HMS360/365

Application Document

Feature Summary

Touch Screen Interface

The HMS360 is controlled through its touch screen. The touch screen responds to a single touch which can be held or moved to make settings and manipulate screens on the HMS360.

IR Remote Control

Can attach an external IR sensor to accept commands from a remote control.

RV-C Interface

Includes a standard RV-C interface. Supports dynamic addressing, and all mandatory RV-C PGNs (DM1, PRODUCT_ID, Address Claiming).

Serial Port

Includes an RS-232 serial port. This port is used for programming the HMS and also for diagnostic purposes.

General Specifications

Input Voltage	8 VDC - 28 VDC
Input Amperage	300 mA @12VDC
Temperature Range	-40 - xxx Deg F
Environmental Limitations	Not sealed for exterior mounting.
Source Address	Dynamic, Starting at 159 (0x9F)
Default Source Address	68 (0x44)
Flash Memory (Code Space)	4 Mbytes
RAM	4 Mbytes
Display	HMS360: 5.6” QVGA 320x240 pixels HMS365: 5.6” VGA 640x480 pixels

Product ID

The HMS360/365 transmits PRODUCT_ID PGN (0xFEEB) data upon request. Details on this PGN are found in the RV-C Protocol Manual. The format of the data appears as:

SILVERLEAF*HMS360X-v.vv***
SILVERLEAF*HMS365X-v.vv***

Where:

v.vv	Product version number
X	Sub-Product ID

The Product version number is mapped to each product as follows:

v1.00 – v1.99	HMS360
v2.00 – v2.99	HMS365 low resolution graphics and fonts (looks like HMS360)
v3.00+	HMS365 high resolution graphics and fonts

The Sub-Product ID was added starting with version 1.07.

A Conventional Inverter/Charger, No Climate Control
B Onan Hybrid, RV-C Climate Control
C Onan Hybrid, No Climate Control
D Conventional Inverter/Charger, RV-C Climate Control
E Conventional Inverter/Charger, No Climate Control, Aqua-Hot
F Fleetwood (American) Coach version
G Aladdin/CMP replacement, Conventional Inv/Chg, No Climate Control, No Genset
H Conventional Inverter/Charger, RV-C Climate Control, Keypad – for Newmar Coach

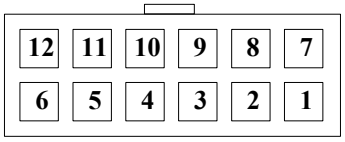
Note that the serial number and unit number are not used.

Connectors

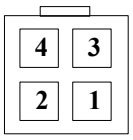
Connector Types

All diagrams are “wire-side” view.

Molex 12-Pin
Receptacle - Molex 5557 Series. Part #39-01-2120
Strain Relief - 41995 Series. Part #15-04-0345
Crimp-on Connectors - 5556 Series. Part #39-00-0039



Molex 4-Pin
Receptacle - Molex 5569 Series. Part #39-30-1040
Strain Relief - 41995 Series. Part #15-04-0294
Crimp-on Connectors - 5556 Series. Part #39-00-0039



Connector Pinouts

Main Connector (“Main”) *12-pin Molex*

Pin	Designation	Type	Notes
1	GROUND	Ground	
2	INPUT1	Active High Input	Not Used
3	INPUT2	Active Low Input	Not Used
4	INPUT3	Active Low Input	Not Used
5	RV-C DATA +	CAN	Attach to RV-C Bus
6	RV-C DATA -	CAN	Attach to RV-C Bus
7	POWER	12V Power Input	Attach to ignition or switched power source
8	Serial Transmit	RS-232 Transmit	Do Not Connect (Used for diagnostic purposes only)
9	Serial Receive	RS-232 Receive	Do Not Connect (Used for diagnostic purposes only)
10	Serial Ground	RS-232 Common	Do Not Connect (Used for diagnostic purposes only)
11	OUTPUT1	Active Low Output	Not Used

Pin	Designation	Type	Notes
12	OUTPUT2	Active Low Output	Not Used

IR Input Connector ("IR") *4-pin Molex*

Pin	Designation	Type	Notes
1	IR Power	3.3V Power	
2	Unused		
3	IR Receive		
4	IR Common	Ground	

Configuration Items

Item	Range	Default
Sleep timer	0 – 240 minutes	5 minutes
Home timer	0 – 240 minutes	5 minutes
OEM	See Table 1	
Beep volume	0 – 3 (Off – Loud)	2 (Normal)
Video switch instance	0 - 250	0
Video brightness	0 - 250	150
Video contrast	0 - 127	75
Video saturation	0 - 127	75
Video hue	0 - 250	0
Transfer Switch Type	See Table 2	1
Inverter Model	See Table 3	1
Floor Heat Mats	0 – 2	1
Floor Heat Time Zones	See Table 4	1
Button Color	See Table 5	15 (Orange)
Video Camera Enable	See Table 6	1 (enabled)
Battery Warning Percent (indicator for Onan Hybrid)	0 – 100 %	50%
Reserve Amps (used for Climate Control)	10 – 30 A	10 A
Reserve Amps Enable (used for Climate Control)	0 – 1 (off – on)	0 (off)
Fresh Tank Warning Level	0 – 100 %	10%
Gray Tank Warning Level	0 – 100 %	90%
Black Tank Warning Level	0 – 100 %	90%
Battery Warning Voltage	0.0 – 13.0 V	11.7 V
Waste System Installed		0 = None

Heat Source		1 = Hydronic
Speaker Mode		1 = Click
Heat/Cool Mode		1 = Allow Simultaneous Heat/Cool
Furnace Model		1 = Generic
Power Management Model		0 = None
Tile Heat Model		0 = None
Cool Instances		1, 2, 3, 4
Heat Instances		164, 0, 166, 0
Temp Instances		1, 2, 3, 4
Dehumidifier		0 = None
Secondary Heat Management		0 = None
Secondary AGS	1 = Charge Bridge	0 = None
Climate Control AGS (per Zone)		All Disabled (0)

System Configuration

System configuration is through a series of proprietary PGNs following the general RV-C guidelines. Since the proprietary PGN includes the source address and the source address is dynamic, the PGNs are shown with "##"s where the source address is indicated. If the HMS is the only control panel on the network the source address will be 0x9F.

Note that although message identifiers are labeled for HMS360, they are also compatible with the HMS365.

PGNs Supported

General Reset
Name: GENERAL_RESET
PGN: 0x17F## (0x17F00 + HMS360 source address)
Bit 1.1-1.2: Reboot unit Supported per RV-C
Bit 1.3-1.4: Not Supported
Bit 1.5-1.6: Reset to Default Settings 0 = No action. 1 = Reset to Defaults
Bit 2.1-2.2 Save Configuration 0 = No action. 1 = Save Configuration
Bit 2.3-2.4 Restore Configuration 0 = No action. 1 = Restore configuration

Proprietary - Configure HMS360
Name: PROP_HMS360_CONFIGURE_1
PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)
Byte 1: Operation 0xBF – Configure HMS360 1
Byte 2: Sleep Timeout 0 – 240 minutes ***(v1.27 and Earlier)***
Byte 3: Home Timeout 0 – 240 minutes ***(v1.27 and Earlier)***
Byte 4: OEM See Table 1
Byte 5: Beep Volume 0 – Off, 1 – Quiet, 2 – Normal, 3 - Loud
Byte 6: Video Switch Instance 0 - 250
Byte 7: Transfer Switch Type See Table 2
Byte 8: Inverter Model See Table 3

Name:	PROP_HMS360_CONFIGURE_2	
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xBE – Configure HMS360 2
Byte 2:	Floor Heat Mats	0 – 2 mats
Byte 3:	Floor Heat Time Zones	See Table 4
Byte 4:	Button Color	See Table 5
Byte 5:	Video Camera Enable	See Table 6
Byte 6:	Battery Warning Percent	Percent, per RV-C Table A.3 For Onan Hybrid
Byte 7:	Ambient Temp Instance	0 = None, 250 = Bay, 249 = Outside
Byte 8:	unused	formerly Reserve Amps Enable

Name:	PROP_HMS360_CONFIGURE_3	
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xBD – Configure HMS360 3
Byte 2:	Fresh Warning Level	Percent, per RV-C Table A.3
Byte 3:	Gray Warning Level	Percent, per RV-C Table A.3
Byte 4:	Black Warning Level	Percent, per RV-C Table A.3
Byte 5-6:	Battery Warning Voltage	Volts, per RV-C Table A.3
Byte 7	LPG Warning Level	Percent, per RV-C Table A.3
Byte 8:	Touchscreen Sensitivity	Percent, per RV-C Table A.3

Name:	PROP_HMS360_CONFIGURE_4 ***v.1.28 and later***	
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xBC – Configure HMS360 4
Byte 2:	Day Idle Timeout	0 – 240 Min
Byte 3.1-3.5	Day Idle Screen	see Table 7
Byte 3.6-3.8	Day Brightness	0 = Hi, 1 = Med, 2 = Lo, 3 = Off
Byte 4	Day Start	0 = Midnight, 1 = 12:15, 48 = Noon, 95 = 11:45 PM
Byte 5:	Night Idle Timeout	0 – 240 Min
Byte 6.1-6.5	Night Idle Screen	see Table 7
Byte 6.6-6.8	Night Brightness	0 = Hi, 1 = Med, 2 = Lo, 3 = Off
Byte 7	Night Start	0 = Midnight, 1 = 12:15, 48 = Noon, 95 = 11:45 PM

Name:	PROP_HMS360_CONFIGURE_5 ***v.1.29 and later***	
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xB4 – Configure HMS360 5
Byte 2:	Waste System	0 = None, 1 = Single Tank, 2 = Dual Tank, 3 = Single+Pump, 4 = Dual+Pump,
Byte 3:	Heat Source	0 = None, 1 = Hydronic, 2 = Heat Pump, 3 = Dual”
Byte 4:	Speaker Mode	0 = Off, 1 = Click, 2 = Beep
Byte 5:	Heat/Cool Mode	0 = Lock Out Heat/Cool, 1 = Allow Simultaneously
Byte 6:	Furnace Model	0 = None, 1 = Generic, 2 = Oasis, 3 = Oasis w/Eng.Heat, 4 = AquaHot (2 electric elements) 5 = Rixen 6 = AquaHot 450 (1 electric element)
Byte 7:	Power Management Model	0 = None, 1 = TM250, 2 = TM-200
Byte 8:	Tile Heat Model	0 = None, 1 = TM102, 2 = TM220+Sensor, 3 = TM220 Timer Only.

Name:	PROP_HMS360_CONFIGURE_6	***v.1.29 and later***
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xB2 – Configure HMS360 6
Byte 2:	Air Conditioner Model	see Table 8
Byte 3:	Zone 1 Cool Instance	0 = None, 1 – 250 Cool Instance
Byte 4:	Zone 1 Heat Instance	0 = None, 1 – 250 Heat Instance
Byte 5:	Zone 1 Temp Instance	0 = None, 1 – 250 Temperature Instance
Byte 6:	Zone 2 Cool Instance	0 = None, 1 – 250 Cool Instance
Byte 7:	Zone 2 Heat Instance	0 = None, 1 – 250 Heat Instance
Byte 8:	Zone 2 Temp Instance	0 = None, 1 – 250 Temperature Instance

Name:	PROP_HMS360_CONFIGURE_7	***v.1.29 and later***
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xB0 – Configure HMS360 7
Byte 2	Dehumidifier	0 = None. 1 = Dehumidifier Installed
Byte 3:	Zone 3 Cool Instance	0 = None, 1 – 250 Cool Instance
Byte 4:	Zone 3 Heat Instance	0 = None, 1 – 250 Heat Instance
Byte 5:	Zone 3 Temp Instance	0 = None, 1 – 250 Temperature Instance
Byte 6:	Zone 4 Cool Instance	0 = None, 1 – 250 Cool Instance
Byte 7:	Zone 4 Heat Instance	0 = None, 1 – 250 Heat Instance
Byte 8:	Zone 4 Temp Instance	0 = None, 1 – 250 Temperature Instance

Name:	PROP_HMS360_CONFIGURE_8	***v.1.29 and later***
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xAE – Configure HMS360 8
Bits 2.1-2.4	Autotemp	0 = None. 1 = Thermostat, 2 = Autotemp
Bits 2.5-2.8	Secondary AGS	0 = None. 1 = ChargeBridge ***v1.44 and later***
Byte 3:	Zone 1 Sec. Heat Instance	0 = None, 1 – 250 Furnace Instance for secondary icon
Byte 4:	Zone 2 Sec. Heat Instance	0 = None, 1 – 250 Furnace Instance for secondary icon
Byte 5:	Zone 3 Sec. Heat Instance	0 = None, 1 – 250 Furnace Instance for secondary icon
Byte 6:	Zone 4 Sec. Heat Instance	0 = None, 1 – 250 Furnace Instance for secondary icon
Byte 7:	Block Heater Instance	0 = None. 1 – 250 AC Load Instance for Engine Heater
Bits 8.1-8.2	Zone 1 Climate AGS	0 = None. 1 = Heat/Cool AGS on Zone 1 ***v1.44+***
Bits 8.3-8.4	Zone 2 Climate AGS	0 = None. 1 = Heat/Cool AGS on Zone 2 ***v1.44+***
Bits 8.5-8.6	Zone 3 Climate AGS	0 = None. 1 = Heat/Cool AGS on Zone 3 ***v1.44+***
Bits 8.7-8.8	Zone 4 Climate AGS	0 = None. 1 = Heat/Cool AGS on Zone 4 ***v1.44+***

Name:	PROP_HMS360_CONFIGURE_9	***v.1.29 and later***
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xAC – Configure HMS360 9
Byte 2:	Zone 1 Primary Heat Inst.	0 = None, 1 – 250 Furnace Instance for primary icon
Byte 3:	Zone 2 Primary Heat Inst.	0 = None, 1 – 250 Furnace Instance for primary icon
Byte 4:	Zone 3 Primary Heat Inst.	0 = None, 1 – 250 Furnace Instance for primary icon
Byte 5:	Zone 4 Primary Heat Inst.	0 = None, 1 – 250 Furnace Instance for primary icon
Byte 6:	TM540 Support	0 = None, 1 = TM540 BlueTooth Supported ***v.1.47+***
Byte 7:	WiFi Support	0 = None, 1 = WiFi Supported ***v.1.59+***
Byte 8:	TriMark Suppport	0 = None, 1 = Door Only, 2 = Door+Cargo

Name:	PROP_HMS360_CONFIGURE_10	***v.1.32 and later***
PGN:	PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)	
Byte 1:	Operation	0xAA – Configure HMS360 10

Byte 2:	Zone 1 Name	See Table 9
Byte 3:	Zone 2 Name	See Table 9
Byte 4:	Zone 3 Name	See Table 9
Byte 5:	Zone 4 Name	See Table 9
Byte 6:	Waste Tanks	0 = Auto detect, 1 = 1 Tank (black), 2 = 2 Tanks ***v1.55+***
Byte 7:	LP Tank	0 = Auto detect, 1 = None, 2 = 1 Tank ***v1.55+***
Byte 8:	Cellular Support	0 = None, 1 = TM522 Cellsign Supported ***v.1.69+***

Name: PROP_HMS360_CONFIGURE_11 ***v.1.34 and later***
PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)

Byte 1:	Operation	0xA8 – Configure HMS360 11
Byte 2:	Floor Zone 1 Name	See Table 9
Byte 3:	Floor Zone 2 Name	See Table 9
Byte 4:	Floor Zone 3 Name	See Table 9
Byte 5:	Floor Zone 4 Name	See Table 9
Byte 6:	Battery Disconnect Instance	0 = None. ***v.1.61 and later***
Byte 7:	Battery Ammeter Instance	0 = None. ***v.1.61 and later***
Byte 8:	Telematics Support	0 = None, 1 = TM555 Telematics Supported ***v3.10***

Name: PROP_HMS360_CONFIGURE_12 ***v.1.62 and later***
PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)

Byte 1:	Operation	0xA6 – Configure HMS360 12
Byte 2:	Slide Room Type	0 = No Safety Locks, 1 = American Coach
Byte 3:	Slide Room Count	0-4
Byte 4:	Awning Type	0 = No Safety Locks, 1 = American Coach
Byte 5:	Awning Count	0-8
Byte 6:	Refrigerator Temp Inst	0 = None. 1-250 – Ambient Temp Instance to Monitor.
Byte 7:	Freezer Temp Inst	0 = None. 1-250 – Ambient Temp Instance to Monitor.
Byte 8:	Keypad Selection	0 = Generic. 1-250 = Keypad configuration selection.

Awning and Slide Room instances are not configurable. The unit assumes that all slide and awning instances are set consecutively, starting at 1.

In addition to displaying the Refer and Freezer Temps, the unit also tracks the highest temperature seen since the coach was parked. The max value resets when the coach goes into motion, or manually.

Name: PROP_HMS360_CONFIGURE_13 ***v.1.67 and later***
PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)

Byte 1:	Operation	0xA4 – Configure HMS360 13
Bits 2.1-2.2	Pop-Up Alarms Enabled	1 = Enabled (default is Enabled)
Bits 2.3-2.4	Audible Alerts Enabled	1 = Enabled (default is Enabled)
Bits 2.5-2.6	Elite Power System Support	1 = Enabled, 0 = Disabled
Bits 2.7-2.8	Climate “Auto” Mode	1 = Heat/Cool Linked. 0 = Heat/Cool Independent ***(2.15 and later)***
Byte 3:	OEM Specific Configuration	0 = Default, other values meaning depend on OEM See Table 10
Bits 4.1-4.2	Rixen Electric Assist Heater	1 = Enabled, 0 = Disabled
Bits 4.3-4.3	DB100 Support	1 = Enabled, 0 = Disabled
Bits 4.4-4.5	RGB Support	1 = Enabled, 0 = Disabled

Name: PROP_HMS360_REQUEST_CONFIGURATION

PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)
Byte 1: Operation 0xB5 = Request Configuration Report
The HMS360 will reply to this PGN with PROP_CONFIGURATION_REPORT_1, PROP_CONFIGURATION_2, PROP_CONFIGURATION_REPORT_3 and PROP_CONFIGURATION_REPORT_4.

Table 1 OEM

Value	*OEM*
0	SilverLeaf
1	Country Coach
2	Newell
3	Foretravel
4	Newmar
5	American Coach
6	Lifeline
7	Advanced RV
8	OSU Beavers

Table 2 TransferSwitch Type

Value	*OEM*
0	None
1	Generic
2	SurgeGuard 34520
3	TM240 1 Leg

Table 3 Inverter Model

Value	*Model*
0	None
1	Generic
2	Xantrex RS Series
3	Basic Outback FX
4	Advanced Outback FX
5	Magnum TM502 (w/o AC Reporting)
6	Magnum TM502 (w/ AC Reporting)
7	Xantrex Freedom SW
8	Magnum RV-C Bridge
9	Outback FX with Mate3

Table 4 Floor Heat Time Zones

Value	*Time Zone*
0	None

1	2 Time Zones (day/night)
2	4 Time Zones (AM On/AM Off/PM On/PM Off)

Table 5 Button Colors

Value	*Colors*
0	Black
1	Blue
2	Green
3	Cyan
4	Red
5	Magenta
6	Brown
7	Light Gray
8	Dark Gray
9	Light Blue
10	Dark Green
11	Aqua
12	Dark Red
13	Purple
14	Tan
15	Orange
16	Pink

Table 6 Video Camera Enable

Value	*Config*
0	Video Disabled
1	Video Enabled
2	Video Auto Detect
3	VMS350

Table 7 Idle Screens

Value	*Config*
0	Home Screen
1	Clock Screen
2	Blank
3	Logo

Table 8 A/C models

Value	*Config*
0	None

1	TM510 / Dometic
2	TM200 / RVProducts
3	Dual TM200 / RVProducts
4	TM510 v1.10+ (Dometic)

Table 9 Zone Names

Value	***Config***	***Value***	***Config***
0	None	8	Gall
1	Zone1	9	Bath
2	Zone2	10	Bed
3	Zone3	11	Front
4	Zone4	12	Rear
5	Salon	13	Mid
6	LvRm		
7	Kitch		

Table 10 OEM Specific Configuration

Advanced RV	
Value	***Config***
0	Default – no park brake indicator on Home screen
1	Park brake indicator on Home screen
All Other OEMs	
Value	***Config***
0	Default

Proprietary - Configure HMS360 Video

Name: PROP_HMS360_CONFIGURE_VIDEO
PGN: PDU_F = 239, PDU_S = ## (Source Address) (0xEF##)
Byte 1: Operation 0xCC – Configure HMS360 Video
Byte 2: Reserved for Enabled 0 – Disabled, 1 - Enabled
Byte 3: Reserved for Orientation 0 – Normal, 1 - Rear
Byte 4: Brightness See Below
Byte 5: Contrast See Below
Byte 6: Saturation See Below
Byte 7: Hue See Below
Byte 8: Reserved

For units with the SAA7111 video decoder (to 2013), the default values are Brightness: 150, Contrast: 75, Saturation: 75, Hue: 0. For units with the MAX9526 decoder (2013+) the default values are Brightness: 0, Contrast:128, Saturation:136, Hue:128. Note that the scales are different for each chip. In version previous to 1.62, the unit must be reset for the changes to be implemented.

Name: PROP_HMS360_REQUEST_VIDEO
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xC4 = Request Video Report
The HMS360 will reply to this PGN with PROP_VMS640_VIDEO_REPORT.

PGNs Reported

Proprietary - Report HMS360 Configuration
Name: PROP_HMS360_CONFIGURATION_REPORT_1
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xBA = Configuration Report 1
Format is identical PROP_HMS360_CONFIGURE_1.

Name: PROP_HMS360_CONFIGURATION_REPORT_2
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xB9 = Configuration Report 2
Format is identical PROP_HMS360_CONFIGURE_2.

Name: PROP_HMS360_CONFIGURATION_REPORT_3
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xB8 = Configuration Report 3
Format is identical PROP_HMS360_CONFIGURE_3.

Name: PROP_HMS360_CONFIGURATION_REPORT_4
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xB7 = Configuration Report 4
Format is identical PROP_HMS360_CONFIGURE_4.

Name: PROP_HMS360_CONFIGURATION_REPORT_5
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xB3 = Configuration Report 5
Format is identical PROP_HMS360_CONFIGURE_5.

Name: PROP_HMS360_CONFIGURATION_REPORT_6
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xB1 = Configuration Report 6
Format is identical PROP_HMS360_CONFIGURE_6.

Name: PROP_HMS360_CONFIGURATION_REPORT_7
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xAF = Configuration Report 7
Format is identical PROP_HMS360_CONFIGURE_7.

Name: PROP_HMS360_CONFIGURATION_REPORT_8
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xAD = Configuration Report 8
Format is identical PROP_HMS360_CONFIGURE_8.

Name: PROP_HMS360_CONFIGURATION_REPORT_9

PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xAB = Configuration Report 9
Format is identical PROP_HMS360_CONFIGURE_9.

Name: PROP_HMS360_CONFIGURATION_REPORT_10
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xA9 = Configuration Report 10
Format is identical PROP_HMS360_CONFIGURE_10.

Name: PROP_HMS360_CONFIGURATION_REPORT_11
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xA7 = Configuration Report 11
Format is identical PROP_HMS360_CONFIGURE_11.

Name: PROP_HMS360_CONFIGURATION_REPORT_12
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xA5 = Configuration Report 12
Format is identical PROP_HMS360_CONFIGURE_12.

Name: PROP_HMS360_CONFIGURATION_REPORT_13
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xA3 = Configuration Report 13
Format is identical PROP_HMS360_CONFIGURE_13.

Proprietary - Report HMS360 Video
Name: PROP_HMS360_VIDEO_REPORT
PGN: PDU_F = 239, PDU_S = Destination (0xEF##)
Byte 1: Operation 0xC8 = Video Report
Format is identical PROP_HMS360_CONFIGURE_VIDEO.

SHF File System

The HMS 360 can automatically detect and display .SHF files (“books”) downloaded to particular addresses. Starting with version 1.14, the unit checks all possible memory blocks for the presence of a valid .SHF file, and if found, adds the “book” to the list provided to the user. Valid files are recognized by the 0x71077345 value which all such files must start with.

The .SHF files must be downloaded to addresses of at least 0x210000, and must be divisible by 0x21000. (e.g. 0x231000, 0x252000, etc.). Files can the following limitations:

Maximum Book Size	128 kB
Maximum Page Count	100
Maximum Topic Count	20
Total Books	8

After download, the unit must be rebooted to reload the current .shf files into the table of contents. Since there is no means of explicitly erasing a memory block, to erase a book simply download an invalid file to the address.

.SHF File Format

All values except the data buffers are 4-byte integers. All strings are 0-terminated.

Header 16 bytes	
File ID	Always 0x71077345
Page Count	
Title Length	
Book Title Position	File Offset to String
Page Definitions (40 bytes per page)	
Page Title Length	
Page Title Position	File Offset to String
Text Length	
Text Position	File Offset to String
Graphic Height	
Graphic Width	
Graphic Color	
Graphic Buffer Size	
Graphic Position	File Offset to Graphic Data

The Page Text includes 0x0D characters to indicate the end of each line. The HMS 360 rendering engine does no formatting, and simply looks for 0x0D characters to indicate line breaks.

If the Page Text Length is 4 or less, it considers the Page to be a Topic. Subsequent pages are organized under that topic, until another Topic page is indicated.

A Graphic Color of 256 indicates that the graphic is a 256-color palette bitmap. Any other value indicates the graphic is a 1-color bitmap. If the color is over 256, the standard color (WHITE) will be used to render the bitmap. See the Button Color table above for a list of color values. In addition, color 17 is Yellow, color 18 is White.

SBD File System

The HMS 360 can automatically detect and display .SBD files downloaded to particular addresses. Starting with version X.XX, the unit checks all possible memory blocks for the presence of a valid .SBD file, and if found, creates a screen composed of buttons defined by the file. Valid files are recognized by the 0xBADDEED5 value which all such files must start with.

The .SBD file must be downloaded to addresses of at least 0x210000, and must be divisible by 0x21000. (e.g. 0x231000, 0x252000, etc.). Files can the following limitations:

Maximum File Size	128 kB
Maximum Command List	8045
Maximum Button Count	240

After download, the unit must be rebooted to reload the current .sbd files into the screen layout. Since there is no means of explicitly erasing a memory block, to erase a book simply download an invalid file to the address.

.SBD File Format

All values except the data buffers are 4-byte integers. All strings are 0-terminated.

Header 16 bytes		
	File ID	Always 0x5EAF00D5
	Command List Count	2 bytes
	Button Count	2 bytes
Commands (16 bytes per command)		
	Command	See Chart
	Data	
Button (48 bytes per button)		
	ID	2-byte word Allows button to be referenced by main program via register_event()
	Button Size	1 byte 0 = 96x30 (2 across) 1 = 56x24 (4 across)
	Button Column	1 byte If size == 0, 0 = Left, 1 = Center, 2 = Right If size == 1, 0-7 If value <= previous button, row is incremented.
	Button Type	0 = Blank 1 - 0xFE = See Chart 0xFF = Page Button
	Lamp Bank	Byte
	Lamp Instance	Byte
	Lamp Variable	If not 0xFF, this variable is set to the lamp value.
	Press Command Index	Index to Command List to execute on initial keypress. 0xFFFF = None
	Hold Command Index	Index to Command List to execute on hold. 0xFFFF = None
	Release Command Index	Index to Command List to execute on hold. 0xFFFF = None
	Reserved	14 bytes for future expansion
	Legend	Up to 19 chars, Null terminated

Commands

	Name	Data
0	End	
1	Send	PGN – 3 bytes Data Packet – 8 bytes The following allows variables to be inserted. Variable Index – 1 byte Variable Data Byte - 0 – 7. 1 byte. Variable Data Bit – 0 – 7, 1 byte Variable Bit Length – 0 – 16, 1 byte If Index is 0xFF, no substitution is made
2	Math	Index - 1 byte Value – 2 bytes Increment – 2 bytes Decrement – 2 bytes

		Min – 2 bytes Max – 2 bytes If both increment and decrement are zero, sets variable to the value indicated.
3	Toggle Variable	Index – 1 byte Value 1 – 2 bytes Value 2 – 2 bytes Value will default to Value 1.
4	Read Variable	Index – 1 byte Instance – 1 byte Bank – 1 byte (not implemented) Type - 1 byte 2 – DC Load Status 3 – AC Load Status 4 – Gen Ind Status 5 – Water Pump Status
5	Conditional Send	PGN – 3 bytes Data Packet – 8 bytes Variable Index – 1 byte if the variable is non-zero, sends the packet

There are up to 255 variables defined. Each is stored as an unsigned 2-byte value. Variables are accessible to the rest of the HMS 360 code via the button_variable array.

Button functions can be accessed programmatically from the code through register_event(). registering SBDPRESS_BASE + id, SBD_RELEASE_BASE + id, and SBDHOLD_BASE + id will execute the command list associated with the button with the matching id.

Lamp Types

Value	Type	Color
0	Blank	N/A
1	Static Button	N/A
2	DC Load	0 = Black Non-Zero = Green
3	AC Load	0 = Black Non-Zero = Green
4	Generic Indicator	0 = Black Non-Zero = Green
5	Water Pump	Off = Black On = Green
6	Page Break	N/A

Page Buttons appear on the left, and simply switch pages when pressed. They may be placed anywhere in the button list, and the order of their appearance and the page they switch to are set automatically to the same order by the HMS360. They have no commands or variables.

Climate Control "AutoLink" Mode

The "Auto" mode simplifies the use of the heating and air conditioning. From the user's point of view, hitting "Auto" turns on both the Heat and Cool, and locks the two set points together. The Auto mode is a global setting, affecting all zones. You cannot set individual zones to Auto. (This is a limitation of the monitor programming, not the TM510, intended to simplify operation.)

From a system point of view, the Auto flag simply causes the unit to set the thermostats to AUTO or OFF, rather than HEAT, COOL, or OFF. The thermostat manages the set points and status.

When setting the schedules, the mode has no actual effect. As the system passes from day to night, etc.., the HEAT/COOL/AUTO status does not change. Note that the TM510 will not run the A/C in AUTO mode if the set point is below 68F. This allows the user to keep the unit is AUTO mode and set the night point to a comfortably low temperature without triggering the A/C.

Note that as of 12/10/2014 the TM200 does not support the AUTO mode, and the Auto button will not be presented on the screen. The Auto mode is not available in single-zone systems.

Climate "Reset Schedule" Button

The Reset Schedule button is found on the Climate Configuration Screen. It can be used to sych up the climate scheduling between different zones and different RV-C climate devices. This is used most often when there is a conflict between zones on what the current schedule mode is. This conflict is seen when the schedule icon (Day – Sun / Night - Moon / Away – Door) is alternating states or blinking on and off.

A press of this button initiates the following:

1. Sets the schedule day begin to 8am and night begin to 10pm for each zone and unit.
2. Sets the current schedule instance (Day/Night/Away) of each zone/unit to the same instance depending on the current time.
3. Sets the schedule mode (On/Off) for each zone/unit to the same mode depending on the current mode setting.

This button is only supported in the HMS365 v3 or higher.

Video Capture / Serial Upload

The unit (Version 3.09 and higher) can capture still images from the video input and upload them via the serial port. There is potential for additional formats, but the only format currently supported is a 320x240 8-bit grayscale Windows BMP.

The serial port is set to 115200bps,N,8,1. The following commands are supported:

B Load the still buffer with the current video image and translated to BMP, Grayscale, 320x240 resolution. The buffer size is 77,880 bytes.
T For testing. Initializes the buffer with a test bitmap.
E$..$ For testing. Echoes up to 10 characters that follow.
S#### Set packet size. Value is in hexadecimal. Unit responds with a single ACK (0x06).
G#### Get packet. The response is a stream of <packet size> hex bytes, followed by a two-byte checksum. If the packet extends beyond the buffer length, the packet is truncated. If the packet is invalid, only the checksum (0) is sent.

All commands are delimited with a <cr> and/or <lf>. All command parameters are transmitted in hexadecimal.

Document Revision History

Date	By	Effective	Revision
05/15/15	CCR	V3.01	Added explanation of Reset Schedule button Added HMS365 references and changed name of doc to HMS360/365 Application Document
06/25/15	CCR	V3.06	Added additional Transfer Switch option (TM240 1 Leg)
08/17/15	CCR	V3.09	Added Magnum RV-C Bridge Inverter Model Added Video Capture/Serial Upload
01/25/16	CCR	V3.10	Added TM555 Telematics Support setting
5/5/16	MSP	v3.17	Added RGB, DB100 support settings.
07/08/16	CCR	V3.20	Added Outback Mate3 inverter model