ELECTRONIC
REVISION
CONTROLLED

RosenView LXM

Technical Manual

RosenView LXM 0603-002

ROSEN
AVIATION
IN FLIGHT ENTERTAINMENT SYSTEMS

Technical Manual, RosenView LXM

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ROSEN AVIATION
IN FLIGHT ENTERTAINMENT SYSTEMS

Rosen Aviation, LLC
1020 Owen Loop South
Eugene, OR 97402
541.342.3802
888.668.4955
Fax: 541.342.4912
www.rosenaviation.com

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1. INTRODUCTION

This manual describes how to install the RosenView LXM moving map with XM WX Satellite Weather and passenger briefing system onto your aircraft. It contains everything you need to know to wire the unit and confirm that they are functioning correctly.

Note: installation and service should be performed only by trained and qualified personnel.

1.1. Unpacking

The parts shipped with the RosenView LXM.

- Outline and Installation Drawing RosenView LXM
- RosenView LXM Housing Assembly
- Connector kit:
  - Connector kit, w/backshell, HD15, male (P/N **0300-026**)
  - Connector kit, w/backshell, HD26, male (P/N **0300-032**)
  - Connector kit, w/backshell, 21WA4, female (P/N **0300-034**)
- Configuration CD, RosenView LX, LXM, and VX
- RosenView LXM User's Guide – leave in the plane
- USB flash drive

Optional Controllers (sold separately) shipped with Remote Controller's, Technical Information (P/N **100434**)

- Universal Remote with color display (P/N **0500-015**)
- 7-Button Controller (P/N **0300-407**)

Optional RosenView briefing controllers (sold separately) (P/N **0300-410**, **0300-411**, and **0300-412**)

NOTICE The *Outline & Installation* drawing **0603-002-CD** is also available at www.rosenaviation.com.

From the Rosen Aviation home page, select **Support→ Drawings and Pinouts**, and search for the drawing by model number or browsing by product category.

1.2. XM WX Weather Components

XM weather portion of this product is provided by XM Satellite Radio, Inc., which requires a separate subscription to its services. To access satellite weather data, you must have a current subscription as well as the XM-approved Satellite Weather antenna and certified receiver by Heads Up Technologies.

2. DATA SYSTEM CONNECTIONS

There are several ways to connect the RosenView LXM to an aircraft's data systems—either with one of two ARINC 429 inputs or an RS-232 (GPS) input.

The 429 buses can be either low- or high-speed buses (the bus speed is auto-detected). The RS-232 bus speed will auto-detect between 1200 to 9600 baud.

The labels on the ARINC bus are described below:

Data	ARINC Label
UTC Time	125
GMT Time	150
Barro Corrected Altitude	204
True Air Speed	210
Static Air Temp	213
Date	260
Present Position Latitude	310
Present Position Longitude	311
Ground Speed	312
Ground Track	313
True Heading	314
Wind Speed	315
Wind Angle	316
Distance to Destination	351
Time to Destination	352
Destination Local Time Offset	353
Destination Airport ID 1*	365
Destination Airport ID 2*	366/364
Equipment ID	371
GAMA Flight Plan	
Data Record Header	74
Active Wpt From/To	75
Record Checksum	113
Wpt Mess. Chars 7-9	301
Wpt Mess. Chars 10-12	302
Waypoint Type	303
Wpt Mess Chars 1-3	304
Wpt Mess Chars 4-6	305
Wpt Latitude	306
Wpt Longitude	307

* Rockwell Collins' Proline 21 only

To achieve at least basic operation, labels 125 or 150, 204, 260, 310, 311, 312, and 313 are necessary. Additional labels will provide more information, for example Destination Airport, Outside Air temperature, etcetera, but they will not be shown if they are not supplied.

2.1. Connection Diagrams

The RosenView LXM will output moving map and satellite weather data concurrently.

The following connection diagrams illustrate how to configure the unit's connections to integrate the LXM unit into a system with an existing XM satellite communicator, or where LXM is the sole XM satellite communicator.

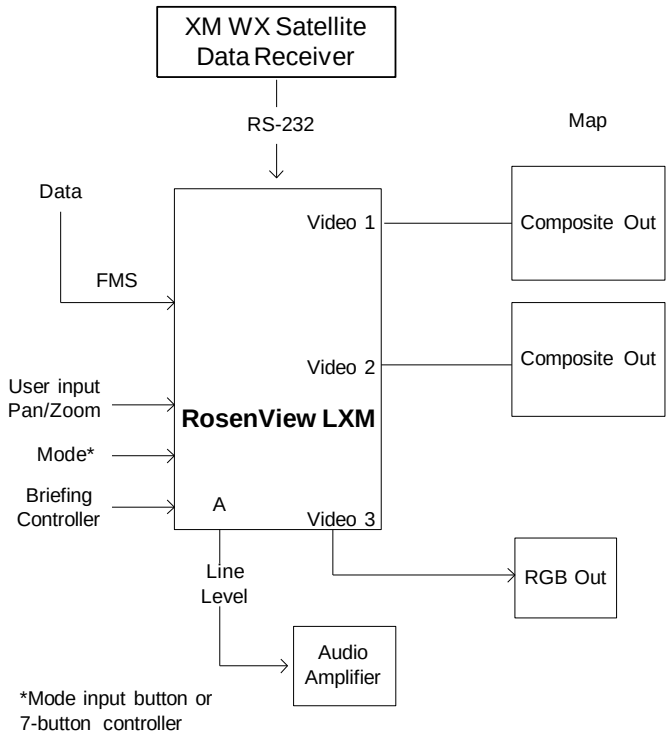


Figure 1. Normal RosenView LXM configuration

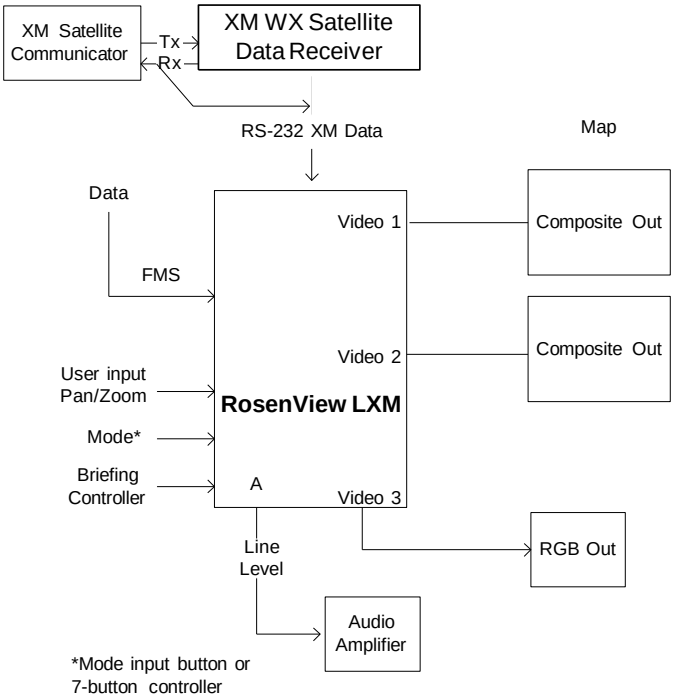


Figure 2. XM slave mode configuration

2.2. Moving Map Connection Options

Option 1

The best option is to connect to the ARINC 429 bus from the FMS or bus concentrator that contains the labels shown previously. This can be connected to either of the ARINC 429 inputs.

Option 2

Connect two different 429 Buses. For example, connect to your GPS for most information, and to another bus (airdata computer) to get the additional information.

Option 3

Connect to a NMEA-183 GPS RS-232 output from a GPS unit. This will yield less information since some of the GPS units do not output route information with this, and many do not output altitude.

Option 4

Connect to one or two ARINC-429 buses, and then connect to an RS-232 output from an airdata computer or GPS (aviation RS-232 format) to get altitude and waypoint information.

With ARINC-429 connected, RosenView LXM will always try to use the data there first, and then it will look to the RS-232 connection if connected. Some GPS's output altitude in the type 1 (non-NMEA) information string, but not on their ARINC bus.

Option 5

Connect the RS-232 input to a NMEA-183, ARNAV, Shadin, Icarus, or Apollo output from a GPS or other instrument outputting this type of information.

Option 6

Connect two ARINC buses for everything except altitude, and then connect the RS-232 input to an altitude encoder that outputs either Shadin, Icarus, or Apollo format.

2.3. Acceptable Input Formats for RS-232

2.3.1. NMEA – 183

The following information is an example of NMEA - 183:

$GPRTE,2,1,c,0,PBRCPK,PBRTO,PTELGR,PPLAND,PYAMBU,PPFAIR,PWARRN,PMORTL,PLISMR*73
$GPRTE,2,2,c,0,PCRESY,GRYRIE,GCORIO,GWERR,GWESTG,7FED*34

$GPRTE	Route info
C	Number of sentences in sequence
C	Sentence number
c/w - 'c'	Current active route, 'w' = waypoint list starts with destination waypoint
Name or number of the active route onwards	
Names of waypoints in Route	

2.3.2. Type 1 Format (ARNAV format)

Electrical Interface
The output signals will be compatible with RS-232C. This format will generate data at 9600 to 115200 baud with a word length of 8 bits, one stop bit, and no parity. Once the baud rate is determined, it will not change.

The RS-232 data will have the following general format:

STX	ASCII start-of text character (02 hex)
T1s	Type 1 sentences (see following paragraphs for description)
T2s	One or more Type 2 sentences (see following paragraphs for description)
ETX	ASCII end-of-text character (03 hex)

Output Sentences Type 1
The Type 1 receive sentences will have the following general format:

Id	item designator (single ASCII alphabetic character)
Dddd	item data (1 to 10 printable ASCII characters)
CR	ASCII carriage return character (0D hex)
LF	ASCII line feed character (0A hex)

Each Type 1 sentence will be output by the unit at least once every second. The track will be output in True (not magnetic) degrees.

Output Sentence Type 2
The unit will receive Type 2 sentences that will have the following format:

Id	item designator (three ASCII characters)
Seq	sequence number (1 binary byte)
Wpt	waypoint identifier (5 ASCII characters)
Lat	waypoint latitude (3 binary bytes)
Lon	waypoint longitude (4 binary bytes)
Myar	magnetic variation at waypoint (2 binary bytes)
CR	ASCII carriage return character (0D) hex
LF	ASCII line feed character (0A hex)

Each waypoint in the route being navigated by the unit will have a Type 2 sentence output by the unit at least (approximately) once every second.

If no route is being navigated (i.e., the active route is empty), the following Type 2 sentence should be received approximately once every second:

Id	item designator (three ASCII characters; route sequence number is “01”)
Seq	sequence number (1 binary byte; last waypoint flag is set; route sequence number is 1)
CR	ASCII carriage return character (0D hex)
LF	ASCII line feed character (0A hex)

2.3.3. Shadin Formats (Altitude Sentence, Airdata Z, Airdata G, Airdata S)

Only Shadin S format has most of the data required to run the RosenView LXM. Formats Z and G do not have positional information, and none of the Shadin formats have destination information.

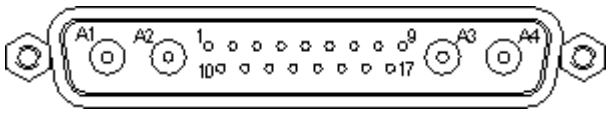
2.3.4. J1 Main Interface Connector

Note: The following connector inputs are for reference only. For the latest pinout information, see the Outline and Installation drawing.

Connector Type: Combo-D 21WA4 (Male)

Rosen Connector Kit: 0300-034 (included)

Pin #	Signal
1	28 volt return
2	28 volts
3	TTL in Briefing 1 switch input* (Ground Active)
4	TTL in Briefing 2 switch input* (Ground Active)
5	TTL in Briefing 3 switch input* (Ground Active)
6	TTL in Briefing 4 switch input* (Ground Active)
7	TTL in -Briefing switch input* (Ground Active)
8	In-Briefing cancel switch input (Ground Active)
9	TTL in –Mode Select* (Ground Active)
10	28V Return (not necessary if Pin 1 connected)
11	28V (not necessary if Pin 2 connected
12	Audio mute (PA override) input (Ground Active)***
13	Briefing Active LED output*
14	Briefing Active output**
15	Briefing Active Output (ground active)**
16	Discrete out 4 (unassigned)**
17	GND
A1	S-Video Y
A2	S-Video C
A3	Composite Video out 1
A4	Composite Video out 2



J1 Main Interface Connector

J1 Main Interface Connector cont.

Notes:

*Pins 3-8 and 13 are usually connected to the optional Rosen 0300-410 Briefing Control Panel. All inputs are activated by momentary switches to ground. Pin 13 is used to connect to an LED, 2V at 10-15 mA.

**Discrete output pins 14 and 16 are 5V active logic outputs. DO NOT connect these pins to any device with an open circuit voltage greater than 5V DC. Pin 14 is 5V at 15mA maximum while briefing is active; pin 15 is 28V tolerant output low when briefing is active.

***Pauses briefing when active.

Contact Rosen for custom configurations of unassigned pins.

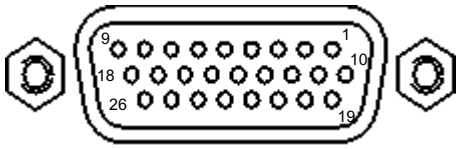
2.3.5. J2 Data Interface Connector

Note: The following connector inputs are for reference only. For the latest pinout information, see the Outline and Installation drawing.

Connector Type: 26-pin High Density D-Sub (Female)

Rosen Connector Kit:0300-032* (included)

Pin #	Signal
1	Left Audio Signal Out
2	Audio GND
3	Right Audio Signal Out
4	GND
5	ARINC 429 Data – Data receiver 1 positive input
6	ARINC 429 Data – Data receiver 1 negative input
7	ARINC 429 Data – Data receiver 2 positive input
8	ARINC 429 Data – Data receiver 2 negative input
9	XM WX RS-232 GND
10	RS-232 Input (GPS)
11	RS-232 GND (Do not attach to aircraft ground.)
12	RosenView Controller +5V Out
13	RS-485 A input
14	RS-485 B input
15	RS-485 A output
16	RS-485 B output
17	GND
18	RS-232 input (control)



J2 Data Interface Connector

9. Slave and normal; connects to XM J1 Connector Pin 23

(table continues)

*J2 Data Interface Connector **cont.***

19	RS-232 output (control) unassigned	
20	RS-232 gnd (control) Do not attach to aircraft ground	
21	XM WX RS-232 In	21. Slave and normal, connects to XM J1 Connector Pin 22
22	IR + 5V output	
23	Demodulated IR Signal input*	
24	IR Ground*	
25	XM WX RS-232 Out	25. Transmit out is not connected in slave mode; connects to XM J1 Connector Pin 4
26	GND	

Notes:

*Do NOT connect any device to pin 23 that has a signal voltage greater than 5V.

Do NOT connect an unmodulated IR receiver such as a pin diode from an IR repeater.

Contact Rosen for custom configurations of unassigned pins.

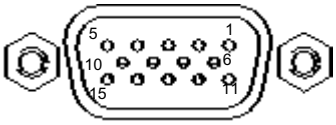
2.3.6. J3 Analog RGB Connector

Note: The following connector inputs are for reference only. For the latest pinout information, see the Outline and Installation drawing.

Connector Type: 15-pin High Density VGA (Female)

Rosen Connector Kit: 0300-026 (included)

Pin #	Signal
1	Red Signal
2	Green Signal
3	Blue Signal
4	NC
5	GND
6	GND (Red return)
7	GND (Green return)
8	GND (Blue return)
9	NC
10	GND (Sync return)
11	NC
12	NC
13	H Sync
14	V Sync
15	NC



J3 Analog RGB Connector

Note: Do not twist the H Sync and V Sync wires together.

We recommend that you use co-axial cables for all VGA connections.

2.3.7. Control Inputs

NOTICE For Controller information, go to www.rosenaviation.com and select **Accessories→Ext. Controllers**. Scroll down to find RosenView LXM external controllers.

Briefing Control Panel operation (P/N 0300-410 and 0300-411)

i) Import briefing files and allow RosenView LXM to reboot (see the *RosenView Software Configuration Manual* (P/N **101127)** for importing information).

ii) Press **Brief 1** (or the desired briefing) and then press **Play** to start the briefing; the Briefing Control Panel's green LED will light while the briefing is active.

iii) Press **Cancel** to stop an active Briefing.

RosenView Briefing Controller (P/N 0300-412)

i) Import briefing files and allow RosenView LXM to reboot (see the *RosenView Software Configuration Manual* (P/N **101127)** for importing information).

ii) To start a briefing, rotate the controller knob to select the briefing and push the knob to begin play.

iii) To stop a briefing, push the controller knob.

7-Button Controller (P/N 0300-407)

The 7-Button Controller uses hard-wired buttons for Zoom (in and out), Pan arrow keys north, south, east, and west), and Return to center the map view on the aircraft's current location.

The RosenView LXM can be controlled with RS-485. For specifications, see Section **3,** RS-485 on page 15.

IR Remotes

Rosen Aviation offers two pre-programmed IR Remote Controls (P/N **0500-011 Black & White and 0500-010 Color**). Other programmable remotes may be programmed using the following information:

The RosenView LXM IR receiver uses NEC style 32 bit encoding. In this encoding format, there are 16 bits of actual information transmitted as part of a 32-bit frame. The 16 bits of information is divided into two parts; the first part being an 8-bit device code, and the 2nd part being an 8-bit function code. Each 8-bit portion of the transmitted code is followed by the same code with each bit inverted. Most IR remotes using this format will have the same device code for each button on the remote, and a unique function code for each button.

The following table lists the default codes in hexadecimal format used with the RosenView LXM.

Table 1. Default codes used with the RosenView LXM.

Control	Device Code	Function Code
Enter Button:	0xE7	0x0D
Pan Up:	0xE7	0x08
Pan Down:	0xE7	0x09
Pan Left:	0xE7	0x11
Pan Right:	0xE7	0x10
Zoom In:	0xE7	0x52
Zoom Out:	0xE7	0x40

As an example, the actual transmission of the Enter button would consist of the following bit sequence:

Table 2. Enter button bit sequence

Lead In Period	Device Code	Inverted Device Code	Function Code	Inverted Function Code
→	d0 d1 d2 d3 d4 d5 d6 d7 1 1 1 0 0 1 1 1	d0 d1 d2 d3 d4 d5 d6 d7 0 0 0 1 1 0 0 0	f0 f1 f2 f3 f4 f5 f6 f7 0 0 0 0 1 0 1 1	f0 f1 f2 f3 f4 f5 f6 f7 1 1 1 1 0 1 0 0

Note: Within each byte transmitted, the least significant bit is transmitted first.

If you need assistance in configuring a universal remote control to work with the RosenView LXM, please contact Rosen Aviation at 541.342.3802.

2.3.8. Audio/Video Outputs

RosenView LXM has three available video output formats and one stereo audio output.

1. **Analog RGB Output:** Analog RGB connects to the 15-pin, high-density connector. Analog RGB will produce the best results when using displays sized 10” or above.

   Note: When used with Rosen Aviation bulkhead displays, a cabin controller can switch between composite and analog RGB via the source input on the display’s external switch controller’s connector. See the applicable display’s technical manual for specific source input toggle information.

2. **S-Video Output:** S-Video connects to coaxial pins A1 and A2 on the main interface connector (21 WA4).

3. **Composite Video Output:** There are also two separate composite video outputs on pins A3 and A4 (21 WA4).

4. **Audio Output:** Audio Left, Right, and Ground connect to pins 1 through 3 on the 26-pin Data Interface Connector.

3. RS-485 INFORMATION

This section defines the type, formats and timing of serial message packets that can be used to control RosenView LXM through a daisy-chained RS-485 serial connection. All RS-485 enabled Rosen Aviation monitors and other Rosen Aviation equipment will fully implement the applicable messages in this document. A maximum of 31 devices may be connected on a half-duplex network. Each device should be assigned a unique address from 1 to 31.

NOTICE RosenView LXM is set to address 31 by default.

Please note that Rosen Aviation equipment is not specifically designed to operate as part of a network with other manufacturers equipment unless the other equipment meets the requirements defined in this document.

3.1. Communication Protocol

- 9600 Baud
- 8 data bits
- 1 stop bit
- no parity

3.2. Packet Format

There are typically 3 bytes per message. The first byte is a header byte and the second identifies the specific command. The third byte is the network address. A network address byte of 0 is reserved as the “global” address, in other words all slave units should respond to that command.

3.3. Packet Timing

- Within a message packet, there is a maximum time of 20mSec between bytes. Messages with bytes sent more than 20mSec apart will not be recognized by the receiving unit.
- There should be a minimum elapsed time of 50mSec between any two message packets. This allows the given processor sufficient time to process the previous message.
- Messages sent less than 50mSec apart are not guaranteed to be processed by the receiving unit.

3.4. Wiring

Rosen Aviation equipment uses a half-duplex wiring layout that requires running only two RS-485 wires between each individual unit. On most products, the RS-485 wires have been internally daisy-chained so that four external pins exist on the connector.

3.5. Packet Format Description for RosenView LXM Control Commands

Enter

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x02	“enter” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Left

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x03	“left” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Right

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x04	“right” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Up

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x05	“up” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Down

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x06	“down” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Menu

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x07	“menu” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Zoom In

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x08	“zoom in” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Zoom Out

Byte 1:	0xA0	RosenView Control Header
Byte 2:	0x09	“zoom out” button command
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

3.6. Briefing Commands

Play Briefing 1

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x01	Play Briefing 1
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 2

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x02	Play Briefing 2
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 3

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x03	Play Briefing 3
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 4

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x04	Play Briefing 4
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 5

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x14	Play Briefing 5
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 6

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x15	Play Briefing 6
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 7

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x16	Play Briefing 7
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 8

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x17	Play Briefing 8
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 9

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x18	Play Briefing 9
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 10

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x19	Play Briefing 10
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 11

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1A	Play Briefing 11
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 12

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1B	Play Briefing 12
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 13

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1C	Play Briefing 13
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 14

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1D	Play Briefing 14
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 15

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1E	Play Briefing 15
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Play Briefing 16

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x1F	Play Briefing 16
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

Cancel Briefing

Byte 1:	0xA3	RosenView Briefing Header
Byte 2:	0x0f	Cancel briefing playback
Byte 3:	network id (value between 1-31) 0 is not a valid id for this command.	

3.7. Status Request

Byte 1: 0xA8 RosenView Status Request Header
Byte 2: 0x55 filler byte
Byte 3: network id (value between 1-31) 0 is not a valid id for this command.

Response:
Byte 1: 0xA9 RosenView Status Response Header

Byte 2: bits 0-6 Device specific status bits
Bit 0 reserved (not defined)
Bit 1 0 = PC not booted, 1 = PC booted
Bit 2 0 = temperature normal, 1 = temperature out of range
Bit 3 0 = no briefing active, 1 = briefing active
Bit 4 reserved (not defined)
Bit 5 0 = no ARINC data, 1 = ARINC 429 data active
Bit 6 0 = no GPS data, 1 = GPS data active
Bit 7 always 0

3.8. Network Setup/Ping Address

A ""master" device" uses the Ping Address message to identify all the attached devices on a network.

Byte 1: 0x88 Ping Message Header
Byte 2: 0x55 Filler byte
Byte 3: network id (value between 1-31) 0 is not a valid id for this command.

Response:
Byte 1: 0x77 Ping Response Header

Byte 2: bits 0-3 Device Identification
0000 = 5.6" monitor
0001 = 8.4" monitor
0010 = 12" monitor
0011 = 15" monitor
0100 = 17" monitor
0101 = 17"WS monitor
0110 = 20" SL II monitor
0111 = 24"WS monitor
1000 = 7" monitor
1001 = 6.5" monitor
1100 = Universal Lift
1101 = DVD player
1111 = RosenView unit

bits 4-7
0001 = Display, power slave only
0010 = Display, video slave only
0011 = Display, power and video slave
0100 = RS485 Master
0000 = other (DVD, Universal Lift or RosenView)

Byte 3: *(for RosenView)*
bits 0-6 Device specific status bits
Bit 0 reserved (not defined)
Bit 1 0 = PC not booted, 1 = PC booted
Bit 2 0 = temperature normal, 1 = temperature out of range
Bit 3 0 = no briefing active, 1 = briefing active
Bit 4 reserved (not defined)
Bit 5 0 = no ARINC data, 1 = ARINC 429 data active
Bit 6 0 = no GPS data, 1 = GPS data active
Bit 7 always 0

Example: If the responding unit were a RosenView LXM, operating normally with ARINC 429 data active, the ping response bytes would be 0x77, 0x0F, and 0x22.

4. INSTALLATION GUIDELINES

4.1. Mounting

The LXM may be mounted in any orientation as long as the following conditions are met:

1. The front panel is accessible so a user/technician may perform field updates and configurations.
2. Vents on the front and back are unblocked to supply adequate ventilation. Leave a minimum of one-inch clearance between the vents and any obstructions. A vent pattern or opening in the cabinet must have at least 5.5 square inches of open area.

The maximum mounting-screw penetration into the housing does not exceed .25 inches. Two mounting holes are available on each side for 6-32 screws, as shown below and on the outline and installation drawing.

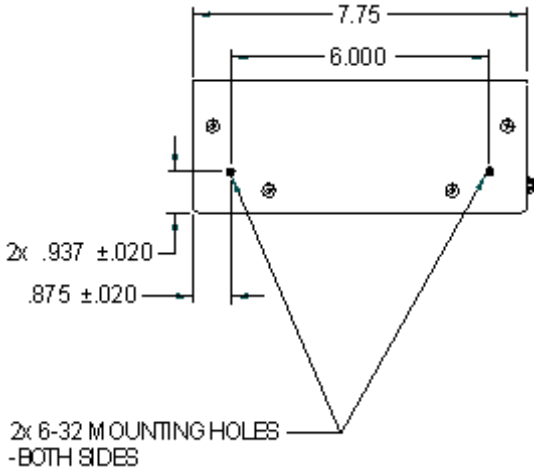


Figure 3. RosenView LXM mounting requirements

5. ROSENVIEW LXM CONNECTIONS, LEDS, AND CONTROLS

The front side of the RosenView LXM unit houses the PS/2 keyboard connection, a USB port, Reset/Power button, and LED displays. The plug in the lower-left corner covers a connector used only by Rosen Aviation technicians.

Figure 4. RosenView LXM front panel

5.1. Front Panel Indicators

Except for resetting the unit, you cannot control the RosenView LXM from the front panel; however, you can control the moving map using an IR remote.

Table 3. RosenView front panel controls

Control	How it Works
PS/2 Keyboard Connection	Connect a keyboard to this connection to access setup and customization screens, and also to see the XM weather ID number and signal status under the **About RosenView LXM** option.
USB port	Connect the USB flash drive (thumbdrive) with customized files to the USB port to import custom configuration files into RosenView LXM, or connect an empty USB flash drive to export a RosenView LXM custom configuration to be loaded onto another RosenView LXM or saved for later.
Reset/Power	Press and hold the Reset/Power button for about one second and then release it to reset RosenView LXM; the system will cycle power and reboot.

Table 4. RosenView LXM LED definitions

LED	How it Works
IR	A blinking blue light indicates active remote control input.
HD	Remains off during normal idle operation and blinks when the hard drive is active.
PC Power	A blue LED indicates three possible conditions: a) Remains on during normal operation. b) Blinks while the RosenView LXM system is booting up. c) Remains off if a system error prevents boot up.
Reset/Power	A steady green light indicates the unit is operating normally; a blinking green light indicates the unit is rebooting. To reset the RosenView LXM, press and hold the Reset/Power button for about one second and then release it. The system will cycle power, reboot, and reset the map processor.
Temp	The temperature alarm indicator: A blinking red LED indicates the internal system temperature is either above or below the allowed parameters. This LED remains off during normal temperature conditions. (The RosenView LXM monitor screen will also be blank if the internal system temperature is above or below the allowed parameters.)
Briefing	The active briefing indicator: A blinking blue LED indicates the unit is playing a briefing. The Briefing LED will blink as long as the briefing is active; it remains off when no briefing is active.
Control	Control activity indicator. It blinks blue when any control inputs are active (RS-232 serial control, IR control, or RS-485). This LED remains off when no control inputs are active.
GPS	(Global Positioning System) LED indicates activity on the RS-232 GPS data input. A blinking blue LED indicates when the unit is receiving data.
ARINC	(Aeronautical Radio, Inc): This LED indicates activity on the ARINC 429 data input. A blinking blue LED indicates the unit is receiving valid data. **Note:** when both GPS and ARINC inputs are being used, only the ARINC light will blink.

NOTICE

If the GPS and ARINC LEDs are alternately blinking on and off, the unit is not receiving data or there is a connection/wiring error.

Test Mode

1. To enter test mode, remove 28V power from RosenView LXM, and then while pressing and holding in the **Reset/Power** button, turn on the 28V power supply.
2. Continue to hold in the **Reset/Power** button for a couple seconds and then release.
3. After booting up, test mode will run on the monitor.

The GPS and ARINC LEDs blink in unison for the first few minutes when RosenView LXM is in test mode. Test mode works only when there is no incoming data to the unit.

5.2. Rear Connectors

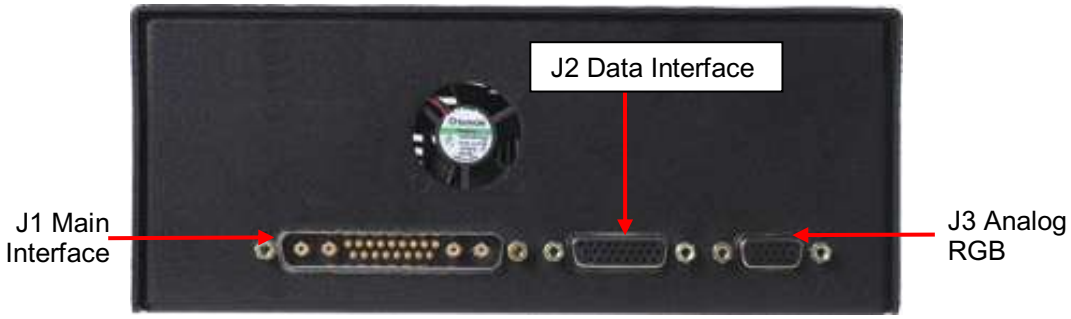


Figure 5. RosenView LXM rear panel connectors

5.3. LXM Map Screen – Optional Remote

With the optional remote control, you can control the map and flight information data by touching the remote control's screen.

Table 5. Remote control screen buttons

Button	How it Works
Mode	Opens a menu of map viewing options and cycles through the Mode Menu options.
+	Zooms in on a map view.
–	Zooms out on a map view. (Zoom times out after a pre-set time.)
▲ ▼ ◄ ►	Pans the map view north, south, west, or east.
Ok	Centers the map view on the aircraft's location.

6. WEATHER VIEW OPERATIONS

The RosenView LXM Moving Map will show Nexrad weather overlaid on both the satellite views and map views; however, these views will display the weather information only on map views that will display the radar image clearly. The weather overlay is at a fairly low detail level and the image becomes too pixilated (grainy) when you zoom in.

The weather view can be turned off in the menu if for some reason the user does not wish to see weather. This can be done either with a keyboard connected to the RosenView LXM or by using the configuration tool and importing the settings. An example of weather overlay is shown below.

Radar Legend

Radar weather displays lighter amounts of precipitation in green, and heavier weather patterns will show patches in the red range of the spectrum.

Figure 6. Radar imagery (green/yellow shapes) overlaid on an LXM map

6.1. Status Summary

6.1.1. Destination Weather Forecast Page

If the destination city can be determined, and it is one of the locations transmitted by the satellite local forecast or within a 50-mile radius of the destination, a summary page will display a brief forecast stating the weather expected within 12 hours of the forecast timestamp, and the weather in the next 12 hours. If the forecast is not for the destination city but nearby, the word “area” will be used. The forecast will be limited to simple descriptions because of the limitations of the data being sent, as shown in the following list. If the destination city is further than 50 miles away from the closest city with a forecast, then the LXM displays no forecast within range.

Table 6. Forecast types

Fair	Partly cloudy	Thunderstorms
Cloudy	Dust	Clear
Mostly cloudy	Foggy	Sleet
Very hot	Haze	Freezing drizzle
Very cold	Snow showers	Snow
Smoke	Drizzle	Sunny
Snow flurries	Windy	Rain showers
Rain and snow mixed	Blizzard	Freezing rain
Blowing snow	Rain	

Temperatures will be shown in 12-hour increments (limitation of the XM data). Expected high, expected low for the first two 12-hour periods from when the forecast was issued.

Chance of precipitation will be given in a percentage, if available; for example, 0% (none shown if this value), 5%,10%,20%,30%,40%,50%,60%,70%,80%,90%,>95%.

As an example, using Creswell (Hobby) field as the destination airport: a forecast page would have the following information because Eugene is on the satellite's list and is within 50 miles of the Creswell Airport:

Today's Forecast For The	(Label)
Eugene Area	(Nearest Airport).
as of 3:00 PM PDT	(Last forecast time - local)
Partly Cloudy	(Forecast)
High 55, Low 42	(Temp Forecast)
40% chance of Precip	(Percentage of Precipitation)

7. TECHNICAL REFERENCES AND SUPPORT

NOTICE The *Outline & Installation* drawing **0603-002-CD** is also available at www.rosenaviation.com.

From the Rosen Aviation home page, select **Support→ Drawings and Pinouts**, and search for the drawing by model number or browsing by product category.

7.1. Troubleshooting

It can take up to 20 minutes before any XM WX Weather data is available. During this time, the LXM displays a message "**Initializing XM,**" as shown below, while accessing city forecast and radar weather data.

Note: This message will disappear after 15-20 minutes, which means the unit has received weather data

Figure 7. XM weather initialization message

NOTICE If the LXM cannot receive an active signal and download any weather data, it displays a message: "**No satellite signal**."

Several error conditions can occur due to wiring or other types of errors in communicating with the XM weather unit. These messages will appear on the screen when these issues are current.

If the display does not function properly, refer to the following troubleshooting tips for symptoms and possible solutions before contacting Rosen Aviation's field support.

7.1.1. ARINC/GPS Summary

The LXM generates a summary of the active status and weather data being received through the ARINC buses and RS-232. Use this report if the screens are missing labels to verify which data the unit is receiving. To open the ARINC/GPS Summary, as shown below, click the **ARINC/GPS Summary** button on the LXM setup screen.

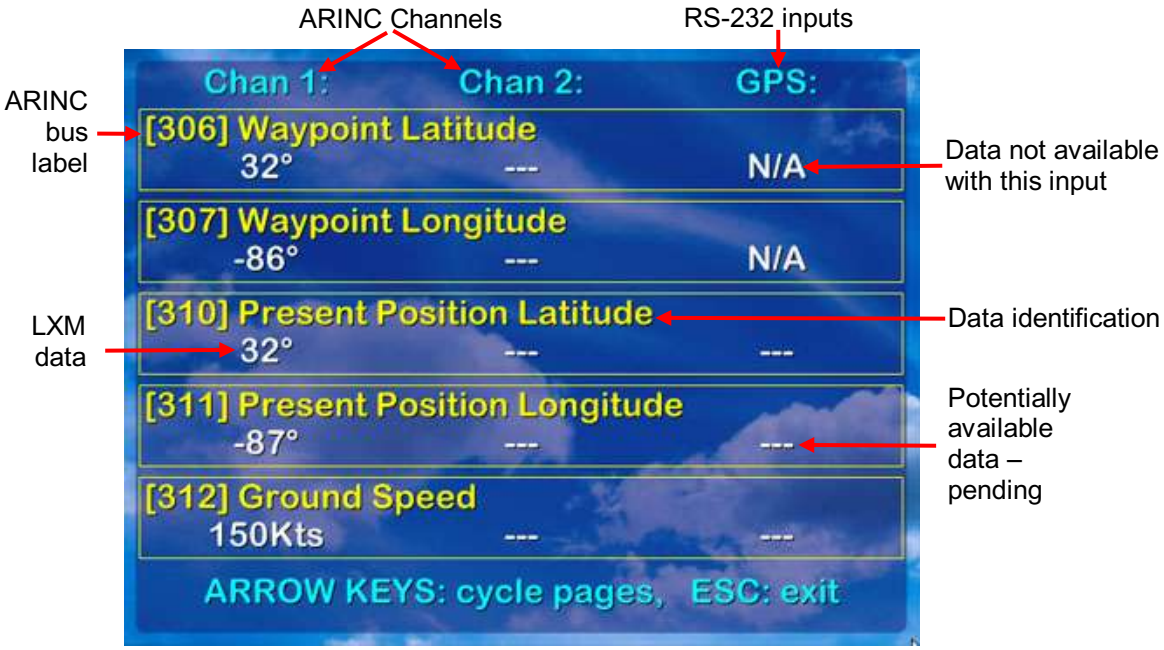


Figure 8. ARINC/GPS Summary report

- Look at each data label to verify whether you have active data.
- GPS / RS-232 output the same bus labels, but ARINC has priority over GPS / RS-232.
- Data is arranged numerically by ARINC label. Label 371 marks the end of the report.

Note: Always use an oscilloscope to verify the video signal and a multimeter to verify voltages. Check actual results against the requirements described in this manual.

Table 7. Troubleshooting tips and solutions

Problem	Possible Solutions
No destination data	• Enabled once the pilot inputs the flight data.
No weather data or partial weather data	• Weather data refreshes at different rates. Precipitation (green) displays first, followed by cloud cover (white). Wait for the "Initializing XM" message to disappear. The LXM downloads city forecast data before weather data.
Data is missing	• Verify the label is correct on the ARINC bus. It is possible to hook up two different ARINC buses. **Note:** Certain data points do not show up on the GPS/RS-232 bus.
No video	• Verify that the video is on and has a tape or DVD installed. • Verify that a signal is reaching the display using an oscilloscope or another display. • Verify that the display is turned on. • Verify that the pinout is correct.
Screen is black	• Verify that the display is receiving power. • Verify that the pinout is correct. • Verify that the video source is on. • Verify all connections between the source and the display. • Ensure the internal system temperature is not above or below the allowed parameters.
Image flickers	• Verify that the signal cable is secure. • Verify that the vertical frame frequency is 75 HZ or less.
Image is distorted	• Verify pinouts. • Verify that a signal is reaching the display using an oscilloscope or another display. • Examine the display for pinched or damaged cables.
GPS and ARINC LEDs are blinking on and off	The unit is not receiving data or there is a connection/wiring error.
Please Activate XM	The XM WX Weather receiver is no longer active or the subscription to WX XM Satellite Weather has expired. You can find the XM weather ID number by selecting the About RosenView button on the setup menu.
Message "No satellite signal"	There is no communication between the LXM and the WX XM Weather box; for example, while the aircraft is in the hanger and cannot receive an active signal.
Message: "Initializing XM"	This message displays while accessing weather data and it should disappear after 15-20 minutes. The LXM recognizes there is an XM box; however, no city forecast or radar imagery is available. **Note:** This message will not display on satellite view maps.
No radar imagery	Radar weather can take up to 20 minutes to display after the LXM receives an active signal. Radar data is generated after city forecast data.

Table 8. Technical references

Document Title	Part Number	Location
Remote Control, Color Display	**0500-015**	www.rosenaviation.com
7-Button Controller	**0300-407**	www.rosenaviation.com
Optional Briefing Controllers	**0300-410**, **0300-411**, and **0300-412**	www.rosenaviation.com

7.2. Specifications

Mechanical packaging: Weight	3.5 lbs [1.59kg]
Power Requirements	28V DC
Audio/Video Outputs:	
DVD Video Out	1V peak-to-peak, 75 Ohms
DVD Audio Out	1V RMS (0db FS), 600 ohms
Auxiliary Video In	1V p-p, 75 ohms
Auxiliary Audio Line In	1V RMS nominal, 4.7k ohms; Max Input Voltage 5.8V p-p
Switched Video Out	1V p-p, 75 ohms; unity gain from auxiliary video input
Switched Audio Out	Unity gain from auxiliary audio input is 600 ohms
Operating Temperature	0ºC - 50ºC
Warranty	2 year

7.3. DO-160E Qualifications

The following table lists the criteria to which we test the RosenView LXM.

Table 9. DO-160E testing criteria for the RosenView LXM

Description	DO-160E Section	DO-160E Category
Temperature and Altitude	4.0	A1
Temperature Variation	5.0	C
Humidity	6.0	A
Operational Shocks & Crash Safety	7.0	B
Vibration	8.0	S, Curve B
Explosive Atmosphere	9.0	N/A
Waterproofness	10.0	N/A
Fluids Susceptibility	11.0	N/A
Sand and Dust	12.0	N/A
Fungus Resistance	13.0	N/A
Salt Fog	14.0	N/A
Magnetic Effect	15.0	A
Power Input	16.0	Z,B
Voltage Spike	17.0	B
Audio Frequency Conducted Susceptibility – Power Inputs	18.0	Z
Induced Signal Susceptibility	19.0	AC
Radio Frequency Susceptibility (Radiated and Conducted)	20.0	TT
Emission of Radio Frequency Energy	21.0	B
Lightning Induced Transient Susceptibility	22.0	N/A
Lightning Direct Effects	23.0	N/A
Icing	24.0	N/A
Electrostatic Discharge (ESD)	25.0	A
Fire, Flammability	26.0	C

7.4. Technical Support

If you need assistance in configuring a RosenView LXM, please contact Rosen Aviation at 541.342.3802 or 888.668.4955.

8. DEFINITIONS

AC Alternating current – voltage from an aircraft alternator.

ARINC Aeronautical Radio, Incorporated. Data bus standard for transmission of avionics data on a differential serial bus.

ARNAV Alternate format for GPS data, where each ASCII sentence is preceded with a hex value of 0x02.

CVBS Composite video base-band signal

DC Direct Current – voltage from an aircraft battery or generator.

DVI Digital visual interface. A video interface standard designed to maximize the visual quality of digital display devices such as LCDs.

EOL End of life

FMS Flight management system

GPS Global positioning system

HD Hard drive

HDCP High bandwidth digital content protection

PC Personal computer

IR Infrared

LCD Liquid crystal display

LED Light emitting diode

Macrovision An analog video scrambling technique (ACP-DVD) that is required on all commercial content playing DVD units

MTBF Mean time between failure

NMEA National Marine Electronics Association

NTSC North American Television Standards Committee – the analog video specification used in North American countries

OSD On screen display – a menu of user options

PAL Phase alternate (by) line – the analog video specification used by most European countries and their former colonies world wide

PCB Printed circuit board – an electronics assembly that performs tasks

PS2 Personal system 2 (trademarked IBM keyboard specification)

RS-232 Standard for transmitting serial information using single-ended signaling (data lines referenced to ground).

RGB Red, green, blue. An abbreviation commonly used for analog computer graphics video that transmits the three primary colors on separate wires.

SECAM (*Séquentiel couleur à mémoire.*) French for "sequential color with memory," an analog color video system first used in France.

USB Universal serial bus. A high-speed differential signaling serial bus typically used to connect peripheral devices to a personal computer.

Vpp Volts peak-to-peak; the maximum range of a sine wave.

YPbPr Analog component video consisting of three inputs with one brightness (Y) and two color (Pb, Pr) channels

Vrms Voltage Root-Mean-Squared- voltage rating used to calculate power.

9. REVISION HISTORY

Revision	Date	Revision Description	EC #
A	01/10/08	New release	07482
B	06/27/08	Update WX slave mode, remote, and wiring note	08272