The following components are used to construct a Cab, XpressNet or Loconet throttle network for OCUM standard modules. If followed, these wiring diagrams will allow creation of a DCC throttle network that is completely compatible with the most popular DCC systems - Digitrax, Lenz, NCE, SystemOne, and Zimo. This bus should also work with other command control systems using flat telephone-style cabling. It will not work with EasyDCC, which uses coaxial video cable for its throttle network.

This specification calls for readily available, inexpensive parts. While callouts are indicated for Tony's Train Exchange part numbers, an equivalent part from another source may be substituted, as long as it meets the same specifications as the listed part.

Each OCUM shall carry at minimum a single Pass-thru cable equal to the length of the module plus 18" (to allow for interconnection) and one F-F coupler.

It should be noted that the wiring for each cable is identical - a relationship of Pin1-to-Pin1 is maintained throughout the bus. This allows any cable to be substituted for any other cable as needed. This same cable is also used fro the throttle cables on NCE/SystemOne Cab Bus- and Lenz ExpressNet-based systems. Digitrax throttles use this connector as a default.

6-Conductor Flat Phone Cable -
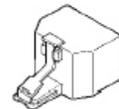Tony's Train Exchange P/N M6C or equivalent



RJ11/12 6-Position Plugs -
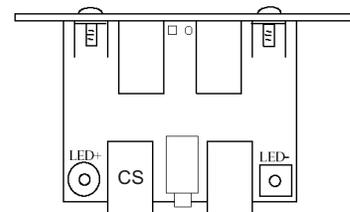Tony's Train Exchange P/N M PG or equivalent
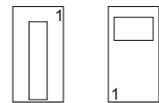


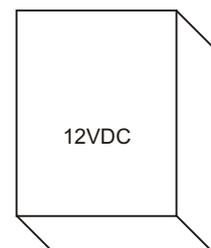Female-to-Female Coupler -
Tony's Train Exchange P/N M FF



Two-way Splitter -
Tony's Train Exchange P/N M SP2
(1-RJ11 Plug-to-2 RJ11 Jack)



Universal Throttle Connector Panel -
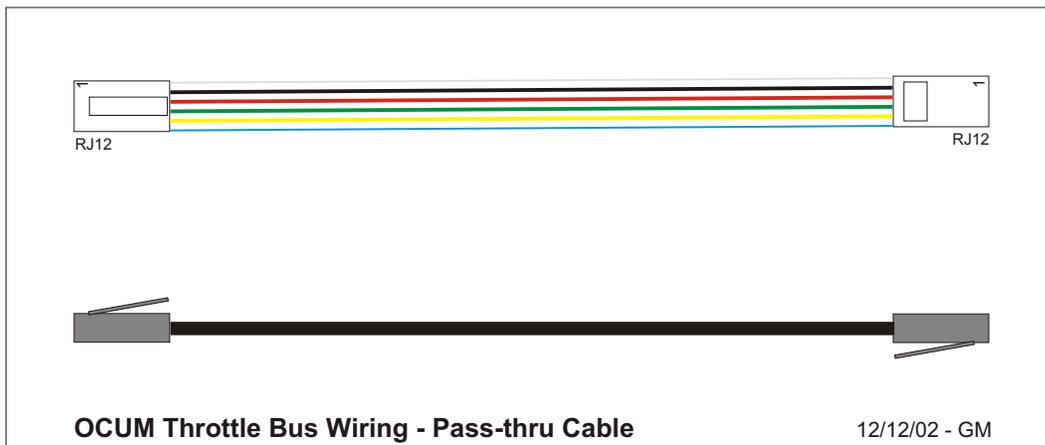Tony's Train Exchange P/N UTP/TTX or equivalent



12V DC 1Amp filtered power supply -
Tony's Train Exchange P/N TTX-XNCE or equivalent.

This wiring diagram illustrates the basic cable used in all instances. It is a simple 6-wire data cable using 6P6C RJ11 connectors and 6-conductor flat telco/network cable. These cables can be ordered custom made to any length, or may be made by the modeler with relative ease.

The cable is inexpensive, at approximately 12 cents per foot, and the connectors can be obtained for approximately 30 cents each (or less, in quantities).

This cable, along with a Female-to-Female coupler fulfills the minimum DCC "pass-thru" requirement for an OCUM-type module.

RJ12                                                                RJ12

**OCUM Throttle Bus Wiring - Pass-thru Cable**                    12/12/02 - GM
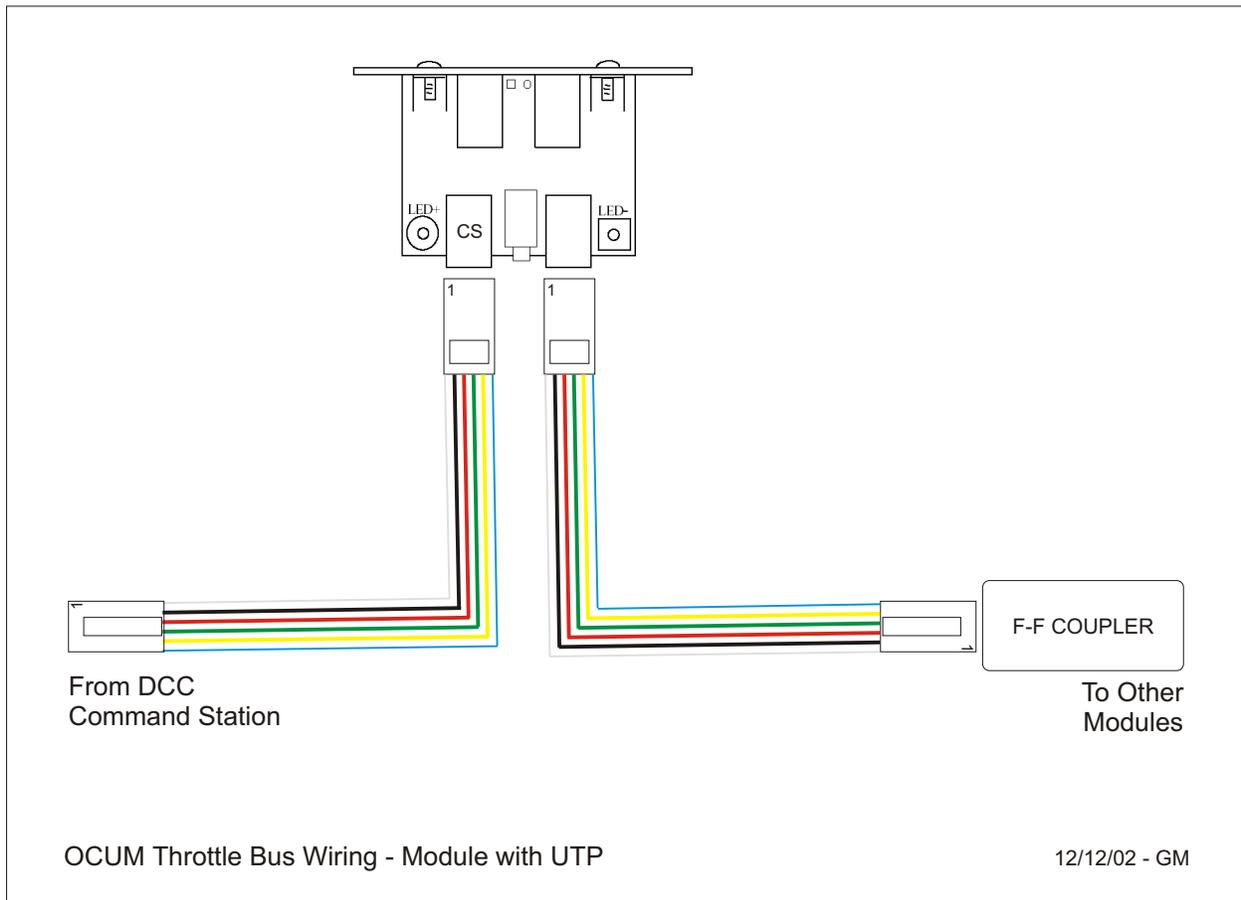
This diagram illustrates the connection of a throttle connection point onto the DCC bus. The connection point, referred to as a Universal Throttle Panel (UTP) can be inserted anywhere on the layout it is needed. It is simply connected between two Pass-thru Throttle Bus cables.

Some modelers may wish to include a UTP permanently on their module, especially if their module provides a point where operators may wish to stop to operate trains (e.g. A switching module or yard).

Alternately, these may be placed between modules as needed in place of a Female-to-Female coupler to provide additional plug-in capability.
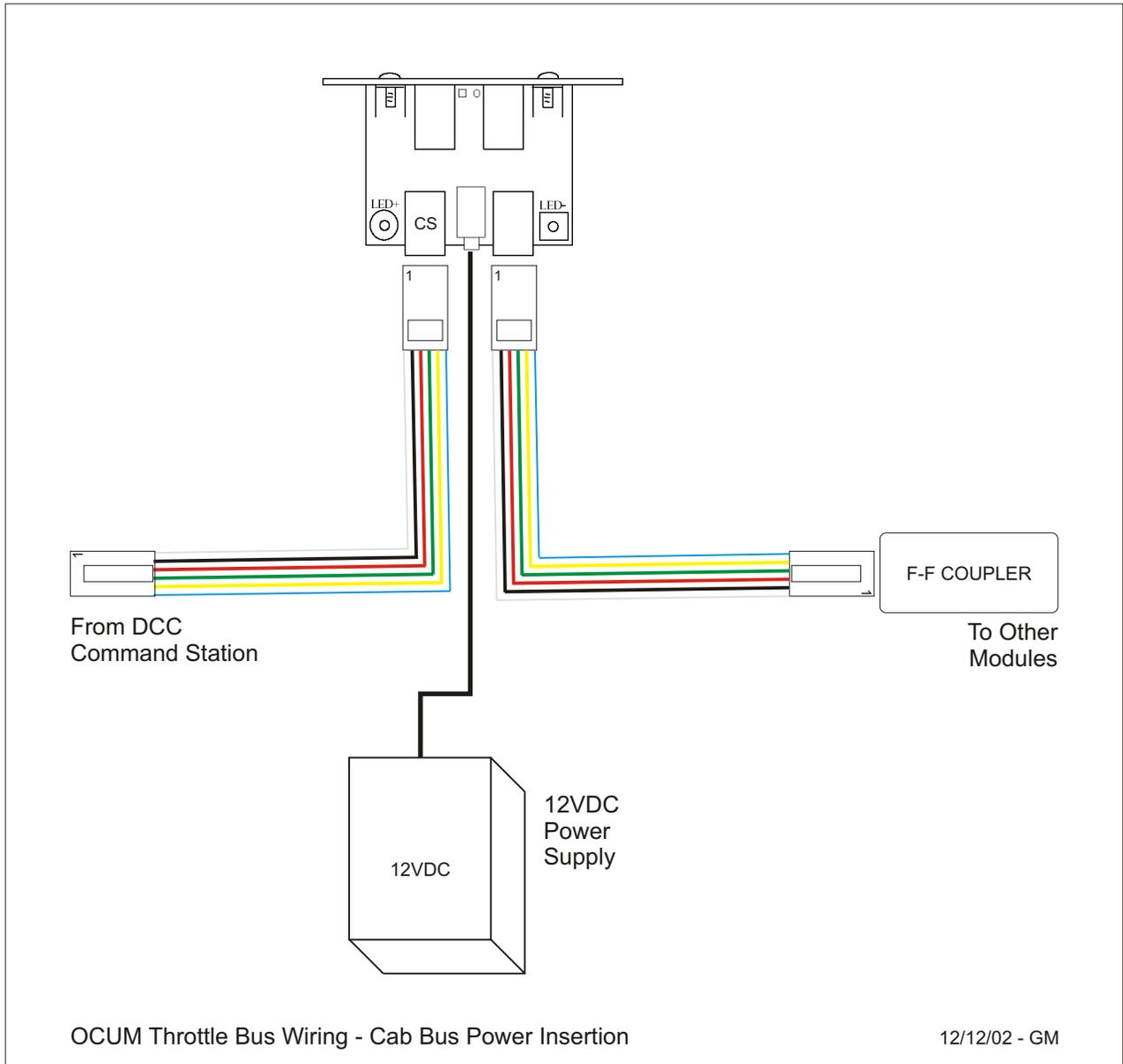
The UTP is truly universal, and is compatible with throttles from the previously mentioned manufacturers. In some cases, the manufacturer's cable has been replaced with a Pass-thru-type cable.



LED+    CS    LED-

1    1

From DCC
Command Station

F-F COUPLER

To Other
Modules

OCUM Throttle Bus Wiring - Module with UTP                    12/12/02 - GM

On large layouts using NCE or SystemOne DCC systems, it is necessary to "inject" power to operate the throttles at intervals around the layout.  This is due in part to the power supply voltage drop over long runs of small-gauge wire typically found in telephone network cable.  For NCE and SystemOne DCC systems, this distance is between 30 and 40 feet.  The specified power supply is of the "wall wart" variety, and simply plugs into the small jack on the rear of the UTP.

It is important to observe the "direction"of data flow when inserting the power supply to avoid feeding the 12VDC back into the command station.  The UTP circuit board is marked to indicate which connector should be fed from the command station.  When properly installed, the UTP, the UTP will open the appropriate circuit to prevent 12V from feeding back to the command station.

This additional power supply is not necessary when using a Digitrax or Lenz DCC system.



From DCC
Command Station

To Other
Modules

F-F COUPLER

12VDC
Power
Supply

12VDC

OCUM Throttle Bus Wiring - Cab Bus Power Insertion          12/12/02 - GM

In situations where there are branching modules, the DCC bus should branch as well. This illustrates how a two-way splitter plug can be used to accomplish this branching. Notice that power insertion is indicated on the branch. This may or may not be necessary, depending on system type and the length of the branch.

It is theoretically possible to branch as often as desired, up to the cumulative limits of the total system bus length. The maximum bus length for Digitrax Loconet and NCE/SystemOne Cab Bus is approximately 1,000 feet. Systems using eXpressNet may reach up to 3000 feet.

In all cases, the DCC Throttle Bus must NEVER form a closed loop. While there is little chance of component damage, operational problems may occur if a loop is formed.



From

Module with UTP

To

F-F COUPLER

From

Module with UTP

To

F-F COUPLER

F-F COUPLER

From

Module with UTP
and Power Insertion

F-F COUPLER

12VDC

OCUM Throttle Bus Wiring - Branches

12/12/02 - GM