

Order Code 3176 - RF Data Link Receiver – Parallel Output

This kit is one in a series of four kits that implement an RF data link. The kits in the series are:

1. 3173 – Serial Input transmitter
2. 3174 - Serial Output receiver
3. 3175 - Parallel Input transmitter
4. 3176 - Parallel Output receiver

Each receiver has a 4-bit address set by an onboard 4-way DIP switch. This allows a total of 16 receivers to be used in a ‘network’ with each one being uniquely addressable.

The RF modules operate at 433.92MHz and use “amplitude modulation” to transmit data. This transmission method, also known as ‘On-Off Keying (OOK)’, transmits data by simply switching the carrier signal on and off. They are produced by ‘WenShing’ of Taiwan – datasheets can be downloaded from their website at “www.wenshing.com.tw”.

Each kit contains an Atmel 89C2051 microcontroller that handles all I/O as well as encoding and decoding the data.

OVERVIEW

3176 will receive any messages sent by 3173 or 3175 and output the data via its parallel port. The pinout of the output connector is the same as a PC printer port, allowing direct connection to a printer. Optional features are included to control a Centronics type printer.

TECHNICAL MANUAL

A PDF document detailing the technical features and operating guidelines of this and the other 3 kits is available for download from:

www.quasarelectronics.com/pdf/rfdatalinktechmanual.pdf

You will need to download and read this document to be able to use all the features and options of these kits in your own application.

QUICK START – HOW TO USE THIS KIT

We will now show you how easy it is to use these kits. We will combine 3074 (PC Printer Port Relay Board) with 3175 and 3176 to create a remote wireless connection to a PC.

3074 is a kit designed to be plugged into the PC’s printer port. It has 8 onboard relays. When connected to a PC each relay is controlled by one bit of the output byte from the printer port. Bit high = relay ON; bit low = relay OFF.

Normally 3074 is connected to the PC using a parallel cable. This limits the distance of the kit from the PC to a few metres. Using 3175 and 3176 we can extend that distance to around 100m (300ft) and it’s all done without wires!

Before using 3175 and 3176, let’s make sure the ‘normal’ connection is working. Connect 3074 to the PC’s parallel port and connect 12VDC to the kit.

Now go to “www.beyond-designs.com/PC_ports.htm” and download ‘VBPortTest’, a freeware Windows program that allows you to set parallel port bits directly from your screen. Install the software and run it. Make sure the correct LPT

port is selected and the I/O mode is set to “Bit (Output on LED Click only)”.

Click on one of the one of the LEDs on the top line and the corresponding relay and LED should operate on the 3074.

If this works you can now replace the ‘wired’ connection with the 3175/3176 combination.

Set the switches and jumpers on 3175/3176 as follows:

3175		3176	
SW1:1	ON	SW1:1	ON
SW1:2	OFF	SW1:4	OFF
SW1:3	OFF	SW1:3	OFF
SW1:4	OFF	SW1:4	OFF
J1		SW2	DIS

Disconnect 3074 from the PC and connect it to 3176. Connect 3175 to the PC’s parallel port. You will need to power both 3175 and 3176 with a suitable DC supply - regulated 12Vdc centre positive (Order Code PSU445).

Now click on the LEDs as before and you should see the relays operate just as before except now it is coming in via the wireless connection! You can experiment with the range by simply picking up the 3074/3176 combination and moving it away from the PC.

SWITCH SETTINGS

A number of operating features are set by the 4-way DIP switch SW1 and slide switch SW2. Full details available in the technical manual.

SW1:1 - SW1:4 Receiver address

Sets the address of the receiver. The address is 4-bits wide meaning that up to 16 receivers can be used together, each with their own unique address. The kit will respond to any messages containing a matching address.

Note: It is possible for a message to contain no address. This is known as a ‘broadcast’ message and all receivers will respond to it. For details refer to the ‘RF Data Link Protocol’ document mentioned previously.

SW2 Busy Signal Enable/Disable

Used when connected to a Centronics printer. Disabling BUSY blocks the BUSY signal from the printer and forces output. Should be enabled normally.

A note about IC3 (octal inverter/buffer)

IC3 is included so that the normal ‘power up’ state of the output pins is low. It was needed because the ‘power up’ state of the outputs from IC1 is high so, for example, when this kit is used with 3074 ALL the relays would operate on power up – not good. IC3 inverts the IC1 outputs and prevents that.

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IC3 is also a buffer so it provides extra output drive for use with cables. The maximum cable length used should be the same as for PCs.

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KIT ASSEMBLY

It is recommended that components be inserted and soldered in the following order, using the component overlay on the PCB as a guide.

1. All the resistors and diodes. Make sure diodes are right way around. R3 fits inside the IC1 socket so make sure it sits down flat and straight.
2. IC sockets
3. Capacitors C1,4,5
4. Resistor network RP1. There is a small dot at one end, this end towards D1
5. 5V regulator IC2
6. LED. The flat spot on the body lines up with the 'line' on the component overlay
7. DIP and slide switches
8. Electrolytic capacitors C2,3. These are polarized – the negative lead is indicated on the capacitor but the PCB indicates the '+' lead.
9. Ceramic resonator Y1
10. RF transmitter module
11. D25 connector and DC jack

A length of wire is supplied for the antenna. This needs to be trimmed to a length of **17.3cm** (1/4 wavelength). Strip one end and solder into the ANT hole on the PCB.

Before inserting any ICs in their sockets we need to check the 5V supply. Power up the kit using a suitable DC power supply eg. 12V and measure the voltage on pins 10 and 20 of the IC1 socket (positive on pin 20). Should be approximately 5 volts.

If OK then remove power and insert the ICs.

TROUBLESHOOTING

Most faults are due to assembly or soldering errors. Verify that you have the right components in the right place.

Inspect your work carefully under a bright light. The solder joints should have a 'shiny' look about them. Check that there are no solder bridges between adjacent pads.

Check that no IC pins are bent up under the body of the IC. This can sometimes happen when inserting ICs into sockets.

CONTACT DETAILS

See our full range online at <http://www.quasarelectronics.com>
Kit support - mailto: support@quasarelectronics.com

PARTS LIST – 3176

Resistors (0.25W carbon film unless specified)

1K8.....	R2.....	1
8K2.....	R1.....	1
10K.....	R3.....	1
10K resistor network.....	RP1.....	1
SIL, 9 resistors, 10 pins		

Capacitors

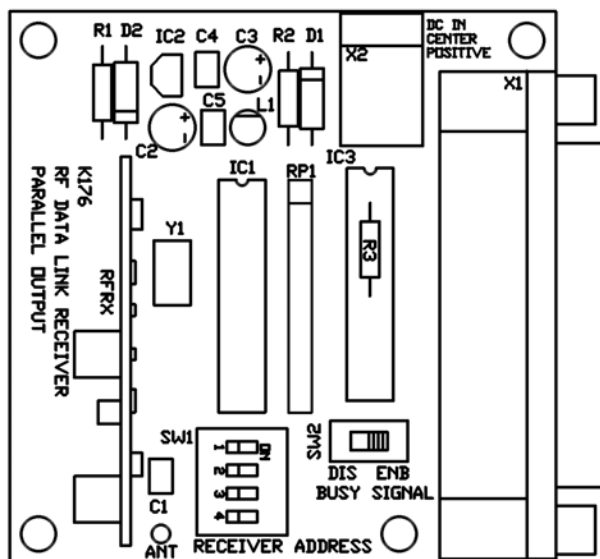
100nF mono, 0.1".....	C1,4,5.....	3
10uF 16V electrolytic.....	C2.....	1
100uF 25V electrolytic.....	C3.....	1

Semiconductors

1N4004.....	D1.....	1
1N4148.....	D2.....	1
LED, red, 3mm.....	L1.....	1
AT89C2051 micro.....	IC1.....	1
(programmed)		
78L05, 5V regulator.....	IC2.....	1
74HC540.....	IC3.....	1
octal inverter/buffer		

Miscellaneous

Ceramic resonator, 3 pin ..	Y1.....	1
11.0592MHz		
DIP switch, 4 way	SW1.....	1
Slide switch, SPDT	SW2.....	1
D25 connector, female	X1.....	1
right angle, PCB mtg		
DC jack, 2.5mm	X2.....	1
RF transmitter module.....	RFRX	1
433.92MHz, 'Wenshing' RWS-371-6		
IC socket, 20 pin, for IC1,2.....		2
Hookup wire for antenna, 20cm.....		1
3176 PCB		1



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