

**RETICON®**

# Application Note #127

## Clock Drivers for P-series Linear Photodiode Array Imagers



### Description

For driving P-series linear CCD sensors, PerkinElmer recommends the following drivers. Each driver has conditions listed with it; consult the appropriate driver datasheet for more specific information regarding use and specifications.

**Table 1. Driver Matrix**

	$\emptyset_{TG}$	$\emptyset_{PG}$	$\emptyset_{AB}$	$\emptyset_{H1}$	$\emptyset_{H2}$	$\emptyset_{RG}$
14 $\mu$ m 1 output	Vishay Microchip	Vishay Microchip	Vishay Microchip	Pericom Intersil	Pericom Intersil	Intersil Philips <sup>1</sup>

Note 1. When driving the 14 $\mu$ m 1 output sensor's  $\emptyset_{RG}$  at a 40MHz 25% duty clock cycle, use the Philips driver only.

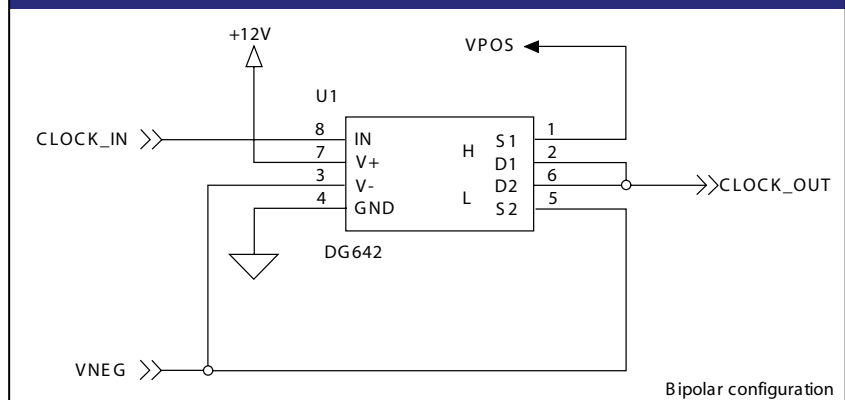


## Driver Application Note

### Vishay Driver Configuration

The Vishay driver is based on an analog switch (Vishay DG642). It provides bipolar clock outputs (i.e. -5V to 5V) up to 10 MHz at a 50% duty cycle clock. It is to be used on  $\emptyset_{TG}$ ,  $\emptyset_{PG}$ , and  $\emptyset_{AB}$ . Unipolar clock outputs (0V to 5V) are possible if Vneg is set to GROUND. This driver will use fewer components and less board space than the Microchip, but will be more expensive. The CLOCK\_IN is TTL. See Figure 1 for configuration.

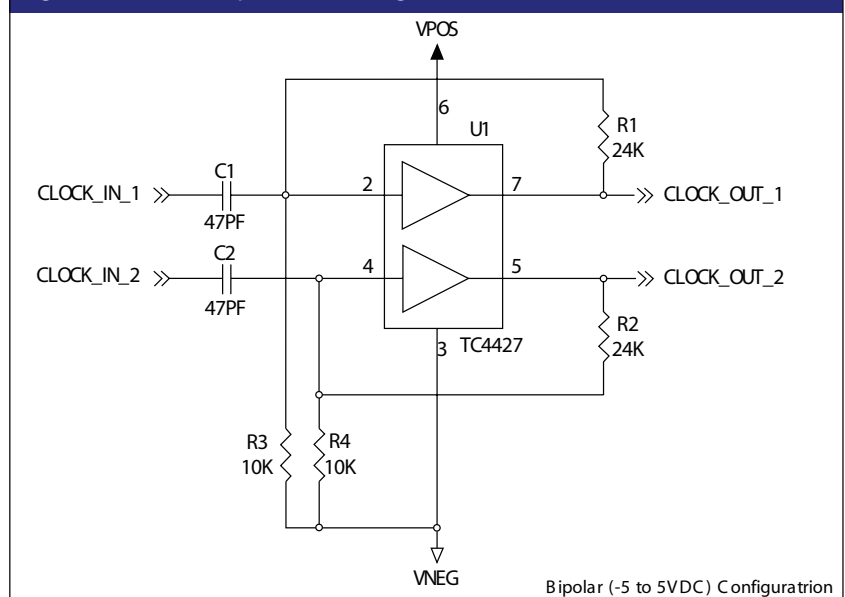
Figure 1. Vishay Driver Configuration



### Microchip Driver Configuration

This Microchip driver is based on a MOSFET driver (Microchip TC4427). It provides bipolar clock outputs (i.e. -5V to 5V) up to 10 MHz at a 50% duty cycle clock. It is to be used on  $\emptyset_{TG}$ ,  $\emptyset_{PG}$ , and  $\emptyset_{AB}$ . Unipolar clock outputs (0V to 5V) are possible if Vneg is set to GROUND. This driver will use more components and board space than the Vishay, but will be less costly. In unipolar configuration with TTL inputs, C1-C2 and R1-R4 are not needed. R1-R4 are selected for -5 to +5VDC output clocks. The CLOCK\_IN\_n is TTL. See Figure 2 for configuration.

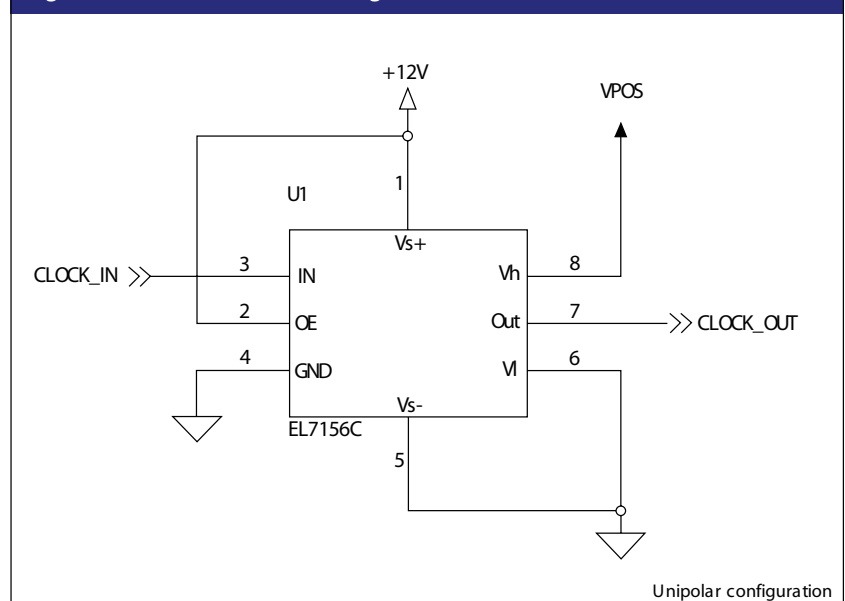
Figure 2. Microchip Driver Configuration



### Intersil Driver Configuration

This driver is based on an Intersil CCD driver (EL7156). It will provide unipolar clock outputs up to a 40 MHz 50% duty cycle clock. It is used in  $\emptyset_{H1}$ ,  $\emptyset_{H2}$ , and  $\emptyset_{RG}$ . Bipolar circuit configurations are also possible. The CLOCK\_IN is TTL. See Figure 3 for configuration.

Figure 3. Intersil Driver Configuration

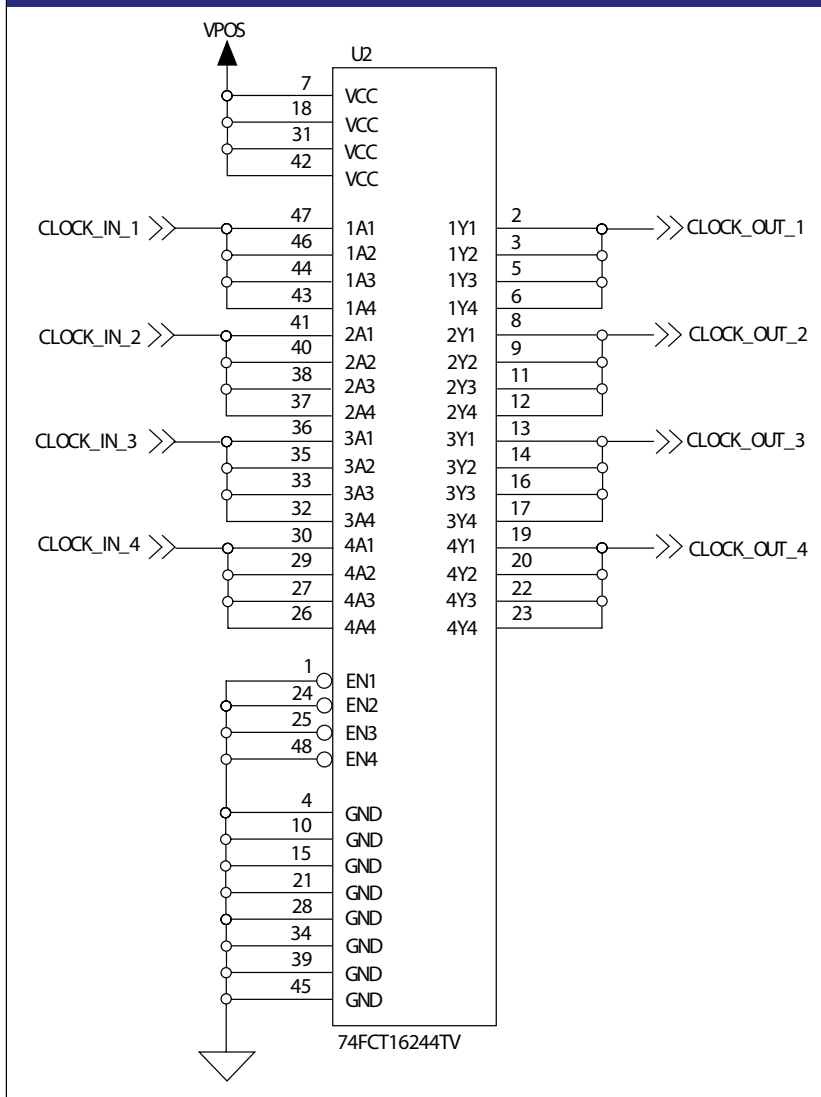


# Driver Application Note

## Pericom Driver Configuration

This driver is based on a Pericom TTL logic buffer (PI74FCT16244). It will provide unipolar clock outputs up to a 40MHz 50% duty clock cycle. It is used for  $\emptyset_{H1}$ ,  $\emptyset_{H2}$ , and  $\emptyset_{RG}$ . Bipolar circuit configurations are not possible with this driver. Vpos is limited to 4.5V to 5.5V. The configuration shown uses parallel outputs to increase current drive capacity. Four parallel buffers will drive an 2048 pixel sensor at 40MHz. The CLOCK\_IN\_n is TTL. See Figure 4 for configuration.

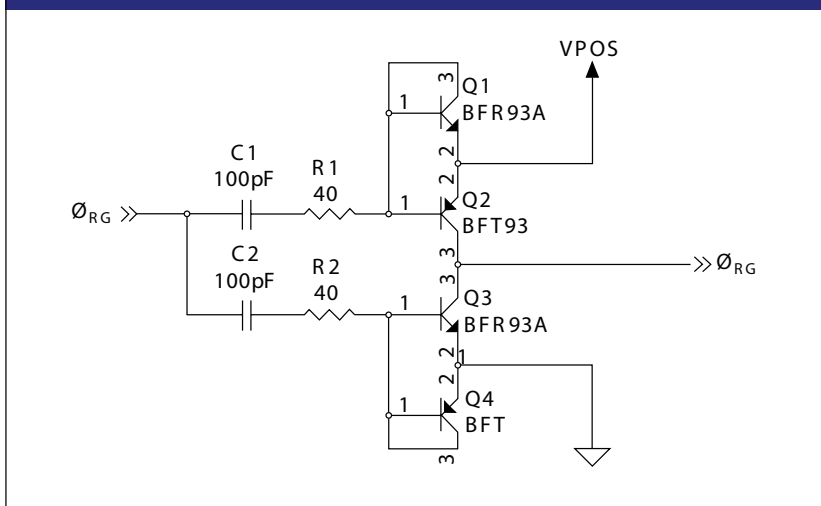
Figure 4. Pericom Driver Configuraiton



## Philips Semiconductor Driver Configuration

This driver is based on a matched pair of Philips Semiconductor RF transistors. This driver is to be used exclusively when driving  $\emptyset_{RG}$  at 40 MHz. The circuit shown is a "push-pull" transistor configuration. Other RF switching transistors are possible. Q1 and Q4 can be replaced with diodes.  $\emptyset_{RG}$  is TTL. See Figure 5 for configuration.

Figure 5. Philips Semiconductor Driver Configuration



## Driver Application Note

### ESD Warning

While P-series imagers have been designed to resist electrostatic damage (ESD), they can be damaged from such discharges. Always observe proper ESD precautions when handling and storing these imagers.

Table 2. Web Links for Data Sheets

Intersil	<a href="http://www.intersil.com">http://www.intersil.com</a>
Philips	<a href="http://www.semiconductors.philips.com">http://www.semiconductors.philips.com</a>
Pericom	<a href="http://www.pericom.com">http://www.pericom.com</a>
Microchip	<a href="http://www.microchip.com">http://www.microchip.com</a>
Vishay	<a href="http://www.Vishay.com">http://www.Vishay.com</a>

### Trace Length

All drivers should be located no more than a 1 inch trace from the sensor pin. Additionally, it is recommended that faster drivers be located closer to the sensor than slower drivers. Traces should always be as short as possible.

For more information e-mail us at [opto@perkinelmer.com](mailto:opto@perkinelmer.com) or visit our web site at [www.perkinelmer.com/opto](http://www.perkinelmer.com/opto). All values are nominal; specifications subject to change without notice.

While the information provided in this application note is intended to describe the form, fit, and function of this product, PerkinElmer reserves the right to make changes without notice. Additionally, users are cautioned to always verify the function and operation of these drivers with the manufacturer before use.

Table 3. Sales Offices

	<b>North America</b>
United States	PerkinElmer Optoelectronics 2175 Mission College Blvd. Santa Clara, CA 95054 Toll Free: 800-775-OPTO (6786) Phone: +1-408-565-0830 Fax: +1-408-565-0703
	<b>Europe</b>
Germany	PerkinElmer Optoelectronics GmbH Wenzel-Jaksch-Str. 31 D-65199 Wiesbaden, Germany Phone: +49-611-492-570 Fax: +49-611-492-165
	<b>Asia</b>
Japan	PerkinElmer Optoelectronics NEopt. 18F, Parale Mitsui Building 8 Higashida-Cho, Kawasaki-Ku Kawasaki-Shi, Kanagawa-Ken 210-0005 Japan Phone: +81-44-200-9170 Fax: +81-44-200-9160 <a href="http://www.neopt.co.jp">www.neopt.co.jp</a>
Singapore	47 Ayer Rajah Crescent #06-12 Singapore 139947 Phone: +65-770-4925 Fax: +65-777-1008

