Experiment 9

Objective:

1.Study of PWM using different Sampling Frequency

2. Study of Pulse Width Demodulation

Equipment Required:

1. ST2110 with power supply cord

2. CRO with connecting probe

3. Connecting cords

Theory:

Objective :
Study of PWM using different Sampling Frequency

Procedure :

1. Connect the circuit as shown in Figure 1 and also described below for clarity.

a.1 KHz sine wave output of function generator block to modulation input of PWM block.

b.64 KHz square wave output to pulse input of PWM block.

2.Switch 'On' the power supply.

3.Observe the output of PWM block.

4.Vary the amplitude of sinewave and see its effect on pulse output.

5.Vary the sinewave frequency by switching the frequency selector switch to 2 KHz.

6.Also, change the frequency of the pulse by connecting the pulse input to different pulse frequencies viz. 8 KHz, 16 KHz, 32 KHz and see the variations in the PWM output.

7.Switch 'On' fault No. 1, 2, & 5 one by one & observes their effect on PWM output and tries to locate them.

8.Switch 'Off' the power supply.

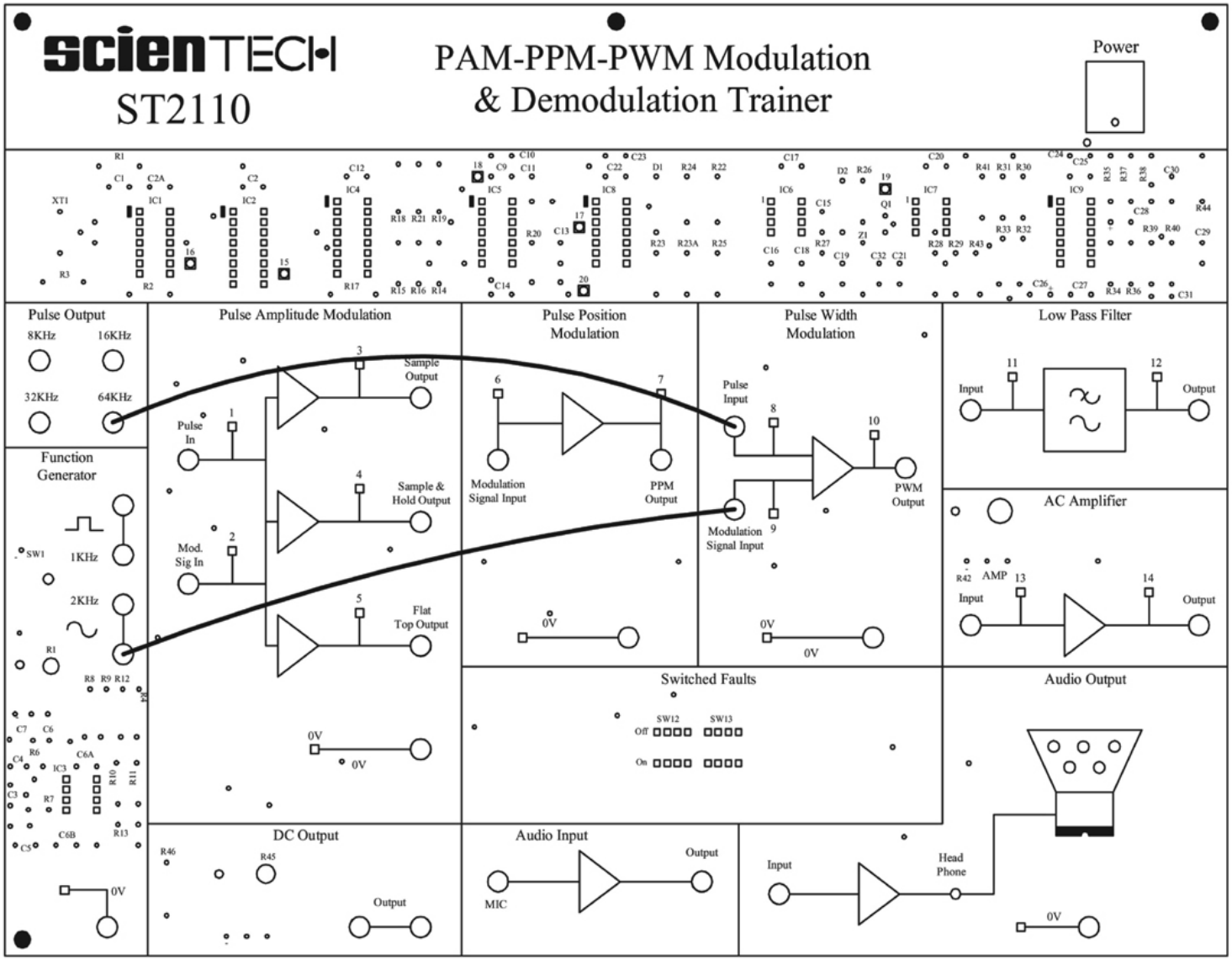

scientech
ST2110
PAM-PPM-PWM Modulation
& Demodulation Trainer
Power
Pulse Output
8KHz
16KHz
32KHz
64KHz
Pulse Amplitude Modulation
Sample Output
Pulse In
Sample & Hold Output
Mod. Sig In
Flat Top Output
0V
Pulse Position Modulation
Modulation Signal Input
PPM Output
0V
Pulse Width Modulation
Pulse Input
PWM Output
Modulation Signal Input
0V
0V
Low Pass Filter
Input
Output
Function Generator
SW1
1KHz
2KHz
AC Amplifier
AMP
Input
Output
Switched Faults
SW12
SW13
Off
On
Audio Output
DC Output
Output
Audio Input
MIC
Output
Input
Head Phone
0V

Figure 1

Objective :
Study of Pulse Width Demodulation

Procedure :

1.Connect the circuit as shown in Figure 2 and also described below for clarity.

a.1 KHz sine wave output of function generator block to modulation input of PWM block.

b. 64 KHz square wave output to pulse input.

c. Output of PWM to input of low pass filter.

d. Output of low pass filter to input of AC Amplifier.

2. Switch 'On' the power supply.

3. Observe the output of low pass filter and AC amplifier respectively to understand the demodulation of pulse width demodulation waveform in detail.

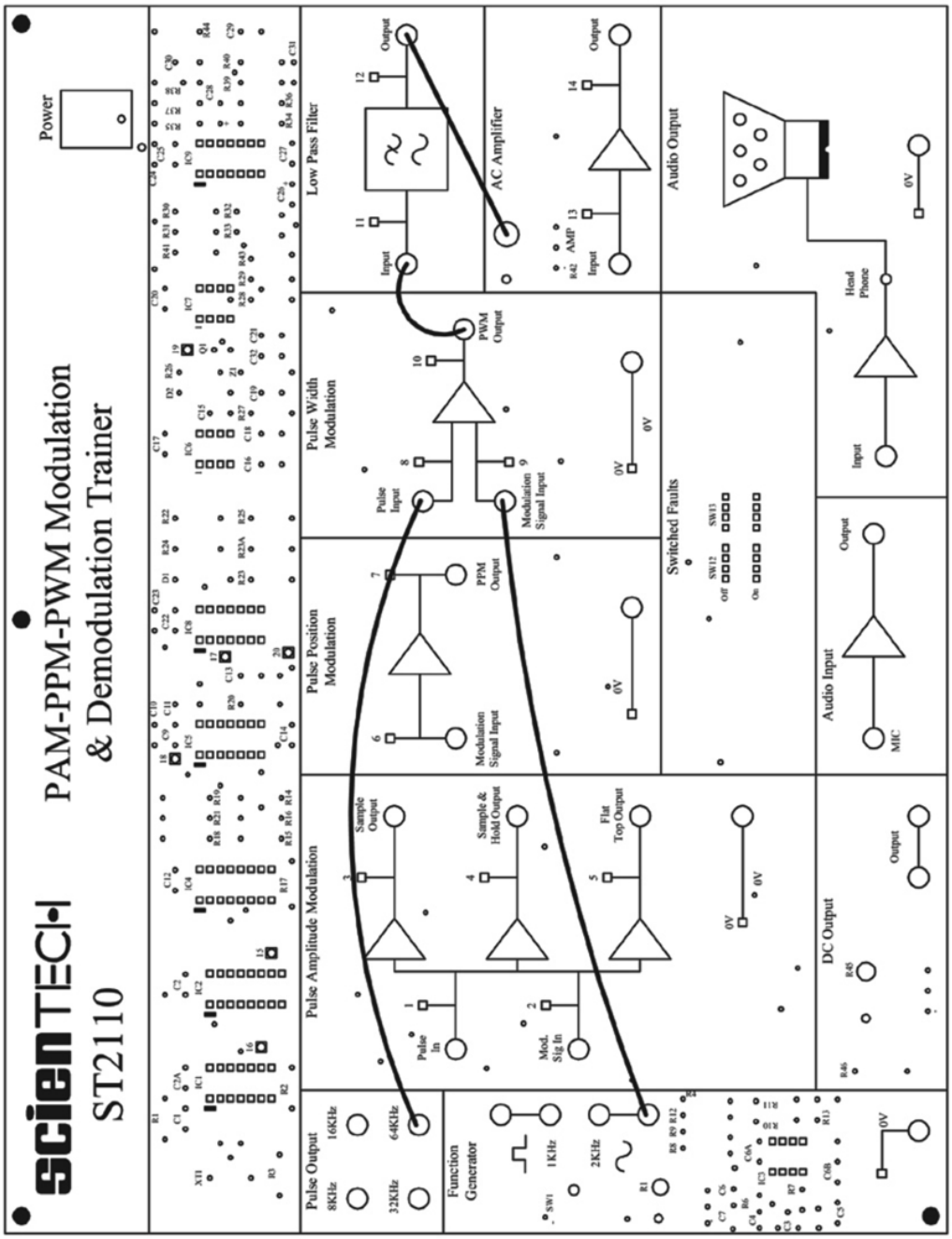
4. Vary the amplitude and frequency of sine wave and observe its effect on the demodulated waveform.

5. Now, connect the pulse input in the pulse width modulation block to the different frequencies available on board viz. 8, 16, 32 KHz and observe their demodulated waveforms.

6. Try varying the amplitude of sine wave signal; you will observe that the output signal varies similarly.

7. Switch 'On' fault no, 1, 2, 5 & 8 one by one at a time. Observe their effects on final output and try to locate them.

8. Switch 'Off' the power supply.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Switched Faults
Function Generator
Pulse Output
8KHz
16KHz
32KHz
64KHz
1KHz
2KHz
Pulse In
Mod. Sig In
Sample Output
Sample & Hold Output
Flat Top Output
PPM Output
Modulation Signal Input
Pulse Input
PWM Output
Modulation Signal Input
Input
Output
AMP Input
Output
Input
Output
Head Phone
MIC
0V

Figure 2

Frequently Asked Questions

1.What is the pulse amplitude modulation?

Pulse-amplitude modulation, is a form of signal modulation where the message information is encoded in the amplitude of a series of signal pulses. It is an analog pulse modulation scheme in which the amplitudes of a train of carrier pulses are varied according to the sample value of the message signal.

2.What is a pulse signal?

In signal processing, the term pulse has the following meanings: A rapid, transient change in the amplitude of a signal from a baseline value to a higher or lower value, followed by a rapid return to the baseline value.

3.What is a sample and hold circuit?

In electronics, a sample and hold (S/H, also "follow-and-hold") circuit is an analog device that samples (captures, grabs) the voltage of a continuously varying analog signal and holds (locks, freezes) its value at a constant level for a specified minimum period of time.

4.What is a holding circuit?

The holding circuit interlock is a normally open auxiliary contact on magnetic starters or contactors. Used in three wire control schemes with momentary inputs. It closes when the coil is energized to form a holding circuit for the starter or contactor after the ``Start`` button or input has been released.

5.What is a pulse width modulator?

Pulse width modulation (PWM) is a fancy term for describing a type of digital signal. Pulse width modulation is used in a variety of applications including sophisticated control circuitry. A common way we use them here at SparkFun is to control dimming of RGB LEDs or to control the direction of a servo motor.

6.What is PWM duty cycle?

Electrical motors typically use less than a 100% duty cycle. For example, if a motor runs for one out of 100 seconds, or 1/100 of the time, then, its duty cycle is 1/100, or 1 percent. Pulse-width modulation (PWM) is used in a variety of electronic situations, such as power delivery and voltage regulation.

7.What is PWM fan speed control?

Pulse-width modulation (PWM) is a common method of controlling computer fans. APWM-capable fan is usually connected to a 4-pin connector (pinout: Ground, +12 V, sense, control). ... The control signal is a square wave operating at 25 kHz, with the duty cycle determining the fan speed.

8.What is a fan tachometer?

CPU Cooling Fan Tachometer Standard. The tachometer signal, also known as “tach signal”, and “FG signal”, conveys rpm information in the form of square waves. ... The final tach signal is usually an open collector design that provides a square waveform output to the motherboard.