Corinex Phase Couplers

In a number of countries the electrical service is provided into homes with two feeds of opposing phases. These two phases are distributed throughout the home to each electrical outlet. For electrical distribution, this dual phase design is seamless - an electrical device works just as well on Phase 1 or Phase 2. However, for the distribution of ethernet over Powerline, these two phases can cause some difficulties in getting a full Powerline signal and the maximum bandwidth to all outlets. A Powerline signal that is injected onto one phase of a dual phase home will have difficulty transmitting to a Powerline adapter connected to the second phase.

The solution to this problem is to "couple" the two phases to ensure that the full Powerline signal is available on all electrical outlets in the home – regardless of whether they are Phase 1 or Phase 2. There are several ways of coupling the phases and Corinex provides simple, consumer friendly solutions to do so. Although the signal from Corinex AV200 units is from 2 MHz to 34 MHz, Corinex also couples signals in the 100 KHz to 200 KHz range to allow for "narrowband" Powerline signals that are sometimes used to control powered devices throughout the home.

Several electrical outlets in the home can provide an opportunity to couple the two phases and the Corinex phase couplers are designed to take advantage of this. In some regions, the two phases are combined on one outlet in the Kitchen. In most regions, the two phases are 110 Volts AC and are combined on some electrical outlets for 220 / 240 Volts AC for appliances such as clothes dryers.

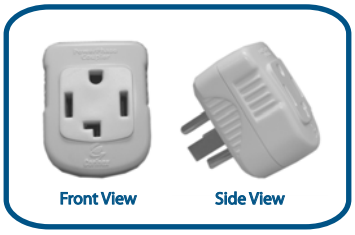
Corinex Product Solutions

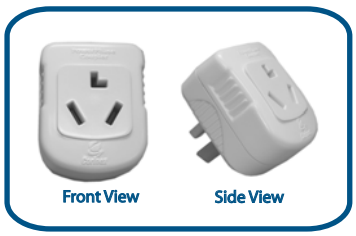
The Corinex PowerPhase Coupler D - 220V coupler is plugged into the 220VAC outlet typically used by electric clothes dryers. The coupler provides an LED indication that lights when the two phases are successfully coupled. The appliance then plugs into the coupler. This device couples the two electrical phases and provides a path for the full Powerline spectrum. There are two couplers available – 3 Pin or 4 Pin – to match the outlet in the home.

Important: The Corinex Coupler is not suitable for electric ovens.

Product Specification

Corinex PowerPhase Coupler D – 220V
Part Number: CXA-CXP-PH2 –D3 (3 Pin)
Part Number: CXA-CXP-PH2 –D4 (4 Pin)





Plug Type	220 Volt AC - 3 OR 4 PIN
Dimensions	2.75"x3.55"x 3.35"
Weight	0.40lb 3 pins 0.45lb 4 pins
Phases coupled	2
Maximum current	30 amps
LED confirmation of coupling	yes
Frequency range coupled	2 MHz to 35 MHz 100 KHz to 200 KHz

The Corinex PowerPhase Coupler K - 110V coupler is plugged into the 110VAC outlet typically found in the Kitchen. The coupler provides an LED indication that lights when the two phases are successfully coupled. The Corinex coupler extends the two electrical outlets so that they remain available to be used. This device couples the two electrical phases and provides a path for the full Powerline spectrum.

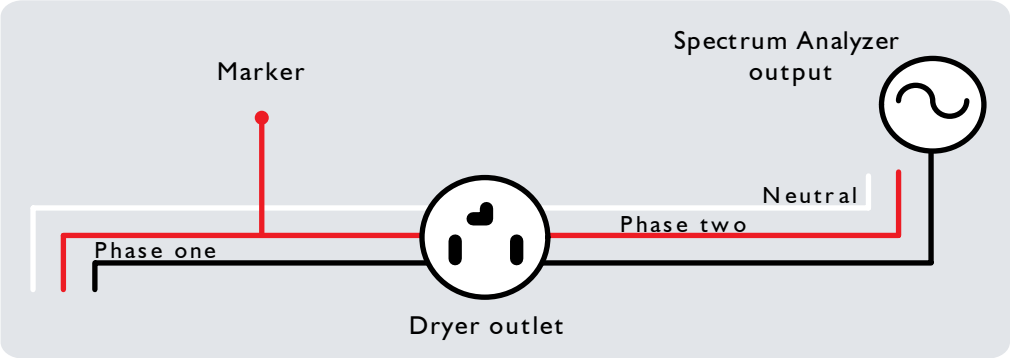
Product Specification

Corinex PowerPhase Coupler K – 110V
Part Number: CXA-CXP-PH2

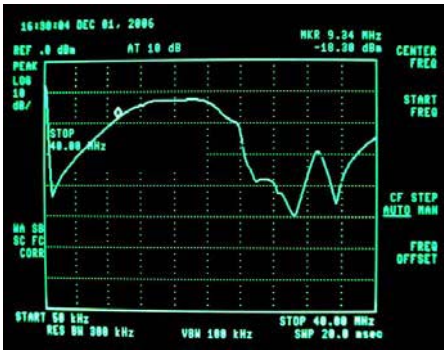
Plug Type	110 Volt AC Outlet
Dimensions	2.68"x2.36"x 4.33"
Weight	0.35lb
Phases coupled	2
Maximum current	10 amps
LED confirmation of coupling	yes
Frequency range coupled	2 MHz to 35 MHz 100 KHz to 200 KHz

Performance increase with the use of Corinex PowerPhase Couplers

With the Corinex PowerPhase Couplers, Powerline performance can be increased dramatically. Two tests were run, one test without a coupler and one test with a Corinex PowerPhase Coupler. In the tests, a "marker" signal was injected on Phase 2 and the signal was measured with a Spectrum Analyzer on Phase 1. The following diagram shows the test setup used to illustrate the performance improvements:

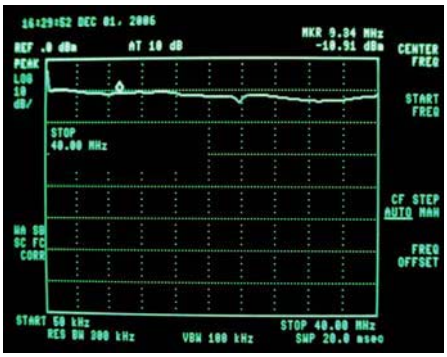


Test One: No coupler



Results of Test One: The screen shows the measurement on the Spectrum Analyzer. The frequency sweep is from 50 KHz to 40 MHz. A marker set at 9 Mhz that shows a signal strength of -18.3 dBm with the signal demonstrating poor frequency response.

Test Two: Corinex PowerPhase Coupler



Results of Test Two: The screen shows the measurement on the Spectrum Analyzer. The frequency sweep is from 50 KHz to 40 MHz. A marker set at 9 Mhz that shows a signal strength of -10.9 dBm with the signal demonstrating nearly flat frequency response through the coupler.

Conclusion

The Corinex PowerPhase coupler greatly improves low frequency coupling and provides frequency independant coupling. At 9 MHz the measured gain using the Corinex PowerPhase coupler is 7.4 dB. From the Spectrum Analyzer graphs above, the estimated gain at 30MHz is 30 dB. In conclusion the Corinex coupler will provide significantly enhanced connection capability for the Powerline signals!

Summary of Coupler Testing			
	Frequency Sweep	Marker (Phase 1)	Signal (Phase 2)
Without Coupling	50 KHz to 40 Mhz	9 Mhz	-18.3 dBm
With Corinex PowerPhase Coupler	50 KHz to 40 Mhz	9 Mhz	-10.9 dBm
		Improvement	7.4 dBm

Corinex

Corinex Communications Corp.
#601 - 905 West Pender Street
Vancouver, BC
Canada V6C 1L6
Tel: 604 - 692 0520
Fax: 604 - 694 0061
http://www.corinex.com

Corinex Communications, a.s.
Ambrova 6
821 01 Bratislava 37
Slovak Republic
Tel.: +421 2 5921 2000
Fax: +421 2 5921 2222
http://www.corinex.eu

2007-10-30