

Connecting Serial Time Clocks Without Cabling

Introduction

Many commercial and manufacturing businesses are installing electronic time clock devices to automate employee time and attendance data gathering. These devices typically require serial RS-232 communications with a host computer to allow application software to download the data. Installation of communications cabling can be difficult in some locations and often requires expensive installation methods. Special line drivers may be required for long cable runs, increasing the installation cost even further.

A simpler alternative to time clock cabling is to use power line communications technology. Using state of the art devices like the Power Line Universal Modem (PLUM1) from Computerwise, Inc., allows one or more time clocks to communicate with the host computer utilizing the existing 120 Vac power lines.

This application note will describe how to use the PLUM1 devices for communications between a time clock and a host computer. In this example the time clock device will be a TTCLOCK from Computerwise, Inc. However, the same techniques are transferable to other time clock devices.

System Overview

The host computer is to be located in an office somewhere in the business facility and the time clock is to be installed in the production area. Two PLUM1 devices will be required, one at the time clock location and one at the host computer location. Application software in the host computer will download time data from the clock via the PLUM1 devices and store it in an ASCII file. The data can be further processed by software to produce valid time and attendance reports.

PLUM1 Setup

The PLUM1 devices should be installed as a "point to point" system to allow the time clock and host computer to communicate. Because there will only be two PLUM1 devices on the network, they can be configured with a complementary default destination node address. An example of PLUM1 addresses for each device is defined as follows:

	Host PLUM1	Clock PLUM1
Device Address	1	2
System Address	1	1
Destination Address	2	1

Each PLUM1 device can be temporarily connected to the host computer for configuration with the PLUMUP utility program (PLUMUP.EXE). Generally, the factory default configuration (except for the addresses) should be used. See the PLUMUP help system for information on other PLUM configuration options.

Host Computer Setup

The host computer can be any standard PC (386 or higher) running the Windows operating system and having a spare RS-232 serial COM port. The PC should have the PLUM1 utility program and a time and attendance application program (such as the Computerwise TAW.EXE) installed. The PLUMUP program is used to configure the PLUM1 devices and can be used as the data download utility. Connection between the host computer COM port and the host PLUM1 is provided by a standard DB9F/DB9M modem cable.

The host PLUM1 (typically device address #1) should be located near the host computer. Some PC power supplies contain noise filters that could effect the PLUM1 power line signal. This situation may require the PLUM1 and the host computer to be installed into separate power receptacles or require use of a power line filter for the host computer power. Refer to the "Environmental Considerations" section of the PLUMUP help system for details.

Time Clock Setup

The TTCLOCK configured with factory default parameters and should include enabling the XON/XOFF protocol. Refer to the TTCLOCK documentation and TTCLOCK utility program (CLOCKUP.EXE) for details to change the configuration if desired. The clock should be installed near a 120 Vac power receptacle and can be powered from the PLUM1, eliminating the requirement for a separate power adapter. Connection between the TTCLOCK and the clock PLUM1 is provided by a RJ-45 modular cable.

The clock PLUM1 (typically address #2) should be equipped with a PMA1 modular adapter. The PMA1 also enables the Power Supply Output option in the PLUM1 to provide power for the TTCLOCK.

Application Software

Once the PLUM1 devices have been installed on the host computer and the TTCLOCK the PLUMUP utility program can be used to "Scan" the power line network to verify communications with the clock PLUM1. The "TTClock Download" function is used to capture the clock data into an ASCII time data file. This file can be used by the time and attendance program for further processing.

The Time & Attendance program (TAW.EXE) from Computerwise, Inc., is a Windows based program used to capture employee time data and produce reports. It can be configured to automatically start the PLUMUP utility and perform the TTCLOCK download function. Refer to the TAW help system for information on how to start an external download program from within the TAW program.

Multiple Clock System

Additional TTCLOCK devices can be installed using one PLUM1 device for each clock. Each PLUM1 device would be setup exactly like the first clock except for the device address and the host PLUM1 device would have a destination address of "0". For example a system with three TTCLOCK devices would be configured as follows:

	Host PLUM1	Clock #1 PLUM1	Clock #2 PLUM1	Clock #3 PLUM1
Device Address	1	2	3	4
System Address	1	1	1	1
Destination Address	0	1	1	1

The "download" function in the PLUMUP program will have to be performed for each clock PLUM1 address.

Other Time Clocks

The PLUM1 devices can be used with other RS-232 serial ASCII time clock devices. The download function will have to be performed by a program written specifically for the time clock used. If the protocol uses standard ASCII character strings to download the data, the PLUM devices should work transparently.