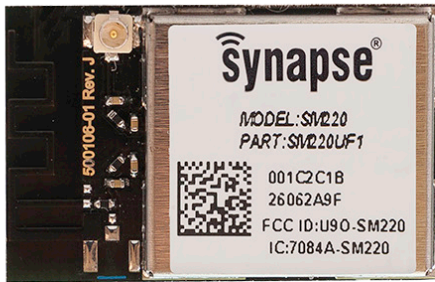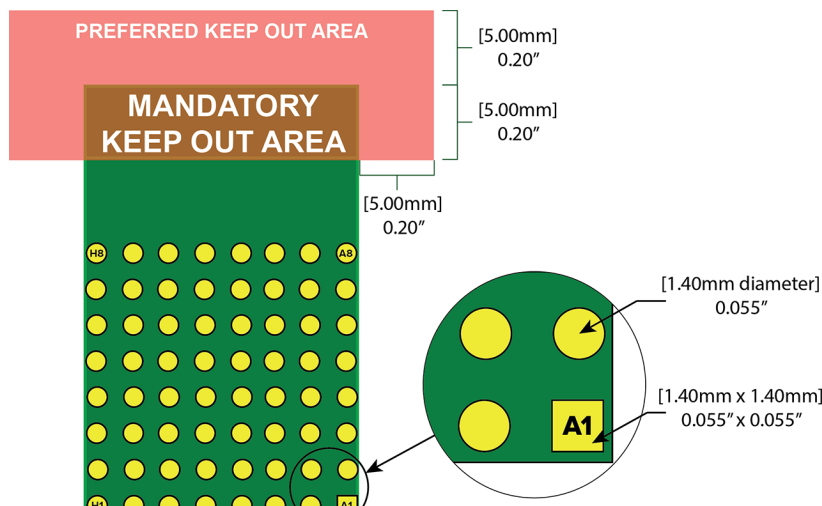# Synapse SM220
SNAP Engine

Long Range in a Small Module

The **SM220 SNAP Engine**® is a reliable, IEEE802.15.4 surface-mount module reaching data rates up to 2Mbps. This small, low-powered, 2.4 GHz transmitter-receiver module has excellent range and power consumption of less than 0.37 μA. The SM220 SNAP Engine comes pre-loaded with the Synapse SNAP® mesh network operating system and provides interoperability with other SNAP Engines.

Product Highlights

- 32 GPIO and up to 8 A/D inputs

- Two UART ports for control or transparent data

- Low power modes as low as 0.37 μA

- 128k flash, 58.5k free for over-the-air uploaded user apps

- Up to 2Mbps radio data rate

- Small form factor surface mount

- Powered by SNAP Network Operating System

PREFERRED KEEP OUT AREA

MANDATORY KEEP OUT AREA

[5.00mm] 0.20″

[5.00mm] 0.20″

[5.00mm] 0.20″

[1.40mm diameter] 0.055″

[1.40mm x 1.40mm] 0.055″ x 0.055″

A1

6723 Odyssey Drive // Huntsville, AL 35806
(877) 982-7888 // Synapse-Wireless.com

116-051513-008-E000

SM220 Specifications

Performance	Outdoor LOS Range	Up to 3 miles
	Transmit Power Output	up to +20 dBm
	RF Data Rate	250Kbps, 500Kbps, 1Mbps, 2Mbps
	Receiver Sensitivity	-103 dBm (1% PER, 250Kbps)
Power Requirements	Supply Voltage	2.0 - 3.6 V
	Transmit Current (Typ@3.3V)	at +20 dBm: 150 mA at +6 dBm: 55 mA
	Idle/Receive On (Typ@3.3V)	22mA
	Idle/Receive Off (Typ@3.3V)	7.8 mA
	Sleep Mode Current (Typ@3.3V)	Timed Sleep: 1.27 μA Untimed Sleep Mode : 370 nA
General	Frequency	ISM 2.4 GHz
	Spreading Method	Direct Sequence (DSSS)
	Modulation	O-QPSK
	Dimensions	29.80mm X 19.00mm
	Operating Temperature	-40 to 85 deg C.
	Antenna Options Weight	U.FL and compact Internal F 3 grams
Networking	Topology	SNAP
	Error Handling	Retries and Acknowledgement
	Number of Channels	15 fully operational channels, and channel 15 operates in a receive only state
Available I/O	UARTS with optional HW Flow Control	2 ports
	GPIO	32 Total, 7 can be analog-in with 10bit ADC
Agency Approvals	FCC Part 15.247	FCC ID: U9O-SM220
	Industry Canada (IC)	7084A-SM220

Part No.	Antenna	Receive Amp	Power Amp
SM220UFI	U.FL and compact Internal F	Yes	Yes

SM220 Module Pin Assignments

Pin #	Pin Name	Pin #	Pin Name
A1	GND	E1	PB2_MOSI_PDI_PCINT2
A2	VCC	E2	PB3_MISO_PDO_PCINT3
A3	VCC	E3	PB4_OC2A_PCINT4
A4	PF0_ADC0	E4	NC
A5	PF2_ADC2_DIG2	E5	NC
A6	PF4_ADC4_TCK	E6	NC
A7	PF6_ADC6_TDO	E7	NC
A8	GND	E8	NC
B1	PE2_XCK0_AIN0	F1	PB0_SSN_PCINT0
B2	PE3_OC3A_AIN1	F2	PB1_SCK_PCINT1
B3	PE5_OC3C_INT5	F3	PD1_SDA_INT1
B4	PF1_ADC1	F4	PD0_SCL_INT0
B5	Test Point - Do not use	F5	Test Point - Do not use
B6	PF5_ADC5_TMS	F6	Test Point - Do not use
B7	PF7_ADC7_TDI	F7	NC
B8	GND	F8	GND
C1	PE0_RXD0_PCINT8	G1	CLKI
C2	PE1_TXD0_PD0	G2	PD7_T0
C3	PE4_OC3B_INT4	G3	PD4_ICP1
C4	PE6_T3_INT6	G4	PD2_RXD1_INT2
C5	PE7_ICP3_INT7_CLK0	G5	PG5_OC0B
C6	PF3_ADC3_DIG4	G6	NC
C7	NC	G7	NC
C8	NC	G8	GND
D1	PB5_OC1A_PCINT5	H1	GND
D2	PB6_OC1B_PCINT6	H2	PD6_T1
D3	PB7_OC0A_OC1C_PCINT7	H3	PD5_XCK1
D4	NC	H4	PD3_TXD1_INT3
D5	NC	H5	RESET#
D6	NC	H6	NC
D7	NC	H7	NC
D8	GND	H8	GND

Please refer to the SNAP User's Guide for the I/O pin-mappings used by the SNAP-OS.

More technical details are in the SM220 datasheet available from:

https://developer.synapse-wireless.com/modules/sm220/