JM0R15-B: Function Generator

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II.   OPERATION

This module takes a DC voltage as its input and uses the XR-2206 IC chip to convert it to a desired waveform. The waveforms that can be generated are a sine wave, a triangle wave, and a square wave. Depending on the input supply voltage, the amplitude of the square wave can vary from 10 to 26 V_{pp}, and the sine and triangle wave can vary from 0.100 to 5.11 V_{pp}.

Fig. 1. Assembled module.

III.   SPECIFICATIONS

Referring to Fig. 1, the switch on the front can switch between a sine and a triangle wave. The ON position outputs a sine wave, and the OFF position outputs a triangle wave. The binding port below the switch is where the sine or triangle wave is outputted. The amplitude and frequency can be adjusted using the knobs labeled "Amplitude" and "Frequency".

The square wave is outputted at the binding port located below the frequency adjust knob. The amplitude cannot be adjusted, but the frequency can be adjusted using the same knob as the sine and triangle wave.

Fig. 2. The supply voltage binding port, located at the back of the module.

Absolute Maximum Ratings	
Supply Voltage	26 V
Power Dissipation	750 mW

Electrical Characteristics				
Parameter	*Min*	*Typ*	*Max*	*Units*
Supply Voltage	10		26	V
Supply Current		14	20	mA
Sine Wave Amplitude	100m		5.11	V_{pp}
Triangle Wave Amplitude	175m		5.11	V_{pp}
Square Wave Amplitude		5.59		V_{pp}
Frequency	17		27k	Hz
Input Impedance		100		kΩ
Output Impedance		600		Ω

*All electrical characteristics were tested across a 600Ω resistor with a supply voltage of 16V.
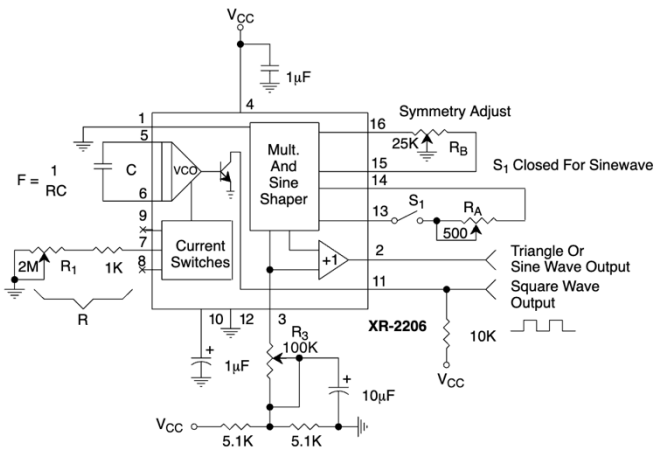
Fig. 3. Circuit schematic.

$$f = \frac{1}{RC}$$
Eq. (1)

The XR-2206 IC chip uses the resistor and capacitor values to create a system that is on the brink of instability. Because the system is close to instability, it creates an oscillator. Using Eq. (1), the user can change the location of the poles of the system. Changing the location of the poles will then adjust the frequency at which it oscillates.

The R_3 resistor adjusts the voltage divider from the source which, as a result, changes the amplitude of the output wave.

Although the chip may seem like a black box, understanding the fundamentals of oscillators helps better understand how the chip functions.

V.   ADDITIONAL FEATURES

- Frequency Range: 17 Hz to 27 kHz
- Banana plugs
- Rotating knobs

REFERENCES

[1] EXAR. "XR-2206 Monolithic function generator." https://www.alldatasheet.com/datasheet-pdf/view/80503/EXAR/XR2206CP.html (accessed Feb. 4, 2025).