SYNAPSE SM300 RF Engine

Synapse's SM300 RF Engines® are long-range, reliable, surface mount 900 MHz transmitter receiver modules. These small, low-powered modules can have a LoS range of up to 1 mile and power consumption as low as 2µA. The SM300 RF Engines come pre-loaded with the Synapse SNAP® mesh network operating system and provide interoperability with all other SNAP RF Engines. SM300PC1 has chip antenna and SM300PU1 has U.FL antenna connector.

SM300 Features:

- 15 GPIO and up to 18 A/D inputs
- One UART port for control or transparent data
- Low power modes: 2µA with internal timer running
- 192K total FLASH with 64K used by SNAP core, 64K free for uploadable SNAPpy scripts, and 64K reserved
- FHSS technology
- Small form factor surface mount
- 10-bit ADC
- FCC, IC certified

TOP VIEW - PADS ON BOTTOM
ALL UNITS IN MILLIMETERS
29.80
19.00
2.40
1.10
PAD 1.4mm X 1.4mm
1.10
2.40
PAD DIAMETER 1.4mm
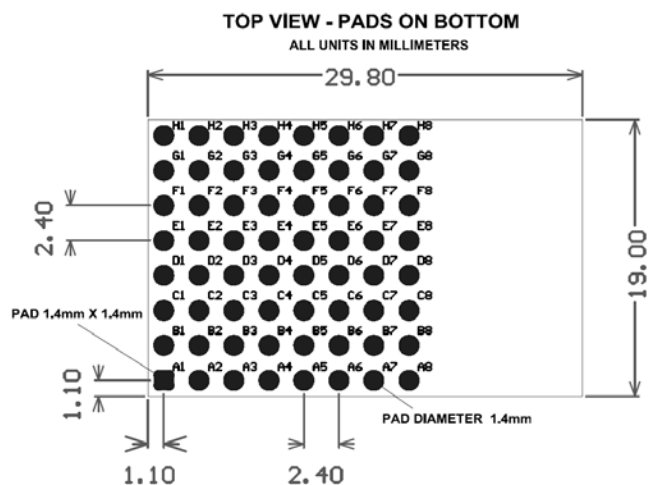
SM300 Specifications:

Performance	Indoor Range	Up to 1000 ft.	**General**	Frequency	900MHz
	Outdoor LOS Range	Up to 1 mile		Spreading Method	FHSS
	Transmit Power Output	20dBm		Modulation	GFSK
	RF Data Rate	150kbps		Dimensions	19.00 x 29.80mm
	Receiver Sensitivity	-121dBm at 9.6kbps and 1E-3 BER -99dBm at 150kbps		Operating Temperature	-40 to 85 deg C.
Power Requirement	Supply Voltage	2.7 – 3.6V		Antenna Options	Chip or U.FL
	Transmit Current (Typ)	85mA at +20dBm TX	**Available I/O**	UARTS with HW Flow Control	1 port
	Receive Current (Typ)	18mA		GPIO	15 total, 18 with 10-bit ADC
	Sleep Current (Typ)	2µA	**Agency Approval**	FCC Part 15.247	Yes, Class B
Networking	Topology	Mesh (SNAP)		Industry Canada (IC)	Yes
	Number of Channels	16			

FUTURE ELECTRONICS

HEADQUARTERS
Montreal (Canada)
Egham (London) UK
Singapore

SM300 RF Engine

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

Part Number SM300PC1 has chip antenna and Part Number SM300PU1 has U.FL antenna connector.

Pin Number	Pin Name	Pin Number	Pin Name
A1	GND	E1	NC
A2	VCC	E2	NC
A3	VCC	E3	GPIO_0
A4	P2.2	E4	NC
A5	P2.3	E5	NC
A6	P1.6 NC (External Flash)	E6	NC
A7	P1.7 NC (External Flash)	E7	NC
A8	GND	E8	RF OUT (Special Order)
B1	NC	F1	NC
B2	NC	F2	NC
B3	NC	F3	NC
B4	P2.1	F4	P0.0_VREF
B5	P2.4	F5	NC
B6	P1.5 NC (External Flash)	F6	NC
B7	P2.0 NC (External Flash)	F7	NC
B8	GND	F8	GND
C1	NC	G1	NC
C2	NC	G2	P2.5
C3	NC	G3	P0.3_XTAL1
C4	ANT_A	G4	P0.5_RX
C5	P0.2_XTAL1	G5	P0.6_CNVSTR
C6	NC	G6	NC
C7	NC	G7	NC
C8	GND	G8	GND
D1	NC	H1	GND
D2	NC	H2	P2.7_C2D
D3	NC	H3	P2.6
D4	NC	H4	P0.4_TX
D5	NC	H5	RESET#_C2CK
D6	NC	H6	P2.7_C2D
D7	NC	H7	NC
D8	GND	H8	GND

More technical details are in SNAP Hardware Technical Manual, Synapse Customer Forum: forums.synapse-wireless.com.

ERRATA

Notice of potential SM300 radio problem with SNAP 2.4.20 and earlier
If you turn the radio off and then back on using the rx() function in your scripts, then after invoking rx(True) your radio will experience poor performance caused by improper antenna control signals.

How to correct radio problem:
After invoking a rx(True) in your script, add the following two "radio pokes" to restore proper operation:
```
pokeRadio(0x000c, 0x12) # GPIO_1 CONFIGURATION REG - set to TX
pokeRadio(0x000d, 0x15) # GPIO_2 CONFIGURATION REG - set to RX
```