

MicroComm DXI/DXL

System Planning MicroComm DXI/DXL

Cable Specifications

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1 Introduction

The MicroComm DXI/DXL systems require field wiring to connect the various devices to exchanges and to connect exchanges to one another. This document lists all the recommended cable types that are used in a DXI/DXL system. As well alternative cable types are listed where appropriate and maximum distances are specified. Most of this information is also contained within individual installation manuals. Listing the specifications for all the required cables in one document will aid system planners.

2 Cabling

2.1 Digital Audio Trunk (CEPT):

2 pairs - 22 gauge (DXI), 1 pair – 22 gauge (DXL) unshielded twisted pair telecommunications data cable (E1 audio trunk)

Characteristic impedance 120 ohms (100 ohms is acceptable)

Maximum node to node length 8200 feet (2500 m)

2.2 Digital Data Network (LonWorks):

Requires LonWorks certified cables, three examples are listed below

1 pair – 16 gauge (unshielded) LonWorks certified twisted pair wiring

- i.e. Belden (1 pair unshielded) 8471
- West Penn (1 pair unshielded) WP225
- Windy City Wire SmartWire (1 pair unshielded) 104500

1 pair - 22 gauge NEMA Level IV twisted pair cable (shielded or unshielded)

- i.e. Belden 7701NH (1 pair, unshielded) or 7702NH (2 pair unshielded)
- Belden 7703NH (1 pair shielded) or 7704NH (2 pair shielded)
- Connect Air W221P-1002 (1 pair unshielded) or WP221P-1004 (2 pair unshielded)
- Connect Air W221P-2001 (1 pair unshielded) or WP221P-2003 (2 pair unshielded)
- Connect Air W221P-1003 (1 pair shielded) or WP221P-1005 (2 pair shielded)
- Connect Air W221P-2002 (1 pair shielded) or WP221P-2004 (2 pair shielded)
- Windy City Wire SmartWire (1 pair unshielded) 105500

Specifications 22 gauge wire

- DC resistance \leq 18 ohms/1000 feet
- Mutual capacitance \leq 17 pf/foot
- Characteristic impedance 100 ohms
- Maximum node to node length 1300 feet (400 m)
- Maximum wire length in segment 1640 feet (500 m)

24 gauge Category 5/Category 5e/Category 6 unshielded twisted pair cable
(using only one pair per LonWorks channel)

Specifications for 24 gauge wire

- DC resistance \leq 28.6 ohms/1000 feet
- Mutual capacitance \leq 17 pf/foot
- Characteristic impedance 100 ohms
- Maximum node to node length 820 feet (250 m)
- Maximum wire length in segment 1470 feet (450 m)

2.3 Ethernet:

4 pair Category 5/Category 5e/Category 6 twisted pair cable using 100baseT or 10baseT

Default transmission speed forced to 100 Mbit/sec (switchable to 10 Mbit/sec in config)

Maximum length 320 feet (100 m)

2.4 400-series Intercom:

1 pair - 22 gauge shielded twisted pair

Maximum length 2500 feet (760 m)

2.5 400-series Full Duplex Handset

2 pair - 22 gauge individually shielded twisted pair

Maximum length 2500 feet (760 m)

2.6 300-series Intercom:

1 pair - 22 gauge shielded twisted pair (audio), and

1 pair - 22 gauge (switch)

or

2 pair - 22 gauge twisted pair (audio and switch)

Maximum length 2500 feet (760 m)

2.7 Paging:

1 pair - shielded twisted pair (gauge appropriate for wattage in circuit)

2.8 Telephone:

1 pair - unshielded twisted pair (Category 3 telephone cable minimum)

2.9 DIO / DXL Status Inputs & Outputs:

1 pair - 22 gauge pair (each switch input)

1 pair - 22 gauge pair (each output)

Maximum length 2500 feet (760 m)

2.10 Master stations with Keypad/Display (IMS-440 and MAI-420/IMS-130)

Audio 2 pairs - 22 gauge shielded twisted pair (maximum distance 2500 feet, 760 m)

Network One LonWorks cable; see specifications for Digital Data Network (LonWorks)

Power 1 pair, gauge appropriate for distance (i.e. 22 gauge twisted pair can work for up to 375 feet, 114 m)

2.11 Master Station without Keypad/Display (MAI-425)

Audio 2 pairs - 22 gauge shielded twisted pair (maximum distance 2500 feet, 760 m)
Power 1 pair, gauge appropriate for distance (i.e. 22 gauge twisted pair can work for up to 375 feet, 114 m)

2.12 Touch Screen Master Station (TMM-440)

Audio 2 pairs - 22 gauge shielded twisted pair (maximum distance 2500 feet, 760 m)
(see IM-TMM-440-1.0 Installation Manual for details)

3 Fiber Optic Cable:

Fiber optic cable distances are based on allowable signal loss, which is mainly determined by losses due to connections and losses due to cable lengths. Typical fiber optic losses are 0.3 dB per connector and 3.2 dB/Km.

3.1 Digital Audio Trunk (CEPT):

62.5/125 μ m multimode fiber at 820 nm wavelength. ST type fiber optic connectors
DXI: 12 db power budget (-12 dBm transmit power, -24 dBm minimum receive power)
DXL: 10 db power budget

3.2 Digital Data Network (LonWorks):

62.5/125 μ m multimode fiber at 880 nm wavelength. ST type fiber optic connectors
14 db power budget (-12 dBm transmit power, -26 dBm minimum receive power)