S.Simplex

True*Alarm*®
Fire Alarm Systems

Fire Alarm Controls
4120 Network
## System Description

UL, ULC Listed
FM Approved

FEATURES

- **Information is communicated among remote fire alarm control panel locations (peer-to-peer network nodes) to provide:**
  - Network-wide initiation of alarm silence, acknowledge, and reset
  - Distributed system operation to ensure survivability
  - Status of system circuit points and point lists
  - Investigation of specific point status details
  - Set-host access for remote node data
  - Declaration of system alarm using input from any network node
  - Synchronized time and date

- **Network nodes include Simplex:**
  - 4120, 4020, 4010, and 4002 Fire Alarm Control Panels
  - 4120 Series Network Processing Units (NPU), Network Display Units (NDU), and MINIPLEX® and Universal Transponders (UT)
  - 4190 Series graphic command centers (GCC)
  - NT 3400™ Security management systems
  - Retrofit into existing 4100 and 2120 systems

- **TrueAlarm® sensor operation**:
  - Read status of TrueAlarm analog detection sensors at multiple locations
  - Perform remote or local sensitivity selection

- **Style 7 wired communications:**
  - Single wire pair between nodes
  - Up to 17,000 feet between nodes with AWG #18 twisted, shielded wire[†]
  - Optional fiber optics and/or modem communications
  - Telephone modem communications are available for network connection flexibility[†]

- **Network communication supervision:**
  - Network level diagnostics
  - LED status indications on interface board

- **Dial-in modem for off-site data access**

* Applicable FM approval information is available on request.

** TrueAlarm analog detection is protected under U.S. Patent # 5,155,468 and 5,173,683.

† Refer to data sheets S4120-0003 and S4120-0005 for additional information.
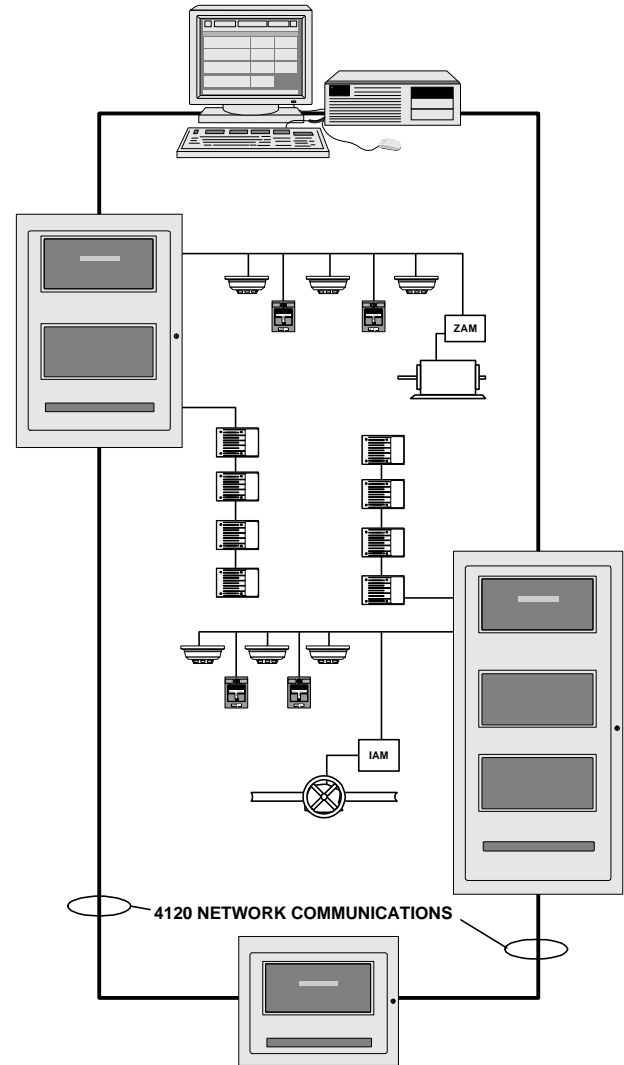
4120 Network Example

INTRODUCTION

The 4120 Network communicates information among distributed Simplex Fire Alarm Control Panels. Each panel maintains the status and control of its own dedicated circuit points while monitoring and controlling activity at other locations. Systems may be composed of similar capability panels sharing information, or specific nodes may be added to perform dedicated network functions. (Refer to glossary of 4120 Network terms on page 7.)

BASIC NETWORK OPERATION

Each panel with direct communications into the 4120 Network is defined as a node. Each node can be a large or small fire alarm control panel, transponder, or special network level communicator/control unit. Although performing different functions, each serves as a "peer-to-peer" (equal) partner in controlling network communications.

Network information is sequentially transmitted from one node to another. At each node, the network message is captured and either retransmitted as received, or modified before retransmission to provide the network with a status update. The ability of the message to circulate through the network will define the network status and allow the nodes to respond accordingly.

If a node goes "off-line", or if the wires between nodes either short, open, or have any other form of communication problem, the nodes will isolate that section of wiring. Nodes that cannot retransmit onto the next node of the network will transmit back to the previous node to maintain communications and to notify the network of the node status. In the event of multiple wiring problems, the remaining nodes will

effectively "regroup" and establish new, smaller "sub-networks" that will maintain communications among the active nodes.

FIGURE 1 shows a basic 4120 Network. Each 4120 Fire Alarm Control Panel monitors and controls its own connected circuit points. Points that are allowed to be monitored and controlled by the network are designated as "public" and are programmed as such at the owner node. When a public point is programmed into a remote node, it is considered "external" and can be monitored and controlled by that node with programming similar to the control of its own points.

In FIGURE 1, MINIPLEX Voice Control Panel A is equipped with a City Connection and MINIPLEX Control Panel B is equipped with a CRT/keyboard for additional operator access. With the appropriate programming, these two panels become a system using each other's unique features, but still remaining capable of being stand-alone control panels. This type of 4120 Network connection is considered peer-to-peer since the panels are similar to each other in capability yet retain their independent monitor and control functions.
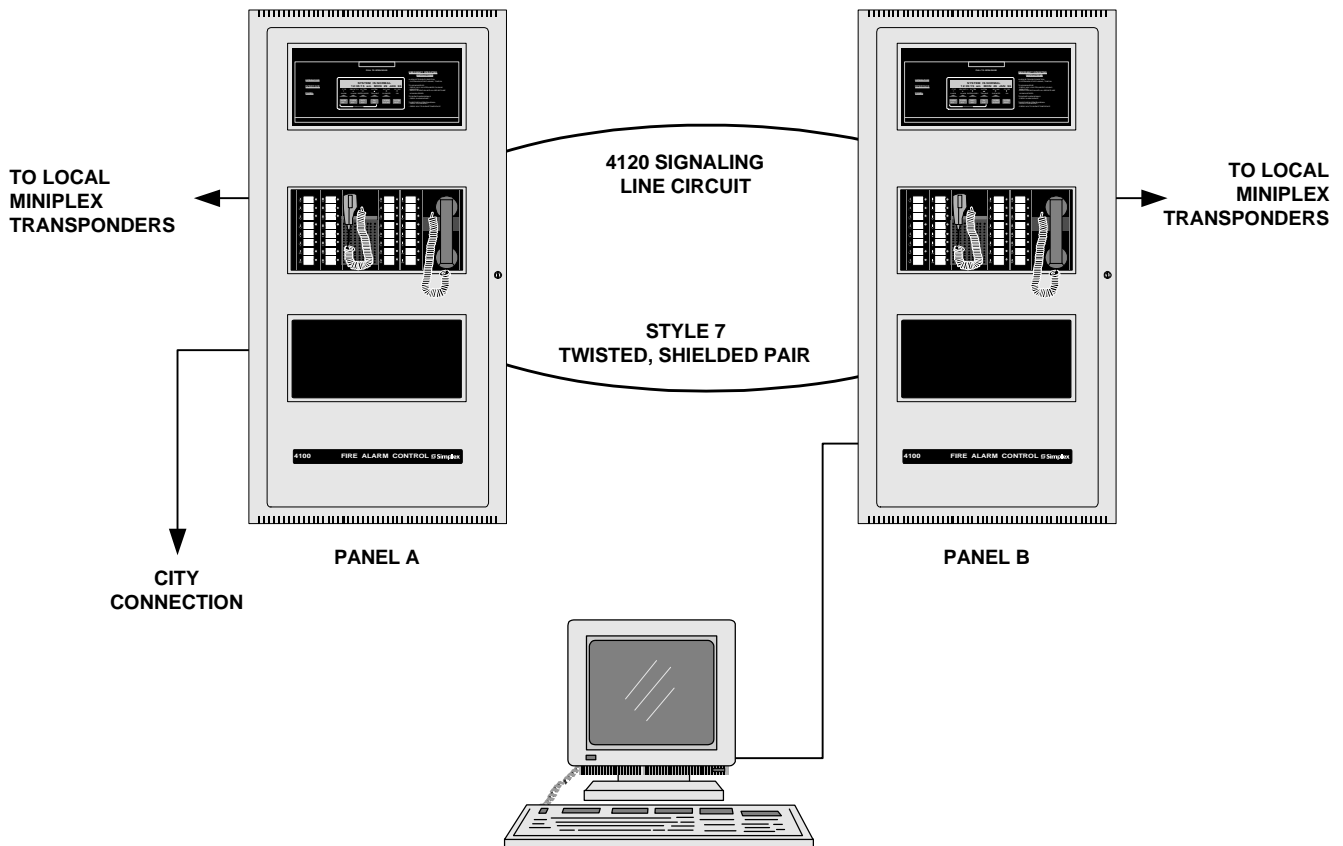

FIGURE 1. Basic Peer-To-Peer 4120 Network Connection using two 4120 Miniplex Fire Alarm Control Panels

MASTER/SUBORDINATE 4120 NETWORK OPERATION

In the peer-to peer example, each panel is a stand-alone NFPA 72 control. In the typical multiplex master/subordinate system, there is a Central Processor Unit (CPU) and the remote devices (typically called transponders) perform the monitoring and control. Although many transponders can implement a local mode operation in the event that communications with the controller is lost, the intent of this system configuration is to provide communications with the CPU such that the transponders need not be fully equipped for stand-alone operation.

In the 4120 Network, the 4120-8511 Network Universal Transponder and the 4120-8601 Network Audio Universal Transponder can be connected to a 4120 Network control panel (such as the 2500 NDU Network Display Unit) in a manner similar to the multiplex master/subordinate configuration. The transponders are literally communications "peers" with the 2500 NDU, allowing 4120 Network communications to be handled by each node in an equal access manner.

FIGURE 2 is an example of a high rise application using the 4120-8821 Voice NDU with Status Command Center and the 4120-8601 Network Audio Universal Transponder.

Note that with the 4120 Network, additional nodes could be connected that are stand-alone control panels without effecting the master/subordinate operation of the Universal Transponders.
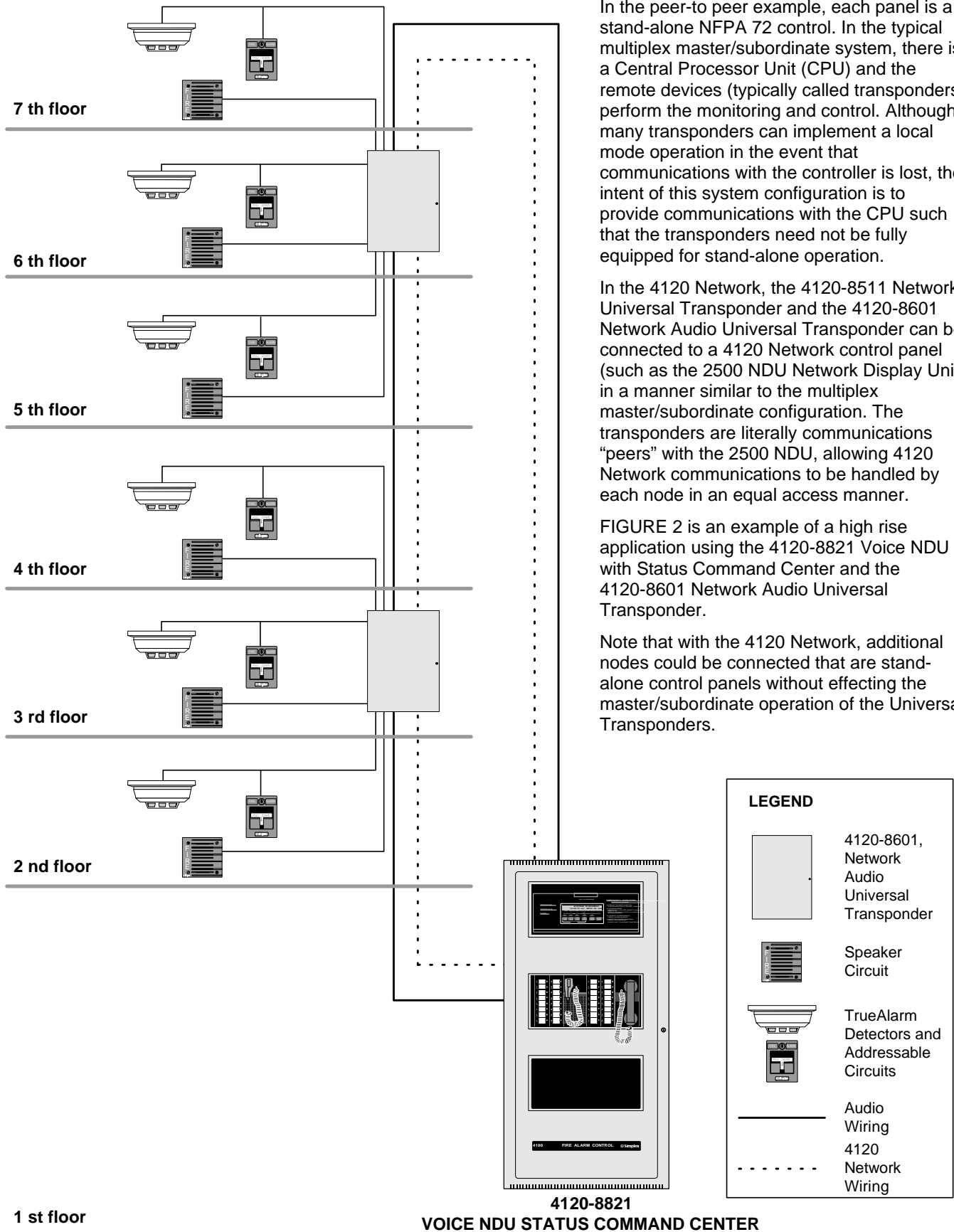
7 th floor

6 th floor

5 th floor

4 th floor

3 rd floor

2 nd floor

1 st floor

4120-8821
VOICE NDU STATUS COMMAND CENTER

LEGEND

4120-8601, Network Audio Universal Transponder

Speaker Circuit

TrueAlarm Detectors and Addressable Circuits
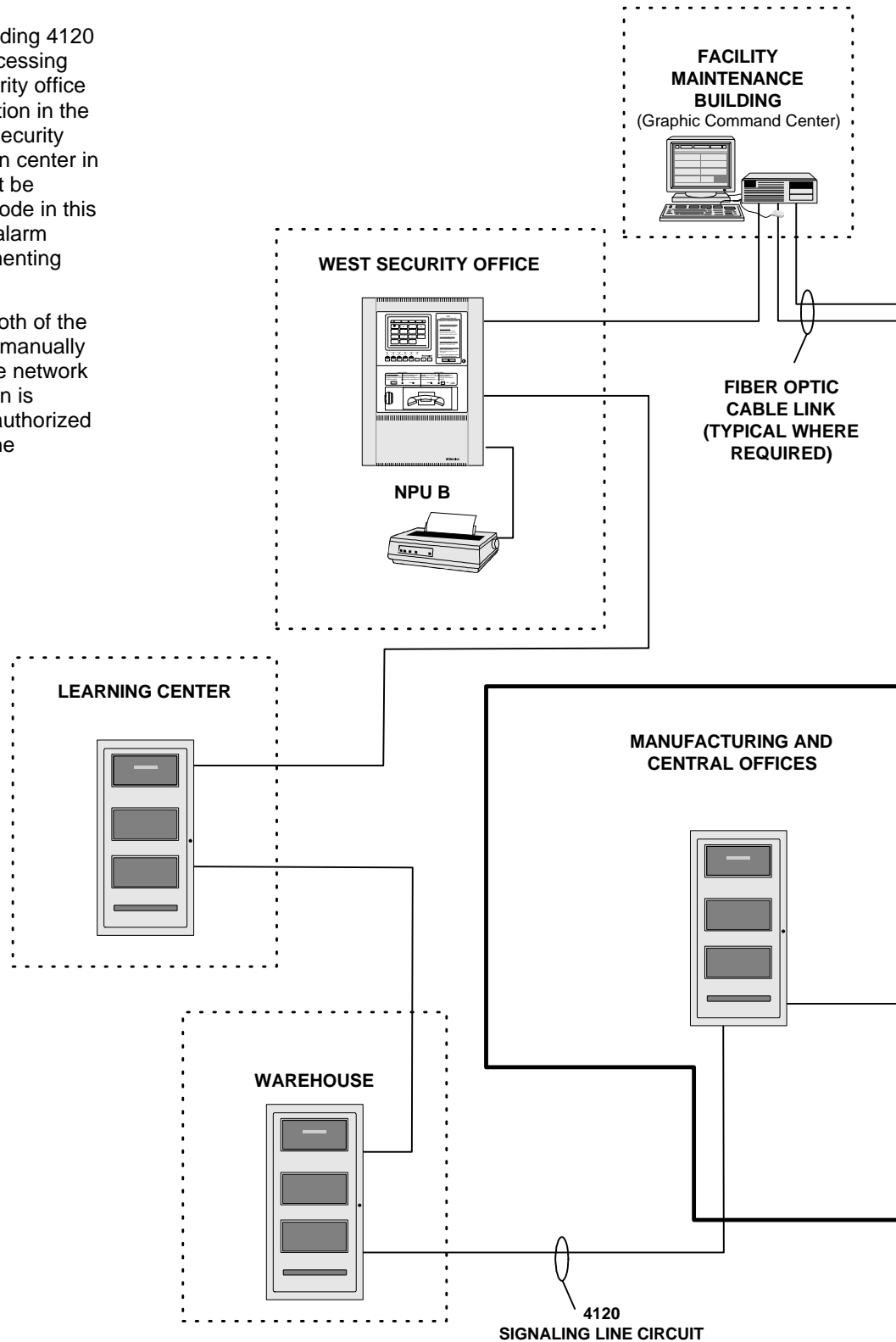
Audio Wiring

4120 Network Wiring

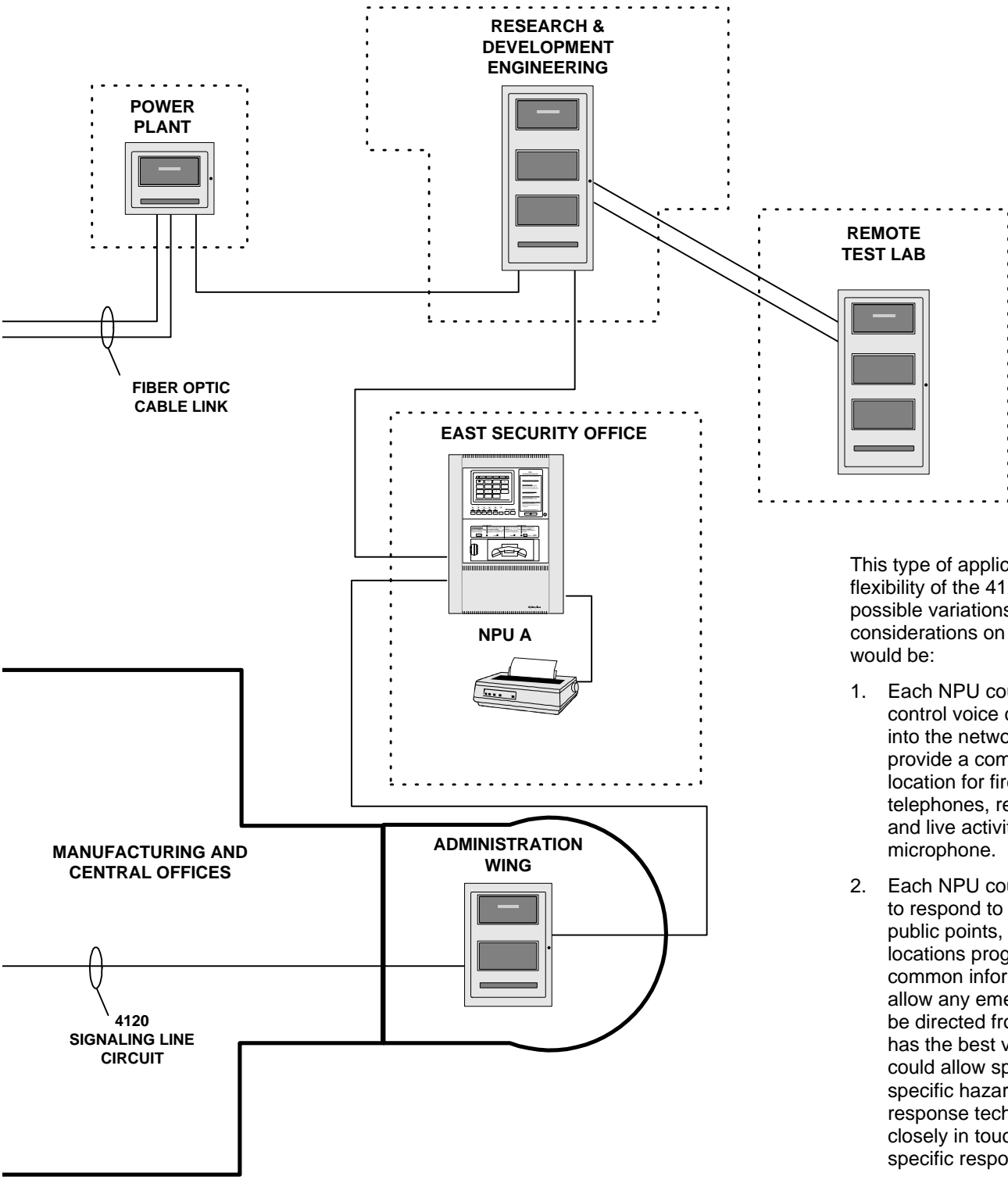**FIGURE 2.** 4120 Network High Rise Application Using 2500 NDU and Universal Transponders

ADVANCED 4120 NETWORK APPLICATIONS

FIGURE 3 represents a multiple building 4120 Network with duplicate Network Processing Unit (NPU) locations. The East security office provides the primary fire fighting station in the event of an emergency. The West security office provides a redundant operation center in the event that a fire emergency must be controlled from that location. Each node in this case is a stand-alone NFPA 72 fire alarm control panel fully capable of implementing local fire response action.

System action recording occurs at both of the NPU locations with each capable of manually investigating and operating the same network public points. Access to the operation is passcode controlled such that only authorized operators have access to override the automatic operation.

FACILITY MAINTENANCE BUILDING
(Graphic Command Center)

WEST SECURITY OFFICE

FIBER OPTIC CABLE LINK (TYPICAL WHERE REQUIRED)

NPU B

LEARNING CENTER

MANUFACTURING AND CENTRAL OFFICES

WAREHOUSE

4120 SIGNALING LINE CIRCUIT

FIGURE 3. 4120 Network Multiple Building Application

POWER PLANT

RESEARCH & DEVELOPMENT ENGINEERING

REMOTE TEST LAB

FIBER OPTIC CABLE LINK

EAST SECURITY OFFICE

NPU A

MANUFACTURING AND CENTRAL OFFICES

ADMINISTRATION WING

4120 SIGNALING LINE CIRCUIT

This type of application illustrates the flexibility of the 4120 Network. Some possible variations and considerations on this application would be:

1. Each NPU could be equipped to control voice communications into the network. This could provide a common control location for fire fighter's telephones, recorded messages, and live activity direction via microphone.

2. Each NPU could be programmed to respond to different sets of public points, perhaps with key locations programmed as common information. This may allow any emergency activity to be directed from the location that has the best view of that area or could allow specialists trained in specific hazardous material response techniques to be kept closely in touch with their specific responsibilities.

Future expansion would be easily accommodated by adding the appropriate node panels, programming the network for the desired response, and connecting the new nodes to the network.

4120 PRODUCT IDENTIFICATION DESCRIPTION

Fire Alarm Control Panels

Product	Description	Data Sheet(s)
4120-8001	4120 Network Control Panel	S4100-0013
4120-8201	4120 Network Control Panel with Audio	S4100-0014
4120-8010	4120 Network MINIPLEX Control Panel	S4100-0013
4120-8210	4120 Network MINIPLEX Control Panel with Audio	S4100-0014 S4100-0015
4120-8511	4120 Network Universal Transponder	
4120-8601	4120 Network Voice Universal Transponder	S4100-0007 S4100-0020
4120-8602	4120 Network Universal Transponder Voice Status Command Center	
4010 Series	4010 Series Fire Alarm Control Panels	S4010-0001
4020 Series	4020 Series Fire Alarm Control Panels	S4020-0003

Network Level Control Products

Product	Description	Data Sheet(s)
4120-8801	2500 Network Display Unit (2500 NDU)	S4120-0002
4120-8821	2500 NDU Voice Status Command Center	S4100-0013
4120-8301	4120 Network Processing Unit (NPU)	S4120-0004
4190-8101 4190-8102 4190-8103	Graphic Command Center	S4190-0005

Network Interface Products

Product	Description	Data Sheet(s)
MULTIPLE*	4120 Network Interfaces	S4120-0003
4120-6023 4120-6024 4020-6023	Physical Bridge Modules	S4120-0005
MULTIPLE	Serial Line Interface, 2120 Systems to NPU or GCC	S4190-0009

Note: The 4120 Network products share many features with the Simplex 4100 Series Fire Alarm Control Panels and additional information is contained in the 4100 series data sheets.

* Describes 4120 Network Interface specifications and connection option details.

GLOSSARY OF 4120 NETWORK TERMS

- **Access Level**
  Network point access is controlled by local panel access and point type. Control can be performed whether the point is local or external.

- **Controller Node, Primary Operator Workstation**
  A node programmed to handle all silence and reset functions for network nodes. This node will be responsible for all network timing functions and will perform network historical logging. Equipment at this node might include a 2500 NDU, printer, and a CRT/keyboard as a network status terminal for smaller networks. Larger networks may require the additional capacity of the Network Processing Unit (NPU) or the Graphic Command Center (GCC).

- **Custom Control**
  Local and external points can both be used for custom control. If a point status is not available due to a network problem, that condition can be considered for writing custom control.

- **External**
  When a node is programmed to monitor or control a public point, that point is considered as external to that node.

- **Global**
  Silence or reset that is sent to all panels of the network requiring each panel to perform that operation and log the information.

- **List**
  If a group of points is assigned to a LIST at a node, the list may be controlled and monitored as a single point. When troubles or alarms occur, the quantity of each is identified as well as the list name, but the details are available only to the owner node or by using the Set-Host feature.

- **Local**
  Activity that only affects operation at the node with no impact to the network.

- **Owner**
  The node where a specific point is physically connected.

- **Node**
  An intelligent device that directly communicates with the network.

- **Peer-to-Peer**
  4120 Network communications are peer-to-peer because they are treated equally by each network node. Each node has an equal opportunity to read and add to the network message. Peer-to-peer node connections occur when the node members have equal (or very similar) capability of interacting with global network information as well as their own local information.

- **Pseudo Point**
  This is a "point-like" function that is monitored and controlled like a physical point, but is actually a feature such as the turning "on" of a timer.

- **Public**
  A monitor or control point, or point list, that has been made available to the network by its owner.

- **Replica**
  When a public point is programmed into a node as an external point, a REPLICA of that point information is maintained at that node. The network updates all replicas whenever a status change occurs. This allows a control panel other than the owner to investigate and respond to specific point information.

- **Set-Host Function**
  Authorized users can access remote node information by logging into the remote node data base. This function enables programming of the entire network from one node.

- **Style 7**
  When communications are capable of operating in the event of a single line-to-line short, single open circuit, or single short to earth. This is normally accomplished by using redundant, isolated wiring that is monitored for status on both the primary path and the redundant path.

- **Timekeeping**
  To synchronize the network time, one node is designated to be the Network Timekeeper. This node will notify the network of authorized time and date changes (with seconds accuracy) and once a day for proper network synchronization. Each node will continue to update its local clock in the event of loss of communications with the network timekeeper.

- **Token Ring**
  The 4120 Network communication protocol handles a network message in the form of the token ring process. The message is sent sequentially to each node and modified or retransmitted intact depending on the status update required of that node.

- **WALKTEST™**
  WALKTEST service operations are local to the node and will not disturb the network. The network is informed that this node is "WALKTEST Active" and the event is logged into the network controller.

- **Wired 4120 Communications**
  A proprietary communications format using differential mode low impedance drivers to provide high data rates over long distances. The electrical characteristics are similar to those of RS-485.

4120 NETWORK NOTES:

Simplex

Gardner, Massachusetts 01441-0001 U. S. A.
Offices and Representatives Throughout the World
Visit us on the world wide web at **www.simplexnet.com**.

All specifications and other information shown were current as of printing and are subject to change without notice.