

Specifications

Table 1.1. XStream-PKG-R RS-232/485 RF Modem Specifications

Specification	9XStream-PKG-R (900 MHz)		24XStream-PKG-R (2.4 GHz)	
Performance				
Indoor/Urban Range	Up to 1500' (450 m)		Up to 600' (180 m)	
Outdoor LOS Range	Up to 7 miles (11 km) w/ dipole antenna Up to 20 miles (32 km) w/ high-gain antenna		Up to 3 miles (5 km) w/ dipole antenna Up to 10 miles (16 km) w/ high-gain antenna	
Transmit Power Output	100 mW (20 dBm)		50 mW (17 dBm)	
Interface Data Rate	Software selectable 1200 - 57600 bps		Software selectable 1200 - 57600 bps	
Throughput Data Rate	9,600 bps	19,200 bps	9,600 bps	19,200 bps
RF Data Rate	10,000 bps	20,000 bps	10,000 bps	20,000 bps
Receiver Sensitivity	-110 dBm	-107 dBm	-105 dBm	-102 dBm
General				
Frequency	902-928 MHz		2.4000-2.4835 GHz	
Spread Spectrum	Frequency Hopping, Wide band FM modulator		Frequency Hopping, Wide band FM modulator	
Network Topology	Peer-to-Peer, Point-to-Multipoint, Point-to-Point, Multidrop		Peer-to-Peer, Point-to-multipoint, Point-to-Point, Multidrop	
Channel Capacity	7 hop sequences share 25 frequencies		7 hop sequences share 25 frequencies	
Serial Data Interface	RS-232/485/422		RS-232/485/422	
Power Requirements				
Supply Voltage	7-18 VDC		7-18 VDC	
Transmit Current	200 mA		200 mA	
Receive Current	70 mA		70 mA	
Power Down Current	< 1 mA		< 1 mA	
Physical Properties				
Enclosure	7.1 oz. (200 g), Extruded aluminum, black anodized		7.1 oz. (200 g), Extruded aluminum, black anodized	
Enclosure Size	2.75" x 5.50" x 1.124" (7.90 cm x 13.90 cm x 3.80 cm)		2.75" x 5.50" x 1.124" (7.90 cm x 13.90 cm x 3.80 cm)	
Operating Temperature	0 to 70° C (commercial), -40 to 85° C (industrial)		0 to 70° C (commercial), -40 to 85° C (industrial)	
Antenna				
Type	½ wave dipole whip, 6.75" (17.1 cm), 2.1 dBi Gain		½ wave dipole whip, 5.25" (13.3 cm), 2.1 dBi Gain	
Connector	Reverse-polarity SMA		Reverse-polarity SMA	
Impedance	50 ohms unbalanced		50 ohms unbalanced	
Certifications (Refer to www.maxstream.net for additional certifications)				
FCC Part 15.247	OUR9XSTREAM		OUR-24XSTREAM	
Industry Canada (IC)	4214A-9XSTREAM		4214A 12008	
Europe	N/A		ETSI, CE	



FCC-Approved Antennas

Table A.1. Antennas approved for use with 9XStream (900 MHz) RF Modems.

Manufacturer	Part Number	Type	Gain	Application	Min. Separation Distance
*	*	Yagi	6.2 dBi	Fixed/Mobile **	20 cm
*	*	Yagi	7.2 dBi	Fixed/Mobile **	20 cm
MaxStream	A09-Y8	Yagi	8.2 dBi	Fixed/Mobile **	20 cm
*	*	Yagi	9.2 dBi	Fixed/Mobile **	20 cm
*	*	Yagi	10.2 dBi	Fixed/Mobile **	20 cm
MaxStream	A09-Y11 (FCC pending)	Yagi	11.2 dBi	Fixed/Mobile **	20 cm
MaxStream	A09-F2	Omni Direct.	2.2 dBi	Fixed **	20 cm
MaxStream	A09-F5	Omni Direct.	5.2 dBi	Fixed **	20 cm
MaxStream	A09-F8	Omni Direct.	8.2 dBi	Fixed **	20 cm
*	*	Omni Direct.	9.2 dBi	Fixed **	20 cm
*	*	Omni Direct.	7.2 dBi	Fixed **	20 cm
MaxStream	A09-M7	Omni Direct.	7.2 dBi	Fixed **	20 cm
MaxStream	A09-H	1/2 wave antenna	2.1 dBi	Fixed/Mobile **	20 cm
MaxStream	A09-HBMM-P5I	1/2 wave antenna	2.1 dBi	Fixed/Mobile **	1 cm
MaxStream	A09-QBMM-P5I	1/4 wave antenna	1.9 dBi	Fixed/Mobile **	1 cm
*	*	1/4 wave integrated wire antenna	1.9 dBi	Fixed/Mobile **	1 cm

Table A.2. Antennas approved for use with 24XStream (2.4 GHz) RF Modems.

Manufacturer	Part Number	Type	Gain	Application	Min. Separation Distance
*	*	Yagi	6 dBi	Fixed **	2 m
*	*	Yagi	8.8 dBi	Fixed **	2 m
*	*	Yagi	9 dBi	Fixed **	2 m
*	*	Yagi	10 dBi	Fixed **	2 m
*	*	Yagi	11 dBi	Fixed **	2 m
*	*	Yagi	12 dBi	Fixed **	2 m
*	*	Yagi	12.5 dBi	Fixed **	2 m
*	*	Yagi	13.5 dBi	Fixed **	2 m
*	*	Yagi	15 dBi	Fixed **	2 m
*	*	Omni Direct	2.1 dBi	Fixed/Mobile **	20 cm
*	*	Omni Direct	3 dBi	Fixed/Mobile **	20 cm
*	*	Omni Direct	5 dBi	Fixed/Mobile **	20 cm
*	*	Omni Direct	7.2 dBi	Fixed **	2 m
*	*	Omni Direct	8 dBi	Fixed **	2 m
*	*	Omni Direct	9.5 dBi	Fixed **	2 m
*	*	Omni Direct	10 dBi	Fixed **	2 m
*	*	Omni Direct	12 dBi	Fixed **	2 m
*	*	Omni Direct	15 dBi	Fixed **	2 m
MaxStream	A24-P8	Panel	8.5 dBi	Fixed **	2 m
MaxStream	A24-P13	Panel	13 dBi	Fixed **	2 m
*	*	Panel	14 dBi	Fixed **	2 m
*	*	Panel	15 dBi	Fixed **	2 m
*	*	Panel	16 dBi	Fixed **	2 m
MaxStream	A24-P19	Panel	19 dBi	Fixed **	2 m
MaxStream	A24-HABMM-P6I	Dipole	2.1 dBi	Fixed/Mobile **	20 cm
MaxStream	A24-HBMM-P6I	Dipole	2.1 dBi	Fixed/Mobile **	20 cm
MaxStream	A24-HABSM	Dipole	2.1 dBi	Fixed/Mobile **	20 cm
MaxStream	A24-QABMM-P6I	Monopole	1.9 dBi	Fixed/Mobile **	20 cm
*	A24-Q1	Monopole	1.9 dBi	Fixed/Mobile **	20 cm
*	*	Monopole	1.9 dBi	Fixed/Mobile **	20cm

* FCC-approved antennas not inventoried by MaxStream – Contact MaxStream (866) 765-9885 for information.

** Can be approved for portable applications if integrator gains approval through SAR testing

Antennas

[Refer to Appendix A for a list of FCC-Approved Antennas]

Factors that determine wireless link range:

- Ambient RF noise (interference)
- Line-of-sight obstructions
- Transmit power
- Receive sensitivity
- Antenna configuration
- XStream Antenna Connector Options

To comply with the FCC rules and obtain a "modular" certification, it is required that XStream Modems utilize a "non-standard" connector. This is to ensure the modems are used only with approved antennas.

RPSMA

The Reverse Polarity SMA (RPSMA) connector uses the same body as a regular SMA connector. In order to be a "non standard" connector, the gender of the center conductor is changed. The female RPSMA actually has a male center conductor.



Antenna Cables

RF cables are typically used to connect a radio installed in a cabinet to an antenna mounted externally. As a general rule, it is best to keep the RF cable as short as possible. All cables promote signal loss which is usually measured in dB loss per 100 ft. MaxStream provides LMR-195 rated cables. Common cables and dB losses are included in this table:

Table B.2. Potential Signal Strength Loss due to Antenna Cable Length

Cable Type	Loss at 900 MHz per 100' (loss per 100m)	Loss at 2.4 GHz per 100' (loss per 100m)	Diameter
RG-58	14.5 dB (47.4 dB)	25.3 dB (83.2 dB)	0.20" (4.95 mm)
RG-174	25.9 dB (85.0 dB)	44.4 dB (145.8 dB)	0.10" (2.54 mm)
RG-316	24.7 dB (81.0 dB)	42.4 dB (139.0 dB)	0.10" (2.59 mm)
LMR-195	11.1 dB (36.5 dB)	19.0 dB (62.4 dB)	0.20" (4.95 mm)
LMR-240	7.6 dB (24.8 dB)	12.9 dB (42.4 dB)	0.24" (6.10 mm)
LMR-600	2.5 dB (8.2 dB)	4.4 dB (14.5 dB)	0.59" (15.0 mm)