

Delphi Data Connectivity Systems

With increasing consumer demand for more entertainment and data exchange within the automobile, Delphi has developed an expanding portfolio of cables, connectors and consumer ports to allow communication of audio, video and navigation data within the vehicle. Delphi's Data Connectivity Systems portfolio includes:

- Consumer ports (USB, Aux, SD and Combination)
- USCAR standard headers (USB, Mini-B and HSDD)
- Automotive grade hubs and accessories
- Cables and connections
- High speed digital data (HSDD) connectivity systems
- FAKRA connections and RF cable assemblies
- MOST® fiber optic systems
- Radio connectors

These interfaces between the automotive electrical system and external consumer equipment are enabling OEMs to place multiple ports throughout the vehicle interior for passenger convenience. Delphi has been in production with Universal Serial Bus (USB) ports and cables on several European vehicles since early 2006.

► Benefits

- Production experience with multiple OEMs
- Expertise in electrical/electronic integration
- Uses standard automotive electrical system components and standard USB connectors
- Uses cost effective, off-the-shelf USB cables
- Easily serviceable
- Customer-specific styling
- Meets USCAR-30 and USB specifications
- Easily adaptable to
 - USB, 1394, LVDS and MOST protocols
 - Various consumer connections, including SD cards, RCA jacks, auxiliary inputs, and more

► Consumer Ports

- Customer specific styling (color, texture, and graphics)
- Optional integrated protective covers
- Can provide illumination
- Combination ports available
 - 3.5 mm audio or video jacks
 - SD card slots
 - RCA jacks
 - Other industry standard inputs
- Positive locking
- Easily serviceable
- USCAR-30 durability (10,000 mating cycles)



Delphi's Automotive USB ports allow OEMs to place device connectivity in convenient locations within the vehicle.



The above configuration shows a typical complete Delphi Data Connectivity System.

The present production Delphi automotive USB consumer port consists of the following components:

- Bezel (front cover) with illuminated graphics and can be modified to customer-specific styling
- USB protective cover (protects from contaminants, such as dirt and liquids, when USB is not in use)
- Printed circuit board with two LEDs
- Header connector with lever lock (interfaces to a standard automotive harness)



Present Production Illuminated USB Port



Exploded View of Present Production Illuminated USB Port

► USCAR Standard Headers

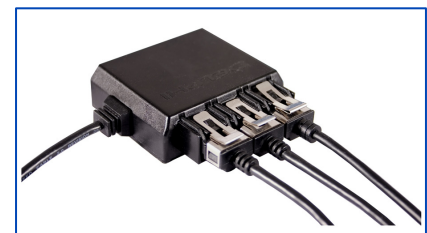
- Conform to USCAR footprint
- Meet USCAR-30 performance specifications
- Multiple indexes for error proof assembly
- Positive alignment for consistent assembly
- Scoop-proof
- Use USB standard Mini-B header (surface mount or through hole)
- Customer-specific mounting to the printed circuit board



Mini-B Header

► Automotive Grade Hubs and Accessories

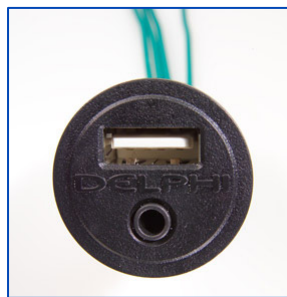
- Engineered for automotive applications
- Meet USCAR-30 performance specifications
- Multiple indexes for error proof assembly
- Positive alignment for consistent assembly
- Scoop-proof
- Use USB standard Mini-B header (surface mount or through hole)
- Can provide external power capability and on/off switching



Three-port Automotive Hub



USB Port and Cover



Cigarette Lighter Combination Port



USB/SD Card Port

▶ Cables and Connections

- Off-shelf cables meet USB 2.0 electrical performance specifications
- Connection design easily adaptable to various connection types, such as Mini-B, Standard A, and others
- Connection design also easily adaptable to other design protocols, such as 1394 FireWire
- Delphi's connection strategy is fast to market and cost effective
- Metal locks provide low profile positive locking
- Multiple indexes available
- Scoop-proof



Delphi's data cable strategy uses off-the-shelf USB cables with modified mold-ons and metal lock features.

▶ High Speed Digital Data (HSDD) Connectivity Systems

- Delphi specific high speed data designs
- Passive lock system
- Uses industry standard 0.64 mm terminals
- Available with headers and in-lines
- Engineered for LVDS, 1394, USB and MOST protocols



High Speed Digital Data (HSDD) Connectivity System

▶ FAKRA Connections and RF Cable Assemblies

- High performance
- ISO/USCAR compliant
- "Drop-in" replacement
- Cost effective

▶ MOST® Fiber Optic Systems

- Provide superior performance over traditional pigtail header assemblies
- High optical performance and reliability
- Loose ferrule design and standard-cut lead process helps increase efficiencies in assembly and packaging

▶ Radio Connectors

- Feature standard radio interfaces
- FAKRA and USCAR compliant versions available



Coaxial Cable Assembly

▶ Typical Applications

Delphi Data Connectivity Systems offerings allow the consumer to interface with an array of onboard information and entertainment systems. Typical applications include:

- Music streaming between popular digital audio formats (MP3, etc.) and the vehicle radio
- Data exchange between various consumer devices and the vehicle
- Passenger convenience data transfer (telematics, global positioning)
- Voice recognition systems, cell phone links, voice mail and internet communications
- Charging of consumer electronics for convenience

▶ Performance Advantages

- First USB automotive application in Europe
- Designed and engineered for automotive and truck electrical/electronic systems integration and supported by Delphi's comprehensive technical resources
- All automotive components of the system are manufactured by Delphi
- Expertise in performance, manufacturing and assembly requirements specific to the automotive industry
- Connectivity choices that can be integrated "as-is" or adapted to many existing aftermarket radios and devices
- Delphi is actively involved in related industry standards including USCAR, USB, ISO, MOST and 1394