CONVERGING SYSTEMS

Technical Bulletin
9/21/2009

# CS-Bus Planning
Cabling, Pin-Outs and Termination

The communication between various intelligent motor controllers and additional peripheral devices employs a robust communication backbone called the "CS Bus." The CS-Bus relies on many of the foundations of the RS-485 communication protocol. Customizations have been made specifically to optimize the operation of motor controllers in an industrial environment. Error-free communication is possible over the CS-Bus provided proper network design and commissioning is executed properly. Important topics are listed below.

Maximum CS-Bus length
The maximum length of the CS-Bus is 4000 feet using UTP CAT 5 wiring. For shorter runs and very simple installations (up to 12 feet), it is acceptable to use 6-conductor flat telephone wire . However, for best results, use CAT 5 cabling whenever possible.

Wiring
Typically, communication wire should be run separate from AC wiring. If you are forced to run alongside AC wiring, do so with at least a six inch gap between the two types of wires. And if you are forced to cross the AC wiring, cross at a 90 degree angle. The easiest method to create your own CS-Bus communication wire is to utilize CAT 5 wire and clip the 4th pair (Brown and Brown/White) wires before they enter the modular connector (so that you only have 3 pairs of wires actually connected to the RJ-25 (6P6C) connectors on either end of the wire). The recommended wiring pin-out color coding is as follows:
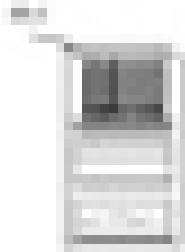
-Pin 1 is Blue
-Pin 2 is Blue/White
-Pin 3 is Orange
-Pin 4 is Orange/White
-Pin 5 is Green
-Pin 6 is Green/White

Note: The cabling is run 1-1 (straight-thru cable).

Termination

RS-485 communication employs a twisted-pair signaling path with termination at each end of the bus. Place a 120 ohm resister tied between pins 3 and 4 (the middle two pins on a six conductor cable) on the front end (i.e. at the beginning of the continuous run) of the CS-Bus and another similar terminator on the back end (at the end of the continuous run) of the CS-Bus. This front-end and back-end termination enables error free communication. Please note that the IBT-100 (serial interface adapter) has an integrated 120 ohm termination built into the unit, so if this unit is being used, it should be installed either at the beginning or end of the CS-Bus. In addition, the BSKP-2000 series of keypads have an on-board shunt connector that can be jumpered to provide built-in termination as well. So as a convenience, one can simply install the shunt plug on a BSKP-2000 series keypad if and only if, that keypad will be installed at the end or beginning of the bus.