



<b>TECH NOTE:</b>	<b>07-002</b>
<b>TITLE:</b>	<b>IP Addresses for DBD</b>
<b>DATE:</b>	<b>06/14/07</b>
<b>REVISION:</b>	<b>1.1</b>

**Purpose:** This document specifies the factory defaults for the IP addresses used by the *Drive by Download*<sup>TM</sup> system. To prevent accidental configuration of two network components with the same IP address, Cirrus is using a standard for setting those IP addresses.

**Technical:** *Drive by Download*<sup>TM</sup> is designed to function on a LAN (local area network). Therefore, *the networking components should be configured to use non-routable IP addresses* (as defined in RFC 1597). There are three non-routable IP address ranges. Those ranges, (in CIDR notation) are 10.0.0.0/8, 172.16.0.0/12, and 192.168.0.0/16.

Cirrus Controls has chosen to use the *192.168.96.0/20 (192.168.96.0 – 192.168.111.255) subnet* because it allows up to 2000 vehicles to be defined, does not interfere with the commonly used 192.168.0.0/24 subnet, and allows related IP address assignments for both the bridge and in truck controller (*SpreadSmart*<sup>TM</sup> or *Data Shark*<sup>TM</sup>). The /20 in CIDR notation is equivalent to a subnet mask of 255.255.240.0. **It is important that all network components are configured with this subnet mask (not the default of 255.255.255.0) since the default subnet mask will prevent correct functioning of the entire Drive by Download**<sup>TM</sup> system.

Because DHCP is too slow to use in a *Drive by Download*<sup>TM</sup> system, all network components (in-cab controller, bridge, access point, and base station PC) **must be assigned a unique static IP address**. The system below allows for easy and consistent assignment of those addresses and will be trivial for a network administrator not familiar with the system to decode.

<u>Address Ranges</u>	<u>Components using this range of addresses</u>
192.168.96.(1-254)	Base station PC, and other network devices such as routers, network printers, other computers, etc;
192.168.97.(1-254)	Access points (for <i>Drive by Download</i> <sup>TM</sup> );
192.168.(98,100..108,110).(1-254)	<i>SpreadSmart</i> <sup>TM</sup> or <i>Data Shark</i> <sup>TM</sup> (in truck controller);
192.168.(99,101...109,111).(1-254)	Wireless <b>bridge</b> (in cab transmitter for <i>Drive by Download</i> <sup>TM</sup> )

**Bridge Address:** Because the **bridge** IP address is cumbersome to configure and retrieve, closely and consistently associating this IP address with the address of the in-cab controller will make tracking and ensuring a unique number a simpler task. Cirrus Controls has chosen to use the same 4<sup>th</sup> number as the controller address, and adding 1 to the 3<sup>rd</sup> number of the controller address to specify the bridge address. So a controller with the address of 192.168.100.25 should be attached to a bridge with the address of 192.168.101.25.

**Factory Settings:** Cirrus will set system component IP addresses following this protocol. When replacement components are shipped, customer service will ask for existing IP addresses to allow for replacement parts to be configured with the correct IP addresses upon shipment

**Example:** This is an example of a small *Drive by Download*™ installation with 4 vehicles and one base station PC/access point:

- 192.168.96.1:** Gateway (router). This component is not supplied by Cirus Controls and is not necessary to operate a *Drive by Download*™ system, but is a common component in a LAN.
- 192.168.96.2:** Base station PC address. Remember that the subnet mask must be 255.255.240.0.
- 192.168.96.5:** Network printer. This component is not supplied by Cirus Controls and is not necessary to operate a *Drive by Download*™ system, but is a common component.
- 192.168.97.3:** Access point for the *Drive by Download*™ system.
- Truck 1
- 192.168.98.1:** In cab controller. Again, make sure the subnet mask is 255.255.240.0.
- 192.168.99.1:** Bridge. This bridge is coupled with the above controller using the addressing scheme described above, enabling simple network debugging in the future.
- Truck 2
- 192.168.98.2:** In cab controller for truck 2.
- 192.168.99.2:** Bridge associated with controller for truck 2.
- Truck 3
- 192.168.100.27:** In cab controller for truck 3.
- 192.168.101.27:** Bridge associated with controller for truck 3.
- Truck 4
- 192.168.102.88:** In cab controller for truck 4.
- 192.168.103.88:** Bridge associated with controller for truck 4.

#### Notes:

Although the IP addresses for the trucks in the example above are not sequential, with the exception of the first two trucks, we highly recommend sequentially assigning addresses for easy maintenance.

In the example of truck 4, we can see that we've assigned an IP address from another set of 254 addresses available. It is important to note that the 3<sup>rd</sup> number of the IP address is always even for the controller, and always odd for the bridge. The bridge 3<sup>rd</sup> number should always be 1 greater than the 3<sup>rd</sup> number of the controller.

#### Custom IP ranges:

Upon customer request, we can accommodate a custom IP address range that fits inside the customer's network scheme if discussed prior to shipment. The minimum sized block of network addresses that fits inside this scheme is a /23 subnet (255.255.254.0 mask). We would prefer that no other network components reside in that block with the exception of the base station PC, to avoid IP address conflicts which are difficult to diagnose since they tend to be intermittent due to the nature of this system. For example, if the customer was using the 172.16.0.0/12 at their site, an example range we could use would be 172.168.200.0/23. (Note that the first address in any address range must have a 3<sup>rd</sup> number that is even). Please contact Cirus Controls for questions about using custom IP address ranges.