte 9 – Time in HHMMSS 24-hour format, BCD format.

Byte 10 ~ Byte 11 – 16-bit CRC.

4.5.34 Command code: 8E (Optional)

Description: Send Card Information

Poll: '01 8E'

Response: '01 8E 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Hand type: 00 = Dealt hand, 01 = Final hand, binary format.

Byte 4 ~ Byte 8 – Card data, left most card first, reference table 4.2.34, binary format.

Byte 9 ~ Byte 10 – 16-bit CRC.

Table 4.2.34: **Card Codes (One Byte Per Card)**

Upper Nibble		Lower Nibble	
0	Spades	0	Two
1	Clubs	1	Three
2	Hearts	2	Four
3	Diamonds	3	Five
4	Joker	4	Six
5	Other	5	Seven
		6	Eight
		7	Nine
		8	Ten
		9	Jack
		A	Queen
		B	King
		C	Ace
		D	Joker
		E	Other

4.5.35 Command code: 8F (Optional)

Description: Send Physical Reel Stop Information

Poll: '01 8F'

Response: '01 8F 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 11 – Physical reel stop information with left most reel first, binary format.
(Unused bytes should be padded with 'FF'.)

Byte 12 ~ Byte 13 – 16-bit CRC.

4.5.36 **Command code:** **A0** **(Required)**

Description: Send Enabled Features

Poll: '01 A0'

Response: '01 A0 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, '0000' for gaming machine, BCD format.

Byte 5 ~ Byte 6 – Feature codes, reference table 4.2.36, binary format.

Byte 7 ~ Byte 10 – Reserved for future use, '00000000'.

Byte 11 ~ Byte 12 – 16-bit CRC.

Table 4.2.36: **Feature Codes**

Byte	Bit	Description
LSB	0 – Jackpot multiplier	0 = Inactive, 1 = Active
	1 – Reserved	0 (reserved)
	2 – Bonus awards	0 = Inactive, 1 = Active
	3 – Tournament	0 = Inactive, 1 = Active
	4 – Reserved	0 (reserved)
	5 ~ 6 – Validation style	00 = Standard
		01 = System
		10 = Enhanced
MSB	7 – Voucher redemption	11 = reserved
		0 = Disabled, 1 = Enabled
		00 = Meter model not specified
		01 = Won credits metered when won
	0 ~ 1 – Meter model flag	10 = Won credits metered when played or paid
		11 = reserved
		0 = Vouchers not included
	2 – Vouchers to drop and cancelled credits	1 = Vouchers included
		0 (reserved)
	3 ~ 7 – Reserved	0 (reserved)

4.5.37 **Command code:** **A4** **(Optional)**

Description: Send Cash Out Limit

Poll: '01 A4'

Response: '01 A4 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, '0000' for gaming machine, BCD format.

Byte 5 ~ Byte 6 – Cash out limit, BCD format.

Byte 7 ~ Byte 8 – 16-bit CRC.

4.6 Multi-game Command

4.6.1 **Command code:** **2D** **(Optional)**

Description: Send Hand Paid Credits

Poll: '01 2D'

Response: '01 2D 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, BCD format.

Byte 5 ~ Byte 8 – Cumulative number of hand paid credits, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.6.2 Command code: 2F (Required)

Description: Send Selected Meters for Game N

Poll: '01 2F 00 00 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Selected meters for game N command code.

Byte 3 – Number of data bytes to follow, in binary format.

Byte 4 ~ Byte 5 – Selected game number, BCD format.

Byte 6 – Meter code* for the first requested meter, binary format.

Variable ... – Additional meter codes* in binary, maximum of 10 meter-codes.

Byte 16 ~ Byte 17 – 16-bit CRC.

Response: '01 2F 00 00 00 00 ... 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Number of data bytes to follow, in binary format.

Byte 4 ~ Byte 5 – Selected game number, BCD format.

Byte 6 – Meter code* for the following meter, binary format.

Byte 7 ~ Byte... – Meter value, 4 or 5 bytes depending on meter, BCD format.

Byte... Additional meter code*, binary format.

Byte... ~ Byte... -- Additional meter value matching the meter code preceding it.

Byte... ~ Byte... – 16-bit CRC.

**Meter code value detailed in table C-7 of appendix C in the protocol specification document.*

4.6.3 Command code: 51 (Required)

Description: Send Total Number of Games Implemented

Poll: '01 51'

Response: '01 51 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Number of games implemented on VGM, BCD format.

Byte 5 ~ Byte 6 – 16-bit CRC.

4.6.4 Command code: 52 (Required)

Description: Send Game N Meters

Poll: '01 52 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, BCD format.

Byte 5 ~ Byte 6 – 16-bit CRC.

Response: '01 52 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, BCD format.

Byte 5 ~ Byte 8 – Coin in meter in number of credits, BCD format.

Byte 9 ~ Byte 12 – Coin out meter in number of credits, BCD format.

Byte 13 ~ Byte 16 – Jackpot meter in number of credits, BCD format.

Byte 17 ~ Byte 20 – Games played meter, BCD format.

Byte 21 ~ Byte 22 – 16-bit CRC.

4.6.5 Command code: 53 (Required)

Description: Send Game N Configuration

Poll: '01 53 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, BCD format.

Byte 5 ~ Byte 6 – 16-bit CRC.

Response: '01 53 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number, BCD format.

Byte 5 ~ Byte 6 – Game ID in ASCII format.

Byte 7 ~ Byte 9 – Additional game ID in ASCII format. Pad with ASCII '0' if none.

Byte 10 – Game denomination in binary format.

Byte 11 – Maximum bet for game N in binary format.

Byte 12 – Progressive group number in binary format.

Byte 13 ~ Byte 14 – Game options selected by the operator, binary format.

Byte 15 ~ Byte 20 – Pay table ID, ASCII format.

Byte 21 ~ Byte 24 – Theoretical base pay back percentage for max bet, ASCII format.

Byte 25 ~ Byte 26 – 16-bit CRC.

4.6.6 Command code: 55 (Required)

Description: Send Selected Game Number

Poll: '01 55'

Response: '01 55 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number in ASCII format. '0000' if none selected.

Byte 5 ~ Byte 6 – 16-bit CRC.

4.6.7 Command code: 56 (Required)

Description: Send Enabled Game Numbers

Poll: '01 56'

Response: '01 56 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.
 Byte 2 – Command code.
 Byte 3 – Length of data field, binary format.
 Byte 4 – Number of games enabled, binary format.
 Byte 5 ~ Byte... – 2-byte game numbers of all enabled games in ASCII format.
 Byte... ~ Byte... – 16-bit CRC.

4.7 Advanced Fund Transfer

This is the new Advanced Fund Transfer (AFT) protocol. Detail explanation of the feature is in section 8 of the protocol specification document.

4.7.1 Command code: 73 (Optional)

Description: AFT Register Gaming Machine

Poll: '01 73 00 00 00 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Registration code, binary format.

00	= Initialize registration
01	= Register gaming machine
40	= Request operator acknowledgement
80	= Unregister gaming machine
FF	= Read current registration

Byte 5 ~ Byte 8 – Gaming machine asset number or house ID, binary format.

Byte 9 ~ Byte 28 – Registration key, binary format.

Byte 29 ~ Byte 32 – Point of Sale terminal ID, binary format.

Byte 33 ~ Byte 34 – 16-bit CRC.

Response: '01 73 00 00 00 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Registration code, binary format.

00	= Gaming machine registration ready
01	= Gaming machine registered
40	= Gaming machine registration pending
80	= Gaming machine not registered

Byte 5 ~ Byte 8 – Gaming machine asset number or house ID, binary format.

Byte 9 ~ Byte 28 – Registration key, binary format.

Byte 29 ~ Byte 32 – Point of Sale terminal ID, binary format.

Byte 33 ~ Byte 34 – 16-bit CRC.

4.7.2 Command code: 74 (Optional)

Description: AFT Lock and Status Request

Poll: '01 74 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Lock code, binary format.

00	= Request lock
80	= Cancel lock or pending lock request

FF = Interrogate current status only
Byte 4 – Lock condition, binary format, bit field. If bit = 1, lock when condition is true.
Bit 0: Transfer to gaming machine OK
Bit 1: Transfer from gaming machine OK
Bit 2: Transfer to printer OK
Bit 3: Bonus award to gaming machine OK
Bit 4: Always 0
Bits 5 ~ 7: TBD. Set to 0
Byte 5 ~ Byte 6 – Lock expiration time in hundredths of a second.
Byte 7 ~ Byte 8 – 16-bit CRC.

Response: ‘01 74 00 00 00 00 00 00 00 00 ... 00 00 XX XX’

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 ~ Byte 7 – Gaming machine asset number or house ID, binary format.

Byte 8 – Game lock status, binary format. 00 = Game locked
40 = Game lock pending
FF = Game not locked

Byte 9 – Available transfer, binary format, bit field.

Bit 0: 1 = Transfer to gaming machine OK
Bit 1: 1 = Transfer from gaming machine OK
Bit 2: 1 = Transfer to printer OK
Bit 3: 1 = Win amount pending cash out to host
Bit 4: 1 = Bonus award to gaming machine OK
Bits 5 ~ 7: TBD. Set to 0

Byte 10 – Host cash out status, binary format, bit field.

Bit 0: 0 = Cash out to host forced by game
1 = Cash out to host controllable by host
Bit 1: 0 = Cash out to host currently disabled
1 = Cash out to host currently enabled
Bits 2~7: TBD. Set to 0

Byte 11 – AFT status, binary format, bit field.

Bit 0: 1 = Printer available for transaction receipts
Bit 1: 1 = Transfer to host of less than full available amount allowed.
Bit 2: 1 = TBD. Set to 0
Bit 3: 1 = AFT registered
Bit 4: 1 = In house transfers enabled
Bit 5: 1 = Bonus transfers enabled
Bit 6: 1 = Debit transfers enabled
Bit 7: 1 = Any AFT enabled

Byte 12 – Maximum transactions in history buffer, binary format.

Byte 13 ~ Byte 17 – Current cashable credits on VGM, not including non-restricted, in cents, BCD format.

Byte 18 ~ Byte 22 – Current restricted credits on VGM, in cents, BCD format.

Byte 23 ~ Byte 27 – Current non-restricted credits on VGM, in cents, BCD format.

Byte 28 ~ Byte 32 – Maximum amount that may currently be transferred to the credit Meter, in cents, BCD format.
 Byte 33 ~ Byte 36 – Current restricted expiration date in MMDDYYYY format or in number of days format, if restricted amt is non-zero, BCD format.
 Byte 37 ~ Byte 38 – Current restricted pool ID, if restricted amount is non-zero, binary format
 Byte 39 ~ Byte 40 – 16-bit CRC.

4.7.3 Command code: 72 (Optional)

Description: AFT Transfer Funds Initiate

Poll: '01 72 00 00 00 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Transfer code, binary format. 00 = Transfer request, full transfer only
 01 = Transfer request, partial transfer allowed
 80 = Cancel transfer request

Byte 5 – Transfer index, binary format. Only current transaction may be initiated, 00

Byte 6 – Transfer type, binary format. (Reference table 8.3d, section 8, page 8-12 of the protocol specification document for transfer types.)

Byte 7 ~ Byte 11 – Cashable transfer amount, requested, in cents, BCD format.

Byte 12 ~ Byte 16 – Restricted transfer amount requested, in cents, BCD format.

Byte 17 ~ Byte 21 – Non-restricted transfer amount requested, in cents, BCD format.

Byte 22 – Transfer flag, binary format, bit field.

Bit 0: Host cash out enable control

(1 = set enable to reflect bit 1 state)

Bit 1: Host cash out enable

(ignore if bit 0 = 0)

Bit 2: Host cash out mode (0 = soft; 1 = hard)

Bit 3: Cash out from VGM request

Bit 4 ~ 5: Reserved

Bit 6: Accept transfer only if locked

Bit 7: transaction receipt request

Byte 23 ~ Byte 24 – Gaming machine asset number or house ID, binary format.

Byte 25 ~ Byte 44 – Registration key (0 = registration not required), binary format.

Byte 45 – Transaction ID length, maximum of 20, binary format.

Byte 46 ~ Byte ... – Transaction ID, variable length, in ASCII format.

Byte ... ~ Byte ... – 4 bytes, expiration date in MMDDYYYY format or in number of days, BCD format.

Byte ... ~ Byte ... – 2 bytes, restricted pool ID, binary format.

Byte ... – 1 byte, number of bytes of receipt data to follow, binary format.

Byte ... ~ Byte ... – Transaction receipt data, variable length, various formats. (Reference table 8.3f, section 8, page 8-14 of the protocol specification document for status codes.)

Byte ... ~ Byte ... – 16-bit CRC.

This command may be used by the host to interrogate the status of the current or most recently completed transfer request. The host may also use the command to retrieve historical data from the buffer.

Poll: '01 72 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Identify poll as interrogation request, set to FF, binary format.

Byte 5 – Transaction index, binary format. 00 = Current or most recent transaction.

01 ~ 7F = Specific history buffer position.

81 ~ FF = Relative history index.

Byte 6 ~ Byte 7 – 16-bit CRC.

Response: '01 72 00 00 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Specific transaction buffer position, 0 for current or most recent, binary format.

Byte 5 – VGM transfer status, binary format. (Reference table 8.3e, section 8, page 8-13 of the protocol specification document for status codes.)

Byte 6 – Transaction receipt status code, binary format. (Reference table 8.3g, section 8, page 8-14 of the protocol specification document for status codes.)

Byte 7 – Transfer type, reference table 4.3.3a, binary format.

Byte 8 ~ Byte 12 – Actual or pending cashable transfer amount, in cents, BCD format.

Byte 13 ~ Byte 17 – Actual or pending restricted transfer amount, in cents, BCD format.

Byte 18 ~ Byte 22 – Actual or pending non-restricted transfer amount, in cents, BCD format.

Byte 23 – Transfer flag, binary format, bit field.

Bit 0: 0 = Cash out to host forced by game.

1 = Cash out to host controllable by host.

Bit 1: 0 = Cash out to host currently disabled.

1 = Cash out to host currently enabled.

Bits 2 ~ 6: Reserved.

Bits 7: Transaction receipt requested.

Byte 24 ~ Byte 28 – VGM asset number or house ID, binary format.

Byte 29 – Length of message transaction ID, binary format.

Byte 30 ~ Byte ... – Variable length, transaction ID, ASCII format.

Byte ... ~ Byte ... – 4 bytes. Date transaction completed in MMDDYYYY, BCD format.

Byte ... ~ Byte ... – 3 bytes. Time transaction completed in HHMMSS, 24 hour format, BCD format.

Byte ... ~ Byte ... – 4 bytes. Expiration date for transfer to ticket or restricted amount in MMDDYYYY format or in number of days format, BCD format.

Byte ... ~ Byte ... – 2 bytes. Restricted pool ID, binary format.

Byte ... ~ 1 bytes. Length of cumulative cashable amount meter for transfer type, after transfer complete, binary format.

Byte ... ~ Byte ... – Variable length, up to 9 bytes. Cumulative cashable amount meter for transfer type, BCD format.

Byte ... – 1 bytes. Length of cumulative restricted amount meter for transfer type, after transfer complete, binary format.

Byte ... ~ Byte ... – Variable length, up to 9 bytes. Cumulative restricted amount meter for transfer type, BCD format.

Byte ... – 1 bytes. Length of cumulative non-restricted amount meter for transfer type, after transfer complete, binary format.

Byte ... ~ Byte ... – Variable length, up to 9 bytes. Cumulative non-restricted amount meter for transfer type, BCD format.

Byte ... ~ Byte ... – 16-bit CRC.

4.7.4 Command code: 66 (Optional)

Description: Host Request for Cash Out Credit Amount

Poll: '01 66 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Acknowledgement flag, binary format.

Byte 4 ~ Byte 5 – 16-bit CRC.

Response: '01 66 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Acknowledgment flag, '00' for initial request message, binary format.

Byte 4 – VGM status code, binary format. Reference table 4.4.4 for detail.

Byte 5 ~ Byte 9 – Cashed out amount, BCD format.

Byte 10 ~ Byte 11 – 16-bit CRC.

Table 4.4.4: **VGM Status Codes**

Code	Description
00	Operation successful
02	Gaming machine door open
04	Transfer amount exceeded the EGM credit limit.
05	Invalid transaction number
06	EGM does not have a credit switch
07	EGM is in a tilt condition
08	Invalid acknowledgment message received
09	EGM is in game play mode
0A	Data field contains non-BCD data
0B	Host transfer request has already been completed
0C	EGM disabled
0D	EGM out of service
0E	EGM is busy

4.7.5 Command code: 75 (Optional)

Description: Set AFT Receipt Data

Poll: '01 75 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data bytes to follow , binary format.
 Byte 4 – Data element type code, binary format. (Reference table 8.11.1b, section 8 page 8-24 of the protocol specification document.)
 Byte 5 – Length of data element to follow, binary format.
 Byte 6 ~ Byte ... – Variable length. Data element. (Reference table 8.11.1b as above.)
 Byte ... ~ Byte ... – Variable length. Additional data code/length/data elements.
 (Reference table 8.11.1b as above.)
 Byte ... ~ Byte ... – 16-bit CRC.
Response: '01' – ACK
 '81' – NAK

(Note: The AFT feature is complex in design; care should be taken when implementing this feature. Obtain clarification of issues and concerns from Montana GCD.)

4.8 Progressive

This feature group is optional.

4.8.1 Command code: 80 (Optional)

Description: Single Level Progressive Broadcast

Poll: '00 80 00 00 00 00 00 00 XX XX'

Byte 1 – This is a broadcast message, SAS address '00', binary format.

Byte 2 – Command code.

Byte 3 – Progressive group ID, binary format.

Byte 4 – Progressive level, binary format.

Byte 5 ~ Byte 9 – Level amount in units of cents, BCD format.

Byte 10 ~ Byte 11 – 16-bit CRC.

Response: VGM does not respond to broadcast message.

4.8.2 Command code: 83 (Optional)

Description: Send Cumulative Progressive Win Amount

Poll: '01 83'

Response: '01 83 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Cumulative progressive win amount in number of credits, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.8.3 Command code: 84 (Optional)

Description: Send Progressive Win Amount

Poll: '01 84'

Response: '01 84 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Progressive group ID, binary format.

Byte 4 – Progressive level, binary format.

Byte 5 ~ Byte 9 – Win amount in units of cents, BCD format.

Byte 10 ~ Byte 11 – 16-bit CRC.

4.8.4 Command code: 85 (Optional)

Description: Send SAS Progressive Win Amount

Poll: '01 84'

Response: '01 84 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – SAS group number, binary format.

Byte 4 – SAS progressive level, binary format.

Byte 5 ~ Byte 9 – Win amount in units of cents, BCD format.

Byte 10 ~ Byte 11 – 16-bit CRC.

4.8.5 Command code: 86 (Optional)

Description: Multiple Level Progressive Broadcast

Poll: '00 86 00 00 00 00 00 00 00 ... 00 XX XX'

Byte 1 – This is a broadcast message, SAS address '00', binary format.

Byte 2 – Command code.

Byte 3 – Data length (07 – C1), binary format.

Byte 4 – Progressive group ID, binary format.

Byte 5 – Progressive level, binary format.

Byte 6 ~ Byte 10 – Level amount in units of cents, BCD format.

Byte 11 ~ Byte... – Optional additional level and amount pairs.

Byte... ~ Byte... – 16-bit CRC.

Response: VGM does not respond to broadcast message. The EGM however should expect the broadcast to occur at least once every five seconds for each level.

4.9 Tournament

This feature group is optional.

4.9.1 Command code: 8C (Optional)

Description: Enter/Exit Tournament Mode

Poll: '01 8C 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 6 – Time duration of tournament, MSB = minutes, LSB = seconds, BCD format.

Byte 7 ~ Byte 10 – Starting credits amount for the tournament session, BCD format.

Byte 11 – Tournament pulses, 00 = disabled, 01 = enabled, binary format.

Byte 12 ~ Byte 13 – 16-bit CRC.

Response: '01' - ACK

'81' - NAK

(Note: To enter tournament mode on an EGM, set the time and/or starting credits field to non-zero. To exit tournament mode, set both time and starting credits field to zero.)

4.9.2 Command code: 95 (Optional)

Description: Send Tournament Games Played Meter

Poll: '01 95'

Response: '01 95 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Number of games played in tournament mode, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.9.3 Command code: 96 (Optional)

Description: Send Tournament Games Won Meter

Poll: '01 96'

Response: '01 96 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Number of games won in tournament mode, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.9.4 Command code: 97 (Optional)

Description: Send Tournament Credits Wagered

Poll: '01 97'

Response: '01 97 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Number of credits wagered in tournament mode, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.9.5 Command code: 98 (Optional)

Description: Send Tournament Credits Won Meter

Poll: '01 98'

Response: '01 98 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Number of credits won in tournament mode, BCD format.

Byte 9 ~ Byte 10 – 16-bit CRC.

4.9.6 Command code: 99 (Optional)

Description: Send Meters 95 ~ 98

Poll: '01 99'

Response: '01 99 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = game machine, BCD format.

Byte 5 ~ Byte 8 – Number of games played in tournament mode, BCD format.
 Byte 9 ~ Byte 12 – Number of games won in tournament mode, BCD format.
 Byte 13 ~ Byte 16 – Number of credits wagered in tournament mode, BCD format.
 Byte 17 ~ Byte 20 – Number of credits won in tournament mode, BCD format.
 Byte 21 ~ Byte 22 – 16-bit CRC.

4.10 Bonusing

4.10.1 Command code: 8A (Optional)

Description: Initiate a Bonus Pay

Poll: '01 8A 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Bonus amount in number of credits, BCD format.

Byte 7 – Tax status, binary format: 00 – Deductible.
 01 – Non-deductible.
 02 – Wager match.

Byte 8 ~ Byte 9 – 16-bit CRC.

Response: '01' - ACK
 '81' - NAK

4.10.2 Command code: 8B (Optional)

Description: Initiate Multiplied Jackpot Mode

Poll: '01 8B 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Minimum win that is eligible for multiplied jackpot, BCD format.

Byte 7 ~ Byte 10 – Maximum win that is eligible for multiplied jackpot, BCD format.

Byte 11 – Multiplier, binary format. Bit 7: 0 = deductible, 1 = non-deductible.

Byte 12 – Enable flag, binary format. 00 – Enable. 01 – Disable.

Byte 13 – Eligible wager type, binary format. 00 – All wagers.
 01 – Only max bet wagers.

Byte 14 ~ Byte 15 – 16-bit CRC.

Response: '01' - ACK
 '81' - NAK

4.10.3 Command code: 90 (Optional)

Description: Send System Initiated Bonus Win Amount

Poll: '01 90'

Response: '01 90 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Multiplier, binary format. Bit 7: 0 = deductible, 1 = non-deductible.

Byte 4 ~ Byte 7 – Multiplied win amount not including original win amount, BCD format.

Byte 8 – Tax status of the bonus, binary format. 00 – Deductible.
 01 – Non-deductible.

02 – Wager match.

Byte 9 ~ Byte 12 – Bonus win amount in number of credits, BCD format.

Byte 13 ~ Byte 14 – 16-bit CRC.

4.10.4 Command code: 9A (Optional)

Description: Send System Bonus Meters

Poll: '01 9A'

Response: '01 9A 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Game number, '0000' = gaming machine, BCD format.

Byte 5 ~ Byte 8 – Deductible bonus meter in number of credits, BCD format.

Byte 9 ~ Byte 12 – Non-deductible bonus meter in number of credits, BCD format.

Byte 13 ~ Byte 16 – Wager match bonus meter in number of credits, BCD format.

Byte 17 ~ Byte 18 – 16-bit CRC.

4.10.5 Command code: 2E (Optional)

Description: Delay Game

Poll: '01 2E 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Delay time in units of 100ms, binary format.

Byte 5 ~ Byte 6 – 16-bit CRC.

Response: '01' - ACK

'81' - NAK

4.11 Real Time Event

This feature group is optional.

4.11.1 Command code: 0E (Optional)

Description: Enable/Disable Real Time Event Reporting

Poll: '01 0E 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Enable code in binary format. 00 = Disable

01 = Enable

Byte 4 ~ Byte 5 – 16-bit CRC.

Response: '01' – ACK

'81' – NAK

Event Reporting

In the RTE reporting environment the VGM shall treat outstanding events with priority over response to long polls. If an outstanding event exists in the event queue, the VGM shall respond to a long poll with the event report.

For the remainder of this section the long poll command used to trigger the event reporting will be '01 11', coin in meter long poll.

4.11.2 Event Code: 4F (Optional)

Description: Bill Accepted Event

Poll: '01 11'

Response: '01 FF 4F 37 00 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Bill accepted exception code in binary format.

Byte 4 – Country code of the accepted bill, BCD format. Reference table C-4, appendix C, page C-5 of the protocol specification document.

Byte 5 – Denomination code of the accepted bill, BCD format. Reference table C-5, appendix C, page C-6 of the protocol specification document.

Byte 6 ~ Byte 9 – Number of accepted bills of this type, BCD format

Byte 10 ~ Byte 11 – 16-bit CRC.

4.11.3 Event Code: 7C (Optional)

Description: Bonus Pay Was Just Awarded Event

Poll: '01 11'

Response: '01 FF 7C 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – System initiated bonus pay was just awarded exception code in binary format.

Byte 4 – Bonus multiplier in binary, with bit 7 indicating tax status: 1 = non-deductible,
0 = deductible.

Byte 5 ~ Byte 8 – Multiplied win amount in units of credits, in BCD.

Byte 9 – Tax status of system bonus award in binary format.

00 = Deductible or no award.

01 = Non-deductible.

02 = Wager match bonus.

Byte 10 ~ Byte 13 – Number of accepted bills of this type

Byte 14 ~ Byte 15 – 16-bit CRC.

4.11.4 Event Code: 7E (Optional)

Description: Game Start Event

Poll: '01 11'

Response: '01 FF 7E 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Game-start exception code in binary format.

Byte 4 ~ Byte 5 – Number of credits wagered for the current game in BCD.

Byte 6 ~ Byte 9 – Coin-in meter after credits wagered in BCD.

Byte 10 – Wager type, bit field, binary format. Bit: 0 ~ 6 – Reserved.

Bit 7: 0 = Not max bet, 1 = Max bet.

Byte 11 – Progressive group for current game.

Byte 12 ~ Byte 13 – 16-bit CRC.

4.11.5 Event Code: 7F (Optional)

Description: Game End Event

Poll: '01 11'

Response: '01 FF 7F 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Game end exception code in binary format.

Byte 4 ~ Byte 7 – Game win in units of credits in BCD.

Byte 8 ~ Byte 9 – 16-bit CRC.

4.11.6 Event Code: 88 (Optional)

Description: Reel N Has Stopped (Reel Game Only)

Poll: '01 11'

Response: '01 FF 88 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Reel N has stopped exception code in binary format.

Byte 4 – Reel number of stopped reel in binary format.

Byte 5 – Physical stop in binary format.

Byte 6 ~ Byte 7 – 16-bit CRC.

4.11.7 Event Code: 8A (Optional)

Description: Game Recall Entered

Poll: '01 11'

Response: '01 FF 8A 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Game recall entered exception code in binary format.

Byte 4 ~ Byte 5 – Selected game number in BCD.

Byte 6 ~ Byte 7 – Recall entry for the game in BCD.

Byte 8 ~ Byte 9 – 16-bit CRC.

4.11.8 Event Code: 8B (Optional)

Description: Card Held/Not Held

Poll: '01 11'

Response: '01 FF 8B 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Card held/not held exception code in binary format.

Byte 4 – Card number and status in binary; left most card = 0, right most card = 4.

Bit 7: 0 = not held, 1 = held.

Byte 5 ~ Byte 6 – 16-bit CRC.

4.11.9 Event Code: 8C (Optional)

Description: Game Selected Event

Poll: '01 11'

Response: '01 FF 8C 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – RTE event identifier in binary format.

Byte 3 – Game selected exception code in binary format.

Byte 4 ~ Byte 5 – Selected game number in BCD.

Byte 6 ~ Byte 7 – 16-bit CRC.

4.12 Ticket Validation and Redemption

There are three ticket validation methods used in the SAS protocol, standard, enhanced and system validation. The enhanced method is the method of choice for the state of Montana.

Enhanced validation provides for a VGM generated 16-digit validation number. The enhanced validation algorithm is described with example in section 15.15, page 15-25 of the protocol specification document. To generate the enhanced validation number, the VGM is required to maintain the VGM machine validation ID number and the validation sequence number in non-volatile memory. The VGM validation ID and the validation sequence number are configured by the CMS, in the absence of the CMS the VGM shall revert to standard validation. This function shall be configurable in the VGM configuration menu.

Standard validation provides for a VGM generated 8-digit validation number. The standard validation algorithm is described with example in section 15.14, page 15-24 of the protocol specification document.

4.12.1 Command code: 4C (Required)

Description: Set Enhanced Validation ID

Poll: '01 4C 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 5 – VGM validation ID number, binary format.

Byte 6 ~ Byte 8 – Starting sequence number, binary format.

Byte 9~ Byte 10 – 16-bit CRC.

Response: '01 4C 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 5 – VGM validation ID number, binary format.

Byte 6 ~ Byte 8 – Current sequence number, binary format.

Byte 9~ Byte 10 – 16-bit CRC.

The host may use this command to retrieve current validation ID and sequence by setting the VGM ID to zero in the poll. If the VGM is not configured for enhanced validation, this command is ignored.

4.12.2 Command code: 4D (Required)

This long poll command is used in response to 2 exceptions reported by the VGM.

- For exception '3D', cash out ticket has been printed.
- For exception '3E', hand pay has been validated.

Description: Send Enhanced Validation Information

Poll: '01 4D 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – Send enhanced validation information command code.

Byte 3 – Function code, binary format:

00 = read current validation information.

01~1F = Validation information from buffer index n.

FF = Look ahead at current validation information.

Byte 4~ Byte 5 – 16-bit CRC.

Response: '01 4D 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Type of validation, binary format. Reference table 4.9.2 below.

Byte 4 – Buffer index number, binary format.

Byte 5 ~ Byte 8 – Validation date in MMDDYYYY format, BCD format.

Byte 9 ~ Byte 11 – Validation time in HHMMSS 24-hour format, BCD format.

Byte 12 ~ Byte 19 – Validation number (enhanced or system), BCD format.

Byte 20 ~ Byte 24 – Ticket/hand pay amount in units of cents, BCD format.

Byte 25 ~ Byte 26 – Sequential ticket number, roll over at 9999, binary format.

Byte 27 – Validation system ID, BCD format:

00 = Enhanced validation number calculated by the VGM.

01 ~ 99 = System ID code (indicate system validation).

Byte 28 ~ Byte 33 – Reserved, set all bytes to '00'.

Byte 34~ Byte 35 – 16-bit CRC.

Table 4.9.2: **Validation Type Code Values**

Code	Validation type
00	Cashable ticket from cash out or win, no hand pay lockup
01	Promotional ticket from cash out
10	Hand pay from cash out (ticket printed)
20	Hand pay from single win (ticket printed)
40	Hand pay from cash out (no ticket)
60	Hand pay from single win (no ticket)
80	Cashable voucher redeemed
81	Promotional voucher redeemed

4.12.3 Command Code: 57 (Required)

Description: Send Pending Cash Out Information

Poll: '01 57'

Response: '01 57 00 00 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Type of cash out, binary format: 00 = Cashable ticket.

01 = Promotional ticket.

80 = Not waiting for system validation.

Byte 4 ~ Byte 8 – Cash out amount in units of cents, BCD format.
Byte 9 ~ Byte 10 – 16-bit CRC.

4.12.4 Command code: 58 (Optional)

Description: Receive Validation Number

Poll: '01 58 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Validation system ID code, BCD format. (00 = system validation denied.)

Byte 4 ~ Byte 11 – Validation number to use for cash out, BCD format.

Byte 12 ~ Byte 13 – 16-bit CRC.

Response: '01 58 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Status, binary format: 00 = Command acknowledged.

80 = Not in cash out mode.

81 = Improper validation, rejected.

Byte 4 ~ Byte 5 – 16-bit CRC.

4.12.5 Command Code: 70 (Optional)

Description: Send Voucher Validation Data

Poll: '01 70'

Response: '01 70 00 00 00 00 00 00 00 00 00 ... 00 XX XX'

Byte 1 – EGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Voucher status, binary format: 00 = Voucher in escrow, data follows.

FF = No voucher in escrow.

Byte 5 ~ Byte 9 – Voucher amount, BCD format. All zeroes if no amount available.

Byte 10 – Validation data parsing code (see below), binary format.

Byte 11 ~ Byte 42 – Voucher validation data, BCD format.

Byte 43 ~ Byte 44 – 16-bit CRC.

4.12.6 Command code: 71 (Optional)

Description: Redeem Voucher

Poll: '01 71 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – Voucher transfer code (table 4.9.6a), binary format.

Byte 5 ~ Byte 9 – Voucher transfer amount, BCD format.

Byte 10 – Validation data parsing code (00), binary format.

Byte 11 ~ Byte 19 – Voucher validation data, BCD format.

Byte 20 ~ Byte 21 – 16-bit CRC.

Response: '01 71 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data field, binary format.

Byte 4 – VGM status code (table 4.9.6b), binary format.

Byte 5 ~ Byte 9 – Voucher transfer amount, BCD format. 0 if no amount available.

Byte 10 – Validation data parsing code (00), binary format.

Byte 11 ~ Byte 19 – Voucher validation data, BCD format.

Byte 20 ~ Byte 21 – 16-bit CRC.

Table 4.9.6a: **Voucher Transfer Codes**

Code	Status
00	Valid cashable voucher
01	Valid promotional voucher
80	Unable to validate (no reason given/other)
81	Not a valid validation number
82	Validation number not in system
83	Voucher marked pending in system
84	Voucher already redeemed
85	Voucher expired
86	Validation information not available
87	Voucher amount does not match system amount
88	Voucher amount exceeds auto redemption limit
FF	Request for current voucher status

Table 4.9.6b: **EGM Status Codes**

Code	Status (3 most significant bit used to determine category of status code)
	Binary codes 000xxxxx indicate voucher redemption successful
00	Cashable voucher redeemed
01	Promotional voucher redeemed
	Binary code 001xxxxx indicate waiting for long poll '71'
20	Waiting for long poll '71'
	Binary code 010xxxxx indicate voucher redemption pending
40	Voucher redemption pending
	Binary code 100xxxxx indicate voucher redemption failed
80	Voucher rejected by host, or unknown
81	Validation number does not match (response should include correct number)
82	Not a valid transfer function
83	Not a valid transfer amount (non-BCD)
84	Transfer amount exceeded the EGM credit meter limit
85	Transfer amount not an even multiple of EGM denomination
86	Transfer amount does not match voucher amount
87	EGM unable to accept transfer at this time
88	Voucher rejected due to timeout
89	Voucher rejected due to communication link down
8A	Voucher redemption disabled
8B	Voucher rejected due to validator failure
	Binary codes 110xxxxx indicate incompatible poll

C0	Not compatible with current redemption cycle (ignore)
	Binary codes 111xxxxx indicate no validation information available
FF	No validation information available

4.12.7 **Command code: 7B (Optional)**

Description: Extended Validation Status

Poll: ‘01 7B 00 00 00 00 00 00 00 00 00 XX XX‘

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 ~ Byte 5 – Control mask. Set bit to allow control of corresponding function in control bits, bit field, binary format. Reference table 4.9.7.

Byte 6 ~ Byte 7 – Status bit control states. Bit = 1 to enable function, 0 to disable function, if corresponding mask bit is 1, bit field, binary format.

Byte 8 ~ Byte 9 – Number of days before cashable ticket expire, BCD format.

Byte 10 ~ Byte 11 – Default number of days before restricted ticket expires, BCD format.

Byte 12 ~ Byte 13 – 16-bit CRC.

Response: ‘01 7B 00 00 00 00 00 00 00 00 00 00 XX XX‘

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 ~ Byte 7 – VGM asset number or house ID.

Byte 8 ~ Byte 9 – Status bit control states. Bit = 1 if function currently enabled, 0 if function currently disabled. Reference table 4.9.7.

Byte 10 ~ Byte 11 – Number of days before cashable ticket expire, BCD format.

Byte 12 ~ Byte 13 – Default number of days before restricted ticket expires, BCD format.

Byte 14 ~ Byte 15 – 16-bit CRC.

Table 4.9.7: **Validation Control/Status Bits**

Byte	Bit	Description	Control	Status
LSB	0	Use Printer as cash out device	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	1	Use printer as handpay receipt device	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	2	Validate handpay and handpay receipts	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	3	Print restricted tickets	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	4	Tickets for foreign restricted amounts	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	5	Ticket redemption	0 = Do not allow 1 = Allow	0 = Currently not available 1 = Currently available
	6~7	Reserved	Set to 0	Returns 0
MSB	0~6	Reserved	Set to 0	Returns 0

	7	Enhanced validation configuration	0 = Cancel config 1 = No change	0 = configuration not set 1 = Currently configured
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4.12.8 **Command code: 7C (Optional)**

Description: Set Extended Ticket Data

Poll: '01 7C 00 00 00 00 00 ... 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Length of data bytes to follow , binary format.

Byte 4 – Data element type code, binary format. Reference table 4.9.8.

Byte 5 – Length of data element to follow, binary format.

Byte 6 ~ Byte ... – Variable length. Data element. Reference table 4.9.8.

Byte ... ~ Byte ... – Variable length. Additional data code/length/data elements.
Reference table 4.9.8.

Byte ... ~ Byte ... – 16-bit CRC.

Response: '01 7C 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Ticket data status flag, binary format. 00 = False, 01 = True.

Byte 4 ~ Byte 5 – 16-bit CRC.

Table 4.9.8: **Ticket Data Fields**

Data Code (binary)	Description	Data
00	Location	Variable ASCII text (40 max)
01	Address 1	Variable ASCII text (40 max)
02	Address 2	Variable ASCII text (40 max)
10	Restricted ticket title	Variable ASCII text (16 max)
20	Debit ticket title	Variable ASCII text (16 max)

4.12.9 **Command code: 7D (Optional)**

Description: Set Ticket Data

Poll: '01 7D 00 00 00 00 00 00 ... 00 00 00 ... 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 ~ Byte 5 – Host identification number, binary format.

Byte 6 – Number of days before ticket expires, '00' for no expiration, binary format.

Byte 7 – Length of location name, binary format.

Byte 8 ~ Byte 47 – Location name, variable length, 40 bytes maximum, ASCII format.

Byte 48 – Length of address 1 data, binary format.

Byte 49 ~ Byte 88 – Address 1, variable length, 40 bytes maximum, ASCII format.

Byte 89 – Length of address 2 data, binary format.

Byte 89 ~ Byte 128 – Address 2, variable length, 40 bytes maximum, ASCII format.
 Byte 129 ~ Byte 130 – 16-bit CRC.

Response: '01 7D 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Ticket data status flag, binary format. 00 = False, 01 = True.

Byte 4 ~ Byte 5 – 16-bit CRC.

4.12.10 Command Code: 3D (Required)

Description: Send Cash Out Ticket Information

Poll: '01 3D'

Response: '01 3D 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Standard validation number (calculated by VGM), BCD format.

Byte 7 ~ Byte 11 – Ticket amount in units of cents, BCD format.

Byte 12 ~ Byte 13 – 16-bit CRC.

If the EGM is configured for enhanced or system validation, the validation number data field should be all zeros in the response.

4.12.11 Command code: 50 (Required)

Description: Send Validation Meters

Poll: '01 50 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Type of validation (table 4.9.11), binary format.

Byte 4 ~ Byte 5 – 16-bit CRC.

Response: '01 50 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Type of validation (table 4.9.11), binary format.

Byte 4 ~ Byte 7 – Total number of validations of type, BCD format.

Byte 8 ~ Byte 12 – Cumulative validation amount in units of cents, BCD format.

Byte 13 ~ Byte 14 – 16-bit CRC.

Table 4.9.11: Validation Type Code Values

Code	Validation type
00	Cashable ticket from cash out or win, no hand pay lockup
01	Promotional ticket from cash out
10	Hand pay from cash out (ticket printed)
20	Hand pay from single win (ticket printed)
40	Hand pay from cash out (no ticket)
60	Hand pay from single win (no ticket)
80	Cashable voucher redeemed
81	Promotional voucher redeemed

4.13 Multi-denomination

This feature group is optional. Refer to section 16 of the protocol specification document for detail of this feature.

Definition:

Accounting denomination – The base denomination used for basic VGM accounting.

Player/Game denomination – The denomination available to the player.

Token denomination – The denomination of the coin mechanism and/or the hopper.

4.13.1 Command code: B0 (Optional)

Description: Multi-Denom Preamble Command

Poll: '01 B0 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 – Denomination, binary format. Reference table C-4, appendix C, page C-5 of the protocol specification document.

Byte 5 – Command code for multi-denom-aware long poll, binary format. Reference table 4.10.1a.

Byte 6 ~ Byte ... - Data appropriate for the base command, variable format.

Byte ... ~ Byte ... – 16-bit CRC.

Response: '01 B0 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 – Denomination, binary format. Reference table C-4, appendix C, page C-5 of the protocol specification document.

Byte 5 – Command code for multi-denom-aware long poll, binary format. Reference table 4.10.1a.

Byte 6 ~ Byte ... - Data appropriate for the base command, or a 1 byte binary error code from table 4.10.1b, variable format.

Byte ... ~ Byte ... – 16-bit CRC.

Table 4.10.1a: **Multi-Denom-Aware Long Poll**

Poll	Description	Default Response (denom = 00)
09	Enable/disable game N	Enable/disable game for all player denomination
11	Send total coin in meter	Coin in meter for VGM
12	Send total coin out meter	Coin out meter for VGM
14	Send total jackpot meter	Jackpot meter for VGM
15	Send games played meter	Games played meter for VGM
16	Send games won meter	Games won meter for VGM
17	Send games lost meter	Games lost meter for VGM
2F	Send selected meters	Selected meters for VGM

56	Send enabled game numbers	Enabled game number for currently selected player denomination
6F	Send extended meters	Selected meters for VGM
AF	Send extended meters	Selected meters for VGM
B5	Send extended game N information	Game information for all player denominations for VGM

Table 4.10.1b: **Multi-Denom Preamble Error Codes**

Code	Error Condition
01	Long poll not supported or ignored
02	Improperly formatted long poll
03	Not a multi-denom-aware long poll
04	Long poll not supported in that format for specific denomination
05	Not a valid player denomination

4.13.2 Command Code: B1 (Optional)

Description: Send Current Player Denomination

Poll: '01 B1'

Response: '01 B1 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Player denomination code currently selected, binary format. Reference table C-4, appendix C, page C-5 in the protocol specification document.

Byte 4 ~ Byte 5 – 16-bit CRC.

4.13.3 Command Code: B2 (Optional)

Description: Send Enabled Player Denominations

Poll: '01 B2'

Response: '01 B2 00 00 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 – Number of player denominations currently enabled, binary format.

Byte 5 ~ Byte ... – Player denomination codes currently enabled, one per denomination enabled, binary format. Reference table C-4, appendix C, page C-5 in the protocol specification document.

Byte ...~ Byte ...– 16-bit CRC.

4.13.4 Command Code: B3 (Optional)

Description: Send Enabled Player Denominations

Poll: '01 B3'

Response: '01 B3 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Token denomination code, 00 = no configured token value, binary format. Reference table C-4, appendix C, page C-5 in the protocol specification

document

Byte 4 ~ Byte 5 – 16-bit CRC.

4.13.5 Command Code: B5 (Optional)

Description: Send Extended Game N Information

Poll: '01 B5'

Response: '01 B5 00 00 00 00 00 00 00 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 ~ Byte 5 – Game number, BCD format.

Byte 6 ~ Byte 7 – Maximum bet for game, in units of game credits, BCD format.

Byte 8 – Progressive group number, binary format.

Byte 9 ~ Byte 12 – SAS progressive level enabled for game N, least significant bit = level 1, most significant bit = level 32; bit field, binary format.

Byte 13 – Length of game name text, binary format.

Byte 14 ~ Byte ... - Optional game name, variable number of bytes, ASCII format.

Byte ... ~ Byte ... – 16-bit CRC.

4.14 Component Authentication

This feature group is optional.

Component authentication is used to individually verify the validity of VGM internal components, such as bill acceptor or ticket printer. Refer to section 17 of the protocol specification document for feature detail.

4.14.1 Command code: 6E (Optional)

Description: Send Authentication Information

Poll: '01 6E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 ... 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 – Requested authentication action, binary format:

- 00 = Interrogate number of installed components
- 01 = Read status of component (address required)
- 02 = Authenticate component (address required)
- 03 = Interrogate authentication status

Byte 5 – Addressing mode, binary format:

- 00 = Addressing by component index number
- 01 = Addressing by component data

Byte 6 – Length of address data following, binary format.

Byte 7 ~ Byte ... – Binary component index if addressing mode = 00,
ASCII component name if addressing mode = 01.

Byte ... ~ Byte ... – 4 bytes. Authentication method requested code, binary format.
Reference table 4.11.1a.

Byte ... – 1 byte. Length of authentication seed code, binary format.

Byte ... ~ Byte ... Variable bytes. Authentication seed value, variable format.

Byte ... – 1 byte. Length of authentication offset, binary format.

Byte ... ~ Byte ... - Variable bytes. Authentication offset value, variable format.

Byte ... ~ Byte ... – 16-bit CRC.

Response: '01 6E 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 – Data field length, binary format.

Byte 4 ~ Byte 5 – CRC of all ASCII component names, binary format.

Byte 6 – Status of component list, component, or error code, binary format. Reference table 4.11.1b for error code.

Byte 7 – Length of name data following, binary format.

Byte 7 ~ Byte ... – Variable bytes. ASCII list name or component name.

Byte ... – 1 byte. Length of size data following, binary format.

Byte ... ~ Byte ... – Variable bytes. Number of component or size of component, binary format.

Byte ... ~ Byte ... 4 bytes. Authentication method supported by component, binary format.

Byte ... ~ Byte ... 4 bytes. Authentication method in use, binary format.

Byte ... – 1 byte. Length of authentication data, 00 if in progress or failed, binary format.

Byte ... ~ Byte ... – Variable bytes. Authentication data if completed, variable format.

Byte ... ~ Byte ... – 16-bit CRC.

Table 4.11.1a: **Authentication Methods**

Code (binary)	Method (bit set if method supported/active)	Seed Size (max bytes)	Result Size (max bytes)
00000000	None	n/a	n/a
00000001	CCITT CRC-16	2 bytes binary	2 bytes binary
00000002	CRC-32	4 bytes binary	4 bytes binary
00000004	MD5	16 bytes binary	16 bytes binary
00000008	Kobetron I	4 bytes ASCII	4 bytes ASCII
00000010	Kobetron II	4 bytes ASCII	4 bytes ASCII
00000020	SHAI	20 bytes binary	20 bytes binary

Table 4.11.1b: **Authentication Status/Error Codes**

Code (binary)	Status
00	Status request successful
40	Authentication currently in progress
41	Authentication completed successful, data included

Status codes 80 through BF indicate component error status	
80	Component does not exist
81	Component disabled or otherwise unavailable
Status codes C0 through FF indicate authentication operation failed	
C0	Authentication failed, reason unknown or unspecified
C1	Authentication aborted, component list changed
C2	Component does not support authentication
C3	Requested authentication method not supported
C4	Invalid data for requested authentication method
FF	No authentication data available

4.15 Maintenance

This section details the machine configuration and maintenance long poll command. These are type 'S' long poll commands, the polls contain data for the VGM to act on. Upon receipt of the command, the VGM either ACK (address of the VGM) or NAK (address of the VGM OR'ed with 0x80.) the long poll based on the validity of the message and the message CRC.

If the command is not supported by the VGM, it shall not be responded to in any manner. Any response from the VGM constitutes support of the command and the VGM shall be expected to act according to the maintenance commands.

4.15.1 Command code: 01 (Optional)

Description: Shutdown (lock out play)

Poll: '01 01 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

Expected behavior:

- If the VGM is not in game play state, all player inputs should be disabled except cash out and the ability to call an attendant. The VGM could automatically cash out all accumulated credits or allow the player to do so.
- If the VGM is in game play state, the game cycle will be allowed to complete before the above action is taken by the VGM. No further game cycle will be allowed to start.
- VGM with AFT feature must allow the player to transfer remaining credits on the VGM back to the host, while the VGM is in the disabled state.

4.15.2 Command code: 02 (Optional)

Description: Start-up (enable play)

Poll: '01 02 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.3 Command code: 03 (Optional)

Description: Sound Off (all sounds disabled)

Poll: '01 03 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.4 Command code: 04 (Optional)

Description: Sound On (all sounds enable)

Poll: '01 04 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.5 Command code: 05 (Optional)

Description: Reel Spin Sound Disable

Poll: '01 05 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.6 Command code: 06 (Optional)

Description: Enable Bill Acceptor

Poll: '01 06 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.7 Command code: 07 (Optional)

Description: Disable Bill Acceptor

Poll: '01 07 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.8 Command code: 08 (Optional)

Description: Configure Bill Denominations

Poll: '01 08 00 00 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 6 – Bill denominations, bit represented, binary format, 0 = disable, 1 = enable.

Bit	LSB	2 nd Byte	3 rd Byte	MSB
0	\$1	\$200	\$20000	TBD
1	\$2	\$250	\$25000	TBD
2	\$5	\$500	\$50000	TBD
3	\$10	\$1000	\$100000	TBD
4	\$20	\$2000	TBD	TBD
5	\$25	\$2500	TBD	TBD
6	\$50	\$5000	TBD	TBD
7	\$100	\$10000	TBD	TBD

Byte 7 – Bill acceptor action flag, binary format

00 = Disable bill acceptor after accepting a bill.

01 = Keep bill acceptor enabled after each accepted bill.

Byte 8 ~ Byte 9 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

4.15.9 Command code: 09 (Optional)

Description: Enable/Disable Game N

Poll: '01 09 00 00 00 XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – Selected game number to enable/disable, BCD format.

Byte 5 – Action to take in binary format, 00 = Disable, 01 = Enable.

Byte 6 ~ Byte 7 – 16-bit CRC.

Response: '01' – ACK
'81' – NAK

- If the command is to enable a disabled game, the specified game number should now be selectable.
- If the command is to disable an enabled game, the specified game number should no longer be selectable.

4.15.10 Command code: 0A (Optional)

Description: Enter Maintenance Mode

Poll: '01 0A XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.
Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
 '81' – NAK

4.15.11 Command code: 0B (Optional)

Description: Exit Maintenance Mode

Poll: '01 0B XX XX'

Byte 1 – VGM SAS address in binary format.

Byte 2 – Command code.

Byte 3 ~ Byte 4 – 16-bit CRC.

Response: '01' – ACK
 '81' – NAK

5 Post Notes

The purpose of this document is to specify required polling commands by the Montana Gambling Control Division. The intent is to clarify any and all vagueness or ambiguity in the protocol specification document. Should ambiguity or vagueness persist, consult Montana GCD personnel before proceeding with implementation.

Modification of interpretation by Montana GCD will be published no later than 7 days after such modification, and shall be effective immediately. New submission of the protocol implementation shall follow the modified interpretation without exception.