
Requirements Specification

for

VGM Monitoring Systems

Montana Department of Justice – Gambling Control Division

December 7, 2023
Version 2.7



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Revision History

Date	Version	Modification
12/7/2023	2.7	Added REQ-TIERI-SYSTEM-33, Appendices F, G, and H. Clarified REQ-TIERI-SYSTEM-11, REQ-TIERI-SYSTEM-15, REQ-TIERI-SYSTEM-22, REQ-TIERI-SYSTEM-27, and REQ-TIERI-SYSTEM-32. Modified REQ-CTVS-SYSTEM-07. Updated Fig 1.2
2/25/2020	2.6	Added REQ-TIERI-SYSTEM-33. Modified REQ-TIERI-SYSTEM-22, REQ-TIERI-SYSTEM-32, and REQ-CTVS-SYSTEM-12.
9/11/2018	2.5	Added REQ-CTVS-SYSTEM-14, REQ-CTVS-SYSTEM-15 and Appendix E. Modified REQ-TIERI-SYSTEM-04, REQ-CTVS-SYSTEM-04 and REQ-CTVS-SYSTEM-07
5/15/2018	2.4	Added REQ-TIERI-DATAFILE-43 and REQ-TIERI-SYSTEM-27-32. Created CTVS Requirements section 3. Modified REQ-TIERI-DATAFILE-05, REQ-TIERISYSTEM-03, REQ-TIERI-SYSTEM-04 and REQ-TIERI-SYSTEM-22
11/2/2017	2.3	Modified REQ-TIERI-SYSTEM-07, REQ-TIERI-REPORTING-03 and REQ-TIERI-REPORTING-05. Added REQ-TIERI-SYSTEM-26.
10/16/2017	2.2	Modified REQ-TIERI-SYSTEM-05 and REQ-TIERI-DATAFILE-15; to remove event 7A. REQ-TIERI-DATAFILE-05, 06, 41 and 42. Modified REQ-TIERI-DATAFILE-14 to set the fblnAppStart flag.
1/4/2017	2.1	Clarified REQ-TIERI-DATAFILE-40. Added REQ-TIERI-SYSTEM-25. Minor spelling corrections. Added GCD logo
10/27/2015	2.0	Modified REQ-TIERI-REPORTING-06
5/12/2015	1.9	Modified Figure 1, 1.4 References, REQ-TIERI-REPORTING-04, REQ-TIERI-REPORTING-06 and Appendix C
3/24/2015	1.8.7	Clarified REQ-TIERI-DATAFILE-21 and 22. Updated Appendix A
2/20/2015	1.8.6	Modified REQ-TIERI-SYSTEM-22. Clarified REQ-TIERI-DATAFILE-02, 21 and 22.
1/26/2015	1.8.5	Clarified REQ-TIERI-SYSTEM-02.1, Added REQ-TIERI-SYSTEM-02.2 support UTC; Clarified REQ-TIERI-SYSTEM-14; Modified REQ-TIERI-SYSTEM-22 to add a time period of 15 minutes and expand Automatic Notification Requirements; Added REQ-TIERI-SYSTEM-24 remote access for testing; Modified TIERI-DATAFILE-05,06 Added Current Credits/UTC/MfgID fields; Added REQ-DATAFILE-38,39,40 defined new Current Credits, UTC and Mfg ID fields respectively; Added REQ-TIERI-REPORTING-06 supports transmission to additional FTS test directory.
1/15/2014	1.8.4	Corrected HTTP/SOAP time in Figure 1: System Architecture; Clarified REQ-TIERI-SYSTEM-12 and REQ-TIERI-SYSTEM-14 and the example in REQ-TIERI-DATAFILE-06; Modified REQ-TIERI-SYSTEM-22, REQ-TIERI-DATAFILE-01, REQ-TIERI-SYSTEM-20; Modified REQ-TIERI-SYSTEM-09 to remove manual EOQ; Modified REQ-TIERI-SYSTEM-18 to remove mandatory mounting of SMIB; Added REQ-TIERI-SYSTEM-23 to require setting time on VGM.
7/23/2013	1.8.3	Clarified REQ-TIERI-SYSTEM-04, REQ-TIERI-SYSTEM-05, REQ-TIERI-SYSTEM-10, REQ-TIERI-DATAFILE-03, REQ-TIERI-DATAFILE-37. Modified REQ-TIERI-SYSTEM-20, REQ-TIERI-SYSTEM-21 and REQ-TIERI-DATAFILE-10, Appendix C.
4/10/2013	1.8.2	Modified REQ-TIERI-REPORTING-01 and REQ-TIERI-REPORTING-03 meter record file reporting interval and time.
3/7/2013	1.8.1	Added REQ-TIERI-SYSTEM-21 and REQ-TIERI-SYSTEM-22 Clarified REQ-TIERI-SYSTEM-06, REQ-TIERI-DATAFILE-21 and REQ-TIERI-DATAFILE-22.

2/27/2013	1.8	Added REQ-TIERI-SYSTEM-16, REQ-TIERI-SYSTEM-17, REQ-TIERI-SYSTEM-19 and REQ-TIERI-SYSTEM-19, REQ-TIERI-SYSTEM-20 and Section 2.4 Source Code Requirements. REQ-TIERI-SYSTEM-03 clarified CRC, REQ-TIERI-DATAFILE-01 clarified record, REQ-TIERI-DATAFILE-10 clarified EOQ, REQ-TIERI-DATAFILE-10 added event code C1 and C2, REQ-TIERI-DATAFILE-21 clarified record, REQ-TIERI-DATAFILE-22 clarified record and REQ-TIERI-DATAFILE-27 clarified record. Updated Appendix A: Glossary
12/11/2012	1.7	REQ-TIERI-SYSTEM-06 clarified TAP User ID. REQ-TIERI-SYSTEM-14 clarified long poll 7B. REQ-TIERI-DATAFILE-10 clarified <i>fbInQuarterEnd</i> field reporting. Appendix A added "Day".
11/30/2012	1.6	REQ-TIERI-SYSTEM-04 added SAS long poll 6F and referenced data file of VGM Program Numbers that don't supporting extended meters; REQ-TIERI-SYSTEM-05 added the exclusion of SAS exception 7A for some program ID's; REQ-TIERI-SYSTEM-11 clarified D1 and D2 as consecutive records; REQ-TIERI-SYSTEM-14 added SAS long poll 7B; REQ-TIERI-DATAFILE-01 clarified last record in the file; REQ-TIERI-DATAFILE-05 modified meter length; Updated Appendix A: Glossary; Added Appendix D SAS to MT Cross Reference.
8/24/2012	1.5	REQ-TIERI-SYSTEM-09 clarified EOQ date field and extended EOQ reporting from seven to fourteen days. REQ-TIERI-DATAFILE-05 modified for <i>fstrReportTime</i> field to report seconds. REQ-TIERI-DATAFILE-22 clarified time stamping of the record.
8/14/2012	1.4	REQ-TIERI-SYSTEM-15, REQUIREMENT-TIERI-DATAFILE-05, and REQUIREMENT-TIERI-DATAFILE-14 were modified to report "0" for <i>fbInAppStart</i> .
8/1/2012	1.3	Added REQ-TIERI-SYSTEM-2.1 and REQ-TIERI-SYSTEM-15. REQ-TIERI-SYSTEM-03 clarified seed value and CRC calculation. REQ-TIERI-SYSTEM-04 added SAS long poll \$1A. REQ-TIERI-SYSTEM-09 clarified FY quarters. REQ-TIERI-SYSTEM-11 exclude \$\$CR for check. REQ-TIERI-SYSTEM-12 clarified E1 event record reporting; corrected meter labels. REQ-TIERI-SYSTEM-13 clarified Start Record reporting constraints. REQ-TIERI-SYSTEM-14 clarified initial VGM configuration. REQ-TIERI-DATAFILE-5 clarified <i>fbInService</i> , <i>fcuCoinInHard</i> , <i>fcuBillInHard</i> , <i>fcuTotalPlayedHard</i> , <i>fcuTotalWonHard</i> , <i>fcuTotalPaidSoft</i> , <i>flngGamesPlayedSoft</i> , <i>flngGamesWonSoft</i> , <i>fstrUserId</i> field reporting constraints. REQ-TIERI-DATAFILE-10 clarified <i>fbInQuarter</i> field reporting constraints. REQ-TIERI-DATAFILE-12 clarified <i>fstrRouteOwned</i> field reporting constraints. REQ-TIERI-DATAFILE-15 Included \$\$CR in the formula; corrected meter labels. REQ-TIERI-DATAFILE-28, 29, 30, 31 corrected meter labels. Appendix A Glossary corrected meter labels.
10/13/2011	1.2	Minor spelling corrections; title page formatting; graphical alterations to Figure 1 to improve readability and reflect Montana law.
8/6/2010	1.1	Changes based on review.
7/7/2010	1.0	Initial release of document.

1. Introduction

1.1 Purpose

The purpose of this document is to define the requirements specifications for Tier I and CTVS.

1.2 Architecture Diagrams

The diagram in Figure 1 shows the data flow from a VGM to the State of Montana tax database. The architecture of the Tier I system and reporting intervals may vary.

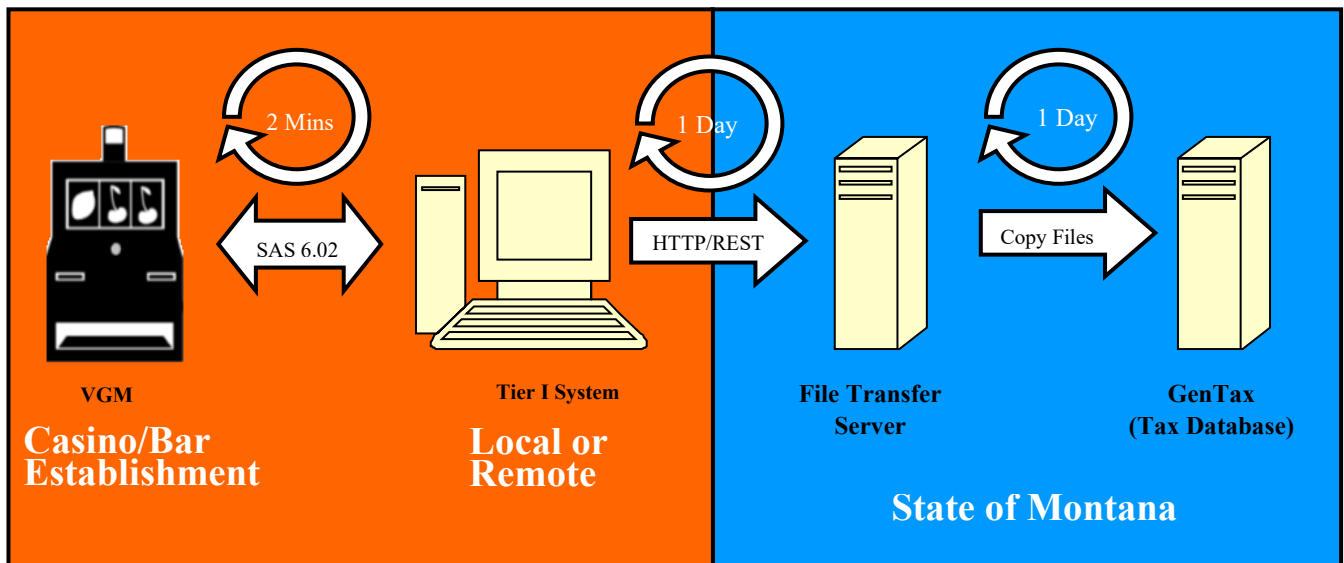


Figure 1 – Tier I System Architecture

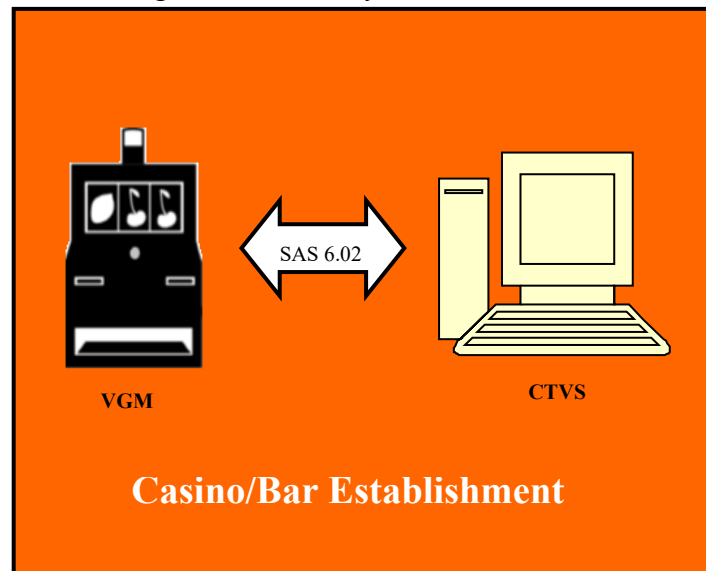


Figure 2 – CTVS Architecture

The diagram in Figure 2 shows the data flow from a VGM to the CTVS.

1.3 Intended Audience

The intended audiences for this requirements specification document are new and existing CTVS and/or Tier I system manufacturers who wish to submit equipment for approval to operate in the State of Montana.

1.4 References

File Transfer Service REST Operations, <https://howto.mt.gov/fts2>

Montana SAS Serial Protocol Implementation Guide, <https://dojmt.gov/gaming/vgm-tier1-testing/>

US Official Time, <http://www.time.gov>

GCD TAP information, <https://dojmt.gov/gaming/tap>

2. Tier I Requirements

2.1 System Requirements

REQ-TIERI-SYSTEM-01: The Tier I System shall communicate with VGMs using the SAS 6.00 or later protocol.

REQ-TIERI-SYSTEM-02: The Tier I System shall keep accurate time in the Mountain Time Zone and adjust for daylight savings using the official US time (<http://www.time.gov>) as a source.

REQ-TIERI-SYSTEM-02.1: The Tier I System shall keep the accurate calendar date and account for a leap year properly.

REQ-TIERI-SYSTEM-02.2: The Tier I System shall support UTC per ISO-8601 International Standard.

REQ-TIERI-SYSTEM-03: The Tier I System shall implement the CCITT 16-bit CRC algorithm defined in Appendix B to signature over all static program components. The Tier I System shall provide an operator interface that allows a 16-bit hex seed to be inputted and used in the CRC calculation. The Tier I system shall display the outcome of the CRC calculation to the operator within 3 minutes. This CRC signature feature shall be used by regulators to ensure only approved Tier I Systems are operational in the field. Include SMIB software in the calculations, if applicable. If peripherals (i.e. CTV) are supported, also include all software in the CRC calculation. If credentials are required for initiation of CRC calculation, they must be hard-coded.

REQ-TIERI-SYSTEM-04: The Tier I System shall poll all connected VGMs at a maximum of two-minute intervals to retrieve current meter values. Current meter values shall be retrieved with a single SAS long poll \$6F where extended meters are supported by a VGM. If extended meters are not supported by a VGM, current meter values shall be retrieved using SAS long polls \$0F and

\$1A. The system must incorporate a data file containing VGM Paytable IDs (Program Names) that do not support extended meters; this file will be used to determine which SAS long poll(s) to use for obtaining current meters (contact GCD TSS for the file). See Appendix A for meter definitions, Appendix D for meter cross-reference and Appendix E for a current list of programs not supporting 6F.

REQ-TIERI-SYSTEM-05: The Tier I System shall immediately poll the VGM for their current meter values and Paytable ID (Program Name) when the VGM reports any of the following exceptions and create a meter record in the current data file.

SAS Event Exception	Event Description	SAS Event Exception	Event Description
\$11	Slot Door Opened	\$19	Cashbox Door Opened
\$12	Slot Door Closed	\$1A	Cashbox Door Closed
\$13	Drop Door Opened	\$1B	Cashbox Removed
\$14	Drop Door Closed	\$1C	Cashbox Installed
\$15	Card Cage Opened	\$1D	Belly Door Opened
\$16	Card Cage Closed	\$1E	Belly Door Closed
\$17	AC Power Applied	\$3C	Operator Changed Options
\$18	AC Power Lost		

REQ-TIERI-SYSTEM-06: The Tier I System shall provide an operator interface that allows the entry of the TAP User ID, file transfer server URL, and file transfer username/password to be input or changed. The TAP User ID is associated with the VGM owner; one establishment could have several TAP User IDs.

REQ-TIERI-SYSTEM-07: The Tier I System shall provide an operator interface that allows the entry of the GOA number. This field should not be changeable unless there are no VGM(s) configured on the system. The Tier I System shall provide an operator interface for each connected VGM that allows the entry of the MDR number and a Boolean for VGMs owned by a route operator.

REQ-TIERI-SYSTEM-08: The Tier I System shall have a unique software version ID that can be displayed to the operator.

REQ-TIERI-SYSTEM-09: The Tier I System shall recognize that EOQ dates correspond only to the following:

- FY EOQ 1 – 9/30
- FY EOQ 2 – 12/31
- FY EOQ 3 – 3/31
- FY EOQ 4 – 6/30

REQ-TIERI-SYSTEM-10: The Tier I System shall poll all connected VGMs for their current meters and Paytable ID (Program Name) and create records with *fstrEventCode* of NULL in the current data file at 5:00 AM every day for an EOD event.

REQ-TIERI-SYSTEM-11: The Tier I System shall compare the last known meter readings for a VGM compared to any newly acquired meter readings any time meter readings are retrieved. If any new meter value is found to be MLP, excluding \$SCR, the Tier I system shall create two consecutive meter records. The first meter record shall have the *fstrEventCode* of D1 using the older meter values and their date/time of occurrence. The second meter record shall have the *fstrEventCode* of D2 using the newest meter values and their date/time of occurrence.

REQ-TIERI-SYSTEM-12: The Tier I System shall create a second EOD meter record with the *fstrEventCode* of E1 if the meters are detected to be out of balance using the formula $$$IN + $$WN = $$PL + $$PD + $$CR$, using the last known meter values.

REQ-TIERI-SYSTEM-13: The Tier I System shall create a meter record in the current data file with the *fstrEventCode* of E2 instead of the EOD meter record *fstrEventCode* of Null if the VGM is detected to be offline using the last known meter values.

REQ-TIERI-SYSTEM-14: The Tier I System shall recognize when a new VGM is connected, and force Operator configuration. The VGMID is obtained using SAS long poll \$7B if supported by the VGM, otherwise the system must force operator configuration of the VGMID. The VGM can be assumed to support \$7B if it returns a number greater than or equal to 100,000 and less than 1,000,000. The Tier I System must recognize duplicate VGMID and serial numbers with the same manufacturer and prevent configuration of the duplicate.

REQ-TIERI-SYSTEM-15: The Tier I System shall create a Start meter record with *fstrEventCode* of *NULL* and *fblnAppStart* of 0 when a VGM is initially configured and brought on-line. No meter record should be created until the VGM is licensed to start at that establishment. A Start meter record is never again reported unless the VGM is withdrawn from play by LOW and subsequently relicensed.

REQ-TIERI-SYSTEM-16: The Tier I System shall comply with SAS timing requirements for Inter-Byte Delay Time as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-TIERI-SYSTEM-17: The Tier I System shall retain data when power is cycled.

REQ-TIERI-SYSTEM-18: Any SMIB shall be enclosed within a protective housing inside the VGM interior. SMIB antennas can be routed to the exterior of the VGM, if applicable.

REQ-TIERI-SYSTEM-19: Long poll responses shall be verified using a CRC16 at the Tier I System communications layer closest to the VGM, such as a SMIB.

REQ-TIERI-SYSTEM-20: The Tier I System shall support user-defined VGM ownership changes at an arbitrary date/time in the future. At the time the change of ownership occurs, the system shall create two meter records for any of the following ownership changes:

GOA (*fstrLocationPermit*) to MDR (*fstrRouteOperator*)
MDR (*fstrRouteOperator*) to MDR (*fstrRouteOperator*)
MDR (*fstrRouteOperator*) to GOA(*fstrLocationPermit*)

The first record shall contain the *fstrEventCode* of C1 using the old ownership and current meters. The second record shall have *fstrEventCode* of C2 using new ownership and the current meters.

REQ-TIERI-SYSTEM-21: The Tier I System shall have an option to permanently remove VGM(s) from the system. When a VGM is removed from the system, a final meter record shall be created with an event code R1 using the date, time and current meters when it was removed.

REQ-TIERI-SYSTEM-22: The Tier I System shall support an automatic notification to the Operator and/or Route Operator via a means approved by the Division (audible, email, etc.) when the Tier I System loses communication with a configured and communicating VGM for longer than a non-zero configurable time and when there will be an issue transmitting the daily file. This notification may include VGM Game ID, VGMID, Serial Number, Program ID and current Tier I Software version. (Note: Game ID is the machine manufacturer obtained with SAS LP \$1F).

REQ-TIERI-SYSTEM-23: The Tier I System shall set the time of connected VGMs, using SAS long poll \$7F, to the current System time. The time shall be set only for the following:

- all VGMS when the System is preparing and/or sending the Tier I daily file,
- an individual VGM upon its initial connection and configuration in the system,
- or an individual VGM when its meters are detected as less than previous.

The Tier I System shall handle a VGM not supporting \$7F by ignoring any failure of acknowledgement from the VGM after no more than three consecutive polls. Tier I System shall never set time on a VGM between the hours of 01:00:00 D and 01:59:59 S when the System date transitions from Mountain Daylight Time to Mountain Standard Time; it should instead wait until the next scenario listed above occurs for a VGM.

REQ-TIERI-SYSTEM-24: The Tier I System shall support the inclusion of remote access via Virtual Private Network for testing purposes upon request.

REQ-TIERI-SYSTEM-25: A Tier I System supporting wireless communications shall utilize WPA2 with AES based encryption algorithm, or other security as approved by GCD TSS.

REQ-TIERI-SYSTEM-26: The Tier I System shall provide an operator interface that allows the change of a GOA number. This interface would automatically remove all VGM(s) from the establishment following **REQ-TIERI-SYSTEM-21** and close the current Tier I data file. A new file shall be started if/when a new GOA has been entered. All file(s) (old GOA and new GOA) would be sent in the next reporting period as per **REQ-TIERI-REPORTING-03**.

REQ-TIERI-SYSTEM-27: The Tier I System shall issue long poll 21 with seed '0000' to each connected VGM after completing EOD processing and before 8:00 AM and create records with *fstrLP21* of the 4 digit response from each VGM in the current data file to be attached to the next EOD record. For any VGM without a logged SAS LP21 response by EOD, NULL shall be reported. A method for excluding specific programs from this requirement may be supported. Refer to Appendix G for a list of specific programs.

REQ-TIERI-SYSTEM-28: The Tier I System shall retrieve the Paytable ID (Program Name) with SAS long poll \$1F. Paytable ID should be retrieved whenever a VGM is detected to have lost connection to the Tier I Host, and at least once a day before the EOD file.

REQ-TIERI-SYSTEM-29: The Tier I System shall communicate with VGMs configured to Secure Enhanced validation mode.

REQ-TIERI-SYSTEM-30: The Tier I System shall support SAS long poll 4C (Set Enhanced Validation ID) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-TIERI-SYSTEM-31: The Tier I System shall respond to a VGM exception 3F and configure the VGM using SAS long poll 4C.

REQ-TIERI-SYSTEM-32: The Tier I System using CTV shall support SAS long poll 3D (Send Cash Out Ticket Information) and/or 4D (Send Enhanced Validation Information) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-TIERI-SYSTEM-33: The Tier I System shall support a method for remotely validating all currently operational Tier I Hosts as per **REQ-TIERI-SYSTEM-03** from a single poll.

REQ-TIERI-SYSTEM-34: The Tier I System shall support a method for validating permitting for a VGM before allowing configuration on the Tier I Host. GCD provides a web service to support this validation. Refer to Appendix H for instructions.

2.2 Data File Requirements

REQ-TIERI-DATAFILE-01: The Tier I data file shall contain meter records for all VGMs connected to the Tier I System in the same file. Each meter record shall be comprised of valid data corresponding to the time it was created. The EOD or EOQ meter record must be the last chronological meter record for each VGM in the data file. If a VGM is offline, any buffered events from the VGM must be tagged with the current time, date, and meter values as they are received by the host upon reconnection.

REQ-TIERI-DATAFILE-02: Meter records within the Tier I data file shall be ordered by UTC date/time.

REQ-TIERI-DATAFILE-03: A new Tier I data file shall be created each day.

REQ-TIERI-DATAFILE-04: The Tier I data file shall have the naming convention “<GOA number> <YYYYMMDD>.txt” where <GOA number> contains the current GOA number input via REQ-TIERI-SYSTEM-07 and <YYYYMMDD> is the date the file is created. The Tier I data file shall have a .txt file extension.

REQ-TIERI-DATAFILE-05: Each Tier I meter record shall have the following:

Field #	Field Name	Description	Type	Format
1	fstrVGMIId	VGMID	String	xxxxxx
2	fdtmQuarter	Quarter Date	Date	MMDDYYYY
3	fbInQuarterEnd	EOQ Flag	Boolean	0 or 1
4	fstrLocationPermit	GOA Number	String	xxxxxxx-xxx-GOA
5	fstrRouteOperator	MDR Number	String	xxxxxxx-xxx-MDR
6	fbInRouteOwned	Route Owned VGM	Boolean	0 or 1
7	fbInAppStart	New Meter Reading	Boolean	0 or 1
8	fstrEventCode	Event Code	String	
9	fbInService	Service Report Flag	Boolean	0
10	fstrServPartBef	Before Service Part Code	String	
11	fstrServLaborBef	Before Service Labor Code	String	
12	fstrServPartAft	After Service Part Code	String	
13	fstrServLaborAft	After Service Labor Code	String	
14	fdtmReportDate	Report Date	Date	MMDDYYYY
15	fstrReportTime	Report Time	String	HHMMSS
16	fcurCoinInHard	Coin In Hard	Currency	0
17	fcurBillInHard	Bill In Hard	Currency	0
18	fcurTotalPlayedHard	Total Played Hard	Currency	0
19	fcurTotalWonHard	Total Won Hard	Currency	0
20	fcurTotalPaidHard	Total Paid Hard	Currency	0
21	fcurTotalInSoft	Total In Soft	Currency	xxxxxxxx.xx
22	fcurTotalPlayedSoft	Total Played Soft	Currency	xxxxxxxx.xx

Field #	Field Name	Description	Type	Format
23	fcurTotalWonSoft	Total Won Soft	Currency	xxxxxxxx.xx
24	fcurTotalPaidSoft	Total Paid Soft	Currency	xxxxxxxx.xx
25	flngGamesPlayedSoft	Total Games Played Soft	Integer	0
26	flngGamesWonSoft	Total Games Won Soft	Integer	0
27	fstrSoftwareVersion	Tier I System Software Version	String	
28	fstrTier	Tier Data Submitted From	String	1
29	fstrUserId	TAP User ID that submitted this data	String	6 to 20 Alpha / Numeric (No special character are allowed)
30	fstrProgID	Paytable ID (Program Name)	String	xxxxxx
31	fcurCurrentCreditsSoft	Current Credits Soft	Currency	xxxxxxxx.xx
32	fstrUTCDate/Time	Record Date/Time in UTC	String	YYYY-MM-DDTHH:MM:SSZ
33	fstrMfgID	Tier I System Manufacturer	String	XXX
34	fstFrequency	Tier II Reporting Period (Tier II only)	String	
35	fstrReportDay	Tier II Reporting Day (Tier II only)	String	
36	fstrLP21	Response to a SAS Long Poll 21 when sending a zero seed.	String	xxxx or NULL

REQ-TIERI-DATAFILE-06: Each Tier I meter record shall delimit between each field in REQ-TIERI-DATAFILE-01 using the “|” character. An example meter record in the data file would look like:

```
"900900|03312008|0|9999999-003-GOA|9999999-004-MDR|1|0|0|0|0|02192008|050359|0|0|0|0|0|0|166570.00|638509.60|579213.95|104274.35|0|0|1.09.0.00|1|BENTAX12345678|MXPGM1|124.70|2014-08-20T11:26:15Z|GCD||1234"
```

* An Excel program used to verify data file format can be obtained from Gambling Control TSS upon request.

REQ-TIERI-DATAFILE-07: The Tier I data file shall contain CR+LF ASCII characters at the end of each meter record.

REQ-TIERI-DATAFILE-08: The *fstrVGMId* field in each meter record shall contain the six-digit VGMID for the VGM associated with the meter record.

REQ-TIERI-DATAFILE-09: The *fdtmQuarter* field in each meter record shall contain the current filing quarter date (033120xx, 063020xx, 093020xx, or 123120xx).

REQ-TIERI-DATAFILE-10: The *fbInQuarterEnd* field in each meter record shall contain “0”. In the case the *fstrEventCode* is NULL or E2 signifying an EOD event and the EOD record date equals

the EOQ date + 1 day, *fblnQuarterEnd* field shall contain “1”. In the case the *fstrEventCode* is C1, the *fblnQuarterEnd* field shall always contain “1”.

REQ-TIERI-DATAFILE-11: The *fstrLocationPermit* field in each meter record shall contain the GOA number input via REQ-TIERI-SYSTEM-07 in the format “xxxxxxx-xxx-GOA”.

REQ-TIERI-DATAFILE-12: The *fstrRouteOperator* field in each meter record shall contain the MDR number input via REQ-TIERI-SYSTEM-07 in the format “xxxxxxx-xxx-MDR” or NULL if VGM is establishment-owned.

REQ-TIERI-DATAFILE-13: The *fblnRouteOwned* field in each meter record shall contain “1” for TRUE or “0” for FALSE input via REQ-TIERI-SYSTEM-07.

REQ-TIERI-DATAFILE-14: The *fblnAppStart* field in each meter record shall always contain “0”; unless the event code is C2 in this case *fblnAppStart* shall always be “1”.

REQ-TIERI-DATAFILE-15: The *fstrEventCode* field in each meter record shall contain one of the following corresponding event codes based on the action that caused the meter record to be created:

Event Code	Description	Cause
NULL	EOD	Meter Readings at 5:00 AM
11	Slot Door Opened	Received SAS Exception \$11
12	Slot Door Closed	Received SAS Exception \$12
13	Drop Door Opened	Received SAS Exception \$13
14	Drop Door Closed	Received SAS Exception \$14
15	Card Cage Opened	Received SAS Exception \$15
16	Card Cage Closed	Received SAS Exception \$16
17	AC Power Applied	Received SAS Exception \$17
18	AC Power Lost	Received SAS Exception \$18
19	Cashbox Door Opened	Received SAS Exception \$19
1A	Cashbox Door Closed	Received SAS Exception \$1A
1B	Cashbox Removed	Received SAS Exception \$1B
1C	Cashbox Installed	Received SAS Exception \$1C
1D	Belly Door Opened	Received SAS Exception \$1D
1E	Belly Door Closed	Received SAS Exception \$1E
3C	Operator Changed Options	Received SAS Exception \$3C
D1	Before MLP	MLP
D2	After MLP	MLP
E1	MOB	Soft MOB \$\$IN+\$\$WN = \$\$PL+\$\$PD + \$\$CR
E2	VGM Offline	Lost Connection With VGM
C1	Before Tier I GOA Number or MDR Number Change	Old Configuration
C2	After Tier I GOA Number or MDR Number Change	New Configuration
R1	The last meter record for an active VGM that was removed from configuration	VGM removed from play in the establishment or a GOA to GOA VGM ownership change

REQ-TIERI-DATAFILE-16: The *fblnService* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-17: The *fstrServPartBef* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-18: The *fstrServLaborBef* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-19: The *fstrServPartAft* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-20: The *fstrServLaborAft* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-21: The *fdtmReportDate* field in each meter record shall contain the Civil Date derived from *fstrUTCDate/Time* of the same meter record.

REQ-TIERI-DATAFILE-22: The *fstrReportTime* field in each meter record shall contain Civil Time derived from *fstrUTCDate/Time* of the same meter record.

REQ-TIERI-DATAFILE-23: The *fcurCoinInHard* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-24: The *fcurBillInHard* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-25: The *fcurTotalPlayedHard* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-26: The *fcurTotalWonHard* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-27: The *fcurTotalPaidHard* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-28: The *fcurTotalInSoft* field in each meter record shall contain the \$\$IN electronic meter value from the VGM.

REQ-TIERI-DATAFILE-29: The *fcurTotalPlayedSoft* field in each meter record shall contain \$\$PL electronic meter value from the VGM.

REQ-TIERI-DATAFILE-30: The *fcurTotalWonSoft* field in each meter record shall contain \$\$WN electronic meter value from the VGM.

REQ-TIERI-DATAFILE-31: The *fcurTotalPaidSoft* field in each meter record shall contain \$\$PD electronic meter value from the VGM.

REQ-TIERI-DATAFILE-32: The *fmgGamesPlayedSoft* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-33: The *fmgGamesWonSoft* field in each meter record shall contain “0”.

REQ-TIERI-DATAFILE-34: The *fstrSoftwareVersion* field in each meter record shall contain the software version string of the Tier I System displayed in REQ-TIERI-SYSTEM-08.

REQ-TIERI-DATAFILE-35: The *fstrTier* field in each meter record shall contain “1”.

REQ-TIERI-DATAFILE-36: The *fstrUserId* field in each meter record shall contain the TAP User ID input in REQ-TIERI-SYSTEM-06 corresponding to the owner of the VGM for the respective record.

REQ-TIERI-DATAFILE-37: The *fstrProgID* field in each meter record shall contain the VGM’s Paytable ID (Program Name) string, when the meters were received for the record.

REQ-TIERI-DATAFILE-38: The *fcurCurrentCreditsSoft* field in each meter record shall contain \$\$CR electronic meter value from the VGM.

REQ-TIERI-DATAFILE-39: The *fstrUTCDate/Time* field in each meter record shall contain the UTC date and time from the Tier I system when the meter record is created except for D1, which shall contain the date and time the meters were read. No meter records for a VGM on a given date can have the same time stamp. UTC time shall be implemented with a 24 Hr clock system, midnight signified as 00:00, the letter “T” as a delimiter, UTC time signified by the letter “Z” and no spaces.

REQ-TIERI-DATAFILE-40: The *fstrMfgID* field in each meter record shall contain the Tier I abbreviated Tier I System manufacturer’s name in three upper case letters as issued by GCD TSS.

Manufacturer	ID
Century	CEN
Rewards	REW

REQ-TIERI-DATAFILE-41: The *fstrFrequency* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-42: The *fstrReportDay* field in each meter record shall be NULL.

REQ-TIERI-DATAFILE-43: The *fstrLP2I* field in each EOD meter record shall contain the 4-digit VGM SAS LP21 response or NULL. Every non-EOD record shall be NULL.

2.3 Reporting Requirements

REQ-TIERI-REPORTING-01: The Tier I System shall report to the State of Montana by uploading the data file to the programmed file transfer server in REQ-TIERI-SYSTEM-06 once a day.

REQ-TIERI-REPORTING-02: The Tier I System shall not report faster than a daily interval.

REQ-TIERI-REPORTING-03: The Tier I System shall report before 6:00 AM on the day it is reporting.

REQ-TIERI-REPORTING-04: The Tier I System shall communicate with the file transfer server using REST over HTTP. More info can be found in Appendix C.

REQ-TIERI-REPORTING-05: The Tier I System shall attempt to report at least twice a day every day until successful if the connection to the file transfer server is down or errors occur. The system should never try to report a file after 5:59:59 AM on a reporting day.

REQ-TIERI-REPORTING-06: The Tier I System shall support sending files to the State of Montana File Transfer Service through the following options:

- <https://transfer.mt.gov/> (mover location name = 4)

- <https://test.transfer.mt.gov/> (mover location name = 4)
- <https://test.transfer.mt.gov/> (mover location name = 51)

The method of transfer shall be user-configurable to any of the above options at any time.

2.4 Software Source Code Requirements

REQ-TIERI-SOURCE-01: The Tier I System source code shall produce the exact same binary image every time it is built regardless of the build machine, location, time, etc. Minor differences may be permitted but all differences must be fully documented and externally verifiable. This requirement should be a deciding factor when choosing the OS platform and/or build environment. The technical services lab needs the ability to build the Tier I production image from source and match it to the submitted binary to ensure the correct source was analyzed and archived.

REQ-TIERI-SOURCE-02: The Tier I System source code shall not contain source that is not compiled into the production or test image.

REQ-TIERI-SOURCE-03: The Tier I System source code shall not contain files that are named the same but have different case in the same directory. This causes problems during source analysis on case insensitive platforms like Windows.

REQ-TIERI-SOURCE-04: The Tier I System source code shall not contain version-specific strings in the file or directory names. This causes issues during the comparison of two versions of source code.

REQ-TIERI-SOURCE-05: The Tier I System source code build environment shall be reproducible and documented.

3. CTVS Requirements

3.1 System Requirements

REQ-CTVS-SYSTEM-01: The CTVS shall implement the CCITT 16-bit CRC algorithm defined in Appendix B to signature over all static program components. The CTVS shall provide an operator interface that allows a 16-bit hex seed to be inputted and used in the CRC calculation. The CTVS shall display the outcome of the CRC calculation to the operator within 3 minutes. This CRC signature feature shall be used by regulators to ensure only approved CTVSs are operational in the field. Include SMIB software in the calculations, if applicable. If credentials are required for initiation of CRC calculation, they must be hard-coded.

REQ-CTVS-SYSTEM-02: The CTVS shall have a unique software version ID that can be displayed to the operator.

REQ-CTVS-SYSTEM-03: The CTVS shall communicate with VGMs using the SAS 6.00 or later protocol.

REQ-CTVS-SYSTEM-04: The CTVS shall only respond to SAS Event Exception 3C, 3D or 3F. The CTVS shall purposely ignore and remain unresponsive to all other exceptions as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-05: The CTVS may support SAS long poll 3D (Send Cash Out Ticket Information) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-06: The CTVS shall support SAS long poll 4C (Set Enhanced Validation ID) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-07: The CTVS may only support SAS long polls 3D, 4C, 4D, 54, 7B, 7E, 7F, and A0 as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-08: The CTVS shall comply with SAS timing requirements for Inter-Byte Delay Time as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-09: Long poll responses shall be verified using a CRC16 at the CTVS communications layer closest to the VGM, such as a SMIB.

REQ-CTVS-SYSTEM-10: Any SMIB shall be enclosed within a protective housing inside the VGM interior. SMIB antennas can be routed to the exterior of the VGM, if applicable.

REQ-CTVS-SYSTEM-11: A CTVS supporting wireless communications shall utilize WPA2 with AES based encryption algorithm, or other security as approved by GCD TSS.

REQ-CTVS-SYSTEM-12: A CTVS shall communicate with VGMs configured to Standard and Secure Enhanced validation modes.

REQ-CTVS-SYSTEM-13: SMIBs shall only communicate to the VGM(s) and the CTVS.

REQ-CTVS-SYSTEM-14: The CTVS may support SAS long poll 54 (Send SAS Version ID and Gaming Machine Serial Number) as defined in the GSA SAS Protocol Version 6.00 or later.

REQ-CTVS-SYSTEM-15: The CTVS may support SAS long poll 7B (Extended Validation Status) as defined in the GSA SAS Protocol Version 6.00 or later.

3.2 Software Source Code Requirements

REQ-CTVS-SOURCE-01: The CTVS source code shall produce the exact same binary image every time it is built regardless of the build machine, location, time, etc. Minor differences may be permitted but all differences must be fully documented and externally verifiable. This requirement should be a deciding factor when choosing the OS platform and/or build environment. The technical services lab needs the ability to build the CTVS production image from source and match it to the submitted binary to ensure the correct source was analyzed and archived.

REQ-CTVS-SOURCE-02: The CTVS source code shall not contain source that is not compiled into the production or test image.

REQ-CTVS-SOURCE-03: The CTVS source code shall not contain files that are named the same but have different case in the same directory. This causes problems during source analysis on case insensitive platforms like Windows.

REQ-CTVS-SOURCE-04: The CTVS source code shall not contain version-specific strings in the file or directory names. This causes issues during the comparison of two versions of source code.

REQ-CTVS-SOURCE-05: The CTVS source code build environment shall be reproducible and documented.

Appendix A: Glossary

\$\$CR – Current Credit Meter.

\$\$IN – Total Coin and Bills In Meter.

\$\$PD – Total Paid Meter.

\$\$PL – Total Played Meter.

\$\$WN – Total Won Meter.

CTV – Cash Ticket Validation is a feature used in conjunction with a Tier I System for the purpose of validating cash tickets.

CTVS – Cash Ticket Validation System is a standalone system that electronically acquires information from VGMs solely for the purpose of validating cash tickets.

Civil Date/Time – Mountain Time derived from UTC date/time (field fstrUTCDate/Time) in the same meter record, using the applicable UTC offset.

Day – Starts at 5:00:00 am and ends at 4:59:59 am.

EOD – End of Day

EOQ – End of Quarter

GCD – Gambling Control Division

GenTax – Tax database used by the State of Montana and created by Fast Enterprises.

GOA – defined as Gambling Operator Account; a unique license number assigned by the State of Montana to licensed establishments.

HTTP – defined as Hypertext Transfer Protocol, is an Application Layer protocol for distributed, collaborative, hypermedia information systems. HTTP is a request-response protocol standard for client-server computing.

LOW – Letter of Withdrawal

MDR – defined as Manufacturer/Distributor/Route Account; a unique license number assigned by the State of Montana.

MLP – Meter Less than Previous

MOB – Meters Out of Balance

NULL – an empty string that has no size nor value.

REST - defined as REpresentational State Transfer Protocol; A software architecture style consisting of guidelines and best practices for web services, typically using hypertext transfer protocol.

SAS – defined as Slot Accounting System protocol; a protocol designed to automate slot machine meter reporting and event logging.

SMIB – System-Machine Interface Board

TAP – TransAction Portal is an online portal which the Department of Revenue and the Department of Justice have developed to provide business owners and individuals with access to government services.

Tier I – a system that electronically communicates with the VGMs using SAS to acquire performance data and automatically report to the State of Montana.

TSS – Technical Services Section

VGM – Video Gambling Machine.

VGMID – defined as Video Gambling Machine Identification number; a unique number assigned to each VGM by the State of Montana and located as a stickered barcode on each VGM.

Appendix B: CRC Algorithm

Sourced from IGT SAS Protocol Version 6.02 Section 5.1.

```
//Function: CRC
//Purpose:      Calculate the 16-bit CRC of a string using
//              a byte-oriented tableless algorithm. The
//              routine inputs are the buffer pointer, the
//              buffer length, and the seed for the
//              calculation. The magic number 010201 octal
//              is derived from the CRC polynomial
//               $x^{16}+x^{12}+x^5+1$ .
//Passed in:    unsigned char, int, unsigned short
//Passed out:    unsigned short

unsigned short CRC (unsigned char *s, int len, unsigned short crcval)
{
    register unsigned c,q;
    for (; len; len--)
    {
        c = *s++;
        q = (crcval ^ c) & 017;
        crcval = (crcval >> 4) ^ (q * 010201);
        q = (crcval ^ (c >> 4)) & 017;
        crcval = (crcval >> 4) ^ (q * 010201);
    }

    return (crcval);
}
```

Appendix C: File Transfer Service REST Operations

More information on REST operations for the File Transfer Service 2.0 can be found on the Web at:
<http://howto.mt.gov/fts2>

For Test or Production account credentials please contact GCD TSS.

Appendix D: SAS to MT Cross Reference

SAS Meter Label	SAS Long Poll Command	SAS Meter Code Value (Only applies to 6F)	Montana Meter Label	Montana Meter Name
Total Coin In	0F or 6F	0000	\$\$PL	Money Played
Total Coin Out	0F or 6F	0001	\$\$WN	Money Won
Total Canceled Credits	0F or 6F	0004	\$\$PD	Money Paid
Total Drop	0F or 6F	0024	\$\$IN	Money In
Current Credits	1A or 6F	000C	\$\$CR	Current Credits

SAS Gaming Machine Asset Number/House ID to VGMID Cross Reference

SAS Label	SAS Long Poll Command	Montana Label
Gaming Machine Asset Number/House ID	7B	VGMID

Appendix E: VGM Programs Not Supporting Extended Metering

Below is a list of VGM programs which do not support communication of electronic meters greater than 999,999.99. When running any of the listed VGM programs on a VGM connected to Tier 1 Host, you must perform a RAM clear (see section 7) when any of the \$\$IN, \$\$PL, \$\$WN, \$\$PD meters exceed a value greater than 900,000.00. Tier I hosts connecting to these programs must use SAS long polls \$0F and \$1A to retrieve meters as reference in **REQ-TIERI-SYSTEM-04**. This list is also available in an .CSV format available from GCD upon request.

It is the Route Operator's responsibility to check the VGMs when performing collections and clear if necessary. Allowing the meters to progress into millions on VGMs running these programs will result in meter rejects at the Division level when reported via Tier 1.

Manufacturer	Programs			
AGT	AGT127			
IGT	1091 00055A 00617B 01K017			
Spielo	2106B5 2107B2 2107B3 2108B5 2108C5	2111AB 2111AC 21124B 21124C		
Summit	640GEN GB0232 GB0280 GB0412 LT0105 LT0213 M04002 M04302	M06003 M06203 M07003 M07202 M07302 M07503 M07804 M08004	M08005 M08105 M08205 M08304 M08306 M08804 M08806 P09105	SB0105 SB0213 SB0214 SB0222 SB0232 TP0242 TP0278 TP0412
VLC	V641B2 V642A2 V642B1			

Appendix F: Incompatible VGM Programs

Below is a list of programs which are not approved for use with a Tier I System. These programs listed should have direct, no cost, replacements available that are approved for use with a Tier I System.

IGT	00617B
-----	--------

Appendix G: VGM Programs that may be excluded from supporting SAS LP21 requirement

Fleetwood	CKFMM6
Spielo	21124B 21124C 21134B 21134C

Appendix H: VGM Permitting Validation

Using the GOA and VGM format shown in the link below, the web service will receive a single GOA and any number of VGMIDs. The JSON response will give a result (pass or fail) and a reason (or reasons) why the check passed or failed.

To test if the service is up:

<https://dorwebservicetest.mt.gov/Staging/VGMLocationValidation/Ping/>

To test VGM Permit validate

<https://dorwebservicetest.mt.gov/Staging/VGMLocationValidation/Validate/?goa=#####-###-GOA&vgmid=#####,#####,#####>