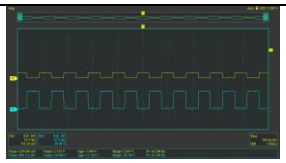
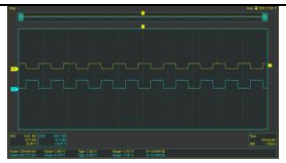
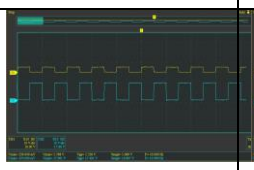
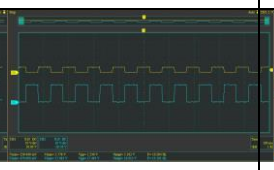
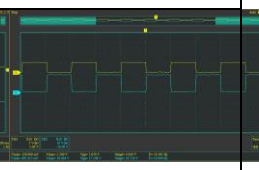
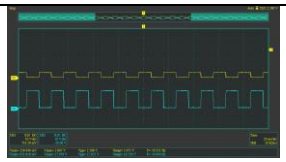
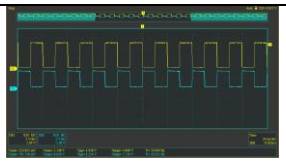
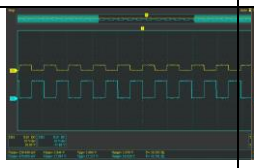
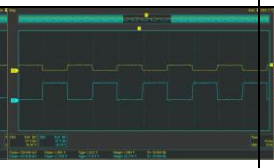
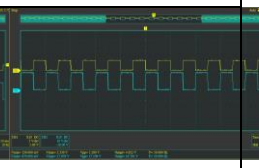
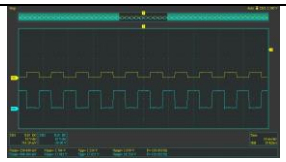
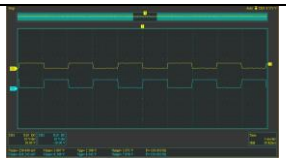
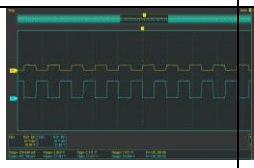
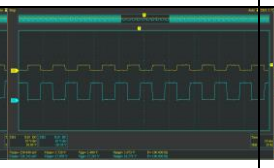
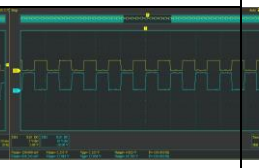
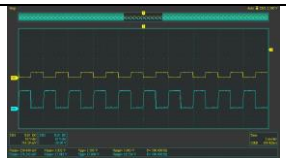
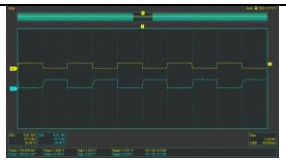
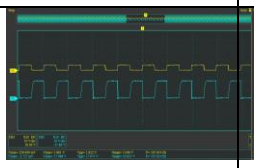
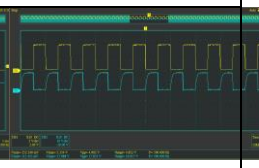
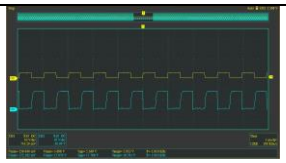
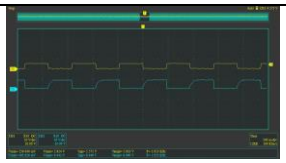
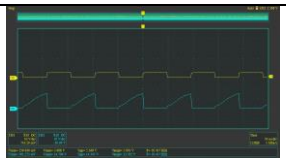
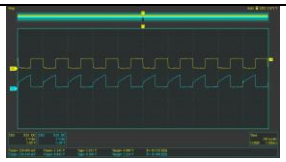
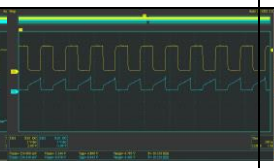
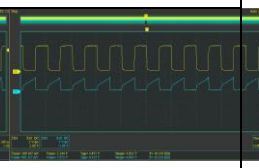
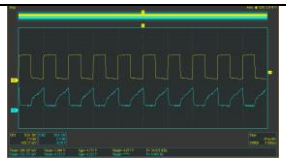
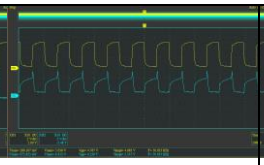
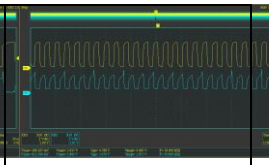
III.2 Simulasi

III.2.1 Pengukuran Bagian Pengirim Menggunakan Berbagai Jenis Transistor

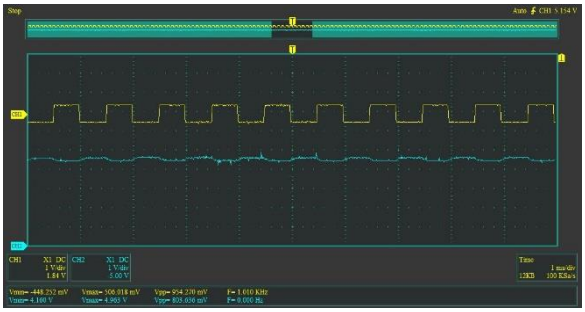
Tabel III.1 Hasil perbandingan pengukuran transistor untuk *switching*

Frekuensi sinyal *Input*	Jenis Transistor				
	TIP41C	IRF840	IRF640	IRF250	IRF150
10 Hz					
50 Hz					
100 Hz					
500 Hz					
1 KHz					
10 KHz					

50 KHz					

III.2.2 Pengukuran Karakteristik Sensor Cahaya (Photodetektor)

Tabel III.2 Hasil pengukuran karakteristik respon photodioda

Frekuensi sinyal *Input*	Jarak	Respon Photodioda
1 KHz	20 cm	
	50 cm	

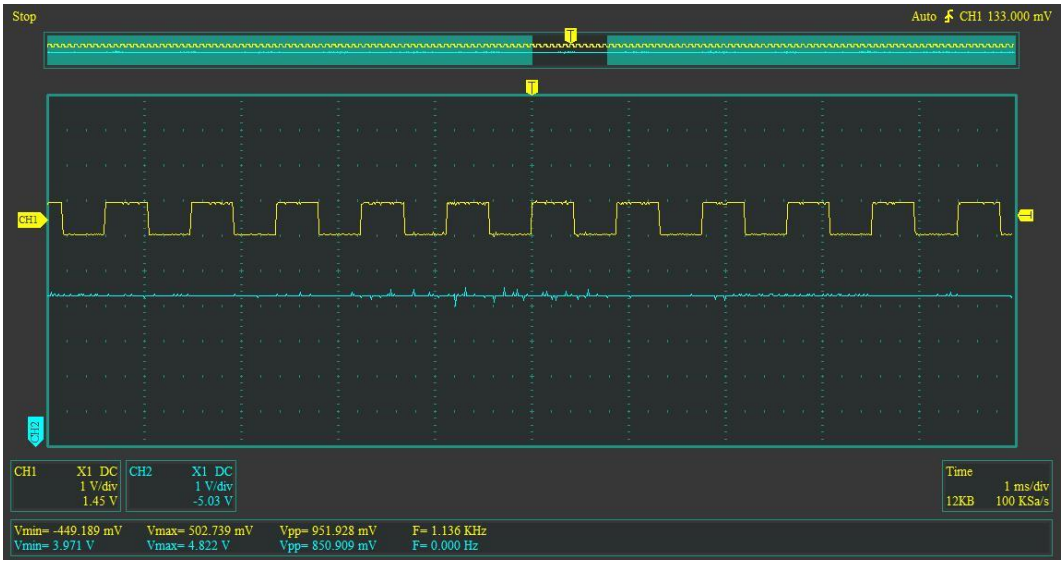
Keterangan: CH1 = Sinyal Masukan

CH2 = Sinyal Keluaran

Dari hasil pengukuran respon photodioda diatas, respon photodioda sudah dapat menerima sinyal dari pengirim. Meskipun hasil respon photodioda sinyalnya tidak menyerupai seperti sinyal *Input* dan respon frekuensi sinyalnya masih belum terbaca. Maka photodioda harus ditambahkan dengan rangkaian penguat menggunakan Op-Amp.

III.2.3 Pengujian Perbandingan Rangkaian Photodioda

Berikut perbandingan sinyal *Output* yang dihasilkan rangkaian pada **Gambar III.6** Skematik Rangkaian photodioda menggunakan Op-Amp 741 dan **Gambar III.7** Skematik Rangkaian photodioda menggunakan Op-Amp OPA137.



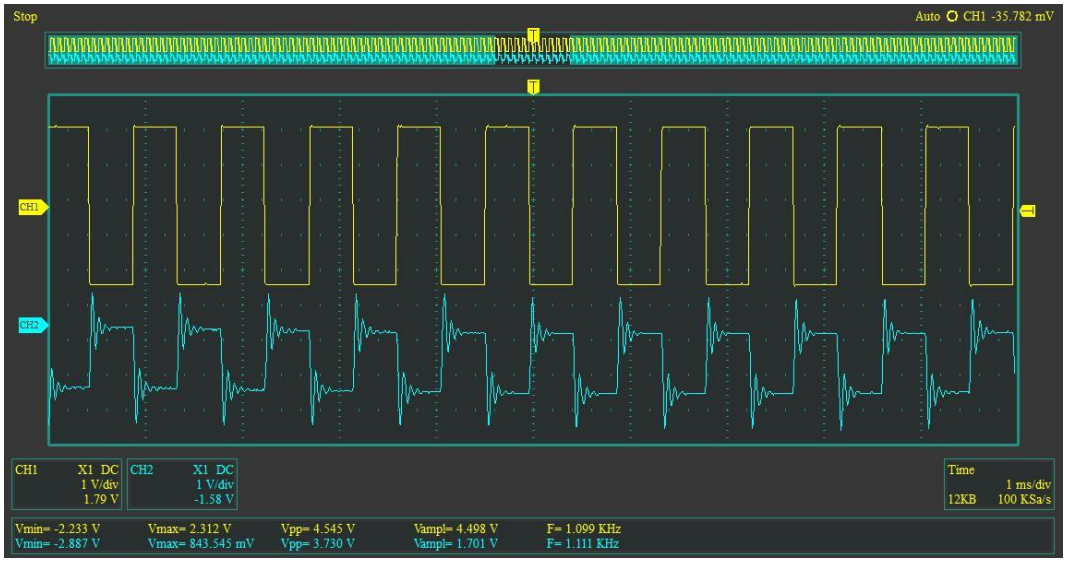
Gambar III.9 Respon rangkaian photodioda menggunakan Op-Amp 741

Keterangan:

CH1 = *input* LED

CH2 = *output* rangkaian photodetektor

Output rangkaian pertama (**Gambar III.6** Skematik Rangkaian photodioda menggunakan Op-Amp 741) sensor tidak dapat menangkap sinyal maupun frekuensi yang dikirimkan oleh LED.



Gambar III.10 Respon rangkaian photodioda menggunakan Op-Amp OPA137

Keterangan:

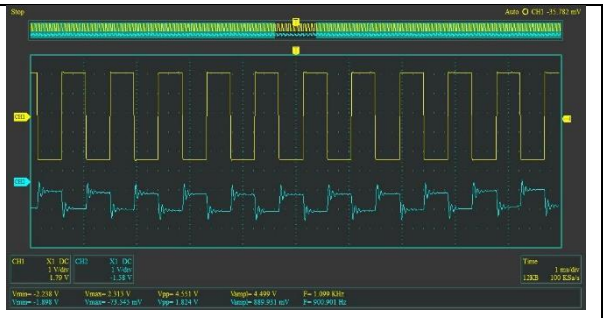
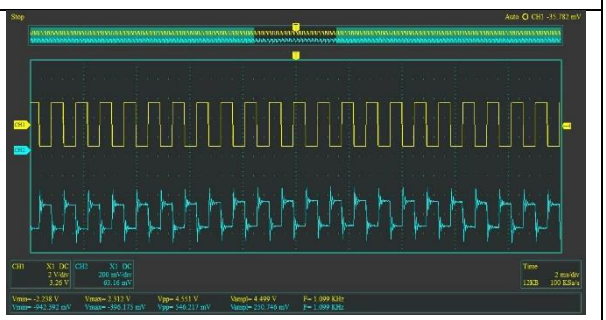
CH1 = *input* LED

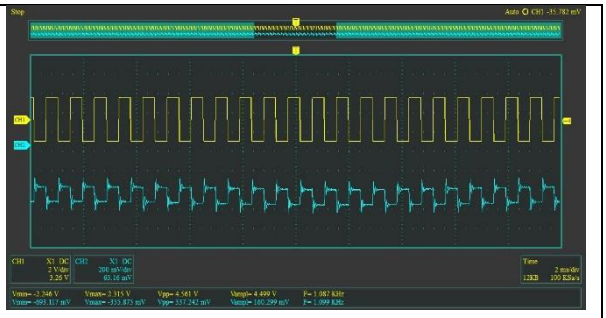
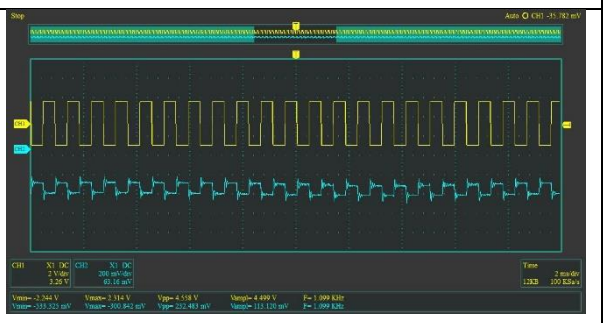
CH2 = *output* rangkaian photodetektor

Pada rangkaian kedua (**Gambar III.7** Skematik Rangkaian photodioda menggunakan Op-Amp OPA137), sinyal dan frekuensi dapat diterima. Namun mendapatkan frekuensi lainnya selain frekuensi yang dikirimkan oleh LED, maka rangkaian perlu ditambahkan filter.

Tabel III.3 Hasil pengukuran respon rangkaian photodioda menggunakan Op-Amp OPA137

Frekuensi sinyal *Input*	Jarak (cm)	Respon Photodioda
1 KHz	48	

	90	
	120	
	150	
	180	

	210	
	240	
	270	
	300