

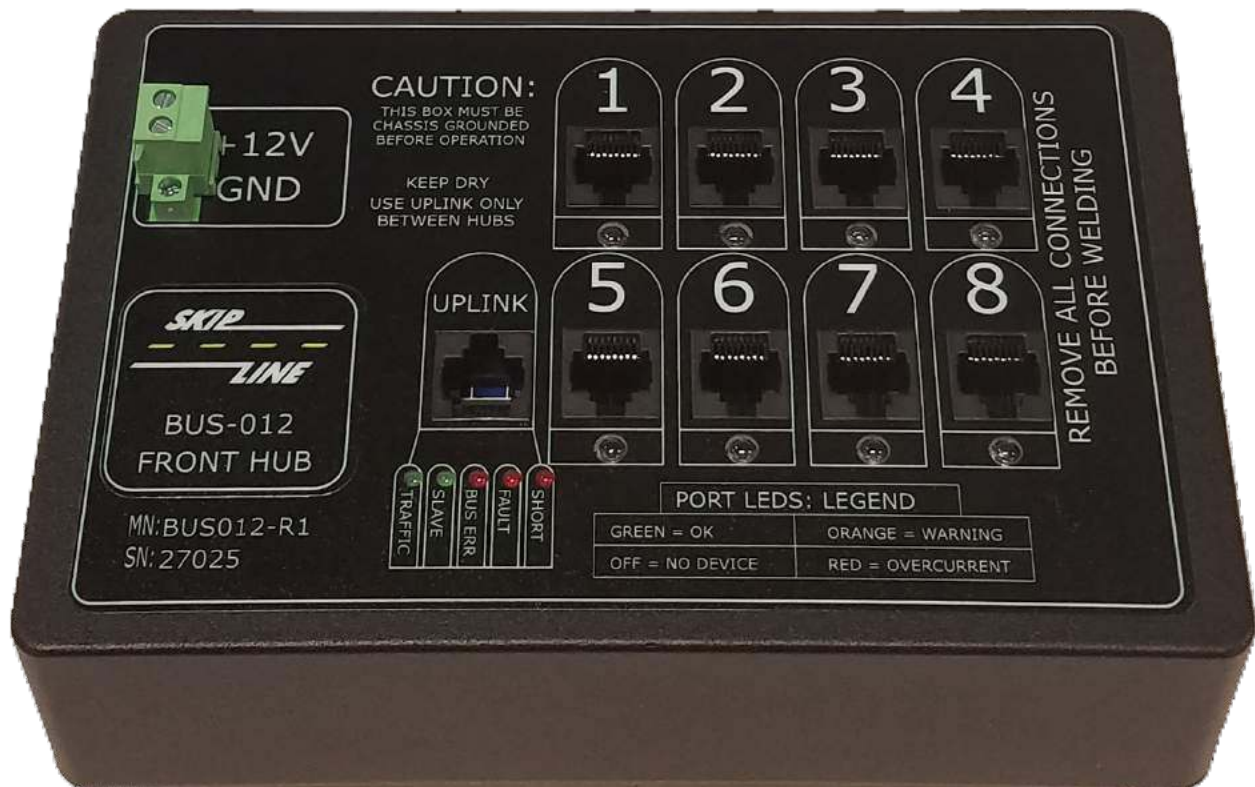
# Installation Overview:

The BUS-012 performs two critical functions; 1) it supplies clean, filtered power to Skip-Line devices, and 2) it is the communication hub for all Skip-Line products.

Every vehicle requires at least two BUS-012 hubs (or a BUS-012 Hub and SC-12 Core Hub). Skip-Line utilizes the proven and reliable CAN bus protocol, which requires two termination points. The BUS-012 acts as those terminal points. Multiple BUS-012 Hubs work together to create a communications network using CAT5 cables.

For more information on CAN Bus, here's an interesting video: <https://youtu.be/ZHaxv-cGZFI>

Each BUS-012 requires it's own +12V and GROUND connections from a battery source.



## Recommended location:

### Front Hub:

The recommended location for the BUS-012 Hub labeled "Front Hub" is inside the front cab of the vehicle. Mount in a location where CAT5 cables can be ran from dash-mounted accessories. Common locations include inside the front console or on the back wall.

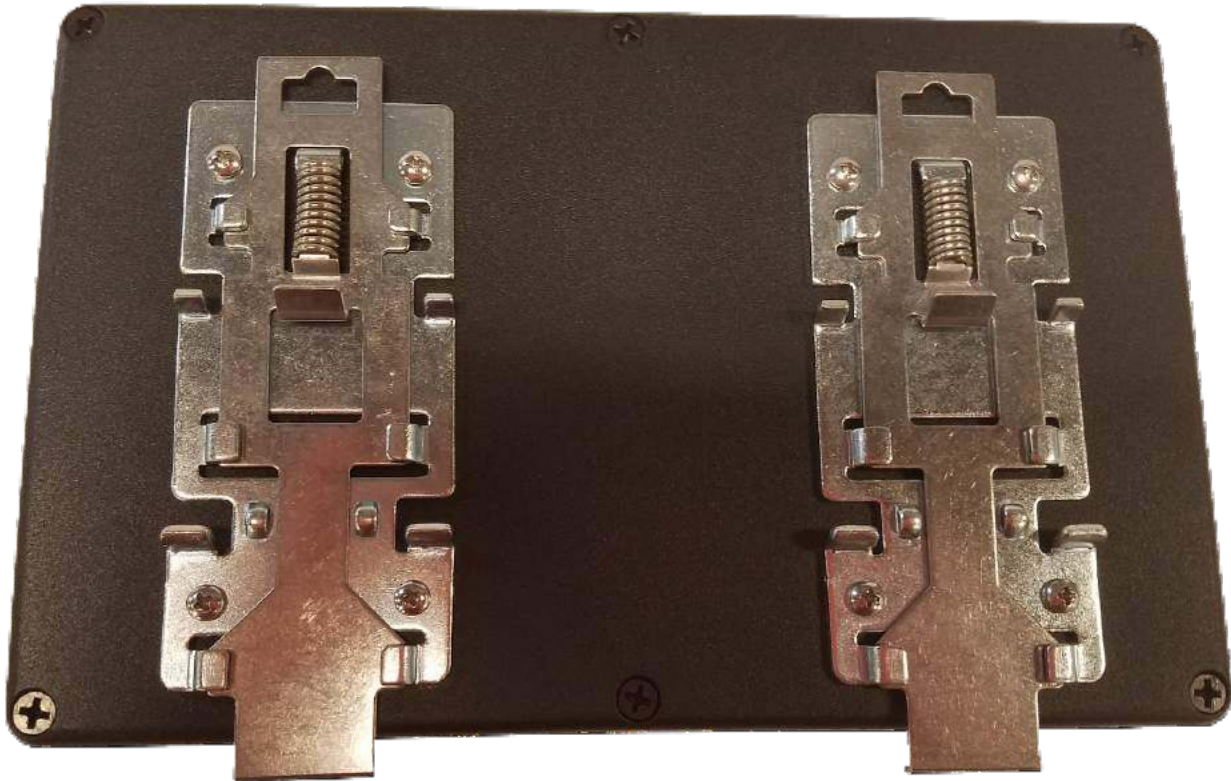
#### Rear Hub:

The recommended location for the BUS-012 Hub labeled “Rear Hub” is inside the center console or main rear cabinet of the vehicle. Mount in a location where CAT5 cables can be ran from SC-12 Masters and output boxes.

#### Mid Hub(s):

On advanced striping vehicles, mid-hubs are often used. They are not terminated like Front and Rear Hubs. Place these where convenient (such as in a mid-deck enclosure)

#### Mounting:



The BUS-012 comes with two DIN clips on the device for top hat DIN rail mounting. Skip-Line does not supply DIN rails, so please contact your preferred distributor or order DIN rails online.

#### Use Top Hat DIN Rails:

EN 5022 35mm x 7.5mm

EN 5022 35mm x 15mm (deep version)

[https://en.wikipedia.org/wiki/DIN\\_rail](https://en.wikipedia.org/wiki/DIN_rail)

<https://www.digikey.com/product-detail/en/phoenix-contact/0807012/277-2064-ND/2179626>

Note: Flange-mount BUS-012 hubs are available by request.

Please mount in a location free from exposure to:

- Water
- Pressure Washing
- Excessive mechanical vibration
- Temperature extremes
- Intermittent, poorly regulated, highly inductive, or noisy power sources
- Improper wiring

## Linking Hubs (IMPORTANT!)

Connecting Two BUS-012 Hubs (Front and Rear Hubs):

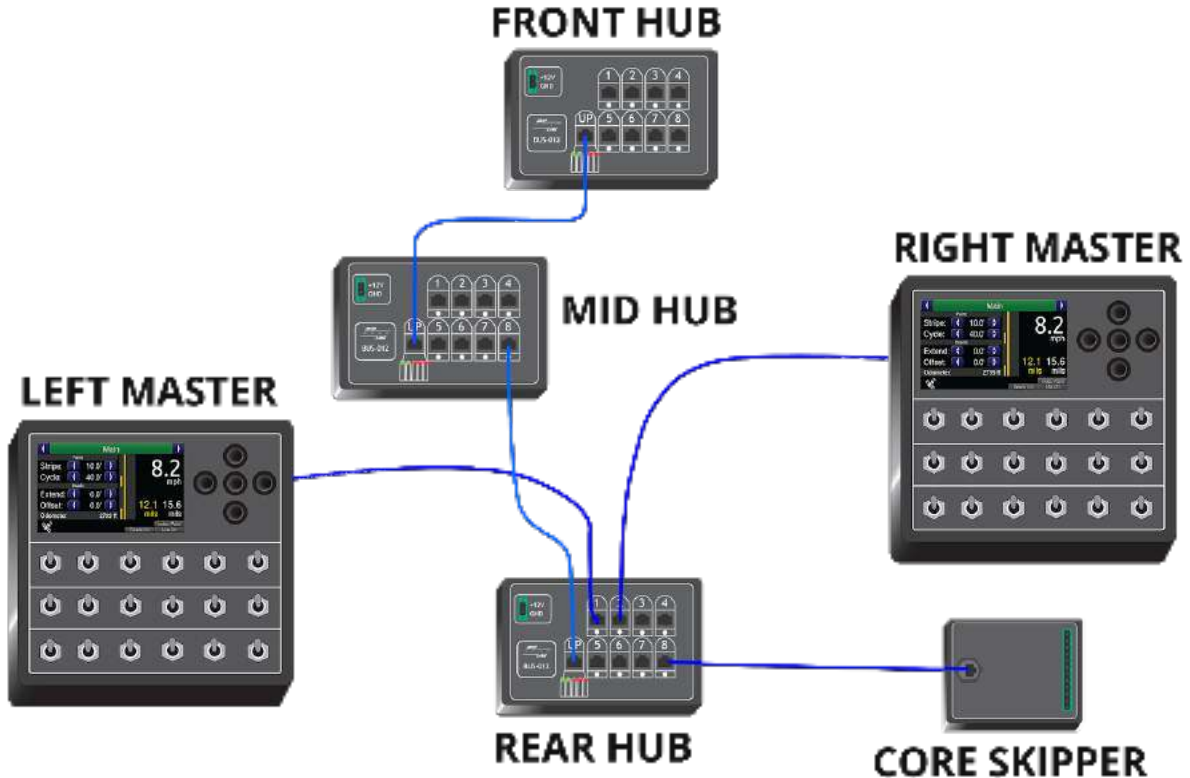
Connect two BUS-012 Hubs using the UPLINK ports with a CAT5 cable. The CAT5 cable between two hubs should be 20 meters or less in length. Never connect two hubs DOWNLINK to DOWNLINK!!

Connecting Three or More BUS-012 Hubs:

If more than two hubs are on the vehicle, the recommended method for connecting them is from an UPLINK port to a DOWNLINK port in a daisy-chain fashion. For example, use the UPLINK port on a Rear Hub and a DOWNLINK port on a Mid Hub, then use the UPLINK port on the same Mid Hub and a DOWNLINK port on a Front Hub. The CAT5 cable between two hubs should be 20 meters or less in length.

Never connect two hubs DOWNLINK to DOWNLINK!!

Example of a Three-Hub Configuration:



## Communications Cabling

The BUS-012 supplies clean, filtered power to Skip-Line devices via CAT5 cables. Connect devices to the most convenient BUS-012 hub on any of the numbered BUS-012 jacks (1-8). It does not matter which hub a device is connected to. Please keep CAT5 cables between the BUS-012 Hub and devices to a maximum length of 5 meters (16.4 ft).

If a device is properly connected to a BUS-012 Hub the large green port light should be illuminated to indicate the device is pulling current. The CVO-312, DL-12, and CPR-212 Paper Tape Printer all have separate power sources and will not cause the port light to illuminate.

Cabling should use 26AWG (or larger) Cat5 cable and RJ45 connectors. Cat5 cable should not be longer than 5 meters (16.4 feet). The Hubs accept only standard RJ45 plugs. Some of the devices have sealed RJ45 jacks, available from Skip-Line, which will accept either standard or strain-relieved IP-67 rated plugs. See Appendix B of the SC-12 Manual for instructions on RJ45 568-B connector wiring.

Avoid pinch points where the cable may be damaged from moving parts.

Tips:

- Use a continuity tester for all Cat5 cables

### Power Connectors:

The BUS-012 Hub requires +12V and GROUND from the vehicle (from primary battery or auxiliary battery). Power and ground wires connect to the green 2-pin plug supplied by Skip-Line. Leads are included with the 2-pin power plug for convenience. The red with is for +12V, and the black wire is to GND. The plug positions are also labelled on the BUS-012 Box.

Recommended wire size for +12V and GND to the BUS-012 Hub is 18-20 gauge wire.



## Fusing:

Recommended fuse size for the BUS-012 Hub is 10 amps.

## Dimensions:

Smart Speedo: 7.38"W x 4.7"H x 2.21"D

Enclosure Used: Hammond 1590DBK

## Troubleshooting

### Three-Color Port LED Indicators:

Indication:	Troubleshooting:
Off: No device connected	Check cabling.
GREEN: Device connected, drawing between 30mA and 700mA.	Normal! Flashing means this port errored since last startup.
ORANGE: Device connected, drawing between 700mA and 1A.	If device doesn't normally draw this much, device may be faulty.
RED: Device overdrawing 1A limit.	Check for breaks or pinches, and

Resettable fuse cutout imminent.	for proper connector pinout.
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Communications & Power Quality LED Indicators:

Label Meaning:	Troubleshooting:
TRAFFIC: Toggles every time traffic is detected.	If not blinking, check that power and comm cables are properly connected.
SLAVE: On when Core Skipper is detected.	If not blinking, check cabling between this hub and the Core Skipper.
BUS ERR: On when a bus error has occurred. Disappears once errors clears	Check cables and cable lengths. Malfunctioning devices can also cause bus error.
FAULT: Power fault detected. Power has disappeared, or a power spike has occurred.	Check and tighten power connections. Remove noisy devices from power branch.
SHORT: Total Hub current greater than 10A.	Check cabling to peripheral devices.

**WARNING!!!**

Always unplug all POWER, LOADS (green connectors) and CAT-5 cables prior to any welding on the vehicle. Failure to do so may result in severe damage to the unit.