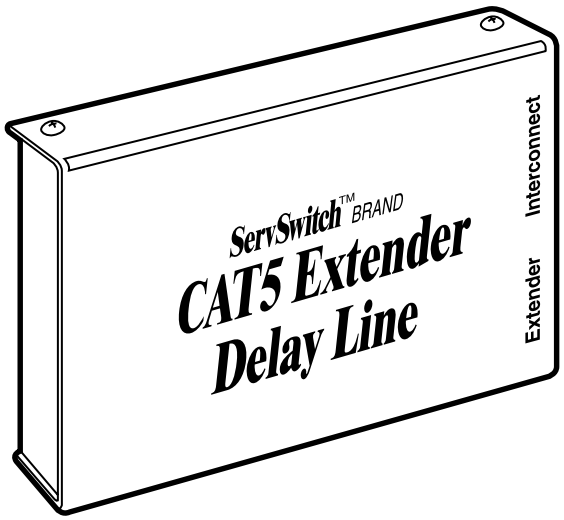
BLACK BOX®
NETWORK SERVICES

SERVSWITCH CAT5 EXTENDER DELAY LINE MODULE



Use CAT5e or CAT6 cable with our CAT5 KVM extenders.

Key Features

- ***Use newer UTP cable with more than 25 of our ServSwitch Brand CAT5 KVM Extenders.***
- ***Eliminates delay skew, which causes blurry on-screen images and color fringing.***
- ***User-selectable switches enable you to adjust RGB cable channels. All video signal components arrive simultaneously at the monitor.***
- ***Simple to set up.***

The ServSwitch Brand CAT5 Extender Delay Line Module can help you overcome one of the common problems associated with video-distance extension over twisted-pair cable. The majority of CAT5 KVM extenders use three of the pairs in Category 5 cable to separately send the red, green, and blue (RGB) components of the video signal. It has often been impossible to use such extenders with some of the newer CAT5e or CAT6 cables, and even some CAT5 cables. This is because the different twist ratios of the three wire pairs cause the pairs to differ significantly in total end-to-end length, which makes the RGB components of each pixel "spread out" (the components arrive at the monitor at different times). This effect, known as "delay skew," causes visual effects such as smearing and color fringing.

When you install the Delay Line Module in series with your CAT5, CAT5e, or CAT6 cable, it can correct many skew problems by adding user-selectable (but imperceptible) delays to the "faster" color signals, ensuring that all RGB components arrive at the monitor simultaneously.

To install the Delay Line Module, unplug one end of the main twisted-pair cable that runs between your extender's transmitter and receiver units and plug it into the module's RJ-45 connector marked "Interconnect." Then run the included patch cable from the module's RJ-45 connector marked "Extender" to the RJ-45 connector on the extender unit from which you unplugged the main cable.

You can place the Delay Line Module at either end of the main cable. However, you will probably find it easier to make adjustments to your video-extension system if you place the module next to your extender's remote unit.

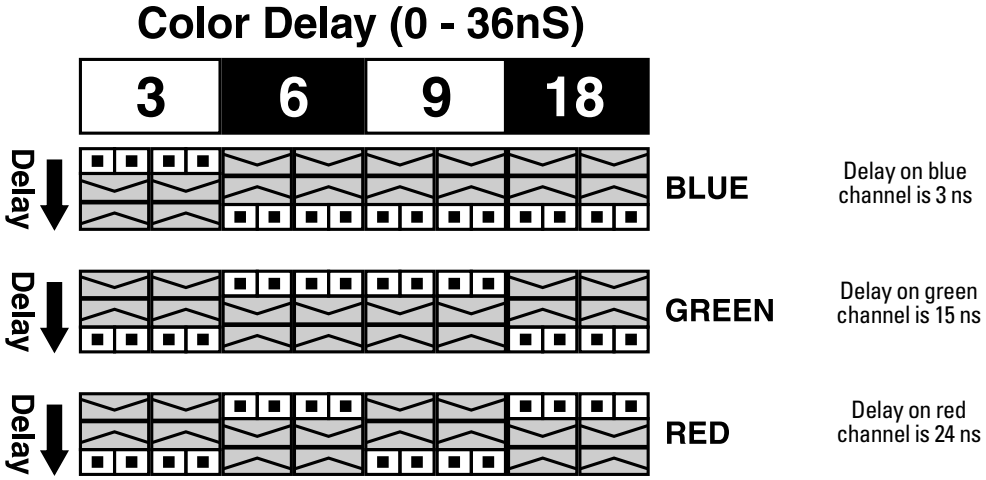
The Delay Line Module comes with a 3-ft. (0.9-m) CAT5 twisted-pair patch cable.

Technically Speaking

You can use the three sets of switches on the bottom of the ServSwitch Brand CAT5 Extender Delay Line Module to set a delay that will be imposed on one or two of the three color signals, forcing them all to arrive at the same time. (By default, no delay is imposed on any color.) Using each set of switches, you can set a delay for the corresponding color between 0 and 36 ns (in any 3-ns increment).

Each set of switches has four delay sections (3, 6, 9, and 18 ns) that add together to form the required delay. To obtain an acceptable image, simply adjust these switches until you achieve the best possible picture quality. For example, to delay blue by 15 ns, you must move blue's 6- and 9-ns switches in the direction of the arrow to the "delay" position. Keep in mind that both switches on each delay section must be set to the same position.

See the illustration **below** for a sample of switch settings.



Specifications

Adjustment Method: Manual, using changeover switches

Cable Required: Between Delay Line Module and other devices: 4-pair (8-wire) Category 5 or higher, shielded or unshielded twisted pair (STP or UTP)

Compliance: CE; FCC Part 15 Subpart B Class A, IC Class/classe A

Delay Increment: 3 ns

Delay per Color: Minimum: 0 ns; Maximum: 36 ns

Distance (Maximum):
- From video source to video destination: 1000 ft. (304.8 m) depending on the type and construction of cables;
- Patch cabling should be kept as short as possible

Independent Delay Lines: 3

Skew Correction Technology: Passive, using switched differential delay lines

Standards: VGA, SVGA, XGA, XGA-2 video

User Controls:
- Bottom-mounted switches: (3) sets for red, green, and blue;
- Each switch set: (4) delay sections in increments of 3, 6, 9, or 18 ns

Interface: Twisted-pair composite including VGA red, green, and blue on 3 of the 4 wire pairs in a cable

Connectors: (2) RJ-45

Indicators: None

Operating Environment:
- Temperature: 32 to 104°F (0 to 40°C);
- Humidity: 5 to 90% noncondensing

Enclosure: Steel

Power: Passive, nonpowered

Size:
- ACUDLY: 1.2"H x 4.7"W x 3.1"D (3 x 11.9 x 7.9 cm);
- Patch cable (included): 3 ft. (0.9 m) long

Weight: 0.8 lb. (0.4 kg)

Compatible ServSwitch™ KVM Extenders

- ServSwitch Brand CAT5 KVM Extenders (ACU1001A, ACU1009A), FaxBack #20754
- ServSwitch Brand CAT5 KVM Extenders with Serial Extension (ACU1002A, ACU1008A), FaxBack #25560
- ServSwitch Brand CAT5 KVM Extenders for Sun® (ACU1004A, ACU1005A), FaxBack #24466
- ServSwitch Brand CAT5 KVM Extenders with Serial Extension and Stereo Audio Support (ACU1022A, ACU1028A), FaxBack #25560
- ServSwitch CAT5 KVM Switching Extender (ACU1049A), FaxBack # 20754
- ServSwitch Brand CAT5 KVM Micro Extender Kit (ACU3001A), FaxBack #24992
- ServSwitch Brand Dual-Access CAT5 KVM Micro Extender Kit (ACU3009A), FaxBack #24992
- ServSwitch Brand CAT5 KVM Micro Extender Kit with Serial and Bidirectional Audio Support (ACU3022A), FaxBack #24992
- Rackmount ServSwitch Brand CAT5 KVM Extender Hubs, Standalone Remote Units, and Rackmount Remote Units (ACU1006RA, ACU1006DRA, ACU1006SRA, ACU1006DSRA, ACU1006VRA, ACU1006DVRA, ACU1006MRA, ACU1006MRVA, ACU1012RA, ACUREM, ACUSREM, ACUMREM, ACUVREM, ACUWREM, ACUREMSW), FaxBack #24985

To use the Delay Line Module with other extenders, compare the pinout of the extender's RJ-45 twisted-pair connectors with the pinout of the Delay Line Module's RJ-45 connectors, shown on the **next page**. Note any differences and, if necessary, adapt cables accordingly by swapping the appropriate pairs.

The second type of cable construction is referred to as "3+1," because three pairs are similar in length and the fourth is different. If skew occurs with this type of cable, it can often be eliminated (or greatly reduced) by using the three similar pairs to send RGB. In this situation, a Delay Line Module might not be required.

The most accurate way to determine which type of cable construction you have is to measure a 300-ft. (91.4-m) length of cable with a scanner. Alternatively, strip back 4 inches (10.2 cm) of the cable sheath and look at how the pairs are twisted. If you have a "2+2" cable, two pairs will be twisted more loosely than the other two. If you have a "3+3" cable, one pair will be more loosely twisted than the others. The three similar pairs in a "3+1" cable should be "pair swapped" onto the RJ-45 pins used to carry RGB signals, and the four used for data signals.

The chart **below** describes which pairs are normally used to transmit RGB and gives associated RJ-45 pinouts. If you require more delay than can be provided by the Delay Line Module, and your cable is a "3+1" type, you should try pair swapping first to reduce the amount of delay that needs to be inserted by the module.

Pinout of the Delay Line Module

Looking into either of the Delay Line Module's RJ-45 ports, or looking at the cable plug from behind, Pin 1 should be on the left and Pin 8 on the right, and the wires should be arranged this way:

Pins	Wire Colors	Function, Pair
1 2	White/Orange Orange/White	Blue video, Pair 2
3 6	White/Green Green/White	Green video, Pair 3
4 5	Blue/White White/Blue	Red video, Pair 1
7 8	White/Brown Brown/White	Data*, Pair 4

* The type of data carried on Pair 4 (Pins 7 and 8) will differ from one extender to another and is irrelevant to the Delay Line Module. These Pins are passed straight through the Module without any delay or other effect.

Why Buy From Black Box? Exceptional Value. Exceptional Tech Support. Period.

Recognize any of these situations?

- You wait more than 30 minutes to get through to a vendor's tech support.
- The so-called "tech" can't help you or gives you the wrong answer.
- You don't have a purchase order number and the tech refuses to help you.
- It's 9 p.m. and you need help, but your vendor's tech support line is closed.

According to a survey by Data Communications magazine, 90% of network managers surveyed say that getting the technical support they need is extremely important when choosing a vendor. But even though network managers pay anywhere from 10 to 20% of their overall purchase price for a basic service and support contract, the technical support and service they receive falls short of their expectations—and certainly isn't worth what they paid.

At Black Box, we guarantee the best value and the best support. You can even consult our Technical Support Experts before you buy if you need help selecting just the right component for your application.

Don't waste time and money—call Black Box today.

Black Box offers the best warranty program in the industry—Fido Protection®. For more information, request **FaxBack 22512**.

Ordering Information

ITEM	CODE
ServSwitch Brand CAT5 Extender Delay Line Module	ACUDLY