Section 9

Universal Satellite Device (USD)
VMC/Peripheral Communication Specifications

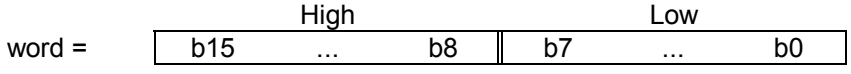
9.1 Introduction

An MDB Universal Satellite Device (USD) is a vending device which lacks customary credit acceptance peripherals. As such, a USD must rely on a host vending machine controller (VMC) to establish credit sufficient to perform a vend. The specification herein describes a protocol by which a USD and a VMC exchange messages and credit via the MDB bus.

9.1.1 Definitions

This section defines the non-response and application response time, base addresses, and the communication bytes sent by the MDB Universal Satellite Device (USD) and a Vending Machine Controller.

- The default maximum non-response time of the USD is 5 seconds.
- The default maximum application response time of the USD is 5 seconds.
- Three consecutive USD base addresses are defined to allow multiple USDs to operate simultaneously from a single VMC
- As defined in Section 2.3, the USD Base addresses are as follows: 01000xxxB (40H), 01001xxxB (48H), and 01010xxxB (50H).
- The specification defined herein assumes a USD base address of 40H in all examples. It should be understood that differing USD base addresses (48H and 50H) will follow the same command format.
- Multi-message responses to a single command are supported. Message length is subject to the 36 byte limit imposed by the MDB standard.
- Unless stated otherwise, all byte information contained herein is assumed to be in a binary format.
- Y_n represents bytes transmitted by the VMC, and Z_n are bytes transmitted by the USD.
- When words are referenced, they consist of two bytes with the higher order byte first.



9.2 USD Summary

This section is a summary of the USD command set and an overview of the modes of operation.

9.2.1 Command Summary

Command	Hex Code	Description
RESET	40	Command for USD to self-reset.
SETUP	41	Command to configure USD to VMC requirements.
POLL	42	Command to request for USD activity status.
VEND	43	Command for vend approve / deny.
FUNDS	44	Command to send funds available or to set prices.
CONTROL	45	Command to enable/disable USD.
EXPANSION	47	Command to allow addition of features and enhancements.

9.2.2 Overview

The USD Command set described herein allows USDs' to be controlled under the following three modes of operation. The USD's mode of operation is determined by the USD's configuration byte[1] and the sequence of commands the VMC uses.

Mode One VMC is used to select items to be vended from the USD and the VMC contains all pricing information. The USD receives vend requests from the VMC and reports vend success or failure.

Mode Two The USD or the VMC may select items to be vended. The USD may have special requirements for price and/or selection ID display. In this case, the USD may issue a **FUNDS** request to retrieve this information. The USD must then issue a **VEND** request to gain approval from the VMC before a vend can take place.

[1] Configuration byte refers to byte Z31 of the sequence Z31 through Z34 of the expansion 07 command. Please refer to page 9.12 for more information on how this byte influences the USD's mode of operation.

Mode Three The USD selects items to be vended and has its own pricing information. The USD must issue an vend request to the VMC and gain approval before a vend can take place.

9.3 Command Protocol

This section contains the complete command set relating to the USD.

9.3.1 RESET

Command	Code	VMC Data	USD Response data
RESET	40	No data bytes.	ACK

The **RESET** command is the vehicle that the VMC should use to instruct the USD to return to its default (power on) operating mode. The USD should respond to a reset command with an ACK to acknowledge receipt of the reset command. The USD must not accept any vend requests until the VMC issued setup command sequence has been completed.

The USD must also respond to the VMC issued “master reset” which resets all MDB peripheral devices. The VMC causes a master reset by transmitting a continuous break condition for a minimum of 100 milliseconds.

To ensure proper initialization, the USD should issue a “just reset” (see **POLL** response **00**) whenever it’s pricing or configuration has changed.

9.3.2 SETUP

Command	Code	VMC Data	USD Response Data
SETUP	41	5 bytes: Y1-Y5	7 bytes: 04 + Z1 - Z6

The **SETUP** command is the vehicle that the VMC should use to configure the USD for feature level, credit scaling factor, display decimal place, and maximum vend approve/deny time. The USD responds to this command by returning it’s feature level, highest vend price (divided by the scaling factor), selection configuration, and maximum application response time.

Alternatively, if the USD is not prepared to render a full response to the **SETUP** command, it may reply with an ACK. If this occurs, the USD must transmit it’s setup data later, in response to a **POLL** command (see **POLL** command, response **04**). Until the **SETUP** command has been received by

the USD, and the USD has correspondingly returned it's own setup data to the VMC, all vend requests will be disallowed.

Data sequence transmitted by the VMC to the USD during SETUP

VMC Data	Meaning or interpretation
Y1 =	VMC Feature level, Indicates current feature level of the VMC. Currently defined level is one.[2]
Y2 - Y3 =	Scaling factor 2 bytes (word). All transactions with the USD must be evenly divisible by this number.
Y4 =	Decimal place (02=US). Indicates the position of the decimal place on the USD's optional credit display
Y5 =	VMC maximum approve / deny time in seconds, FF = 255 seconds.

Data sequence transmitted by the USD to the VMC during SETUP

USD Response	Meaning or interpretation
04 + Z1 =	USD Feature level, indicates current feature level of the USD. Currently defined level is one.[3]
Z2 - Z3 =	Maximum price on USD in 2 bytes (word). Indicates the highest priced item on the USD.[4] USD should return FF FFh if it does not have internal pricing capability.
Z4 - Z5 =	Item number, defined by the manufacturer configuration (Binary).
Z6 =	USD maximum application response time in seconds, FF = 255 seconds.

[2] Feature level of the VMC is sent to allow the USD to arbitrate command compatibility with the VMC.
[3] Feature level of the USD is sent to allow the VMC to arbitrate command compatibility with the USD. The USD may opt to send this data later in response to a POLL.
[4] The maximum price on the USD is returned to the VMC so this price can be used in the computation of maximum credit acceptance.

9.3.3 POLL

Command	Code	USD response Data	USD Response Description
POLL	42	00	USD has just been reset, or wishes to be reset by the VMC.
		01 **+** 4 bytes Z1- Z4	Vend request, USD requests approval to vend a specified item from VMC.
		02	Vend or home success, requested vend or home was successful.
		03 **+** 4 bytes Z1 - Z4	Vend or home fail, requested vend or home has failed. Reason for failure is returned.
		04 + 6 bytes Z1 - Z6	USD configuration and setup data.
		05 + 2 bytes Z1 - Z2	USD item price request.
		06 + 2 bytes Z1 - Z2	USD Error codes.
		07 + 34 bytes Z1 - Z34	USD Peripheral ID string.
		08 + 4 bytes Z1 - Z4	USD Status response.
		09 + *n* bytes Z1 - Z*n*	USD multiple data block transfer response.
		0A + n bytes Z1 - Zn	USD single data block response
		1B + 5 bytes Z2 - Z6	FTL REQ TO RCV response
		1C + 3 bytes Z2 - Z4	FTL RETRY / DENY response
		1D + n bytes Z2 - Zn	FTL SEND BLOCK response
		1E + 2 bytes Z2 - Z3	FTL OK TO SEND response
		1F + 5 bytes Z2 - Z6	FTL REQ TO SEND response
		FF + Z1 - Z*n*	USD Diagnostic response.

The **POLL** command is used by the VMC to obtain status information from the USD. The same command is used by the USD to indicate a reset, request a vend, indicate vend success, indicate the reason for a vend failure, request the price of an item, send configuration and/or error data, return the USD's peripheral identification string, control the transmission and reception of data blocks, return a status and/or diagnostic response.

The USD responds to the **POLL** command with either an ACK, or a multi-byte response if there is more information to convey.

Data sequence transmitted by the USD to the VMC after a *Reset Request*

USD Response	Meaning or interpretation
00	The 00 response indicates that the USD has just been reset or wishes to be reset[5].

Data sequence transmitted by the USD to the VMC for a V*end Request*

USD Response	Meaning or interpretation
01 + Z1- Z2 =	Selection in 2 bytes. Indicates the product to be vended by item number, defined by the manufacturer, as part of a vend request.
Z3 - Z4 =	Scaled product price in 2 bytes (word). Indicates the price of the product to be vended divided by the scaling factor. A price of FFFF is transmitted if the USD does not contain price information.

Data sequence transmitted by the USD to the VMC after a V*end or Home success*

USD Response	Meaning or interpretation
02	Indicates that the requested vend or home was successful.

Data sequence transmitted by the USD to the VMC after a V*end or Home Fail*

USD Response	Meaning or interpretation
03 + Z1 - Z2 =	USD item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range[6].

[5] The VMC is expected to reconcile whether the USD is transmitting a 00 in confirmation of a VMC issued reset that has just occurred, or as an unsolicited request to be reset. The context of the VMC's prior communication activity should be used in making this assessment.

	b4 = Health safety error. b5 - b15 = Not defined.

Data sequence transmitted by the USD to the VMC if *SETUP response delayed*

USD Response	Meaning or interpretation
04 + Z1 =	USD Feature level, Indicates current feature level of the USD. The currently defined level is one.[7]
Z2 - Z3 =	Maximum price on USD 2 bytes (word). Indicates the highest priced item on the USD.[8] USD should return FF FFh if it does not have internal pricing capability.
Z4 - Z5 =	Item number, defined by the manufacturer.
Z6 =	USD maximum application response time in seconds, FF = 255 seconds.

Data sequence transmitted by the USD if the *USD needs pricing information*

USD Response	Meaning or interpretation
05 + Z1 - Z2 =	Item number, defined by the manufacturer.

Data sequence transmitted by the USD if the *USD has a failure to report to VMC*

USD Response	Meaning or Interpretation
06 + Z1 - Z2 =	Bits: b0 = Health Safety violation. b1 = Home or Chute sensor failure b2 = Keypad or Selection switch failure b3 - b15 = Not defined.

[6] This error code is included to identify actuators that may not be present within the initially defined row and column configuration. See bytes Z4 and Z5 of the USD's setup response. This is typical in a snack machine implementation where some trays may not be populated with a full complement of motors and/or actuators.

[7] Feature level of the USD is sent to allow the VMC to arbitrate command compatibility with the USD. The USD may have elected to transmit this setup data in fulfillment of an earlier **SETUP** command.

[8] The maximum price on the USD is returned to the VMC so this price can be used in the computation of maximum credit acceptance.

Data sequence transmitted by the USD for peripheral ID

USD Response	Meaning or Interpretation
07 + Z1 - Z4 =	Manufacturer ID Code.
Z5 - Z16 =	USD Serial Number.
Z17 - Z28 =	USD Model Number.
Z29 - Z30 =	USD Software Version.
Z31 - Z34 =	Optional feature bits.

Data sequence transmitted by the USD to the VMC after a Status request

USD Response	Meaning or interpretation
08 + Z1 - Z2 =	Item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range. b4 = Health safety error. b5 - b15 = Not defined.

Data sequence transmitted by the USD to the VMC after a USD data transfer command

USD Response	Meaning or interpretation
09 + Z1 =	Z1 = 00 USD requests to receive data block Z2 from VMC Z1 = 01 USD requests to send Z2 data block(s) to VMC Z1 = 02 USD data block response where: Z2 = data block number Z3 - *Zn* = contents of data block
Z2 =	Z2 = Block number USD requests to receive if Z1 = 00 Z2 = Number of blocks the USD requests to send if Z1 = 01 Z2 = Block number the USD is sending if Z1 = 02.
Z3 - *Zn* =	Contents of data block sent by USD to VMC if Z1 = 02

Data sequence transmitted by the USD to the VMC to send a single block of data

USD Response	Meaning or interpretation
0A + Z1 - Z*n*=	Z1 -Z*n* = Arbitrary data to be received by the VMC. The number "*n*" must be less than 35 per MDB standards

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) REQ TO RCV command

USD Response	Meaning or interpretation
Z1=1B + Z2 - Z6	The USD is requesting to receive data from a device or VMC Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = File ID Z5 = Maximum length Z6 = Control

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) RETRY / DENY command

USD Response	Meaning or interpretation
Z1=1C + Z2 - Z4	The USD is requesting a device or VMC to retry or deny the last FTL command. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = Retry delay

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) SEND BLOCK command

USD Response	Meaning or interpretation
Z1=1D + Z2 - Z34	The USD is sending a block of data (maximum of 31 bytes) to a device or VMC. Z2 = Destination address of response Z3 = Block # Z4 - Z34 = Data (maximum of 31 bytes)

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) OK TO SEND command

USD Response	Meaning or interpretation
Z1=1E + Z2 - Z3	The USD is indicating that it is OK for the device or VMC to send it data. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H)

Data sequence transmitted by the USD to the VMC after an File Transport Layer (FTL) REQ TO SEND command

USD Response	Meaning or interpretation
Z1=1F + Z2 - Z6	The USD is requesting to send data to a device or VMC. Z2 = Destination address of response Z3 = Source address of response (40H, 48H, 50H) Z4 = File ID Z5 = Maximum length Z6 = Control

Data sequence transmitted by the USD to the VMC after a diagnostic command

USD Response	Meaning or interpretation
FF + Z1 - *Zn* =	Diagnostic response.

9.3.4 VEND

Command	Code	Sub-Cmd	VMC Data	Response Data
VEND	43	00	none	none
	43	01	none	none
	43	02	2 bytes Y1-Y2	none
	43	03	2 bytes Y1-Y2	none

	43	04	2 bytes Y1-Y2	5 bytes: 08 + Z1 - Z4

The **VEND** command is the vehicle that the VMC uses to signal vend approval or disapproval in response to a USD issued vend request (**POLL** response 01). The VEND command can also be used by the VMC to initiate a vend, home a selection, or query the status of a selection on the USD.

Sub Cmd:	Meaning or interpretation
00 =	Requested vend approved.
01 =	Requested vend disapproved.
02 =	Vend specified Item number, defined by the manufacturer.
03 =	Home specified Item number, defined by the manufacturer.
04 =	Request status of specified Item number, defined by the manufacturer.

Data sequence transmitted by the USD to the VMC after a Status request

USD Response	Meaning or interpretation
08 + Z1 - Z2 =	Item number, defined by the manufacturer.
Z3 - Z4 =	Bits: b0 = Selection sold out. b1 = Selection motor / actuator jam. b2 = Non-existent motor / actuator. b3 = Invalid selection range. b4 = Health safety error. b5 - b15 = Not defined.

9.3.5 FUNDS

Command	Code	Sub-Cmd	VMC Data	Response Data
FUNDS	44	00	2 bytes: Y1-Y2	none
	44	01	6 bytes: Y1-Y6	none

The **FUNDS** command is the vehicle the VMC should use to specify the funds available for vending. The **FUNDS** 00 command is issued by the VMC whenever the level of credit changes. Typically, the USD would display the credit information returned by a **FUNDS** 00 command on a credit display. The **FUNDS** 01 is issued by the VMC in response to an item price request (**POLL** response 05) by the USD.

Sub-Cmd	Meaning or interpretation
00 + Y1 - Y2 =	Funds available in 2 bytes (word), scaled by the coin scaling factor.

Sub Cmd	Meaning or interpretation
01 + Y1 - Y2 =	Item number, defined by the manufacturer.
Y3 - Y4 =	Selection price in 2 bytes (word) scaled by coin scaling factor.
Y5 - Y6 =	Alphanumeric selection identifier 2 bytes (word), or FFFF if not available.[9]

9.3.6 CONTROL

Command	Code	Sub-Cmd	VMC Data	Response Data
CONTROL	45	00	none	none
	45	01	none	none

This command is the vehicle the VMC should use to enable or disable the USD.

Sub-Cmd	Meaning or interpretation
00	Disable USD.
01	Enable USD.

9.3.7 EXPANSION

Command	Code	Sub-Cmd	VMC Data	Response Data
EXPANSION	47	00	None	07 + Z1 - Z34 Peripheral ID string and feature bits.
	47	01	Y1 – Y4	none
	47	02	Y1	none
	47	03	Y1 - Y*n*	none
	47	04	Y1	09 + Z1 + Z2 - Z*n*

[9] Alpha-numeric selection identifier is provided to the USD for display purposes only.

	47	05	Y1 - Y*n*	none
	47	FA	Y1 - Y5	1D + Z2 - Z34 or 1C + Z2 - Z4
	47	FB	Y1 - Y3	none
	47	FC	Y1 - Y33	none
	47	FD	Y1 - Y2	1D + Z2 - Z34
	47	FE	Y1 - Y5	1E + Z2 - Z3 or 1C + Z2 - Z4
	47	FF	Diagnostics	Diagnostic response.

Data sequence transmitted by the USD to the VMC after an expansion 00 sub-command

USD Response	Meaning or Interpretation
07 + Z1 - Z3 =	Manufacturer ID Code.
Z4 - Z15 =	USD Serial Number.
Z16 - Z27 =	USD Model Number.
Z28 - Z30 =	USD Software Version.
Z31 - Z34 =	Optional feature bits: b0 = USD is capable of storing and controlling pricing. b1 = USD is capable of selecting items to vend. b2 = USD is capable of supporting the File Transport Layer. This support is defined in Section 2.6. b3 - b31 = Available for future use.

Sub-Command used by the VMC to enable optional feature bits on the USD

Sub-Cmd	Meaning or interpretation
01 + Y1 - Y4	Enable optional feature bits defined in Z31-Z34 above. Feature is enabled if bit is set to 1, all features are disabled after a reset.

Sub-Command used by the VMC to identify the number of data blocks it wishes to send to the USD

Sub-Cmd	Meaning or interpretation
02 + Y1	Number of data blocks the VMC has to send to the USD

	(Binary)

Sub-Command used by the VMC to transmit a data block to the USD (Y2-Y*n*) and to identify the current block number being transmitted (Y1)

Sub-Cmd	Meaning or interpretation
03 + Y1	Block number the VMC is transmitting to the USD
Y2 - Y*n*[10]	Data the VMC is transmitting to the USD

Sub-Command used by the VMC to request that the USD send or re-send data block number (Y1)

Sub-Cmd	Meaning or interpretation
04 + Y1	VMC requests USD to send block Y1

Sub-Command used by the VMC to send a single block of data to the USD

Sub-Cmd	Meaning or interpretation
05 + Y1 - Y*n*	VMC sends a single block of data consisting of Y1..Y*n*

Sub-Command used by the VMC for an FTL REQ TO RCV. The Z1- Zn response can be either immediate or delayed (POLLed).

Sub-Cmd	Meaning or interpretation
FA + Y1 - Y5	The VMC is requesting to receive data from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6. Y1 = Destination address of command (40H,48H,50H) Y2 = Source address of command Y3 = File ID Y4 = Maximum length Y5 = Control
USD Response	**Meaning or interpretation**
Z1 - Z34 or	Z1 = 1DH which indicates SEND BLOCK Z2 = Destination address of data Z3 = Block # Z4 - Z34 = Data (maximum of 31 bytes) or

[10] The number "*n*" is limited by the MDB maximum message length of 36 bytes.

Z1 - Z4	Z1 = 1CH which indicates RETRY / DENY Z2 = Destination address of response Z3 = Source address of response (40H,48H,50H) Z4 = Retry delay

Sub-Command used by the VMC for an FTL RETRY / DENY.

Sub-Cmd	Meaning or interpretation
FB + Y1 - Y3	The VMC is retrying, denying, or aborting a data transfer to/from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6. Y1 = Destination address of command (40H,48H,50H) Y2 = Source address of command Y3 = Retry delay

Sub-Command used by the VMC for an FTL SEND BLOCK.

Sub-Cmd	Meaning or interpretation
FC + Y1 - Y33	The VMC is sending data to the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6. Y1 = Destination address of command (40H,48H,50H) Y2 = Block # Y3 - Y33 = Data (maximum of 31 bytes)

Sub-Command used by the VMC for an FTL OK TO SEND. The Z1 to Z33 response can be either immediate or delayed (POLLed).

Sub-Cmd	Meaning or interpretation
FD + Y1 - Y2	The VMC is requesting to receive data from the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6. Y1 = Destination address of command (40H,48H,50H) Y2 = Source address of command
USD Response	**Meaning or Interpretation**
Z1 - Z34	Z1 = 1DH which indicates SEND BLOCK Z2 = Destination address of data Z3 = Source address of data Z4 - Z34 = Data (maximum of 31 bytes)

Sub-Command used by the VMC for an FTL REQ TO SEND. The Z1 - Zn response can be either immediate or delayed (POLLed).

Sub-Cmd	Meaning or interpretation
FE + Y1 - Y5	The VMC is requesting to send data to the USD whose destination address will always be (40H, 48H, 50H). Note that all FTL Commands / Responses are defined in Section 2.6. Y1 = Destination address of command (40H,48H,50H) Y2 = Source address of command Y3 = File ID Y4 = Maximum length Y5 = Control
USD Response	**Meaning or Interpretation**
Z1 - Z34 or Z1 - Z4	Z1 = 1EH which indicates OK TO SEND Z2 = Destination address of response Z3 = Source address of response (40H,48H,50H) or Z1 = 1CH which indicates RETRY / DENY Z2 = Destination address of response Z3 = Source address of response (40H,48H,50H) Z4 = Retry delay

Data sequence transmitted by the USD to the VMC after a diagnostic command

USD Response	Meaning or interpretation
FF + Z1 - *Zn* =	Diagnostic response.

9.4 USD Power Requirements

This section defines the maximum power requirements for a USD.

USD peripherals may draw power from the MDB bus or from an integral power supply. In such cases where the USD will require power from the MDB bus, the current draw must remain within the following limits:

USD Mode	Current draw
Idle	200 mA (maximum continuous)

Vending/Homing	1.75 A (for up to 10 seconds)

9.5 Examples – Mode 1 / 2 / 3 Sessions

This section contains three examples of USD sessions in which each of the three modes of USD operation are demonstrated operation respectively.

9.5.1 MODE ONE

In this example session the VMC selects the item to vend and knows the vend price. The USD receives the vend command, attempts the vend, and reports if the attempted vend failed or was successful.

VMC	MDB Data	Explanation	USD
⇒	**43+02+01+03**	VMC requests to vend item from the USD.	
	<ACK>	USD acks vend request.	⇐
⇒	**42**	VMC polls the USD.	
	<ACK>	USD acks receipt of poll.	⇐
⇒	**42**	VMC polls the USD again .	
	02	USD responds: vend complete	⇐
⇒	**<ACK>**	VMC acks vend outcome.	

9.5.2 MODE TWO

In this example session the USD or the VMC can select items to vend but the USD may not be aware of the vend price of the item selected. If the USD needs the selected item price, it may request the item price from the VMC. The USD must then issue a **VEND** request, and wait for approval from the VMC before a vend is attempted. The VMC then approves or denies the requested vend and polls the USD for vend success or vend fail.

VMC	MDB Data	Explanation	USD
⇒	**42**	VMC polls the USD.	
	05+02+06	USD responds with pricing request for item in USD.	⇐
⇒	**<ACK>**	VMC acks the USD price request.	
⇒	**44+01+02+06+00+14 +FF+FF**	Using the Funds command the VMC sends a price of 20 coin factors for item in USD.	
	<ACK>	USD acks receipt of VMC price data.	⇐
⇒	**42**	VMC polls the USD.	
	01+02+06+FF+FF	USD responds with a request to vend item in USD at the VMC selected price.	⇐
⇒	**<ACK>**	VMC acks receipt of vend request.	
⇒	**43 + 00** or **01**	VMC approves or denies vend request.	
	<ACK>	USD acks receipt of approval or denial.	⇐
⇒	**42**	VMC polls the USD.	
	03+02+06+00+01	USD responds: vend fail, sold out.	⇐
⇒	**<ACK>**	VMC acks vend outcome.	

- The **FUNDS** command can be used by USD's which do not have internal prices but need pricing information for display purposes or for other reasons that are not required to complete a transaction.

9.5.3 MODE THREE

In this example session the USD selects the item to vend and is aware of the vend price of the item. The USD must issue a vend request and the VMC then approves or denies the requested vend. The VMC then polls the USD for vend success or vend fail.

VMC	MDB Data	Explanation	USD
⇒	**42**	VMC polls the USD.	
	01+03+02+00+1E	USD requests vend for item at in USD with price of 30 coin factors.	⇐
⇒	**<ACK>**	VMC acks the USD vend request.	
⇒	**43+ 00** or **01**	VMC approves or denies vend request.	
	<ACK>	USD acks receipt of approval or denial.	⇐
⇒	**42**	VMC polls the USD.	
	02	USD responds: vend complete	⇐
⇒	**<ACK>**	VMC acks vend outcome.	

9.6 Examples - Data Block Transfers

This section contains two examples in which data blocks are transferred between the VMC and the USD and vice versa.

9.6.1 Data Block Transfer from VMC to USD

In this example the VMC wishes to send two data blocks to the USD. To do this, the VMC uses the expansion 02 command to advise the USD of it's request to send data and also to identify the number of data blocks it wishes to send. In response, the USD uses a poll 09 to request the transmission of a data block with the block number enumerated as part of it's poll response. The VMC then uses a different expansion command (03) to send the data to the USD.

VMC	MDB Data	Explanation	USD
⇒	**47+02+02**	VMC issues a request to send two data blocks to the USD	
	<ACK>	USD acks receipt of the request	⇐
⇒	**42**	VMC polls the USD	
	09+00+01	USD responds with a request to receive data block number 01 from the VMC	⇐
⇒	**<ACK>**	VMC acks receipt of block number	
⇒	**47+03+01+21+22+23**	VMC transmits block number 01 containing data: 21, 22, and 23.	
	<ACK>	USD acks receipt of the data block	⇐
⇒	**42**	VMC polls the USD.	
	09+00+02	USD responds with a request to receive data block number 02 from the VMC.	⇐
⇒	**<ACK>**	VMC acks receipt of the block number.	
⇒	**47+03+02+24+25+26**	VMC transmits block number 02 containing data: 24, 25, and 26.	
	<ACK>	USD acks receipt of the data block	⇐

9.6.2 Data Block Transfer from USD to VMC

In this example the USD wishes to send two data blocks to the VMC. To do this, the USD makes use of the Poll 09 command to inform the VMC of it's request to send data and also to identify the number of data blocks it wishes to send. In response, the VMC uses expansion 04 command to request the transmission of a data block by the individual block number. The USD then uses the poll 09 response to send the data blocks to the VMC.

VMC	MDB Data	Explanation	USD
⇒	**42**	VMC polls the USD	
	09+01+02	USD responds with a request to send 2 data blocks to the VMC	⇐
⇒	**<ACK>**	VMC acks request to send data	
⇒	**47+04+01**	VMC responds with a request to receive data block number 01 from the USD	
	<ACK>	USD acks receipt of block number request	⇐
⇒	**42**	VMC polls the USD	
	09+02+01+55+56+57	USD responds by transmitting block number 01 containing data 55, 56, and 57.	⇐
⇒	**<ACK>**	VMC acks receipt of data	
⇒	**47+04+02**	VMC responds with a request to receive data block number 02 from the USD	
	<ACK>	USD acks receipt of block number request	⇐
⇒	**42**	VMC polls the USD	
	09+02+02+58+59+60	USD responds by transmitting block number 02 containing data 58, 59, and 60.	⇐
⇒	**<ACK>**	VMC acks receipt of data	

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