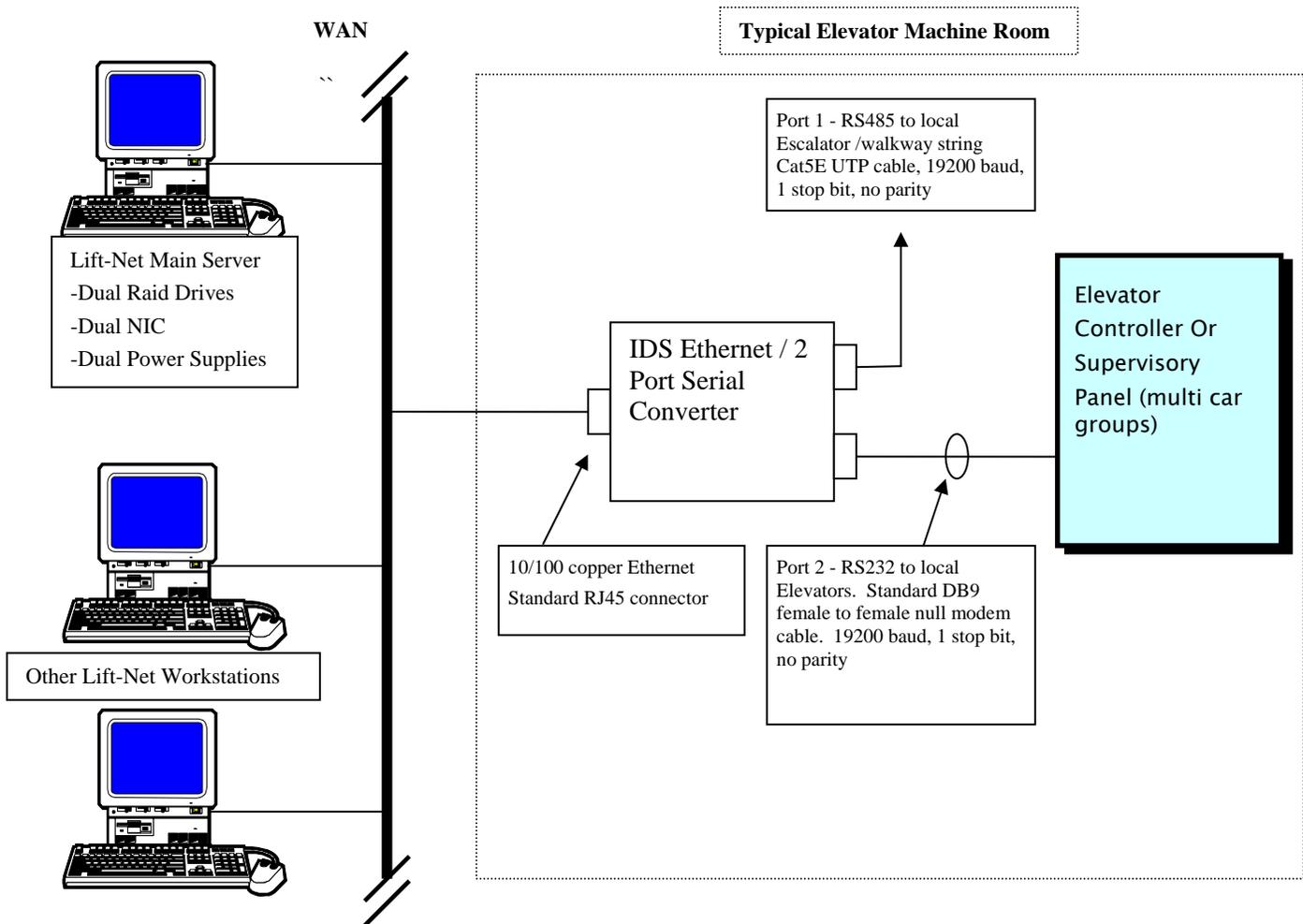# Lift-Net Vertical & Horizontal Management Systems

Generic Description - Lift-Net Elevator / Escalator Communication: Physical Overview

General / Physical Overview

2.1. **General Communication** between the elevator, escalator & walkway controllers and the Lift-Net computers is accomplished via a serial connection using the Lift-Net protocol. Or certain other common protocols such as Modbus, etc. The Lift-Net serial data protocol, developed and copyrighted by IDS, is a well defined means by which many elevator manufacturers may communicate to third party VHTMS, such as the Lift-Net system. The protocol can be accomplished using common serial ports (RS232, RS422, RS485 etc.), or over TCPIP networks by using various adapters and IP addressing schemes.

2.2. **Elevator Communications** The Lift-Net protocol has been provided to control manufacturers by IDS under NDA and other agreements. Control manufacturers will program the Lift-Net protocol into the firmware of the management computer supplied in each elevator bank. There will be only one serial connection per bank, regardless of the number of elevators in that bank. Serial parameters vary with manufacturer.

2.3. **Escalator / Walkway Communication** is accomplished by a Lift-Net Processor (LNP) Card supplied by IDS. An LNP card will be factory-installed in each escalator & walkway. A serial port on the LNP card polls the escalator / walkway controller for information via Modbus protocol and converts that information into Lift-Net protocol messages. The Modbus exchange takes place via two wire RS485, 9600, 8, N, 1. The LNP cards are arranged "daisy chain" fashion on a multi-drop network which caries the Lift-Net messages to an Ethernet interface device located in certain elevator machine rooms. Lift-Net data exchange takes place via two wire RS485, 19200, 8, N, 1.

2.4. **An Ethernet serial converter** supplied by IDS connects the elevator(s) and the escalators/walkways to the Ethernet wide area network supplied by others. Each converter accepts a standard RJ45 connector for 10/100 Ethernet. Static IP address are supplied for each converter by the network administrators. Each serial converter has two serial ports - Port one, on TCP port 4000, is RS485 which connects to the local escalator/walkway multi-drop string via CAT5e UTP cable. Port two, on TCP port 4001, is RS232 and connects to the local elevator equipment via a standard DB9 female to female null modem cable. It is anticipated that the converter will be mounted to an internal wall of the elevator controller cabinet and utilize the same 110vac power that powers the elevator management PC. The elevator contractor will perform all physical connections and testing in the elevator machine room.

3. Schematic of Physical Interface

WAN

Typical Elevator Machine Room

Port 1 - RS485 to local
Escalator /walkway string
Cat5E UTP cable, 19200 baud,
1 stop bit, no parity

Lift-Net Main Server
-Dual Raid Drives
-Dual NIC
-Dual Power Supplies

IDS Ethernet / 2
Port Serial
Converter

Elevator
Controller Or
Supervisory
Panel (multi car
groups)

10/100 copper Ethernet
Standard RJ45 connector

Port 2 - RS232 to local
Elevators. Standard DB9
female to female null modem
cable. 19200 baud, 1 stop bit,
no parity

Other Lift-Net Workstations

Notes:

- It is anticipated that the Ethernet converter will be mounted to an internal wall of the elevator controller cabinet and utilize the same 110vac power that powers the elevator management PC.
- Cat5 cabling for network and escalator/walks should be pulled to the individual controller for single car groups and to the supervisory panel for multi car groups. Before termination, cables should be left long enough to reach the farthest internal point of the cabinet.

4. Interface Protocol

4.1. **The Lift-Net Protocol** is a serial method of transferring data bits from and to elevator / escalator / walkway equipment. An agreed-upon data memory offset table for every type of equipment is maintained on both the equipment and on the Lift-Net PC. Each offset contains eight bits of data which represent the value of individual status bits or analog values, based on the agreed upon offset table.

4.2. **Lift-Net Messages** consist of a header describing message type, memory offset of the data that changed, new values of the memory locations, and internal crc error checking to insure data validity. Messages are encoded in binary. The offset table is contained at both ends of the communicating link and any discrepancy in the message structure or offset table will be rejected.

4.3. **The protocol contains Methods to Refresh** all data on start-up of either a Lift-Net PC or individual piece of equipment. After the initial refresh, only data bits that actually change are sent, except for periodic automatic refreshes initiated either by the Lift-Net PC or the target equipment.

4.4. **A Periodic Heartbeat** is exchanged between the target equipment and the Lift-Net PC. This insures that the PC will be able to detect and re-initiate upon loss of communication. Logs are kept and screen indicators are set to indicate gain and loss of communication. The TCP/IP connection to each bank is also monitored and logged.

4.5. **The complete Lift-Net Protocol Specification** is beyond the scope of this document. The information presented above is for informational purposes. The protocol was designed specifically for data interchange between control manufacturers and the Lift-Net system. The precise binary message structure specification may be made available to other qualified personnel on a need to know basis, subject to a signed disclosure agreement.