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A Sierra Monitor Company

## **FieldServer Troubleshooting Guide**

### **APPLICABILITY & EFFECTIVITY**

**Effective for all systems manufactured after May 1, 2001**

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## 1. Initial Start-up

### 1.1. Delivery Issues

When receiving a FieldServer, the components that were meant to be shipped with the FieldServer are listed in the related Instruction Manual. If there appears to be something missing, call FieldServer Technologies 408-262-2299 x104 or 888-509-1970 x104,. The Customer Service Representative (CSR) will provide assistance.

### 1.2. Power to the FieldServer

The Power LED should show steady green at all times when the FieldServer is connected. See Instruction Manual for more information on LED's. If the LED is not green, check the power source, power supply and connections.

## 2. FieldServer Utility Problems

### 2.1. Ping cannot locate the FieldServer...

Check the following:

- Computer connection to the network.
- Computer adapter in use is enabled and connected to the FieldServer/network.
- Computer has TCP/IP installed – See Section 6.4.1.
- Subnet of FieldServer connection -- If the FieldServer can be reached by Ruiping using broadcasts; it is probably on a different subnet to the computer. See Section 6.4.1.3 for more information.
- Duplicate IP address – If a new computer or networked device has been added to the same network as the FieldServer this could have resulted in a duplicate IP address.
- Different IP address -- Has anyone changed the IP addresses of any of the devices on the network?
- Network topology -- Have any changes been made to the network topology? New routers? New switches?
- Firewall configuration been changed to block ports or IP's?
- Router configuration been changed to block some ports or IP addresses or protocols?
- Excessive collisions on the network?

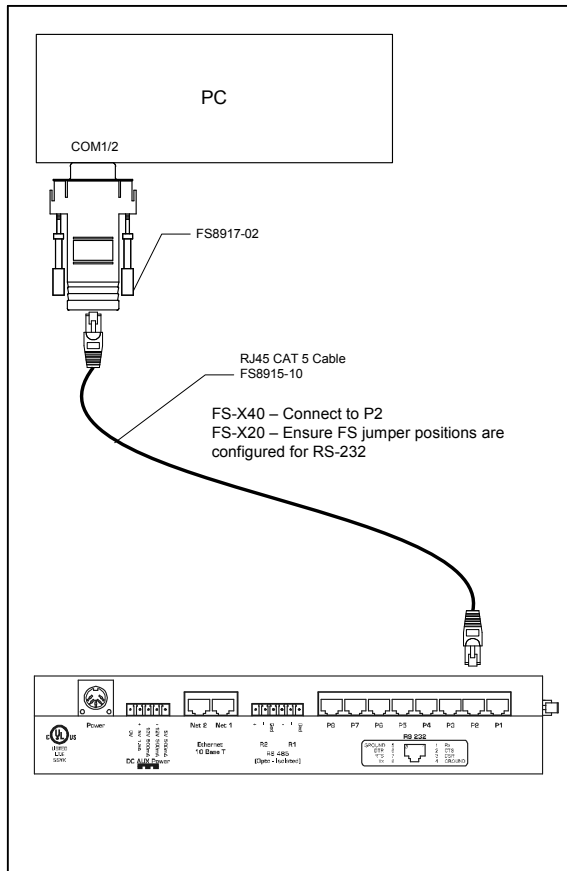
If the computer cannot Ruiping the FieldServer and none of the above reasons apply, contact FieldServer Technical Support.

### 3. Firmware Recovery Using HyperTerminal

There is limited amount file storage space on a FieldServer. If space permits, files are downloaded to a temporary file until the download is completed successfully. The old file is then removed and the temporary file renamed. If there is insufficient space, the temporary file method cannot be used and the firmware may be corrupted if the download is interrupted. If the Run LED is not flashing then the FieldServer's firmware or configuration file is invalid and new firmware or configuration must be downloaded to the FieldServer using the following method.

#### 3.1. Connection

Connect the PC to the FieldServer as shown in the following configuration diagram.



#### 3.2. Hyperterminal Configuration

- Launch Hyperteminal - **Start|Programs|Accessories|Communications|Hyperterminal**
- Make sure Hyperterminal is disconnected (**Call|Disconnect**)
- Go to **File|Properties**, choose the serial com port that will be used (COM1 or COM2) and select "Configure"
- Choose the port parameters as follows:

Baud rate: 115200 (FieldServer default)  
 Data bits: 8  
 Parity: None  
 Stop bit: 1  
 Flow control: None (use Xon/Xoff if having problems)

#### 3.3. Transferring the good file to the FieldServer

- Connect. – **Call|Connect**
- Remove power from the FieldServer
- Navigate through HyperTerminal Menu - **Transfer|Send File**
- Select the file to be transferred (make sure it is named correctly, e.g config.csv or cb8menu.exe) using the Browse button.
- Ensure that the Protocol is set to ZMODEM
- Click on **Send**
- Reconnect power to the FieldServer
- The FieldServer will initiate the handshake with Hyperterminal on startup.
- Hyperterminal will now send the selected file to the FieldServer.
- Remove and re-apply power to the FieldServer.

#### 3.4. Troubleshooting Hyperterminal downloads

- Retry several times.
- Try setting Flow Control to XON/XOFF.
- File transfer may hang during the procedure. If the number of bytes transferred does not change for a couple of minutes, restart from the beginning.
- Modify the FS-8917-02 connector by bridging pins 3 and 6 (DTR/DSR), and try again. A full list of pin and wire connections is provided in the Instruction Manual.

## 4. Connection Issues

### 4.1. General

- Confirm that cables are undamaged and correctly seated, and that the cable type is correct (e.g.: for Ethernet - cross-over vs. direct)
- Check the adapters by transferring the cable between different adapters. If one adapter works, the problem is likely to be with the other adapter.
- Refer to the FieldServer and third party documentation of the signal pinouts to ensure that connection has been set up correctly

### 4.2. Ethernet

- If connected to a switch/hub, confirm that it supports 10/100BaseT and that the cable is not plugged into an uplink port
- Ensure that the link light is showing a good connection.
- For PC's, ensure that the Ethernet port is installed and active.
- See Section 6.4 for more information.

### 4.3. RS-232

If connected directly to the PC confirm that the com port in use is activated

#### 4.3.1. Wiring Verification Techniques for RS-232 Devices

##### 4.3.1.1. Multi-Meter Method

If the device serial terminals are not clearly labeled or if the device serial connector is a D-Type connector then use this method:

- Remove the cable from the device.
- Measure the voltage between pin 2 and the GND pin (pin 5 on 9 pin connectors and pin 7 on 25 pin connectors).
- Measure the voltage between pin 3 and the GND pin
- Between ground and the transmit pin there should be between -12 and -8 volts DC. Between ground and the receive pin there should be zero volts.
- Check the cables to ensure that the transmit pin on the device is connected to the receive pin on the FieldServer.

##### 4.3.1.2. Mini-Tester Method<sup>1</sup>

Insert the mini-tester in line with the RS-232 connection. It may be necessary to use some gender changers and 9 to 25 pin converters to accomplish this.

If the cable is correctly made up RD and TD will light up solid (red or green). If only one of them lights up then there is a 90% probability that Tx and Rx are swapped.

### 4.4. RS-485

- FieldServer Technologies makes use of 2-wire RS-485 on their devices. When using the FieldServer in 4-wire RS-485 or RS-422 networks, it is recommended that a 2 to 4 wire converter is used. It is possible to communicate on a four wire network with a 2-wire device without using a converter, but this should only be attempted if the user understands the implementation well.

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<sup>1</sup> The following web link has further information on the supplied mini tester-  
[http://www.bb-elec.com/tech\\_articles/faq\\_rs232\\_connections\\_work.asp](http://www.bb-elec.com/tech_articles/faq_rs232_connections_work.asp).

- RS-485 guidelines for maximum cable length stipulate 4000ft. Note that this guideline makes several assumptions about the quality of the network and power consumption of the devices present, and it is recommended that extra repeaters are installed if the network in question is approaching this limit.
- RS485 guidelines stipulate that the network is terminated. Guideline resistance for termination is 120 Ohms. It is entirely plausible, however, that no termination or a different termination resistance can work better in a given application, and so it is best to experiment when experiencing poor quality communications.
- RS-485 converters come in different levels of complexity. Simple converters allow for baud rate and send control to be adjustable, and fix the other parameters to a value that is suitable for most applications. It is recommended that more complex converters are used only if the simple converter is not meeting the needs of the network in question.

#### 4.4.1. Wiring Verification Techniques for RS-485 Devices

- Match the “+” and “-” signals on the two devices. Where devices label their signals A and B, “A” normally denotes “-”, and “B” “+”
- Connection of the third “signal ground” wire is not always necessary, but is advised.
- When measuring between signal ground and “+” at steady state (i.e.: no communications), a voltage of between 1.5V and 7V should be present. The same applies to measuring between signal ground and “-”. If a voltage outside this range is measured, then it may be necessary to bias the line.
- A line can be biased by putting a 120 Ohm resistor between “+” and “-”, and a 10k Ohm resistor between signal ground and “+” as well as a 10k Ohm resistor between signal ground and “-”.
- RS-485 achieves binary transmission by switching the voltage polarity between “+” and “-”, so if the Rx light is on when there is no communications, there is a good chance that “+” and “-” are swapped, or that there are some bad voltages on the line. The transceiver could also be damaged.

#### 4.5. Adapter cards (X30 and X40 only)

Please refer to the driver manual related to the Adapter card in question. Troubleshooting tips can typically be found in the back of the driver manual.

#### 4.6. Remote device Configuration and Settings

- Confirm that all remote devices are powered up and operating normally.
- Some devices have a single port which supports more than one protocol - ensure that the protocol has been correctly configured for use with the FieldServer.
- Confirm that all settings on the remote device are correct. Some devices have micro switches which are used to enable a port or to configure a port in ASCII or hexadecimal format. Some have menus to set the device address as well as other parameters.
- Some devices change their operating setting back to defaults when recycled and the default setting may not be valid for the configured connection.
- A remote device may have been faulty and service personnel may have changed the part out without setting the communication parameters correctly.
- Has someone changed the address of the remote devices?
- On an RS-485 network, had a new device been recently added? Does it have a duplicate address? Is the max node count exceeded? Some systems have additional constraints such as requiring that the devices be placed on the network so that they are arranged in address order.
- Has anyone recently updated the firmware on the remote device?
- Is the remote device programmable like a PLC? Has anyone recently changed the logic in the remote device?
- If the remote device sends unsolicited messages such as a fire alarm panel, is this capability still enabled?

## 5. Configuration Files

- Not all configuration errors can be detected by the FieldServer. For example, it is not possible for the FieldServer to know that the address used for a remote device is incorrect if that address is a legal value. If the FieldServer picks up a configuration error, then the error will be logged in the System Error screen of the Remote User Interface (RuiNet) and the configuration error light will be lit. The message in the System Error screen will point to the line in the configuration file where the error exists, and provide some explanation as to the cause of the error.
- When trying to pinpoint a problem in a large configuration file, it is useful to apply the “ignore” and “process” keywords to isolate the problem area by disabling sections of the configuration at a time (see FieldServer Configuration Manual).

### 5.1. System Overruns

System overruns occur as a result of the FieldServer program cycle time exceeding FieldServer norms. If this message occurs infrequently, it's nothing to be concerned about. However, if the error occurs consistently, then it should be reported to FieldServer technical support for resolution.

### 5.2. Could not create cache block

- Confirm the existence of the virtual node from which client is attempting to poll data
- If the node does not exist, create one.
- If the node exists, but the Map Descriptors for it do not, add a new Map Descriptor.
- Determine the node, address, and length the client is polling, and check to see if they exist in the configuration.
- If this information is not in the configuration file, or is incorrect, alter the information or add a new Map Descriptor containing the correct information.
- Consult the Driver Manual

### 5.3. Things to consider when troubleshooting....

- Have firmware or CSV been recently updated? Revert to the older version and see if the problem persists?
- Have any files been recently deleted on the FieldServer?
- Have any files been recently downloaded to the FieldServer?
- Has any one else changed the firmware or configuration? Does anyone else have access to the FieldServer?

## 6. Communications Issues

### 6.1. Sys LED indicates problem

The LED is lit (red) every time that the firmware produces a system error message. To investigate the problem, connect to the FieldServer using RuiNet and check the 'E' (Error) Screen. (Refer to Utilities Manual). Locate a message that begins with the message "System Error..." Report this message to FieldServer Technical Support. The problem is not necessarily critical, but can be, and as such should be reported.

### 6.2. Com (Node offline) LED indicates problem

During normal operation of the FieldServer this LED should be off. If one or more nodes are offline then the FieldServer will flash this LED briefly every few seconds. This problem can be investigated further by browsing the Node Screens using RuiNet.

### 6.3. Serial

- If communication is unidirectional (i.e: no responses to any queries), review Section 4 of this manual and ensure the connection is absolutely correct.
- If the FieldServer is communicating with the remote device, but experiencing frequent errors, then the most probable cause is line quality. Note that an RS-232 connection should not exceed 50 feet, and an RS-485 connection should not exceed 4000 feet.
- If the connection of the line has been checked thoroughly, and problems persist, then take a serial capture log (See Utilities Manual and Appendix A.2 of this manual) and send it to FieldServer Technical Support for analysis.

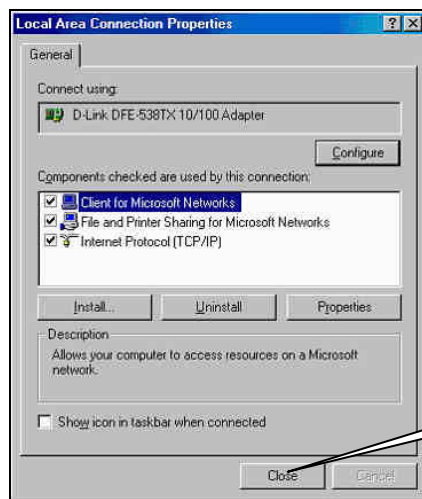
## 6.4. Ethernet

If communication is unidirectional (i.e: no responses to any queries), start by reviewing Section 4 of this manual to make sure the connection is absolutely correct

### 6.4.1. IP addressing and allocation

#### 6.4.1.1. Install TCP/IP protocol

- Select **Start|Settings|Network and Dialup Connections**
- Double Click on Local Area Connection
- Select **Properties**
- If TCP/IP is not installed, select "**Install**"
- Select "**Protocol**" then "**Internet Protocol (TCP/IP)**"
- The window closes and the following Dialog displays.



Select "**Close**" and restart the computer for the settings to take effect.

#### 6.4.1.2. Determine the Computer's IP Address and Netmask

- Open a DOS window and change to the Windows (System32) directory.
- Type **ipconfig<Enter>**
- Review and note the information on the screen.

#### 6.4.1.3. Determine the Computer's Subnet

A physical network may be divided into several logical networks called subnets. Sub-netting is achieved using netmasks. The netmask identifies the portion of the IP address containing the network ID. The remaining portion conveys the Node/computer ID.

##### **Example:**

- IP = 192.168.1.174
- Mask = 255.255.255.0

The netmask indicates that the first three IP values identify the network and the remainder (the 4<sup>th</sup> value) contains the Node ID. Thus we have the network ID equal to 192.168.1 and the node or computer ID is 174.

#### 6.4.1.4. Changing the Computer's IP address

- Select **Start|Settings|Network and Dialup Connections**
- Double Click on appropriate Local Area Connection
- Select **Properties**

- Select **TCP/IP** and **Properties**
- Allocate an IP address
- An IP address of 192.168.1.102 with netmask 255.255.255.0 will ensure that this computer is on the same sub-net as the FieldServer with its shipping settings.
- Click **OK** when done.

#### 6.4.1.5. Allocating FieldServer IP Addresses using RuiNet (Preferred method)<sup>2 3</sup>

From the main menu in Ruinet, type I. Choose the address to change, change it, and cycle power to the FieldServer

#### 6.4.1.6. Using Ruiboot

Notes: When Ruiboot is used in this simple mode it does not check for duplicate IP addresses, therefore a manual check is required.

Ruiboot responds to the **first** FieldServer to boot. In this basic mode it can only allocate the IP address to one FieldServer.

- Power down the FieldServer.
- Start Ruiboot
- Cycle power to FieldServer and wait for completion (up to 60s)
- Hit a key to exit Ruiboot.

#### 6.4.1.7. Modify SMCTCP.ini<sup>4</sup>

This method can only be used to set the IP address of the N1 adapter.

Upload the file SMCTCP.ini modify the file, download the modified file and restart the FieldServer.

#### 6.4.1.8. Modify fs\_tcp.ini<sup>4</sup>

Delete the smctcp.ini file for the FieldServer to use the values in the fs\_tcp.ini file.

A more recent version of one the firmware files on the FieldServer must be present. The file name is 8051bp03.exe.

Upload the file FS\_TCP.ini, modify the file, download the modified file and restart the FieldServer.

## 6.5. Adapter Card

Please refer to the driver manual related to the Adapter card in question. Troubleshooting tips can typically be found in the back of the driver manual

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<sup>2</sup> This option is not available in FieldServers purchased before June 2004.

<sup>3</sup> If changing the FieldServer's IP address so that it is part of a different sub-net to the host computer's then the user will only be able to connect to the FieldServer (from the host PC) using Ruinet's broadcast method. Ruinet can only connect to one FieldServer by broadcast.

<sup>4</sup> FieldServers purchased before July 2002

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**Appendix A. Calling Tech Support**

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**Appendix A.1. Use this Manual**

Use this manual, the driver manuals and the FieldServer instruction manual to diagnose and correct the problem. The primary contact with FieldServer technical support will help the user proceed through many of the procedure and diagnostic steps in this manual.

**Appendix A.2. Take a log**

- For successful troubleshooting, FieldServer Technical Service personnel require a log of the conditions creating the error or event.
- In the case of serial devices, take a serial communications log – Refer to <http://www.fieldserver.com/docs/pdf/ENOTE0058.pdf>
- For non-serial devices, take a snapshot capture log – refer to <http://www.fieldserver.com/docs/pdf/ENOTE0058.pdf>
- For ethernet devices a Wireshark capture should be taken, - refer to <http://www.fieldserver.com/docs/pdf/ENOTE0063.pdf>.
- For information on taking serial logs from a command line prompt, refer to [http://www.fieldserver.com/techsupport/manuals/datasheets/fieldserver\\_utilities\\_manual\\_\(t17009\).pdf](http://www.fieldserver.com/techsupport/manuals/datasheets/fieldserver_utilities_manual_(t17009).pdf)
- Mail the log with the FieldServer configuration to [Support@FieldServer.com](mailto:Support@FieldServer.com).
- Call FieldServer Tech Support 408-262-2299 x126. If an SI (Support Incident) number exists then quote the number to continue with support on an existing incident. If the incident is new a SI number will be allocated.

## Appendix B. General Information

### Appendix B.1. Rules for File Names on a FieldServer

File must be named using DOS's 8.3 file naming convention

- File name consists of two parts; Prefix and an optional extension separated by a period.
- The prefix may consist of a maximum of 8 characters.
- The extension may consist of a maximum of 3 characters.
- The characters must be one the following set (case independent)

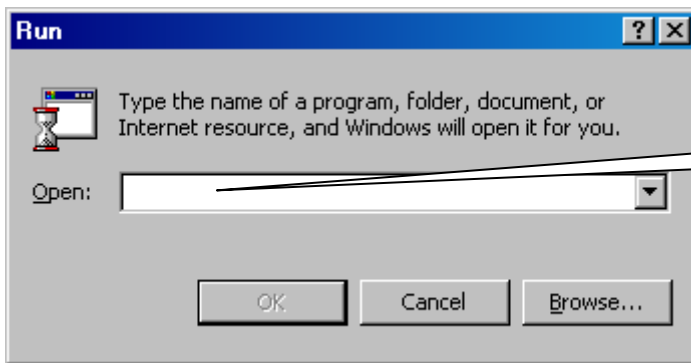
0..9 A..Z a..z []~\_{}

### Appendix B.2. Start a DOS box (DOS session on a windows computer)

1. Check your computer's desktop. If the DOS icon is present, double click on it.



2. **Start|Run**



3. **Start|Programs|Accessories|Command Prompt**

### Appendix B.3. Locate a file

#### Using DOS

Assume the file you are trying to locate is called *filename.ext*

Start a Dos box.

At the prompt type

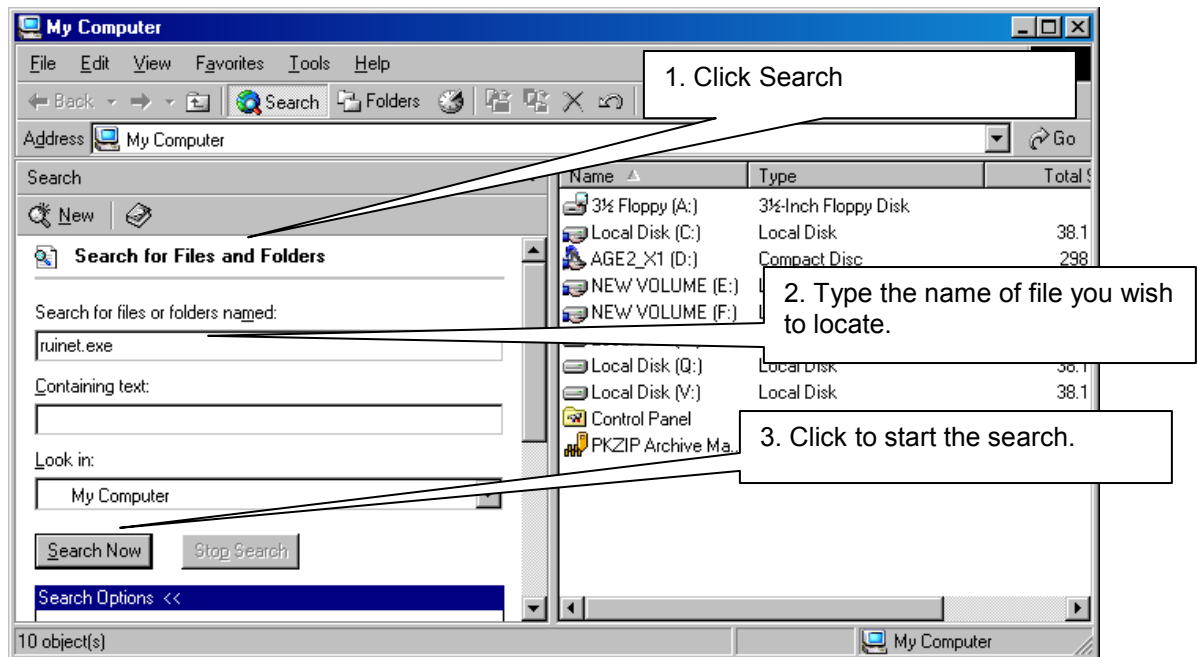
**C:** <Enter>

**CD\** <Enter>

**DIR filename.ext /s** <Enter>

Record the results

**Using Explorer** - Hold down the *windows key* and push the *E key*.



## Appendix C. Glossary

Term	Description
ActiveX	An ActiveX control is a <b>component</b> program <b>object</b> that can be re-used by many application programs within a computer or among computers in a network. The technology for creating ActiveX controls is part of Microsoft's overall <b>ActiveX</b> set of technologies, chief of which is the <b>Component Object Model</b> (COM). ActiveX controls can be downloaded as small programs or animations for Web pages, and can also be used for any commonly-needed task by an application program in the latest Windows and Macintosh environments. In general, ActiveX controls replace the earlier <b>OCX</b> (Object Linking and Embedding custom controls). An ActiveX control is roughly equivalent in concept and implementation to the <b>Java applet</b> .
Browser	Software used for browsing the Internet or Intranet e.g. Microsoft Internet Explorer
Container	In Sun Microsystems' <b>JavaBeans</b> component architecture and Microsoft's <b>Component Object Model</b> (COM), a container is an application program or subsystem in which the program building block known as a <b>component</b> is run. For example, a component - such as a button or other graphical user interface or a small calculator or database requestor - can be developed using JavaBeans that can run in Netscape containers such as browsers and in Microsoft containers such as Internet Explorer, Visual Basic, and Word.
Download	Transfer a file from host computer to a FieldServer.
Downstream Device	A device connected to FieldServer where the FieldServer is the client (sometimes a passive client) in the relationship between the pair. - See Upstream Device.
Consumer	See Passive Client
OCX	The default filename extension of an ActiveX control. The term OCX is also used as a synonym for an ActiveX control.
Passive Client	A driver is termed a passive client driver when it is only capable of listening for unsolicited messages. Most of the FieldServer drivers used to connect to fire alarm panels are passive client drivers connected via the panel's printer or auxiliary ports.
Producer	A driver designed to generate events or periodic messages but not respond to polls for data.
RUI	Remote User Interface.
Tier	A tier is a virtual FieldServer – a software construction on which the various drivers are executed. Most applications only use one tier (called "Tier 2" or "Tier B" or "The Pex Tier") but some emulations and complex configurations use multiple tier's.
Upload	Transfer a file from a FieldServer to a computer.
Upstream Device	A device connected to FieldServer where the FieldServer is the server in the relationship between the pair. The Upstream device polls the FieldServer, which responds with data to the upstream device. - See Downstream Device.
<b>Networking Terms</b>	
10Base2	10Base2 is the implementation of the IEEE 802.3 Ethernet standard on thin coaxial cable. Thin Ethernet or thin-net, as it is commonly called, runs at 10Mbps. Stations are daisy chained and the maximum segment length is 200 meters.
10Base5	10Base5 is the implementation of the IEEE 802.3 Ethernet standard on thick coaxial cable. Thick or standard Ethernet, as it is commonly called, runs at 10Mbps. It uses bus topology and the maximum segment length is 500 meters.
10BaseT - (Standard on FieldServer)	10BaseT is the implementation of the IEEE 802.3 Ethernet standard on unshielded twisted-pair wiring. It uses star topology, with stations directly connected to a multi-port hub. It runs at 10Mbps, and has a maximum segment length of 100 meters.
802.3	This IEEE standard governs the Carrier Sense Multiple Access/Collision Detection (CSMA/CD) networks - more commonly called Ethernet. 802.3 networks operate at varying speeds and over different cable types. See 10Base2, 10Base5 and 10BaseT. Examples of leased line services are 56 Kbps or T-1 lines.

Term	Description
Arcnet	A 2.5 Mbps token-passing star-wired network designed by Datapoint in the 1970s. Its low cost and high reliability can make it attractive to companies on a tight network budget, although not endorsed by any IEEE committee. ArcnetPlus is a proprietary product data and peripherals. All connections are made by cable or wireless media. It typically spans a single building or campus.
Bridge	A bridge connects two networks of the same access method, e.g., Ethernet to Ethernet. A bridge works at the OSI's Media Access Layer, and is transparent to upper-layer devices and protocols. Bridges operate by filtering packets according to their destination addresses. Most bridges automatically learn where these addresses are located, and thus are called learning bridges.
Ethernet	Ethernet is a 10Mbps, 100 Mbps, or 1000 Mbps CSMA/CD network that runs over thick coax, thin coax, twisted-pair, and fiber-optic cable. A thick coax Ethernet uses bus topology. A thin coax Ethernet uses daisy chain topology. A fiber Ethernet is point-to-point. DIX or Blue Book Ethernet is the name of the Digital Equipment Corp., Intel and Xerox specification; 8802/3 is the ISO's specification.
Gateway	In OSI terminology, a gateway is a hardware and soft-ware device that connects two dissimilar systems such as a LAN and a mainframe. It operates at the fourth through seventh layers of the OSI model. In Internet terminology, a gateway is another name for a router.
Hub	A multiport repeater or hub that brings together the connections from multiple network nodes. Concentrators have moved past their origins as wire concentrator centers, and often house bridges, routers, and network-management devices.
Internet Protocol (IP)	IP is part of the TCP/IP suite. It is a session layer protocol that governs packet forwarding.
Leased line	A transmission line reserved by a communications carrier for the private use of a customer. Examples of leased line services are 56 Kbps or T-1
Local area network (LAN)	A group of computers, each equipped with appropriate network adapter cards and software that share applications, data and peripherals. All connections are made by cable or wireless media.
Network	A connected system of computers, hardware and software over which data, files, and messages can be transmitted and end users communicate. Networks may be local or wide area.
Open systems	In open systems, no single manufacturer controls specifications for the architecture. The specifications are in the public domain, and developers can legally write to them. Open systems are crucial for interoperability.
Packet	A collection of bits comprising data and control information, sent between nodes
Packet switching	In packet switching, data is segmented into packets and sent across a circuit shared by multiple subscribers. As the packet travels over the network, switches read the address and route the packet to its proper destination. X.25 and frame relay are examples of packet-switching services.
Protocol	A standardized set of rules that specify how a conversation is to take place, including the format, timing, sequencing and/or error checking.
Router	A network layer device connecting networks using the same Network-Layer protocol, (e.g. TCP/IP or IPX). A standardized protocol, such as RIP is used to move packets over an internetwork. A router provides greater control over paths and greater security than a bridge but is more difficult to set up and maintain.
TCP/IP, Transmission Control Protocol/Internet Protocol	The protocol suite developed by the Advanced Research Projects Agency (ARPA), almost exclusively used on the Internet and widely used in corporate internetworks, because of its superior design for WANs. TCP governs how packets are sequenced for transmission; IP provides a connectionless datagram service. The term "TCP/IP" is often used to generically refer to the entire suite of related protocols.
Wide area network (WAN)	A WAN consists of multiple LANs that are tied together via telephone devices and/or fiber optic cabling. Span is unlimited.

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Term	Description
Wireless LAN	A wireless LAN does not use cable to transmit signals, but rather uses radio or infrared to transmit packets through the air. Radio frequency (RF) and infrared are the most commonly used types of wireless transmission.