

## Balanced Line Receiver for Digital Signal Over Twisted Pair CAT-5 Cable

The circuit presented here is a high-frequency differential line receiver amplifier that has excellent common-mode rejection at its inputs. The project is an ideal solution for a receiver of a digital signal or video signals that are transmitted over long distances on twisted-pair cables like CAT5. Category 5 cables are very common in office settings and are extensively used for data transmission. These cables can also be used for the digital signal or analog transmission of signals such as video. These long cables pick up noise from the environment they pass through. This noise does not favor one conductor over another and therefore is a common-mode signal. A receiver that rejects the common-mode signal on the cable can greatly enhance the signal-to-noise ratio performance of the link. This project is tested with 100Hz to 1Mhz square wave signal, however, it can support higher frequency.

This board converts differential Video/Digital signals into single-ended signals and can be paired with Single-ended Video/Digital input to differential output driver (High Speed Differential Driver) project published on our website.

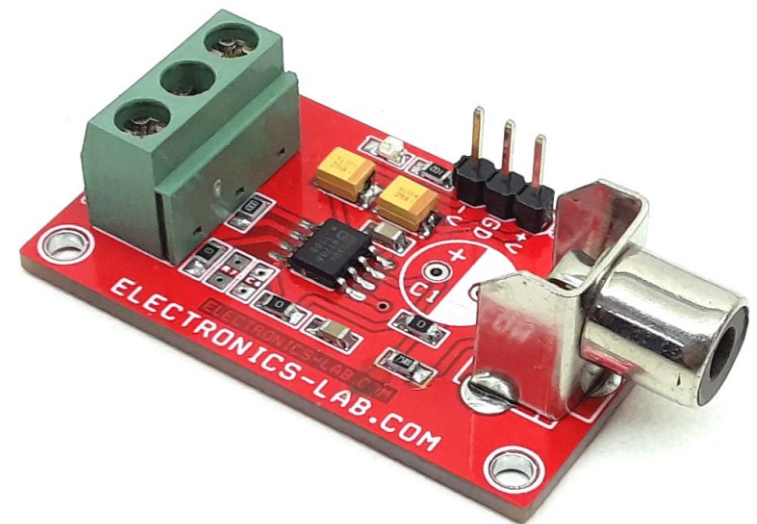
<https://www.electronics-lab.com/project/single-ended-video-digital-input-to-differential-output-driver-high-speed-differential-driver/>

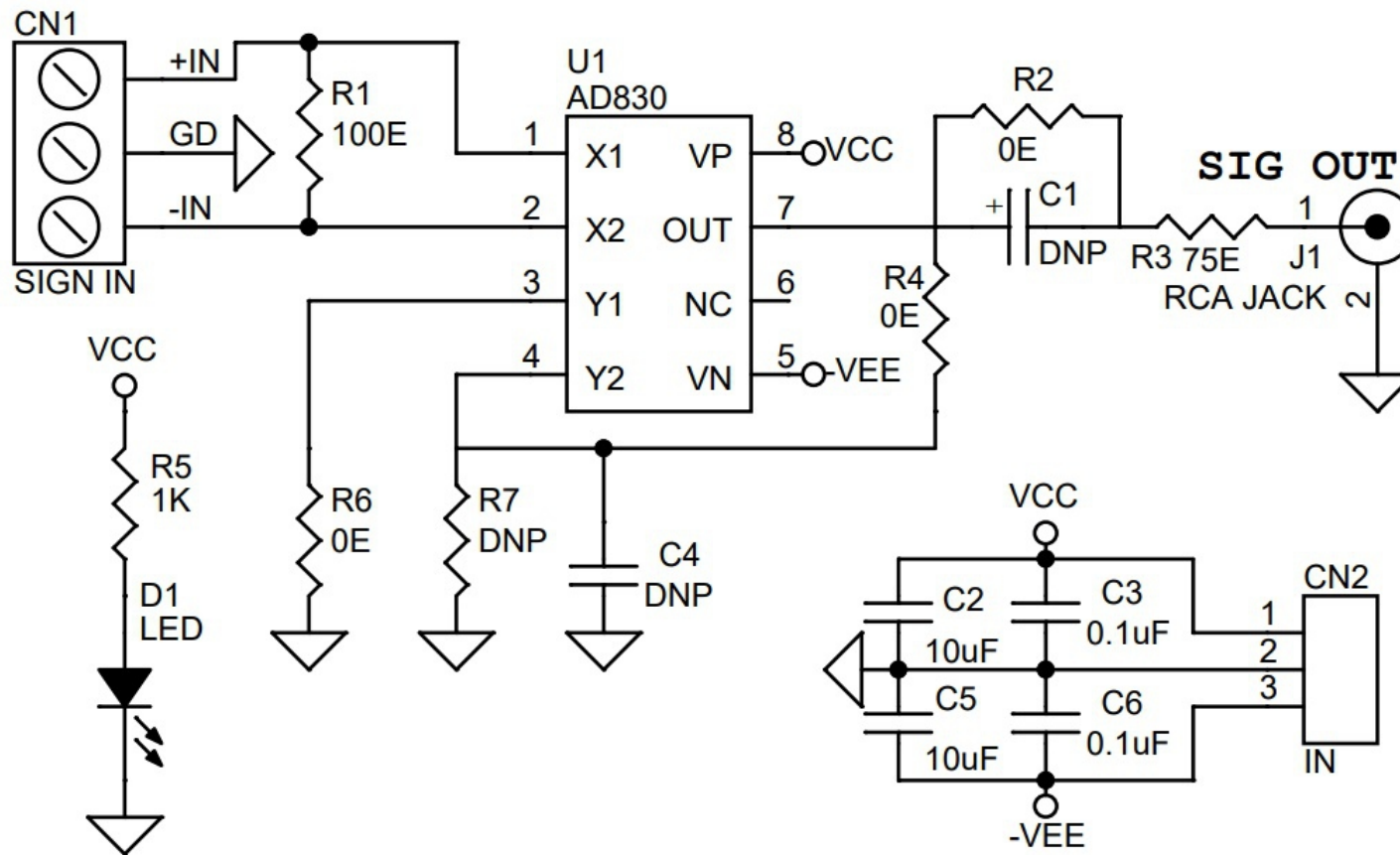
**Note:** Note: The above Transmitter (Line Driver) is compatible with this line receiver, but one change is required, replace C5 with a direct jumper for digital input, since it was initially designed for video input.

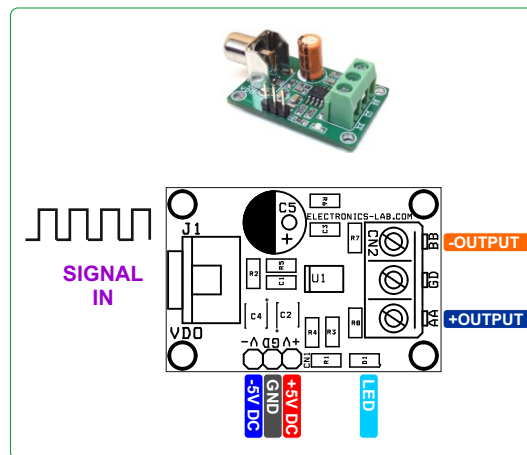
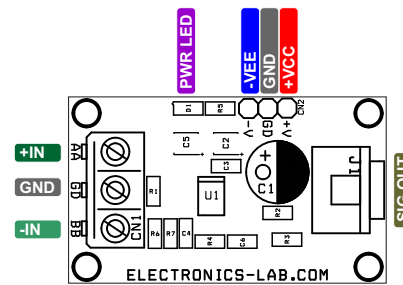
Transmitter and receiver work in tandem to convert a digital signal or Composite Video signal to a differential signal and extend it over a single CAT-5 cable pair. Line driver and line receiver projects can be used to transmit and receive digital signals over 300 meters of category 5 (CAT-5) cable. The cable has an attenuation of approximately 20dB at 10Mhz for 300 meters.

### Features

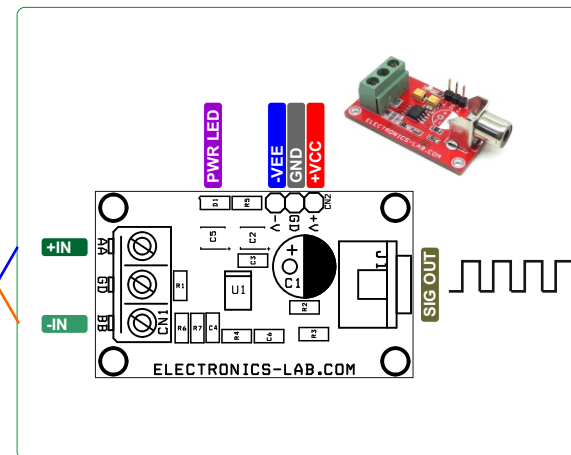
- Operating Supply Dual +5V/-5V (+/-5V) @ 80mA
- Input and Output Voltage Level 500mV to TTL
- Compact Solution for Digital Signal Transmitter and Receiver over CAT-5 Twisted Cable
- Screw Terminal for Twisted Pair CAT-5 Cable
- RCA Connector for Digital Signal Outputs
- Header Connector For +5V/-5V Supply input
- Onboard Power LED
- PCB Dimensions 42.39MM X 25.24MM

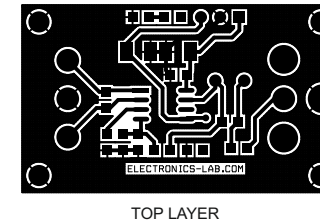
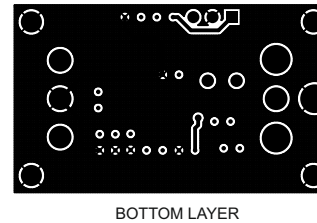
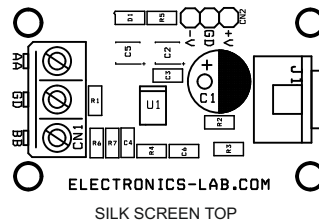






CAT5 TWISTED PAIR CABLE





PCB DIMENSIONS 42.39MM X 25.24MM

| BOM |      |          |                                    |              |          |                  |
|-----|------|----------|------------------------------------|--------------|----------|------------------|
| NO  | QNTY | REF      | DESC                               | MANUFACTURER | SUPPLIER | SUPPLIER PART NO |
| 1   | 1    | CN1      | 3 PIN SCREW TERMINAL PITCH 5.08MM  | PHOENIX      | DIGIKEY  | 277-1248-ND      |
| 2   | 1    | CN2      | 3 PIN MALE HEADER PITCH 2.54MM     | WURTH        | DIGIKEY  | 732-5316-ND      |
| 3   | 3    | C1,C4,R7 | DNP                                |              |          |                  |
| 4   | 2    | C2,C5    | 10uF/16V TANTLUM SIZE 1210 OR 1206 | KEMET        | DIGIKEY  | 399-18017-1-ND   |
| 5   | 2    | C3,C6    | 0.1uF/50V SMD SIZE 0805            | MURATA/YAGEO | DIGIKEY  |                  |
| 6   | 1    | D1       | LED RED SMD SIZE 0805              | LITE ON      | DIGIKEY  | 160-1427-1-ND    |
| 7   | 1    | J1       | RCA JACK                           | CUI DEVICE   | DIGIKEY  | CP-1405-ND       |
| 8   | 1    | R1       | 100E 5% SMD SIZE 0805              | MURATA/YAGEO | DIGIKEY  |                  |
| 9   | 3    | R2,R4,R6 | 0E SMD SIZE 0805                   | MURATA/YAGEO | DIGIKEY  |                  |
| 10  | 1    | R3       | 75E 1% SMD SIZE 0805               | MURATA/YAGEO | DIGIKEY  |                  |
| 11  | 1    | R5       | 1K 5% SMD SIZE 0805                | MURATA/YAGEO | DIGIKEY  |                  |
| 12  | 1    | U1       | AD830                              | ANALOG       | DIGIKEY  | AD830ARZ-ND      |