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DSEEXTRA[®]

**DSE865 RS485 Ethernet Adaptor
Document Number 057-099**

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057-099 *DSE860/DSE865 Serial to Ethernet Adaptor operator manual*

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Amendments since last publication

Amd. No.	Comments
Issue 1.1	Added page about WAN connection
Issue 1.2	Added more details about connections
Issue 1.3	Added more details about DS manager

Typeface : The typeface used in this document is *Arial*. Care should be taken not to mistake the upper case letter I with the numeral 1. The numeral 1 has a top serif to avoid this confusion.

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1 BIBLIOGRAPHY

This document refers to and is referred to by the following DSE publications which can be obtained from the DSE website www.deepseapl.com :

DSE PART	DESCRIPTION
057-006	5200 / 5300 series PC configuration Software Manual
057-007	5500 series PC configuration Software Manual
057-077	DSE7200 / DSE7300 Series Configuration Software Manual
057-078	DSE7500 Series Configuration Software Manual

2 DESCRIPTION

The **DSE865** is designed to allow the connection of any DSE RS485 serial enabled product to be connected to the LAN (network) / WAN (internet).

Once connected to the DSE Configuration Software, full control of the module via the PC software's SCADA section is possible along with complete read/write and edit of the module's configuration. Selected DSE modules have PIN codes to lock out unauthorised access.

Full details of the operation of the PC configuration software is contained in the relevant software manual.

- Incorporates hardware data flow control and can have a static or assigned IP address.
- To use the product through the internet, the customers IP address given to the DSE865 has to be visible to the outside world. The customer must configure their router to achieve this goal.
- A simple PC windows application allows the location and setting of the various parameters of the DSE865 – Fully customer configurable removing the need for customisation by DSE before despatch.
- Indicators located on the Ethernet port show the operation and connection status at all times.
- DIN-rail mounting enclosure to facilitate the installation of the adapter within the customer's product.
- Automatic reconnection In the event of loss of communication.



DSE865 (RS485)

3 SPECIFICATION

3.1 DC SUPPLY

Nominal voltage	8V to 35V continuous DC
Protection against surges to	60V DC
Power consumption	@ 12V DC - 110mA +/- 5%, app. (in 100BaseT mode)

3.2 ENVIRONMENTAL SPECIFICATIONS

Operating Temperature	-30°C to +70°C
Storage Temperature	-40°C to +85°C
Vibration	2g, 10-500Hz, amplitude 0.15mm, 6g desirable
Mechanical Shock	N/A
Humidity	85%, relative, non-condensing, up to 85°C

3.3 APPLICABLE CODES AND STANDARDS

DSE860/5 meets or exceeds the following standards

EMC (Emissions and Immunity):	EN61000-6-2 Generic Immunity EN61000-6-3 Generic Emissions
Usage within USA and Canada	UL 508, CSA 22.2, NFPA 70 / 110

4 HARDWARE INSTALLATION

4.1 CONNECTION DETAILS

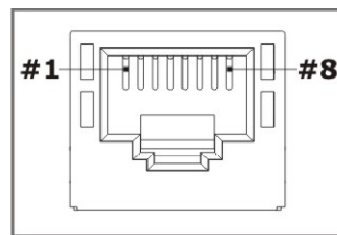
4.1.1 POWER

Pin no.	Description
1	DC -ve
2	DC +ve



4.1.2 ETHERNET

Pin no.	Description
1	TX+
2	TX-
3	RX+
4	Do not connect
5	Do not connect
6	RX-
7	Do not connect
8	Do not connect

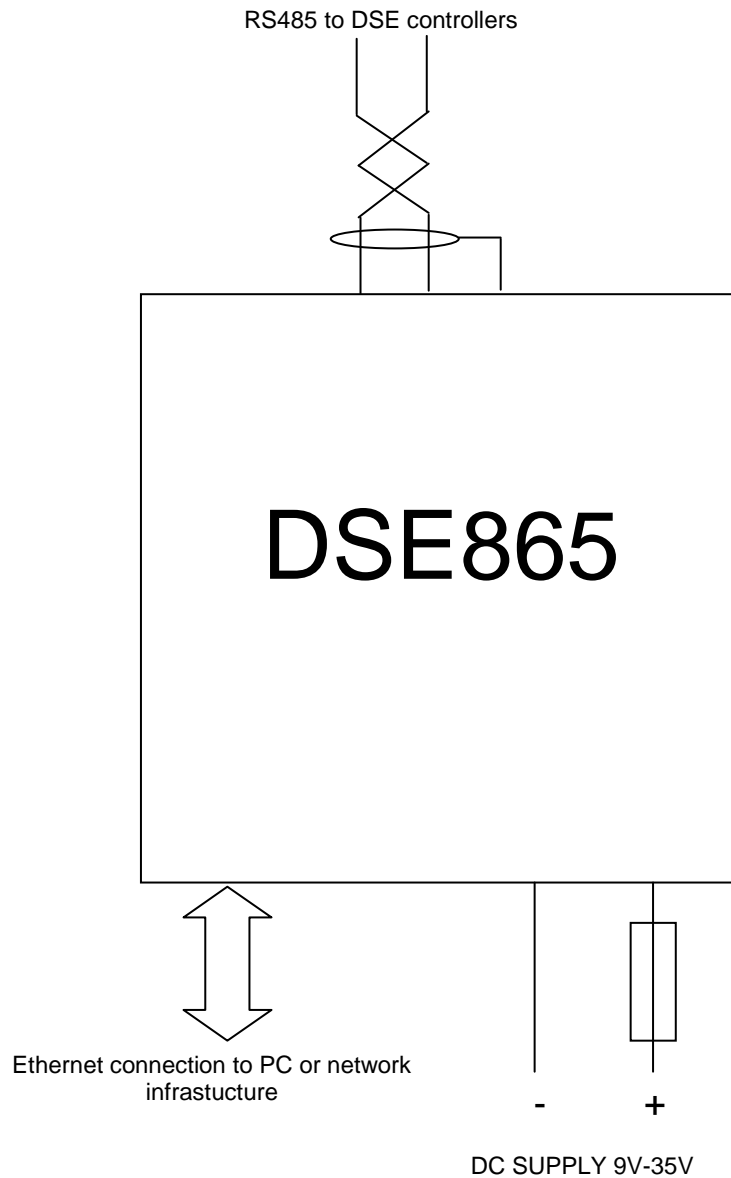


4.1.4 SERIAL RS485 (DSE865 ONLY)

1	Screen
2	B
3	A



4.3 TYPICAL WIRING DIAGRAM RS485 (DSE865 ONLY)



NOTE:- Screened 120Ω impedance cable specified for use with RS485 must be used for the RS485 link.
DSE stock and supply Belden cable 9841 which is a high quality 120Ω impedance cable suitable for RS485 use (DSE part number 016-030)

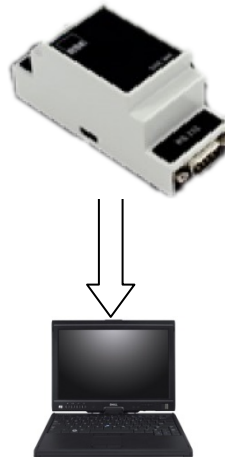
NOTE:- Remember to fit 120Ω termination resistor to the 'first' and 'last' equipment on the RS485 link.

4.4 TYPICAL SYSTEM SCHEMATICS

4.4.1 DIRECT PC CONNECTION

Requirements

- DSE module with RS232 or RS485 serial port
- DSE860/5
- Crossover Ethernet cable (see below for details)
- PC with Ethernet port and Windows Internet Explorer 6 or above, Firefox
- DSE PC software for the DSE module being connected to.

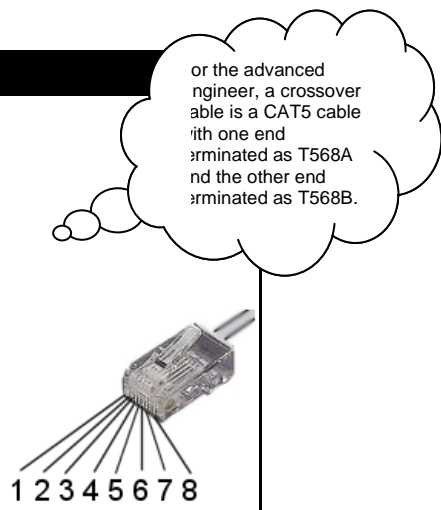


NOTE:- The serial connection from the DSE module to the DSE860/5 has been omitted for clarity of the diagram

Crossover cable wiring detail

Two pairs crossed, two pairs uncrossed
10baseT/100baseTX crossover

Pin	Connection 1 (T568A)	Connection 2 (T568B)
1	white/green stripe	white/orange stripe
2	green solid	orange solid
3	white/orange stripe	white/green stripe
4	blue solid	blue solid
5	white/blue stripe	white/blue stripe
6	orange solid	green solid
7	white/brown stripe	white/brown stripe
8	brown solid	brown solid

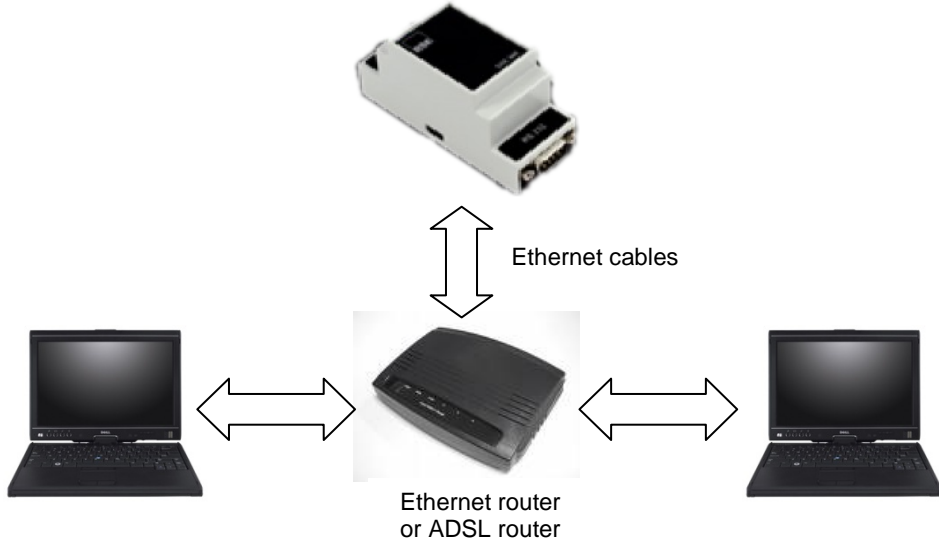


NOTE:- These can be purchased from any good PC or IT store.

4.4.2 CONNECTION TO BASIC ETHERNET

Requirements

- DSE module with RS232 or RS485 serial port
- DSE860/5
- Ethernet cable (see below)
- Working Ethernet (company or home network)
- PC with Ethernet port and Windows Internet Explorer 6 or above, Firefox
- DSE PC software for the DSE module being connected to.



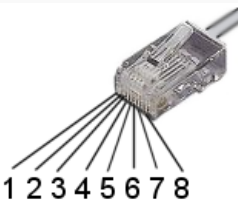
NOTE:- The serial connection from the DSE module to the DSE860/5 has been omitted for clarity of the diagram

Ethernet cable wiring detail

For the advanced Engineer, this cable has both ends terminated as T568A (as shown below) or T568B.

Pin	Connection 1 (T568A)	Connection 2 (T568A)
1	white/green stripe	white/green stripe
2	green solid	green solid
3	white/orange stripe	white/orange stripe
4	blue solid	blue solid
5	white/blue stripe	white/blue stripe
6	orange solid	orange solid
7	white/brown stripe	white/brown stripe
8	brown solid	brown solid

For the advanced Engineer, this cable has both ends terminated as T568A (as shown below) or T568B.

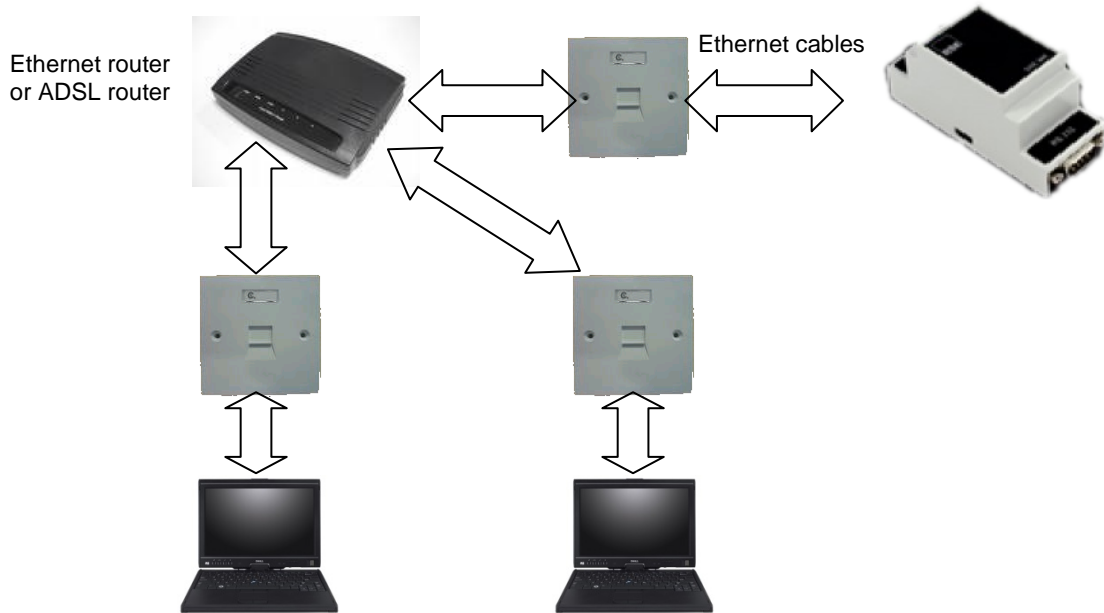


NOTE:- DSE Stock a 2m (2yds) Ethernet Cable – Part number 016-137. Alternatively they can be purchased from any good PC or IT store.

4.4.3 CONNECTION TO COMPANY INFRASTRUCTURE ETHERNET

Requirements

- DSE module with RS232 or RS485 serial port
- DSE860/5
- Ethernet cable (see below)
- Working Ethernet (company or home network)
- PC with Ethernet port and Windows Internet Explorer 6 or above, Firefox
- DSE PC software for the DSE module being connected to.



NOTE:- The serial connection from the DSE module to the DSE860/5 has been omitted for clarity of the diagram

Ethernet cable wiring detail

For the advanced Engineer, this cable has both ends terminated as T568A (as shown below) or T568B.

Pin	Connection 1 (T568A)	Connection 2 (T568A)
1	white/green stripe	white/green stripe
2	green solid	green solid
3	white/orange stripe	white/orange stripe
4	blue solid	blue solid
5	white/blue stripe	white/blue stripe
6	orange solid	orange solid
7	white/brown stripe	white/brown stripe
8	brown solid	brown solid

For the advanced Engineer, this cable has both ends terminated as T568A (as shown below) or T568B.

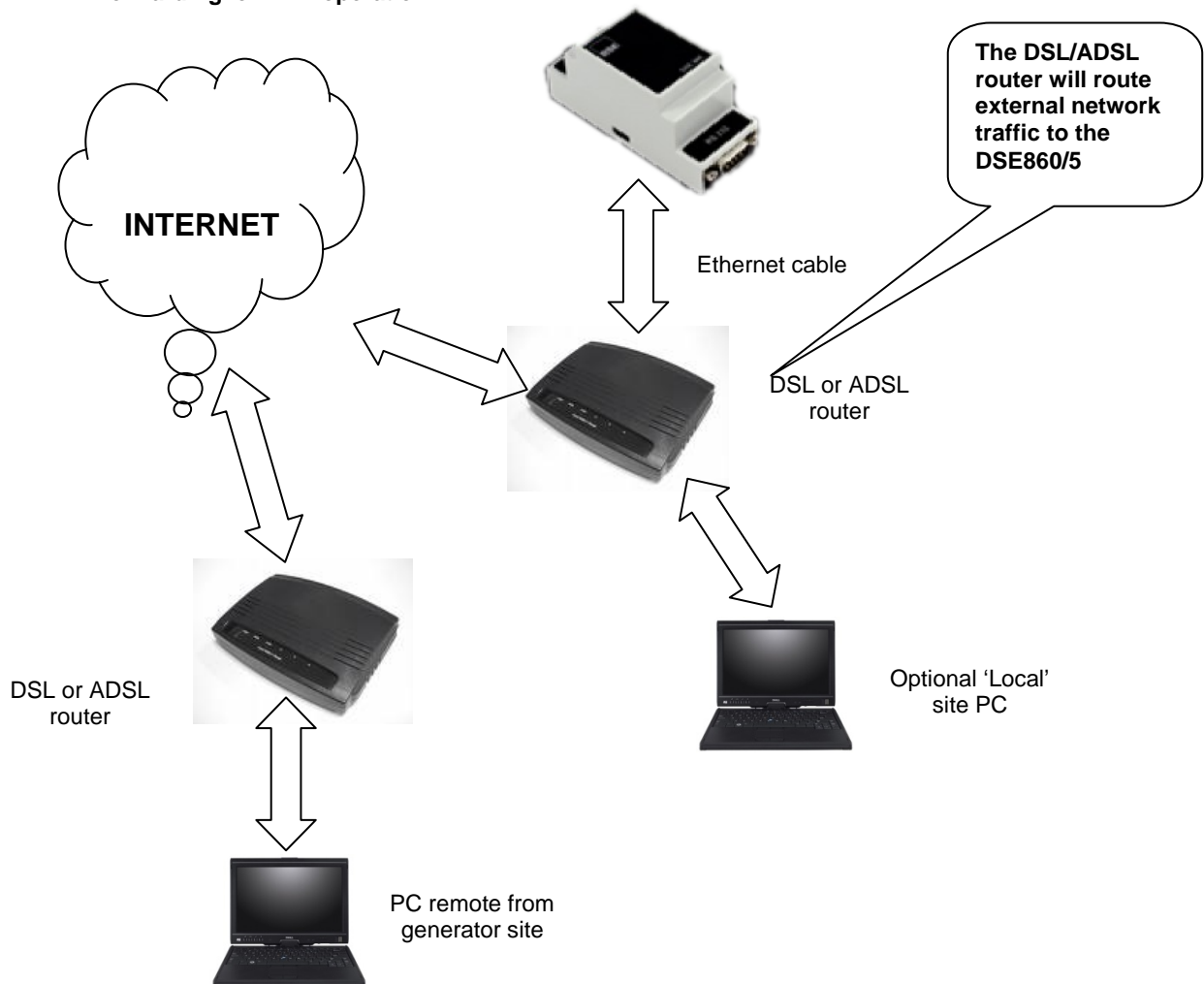
NOTE:- DSE Stock a 2m (2yds) Ethernet Cable – Part number 016-137. Alternatively they can be purchased from any good PC or IT store.

4.4.4 CONNECTION TO INTERNET

DSE do not supply or support equipment to connect the DSE860 / DSE865 the internet, however for those wishing to do so, a description is given below.

Requirements

- DSE module with RS232 or RS485 serial port
- DSE860/5
- Ethernet cable
- Working Ethernet (company or home network)
- PC with Ethernet port and Windows Internet Explorer 6 or above, Firefox
- DSE PC software for the DSE module being connected to.
- Working Internet connection (ADSL or DSL recommended) with Router capable of 'port forwarding' or DMZ operation.



NOTE:- The serial connection from the DSE module to the DSE860/5 has been omitted for clarity of the diagram

Continues overleaf....

Firewall configuration for internet access

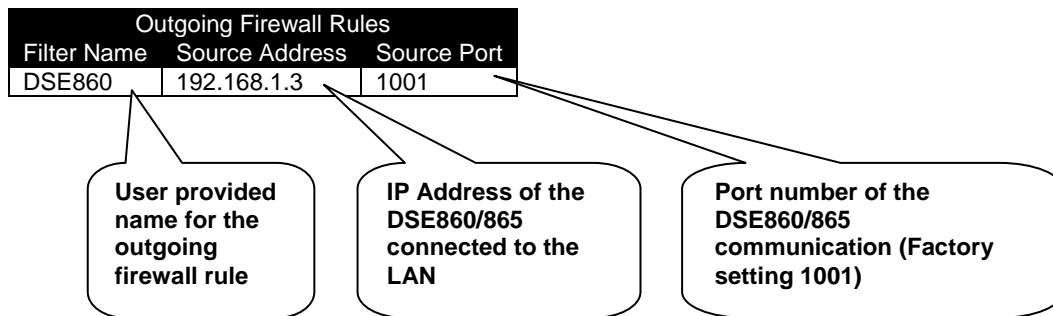
As modem/routers differ enormously in their configuration, it is not possible for DSE to give a complete guide to their use with the DSE860 / DSE865 interface. However it is possible to give a description of the requirements in generic terms. For details of how to achieve the connection to your modem/router you are referred to the supplier of your modem/router equipment.

The DSE860/865 communicates over the Ethernet using Port 1001 (factory setting). You must configure your modem/router to allow outbound traffic on this port and to pass through traffic coming in to this port, to the IP address of the DSE860/865.

Outgoing Firewall rule.

The firewall must be configured in the modem/router to allow outgoing traffic from the DSE860/DSE865.

Example :



Result : Traffic from IP address 192.168.1.3 :1001 (our DSE860/865 talking on port 1001) is allowed out through the firewall to the WAN (Internet)

Incoming traffic (virtual server)

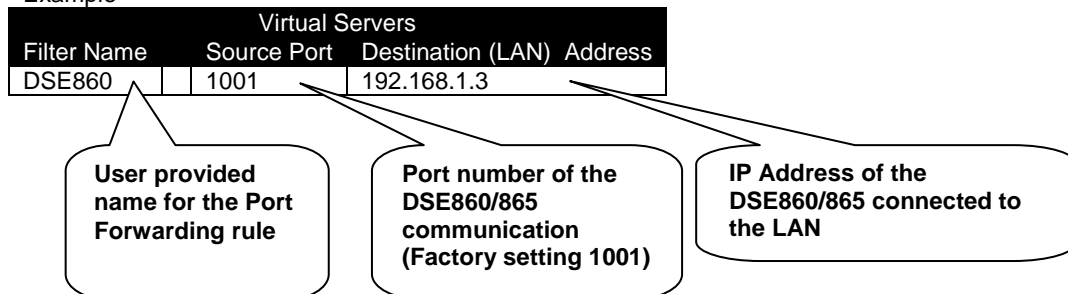
Network Address and Port Translation (NAPT) allows a single device, such as the modem/router gateway, to act as an agent between the Internet (or "public external network") and a local (or "internal private") network. This means that only a single, unique IP address is required to represent an entire group of computers.

For our DSE860/DSE865 application, this means that the WAN IP address of the modem/router is the IP address we need to access the site from an external (internet) location.

When traffic from the DSE configuration suite reaches the modem/router, we want this passed to a 'virtual server' for handling, in our case this is the DSE860/865 module.

A 'virtual server' rule must be configured in the modem/router to pass the required data to the DSE860/DSE865 when it is received from the WAN (internet).

Example

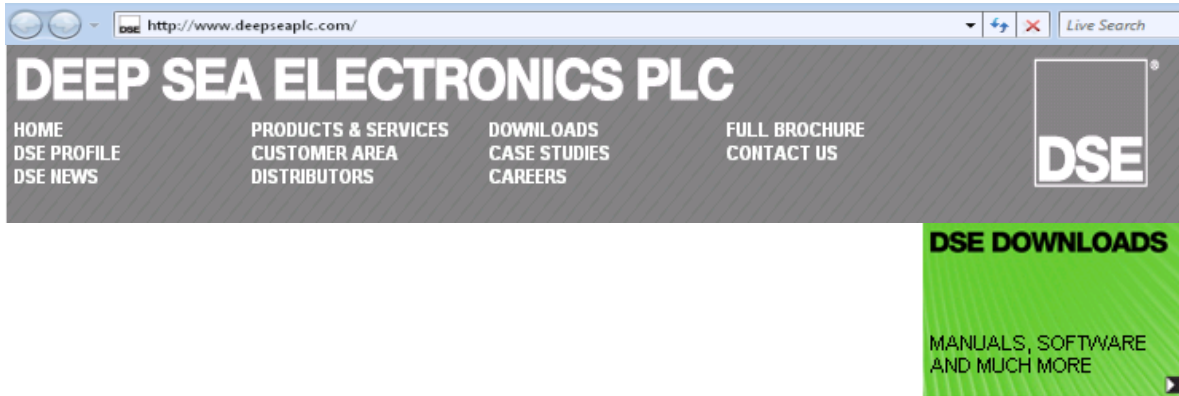


Result : Traffic arriving from the WAN (internet) on port 1001 is automatically sent to IP address 192.168.1.3 on the LAN (DSE860/DSE865) for handling.

5 SOFTWARE INSTALLATION

5.1 DSE860 CONFIG TOOL SETUP WIZARD

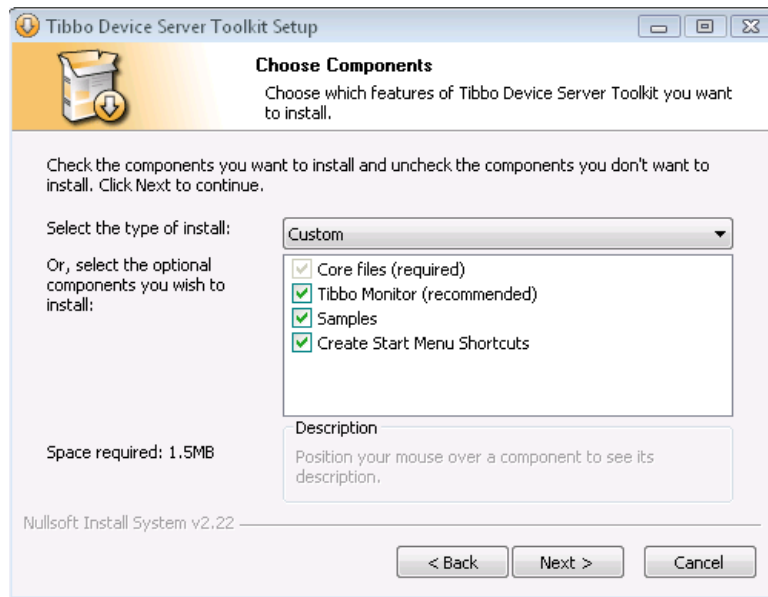
Visit www.deepseapl.com and select DSE DOWNLOADS to download the latest version of the DSE860/5 Config Tool Setup Wizard and install the software on your PC.



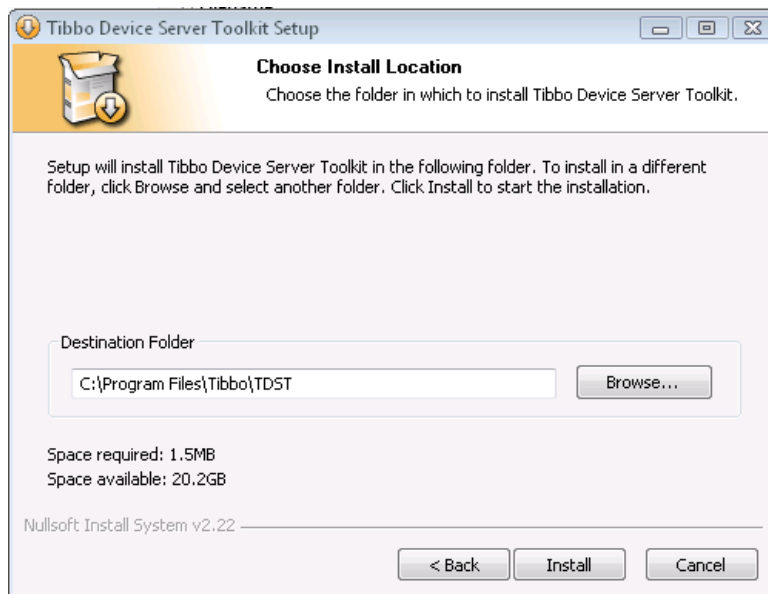
Now execute Setup and install the software as shown below :



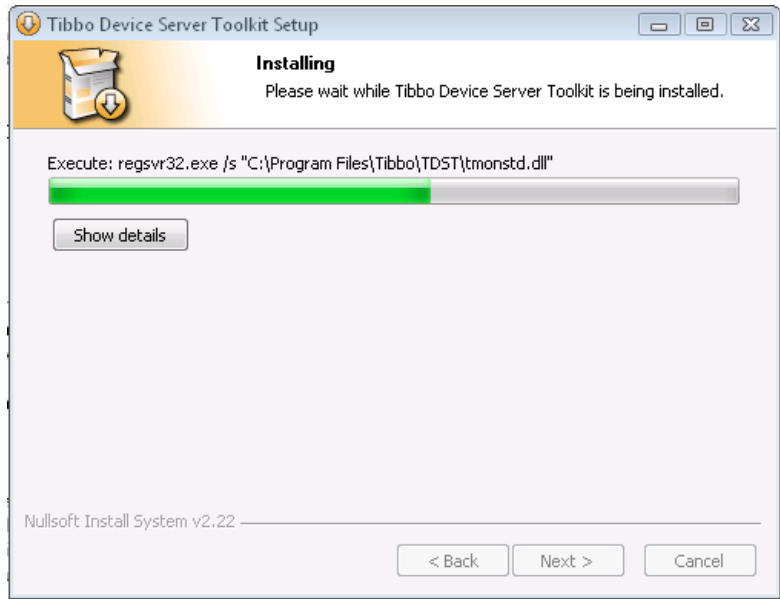
Read the license agreement for the Virtual Serial Port software supplied by Tibbo Technology Inc. Click **I AGREE** to continue.



Accept the default settings and click **NEXT**



Accept the default settings and click **INSTALL**



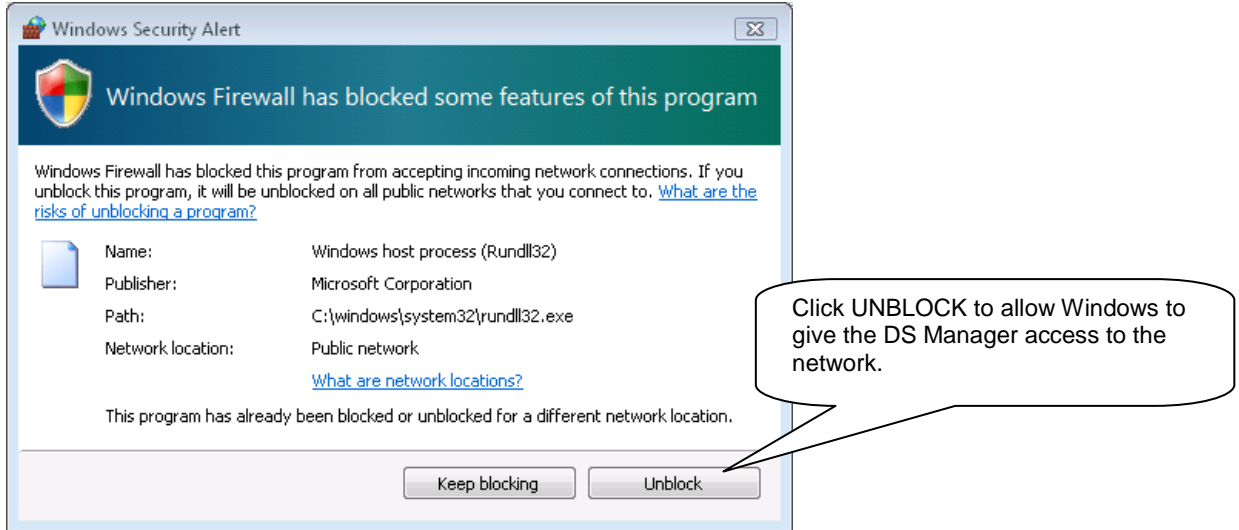
The driver installs...



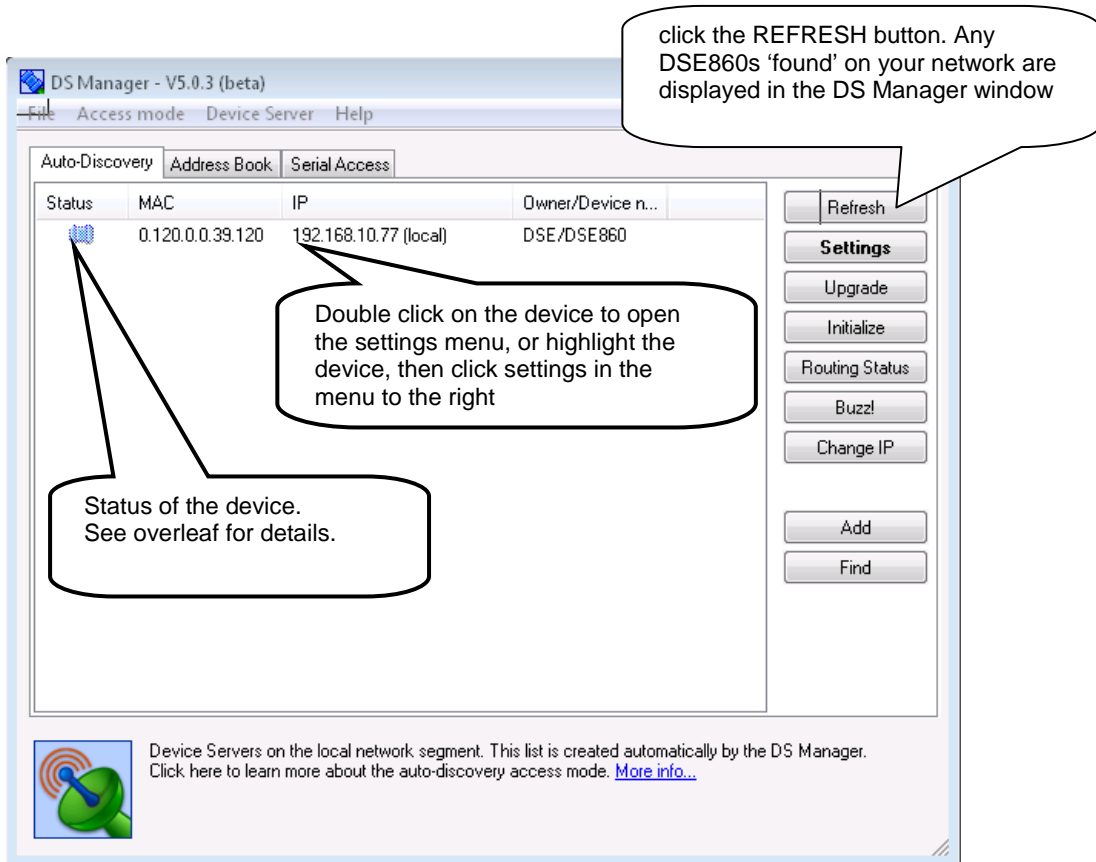
Select **REBOOT NOW** and click **FINISH** to reboot your computer and complete the installation process. You cannot use the DSE860/5 connection until the PC has been rebooted.

5.1.1 USING THE DS MANAGER SETUP PROGRAM

Connect the DSE860/5 to your PC's network port in order to set it up. Start the DS MANAGER SETUP PROGRAM. Windows Firewall may ask you to unblock the program from accessing your network :



The DS Manager software searches the connected network and displays any DSE860 DSE865 modules that are found :



5.1.2 DS MANAGER STATUS ICONS

The status icon consists of three parts:

- **The central part** depicts the DS and reflects its general status and well-being



No status info available. The DS is running old firmware (2.xx or older) and the status information cannot be obtained remotely.



Normal state. The DS is online and appears to function properly.



Error mode. The DS is running in the error mode and requires initialization;



IP-address not obtained. The DS is online but hasn't yet obtained its IP-address from the DHCP server (when the DHCP (DH) setting is 1 (enabled)). In this state the DS is not performing its data routing function. If the DS is also in the error mode (see above) at the same time then it is the error mode status that will be shown by the icon;



Firmware upload mode. The DS is in the firmware upload mode and is ready to accept new firmware file. If the DS enters this mode right after the powerup then this means that no firmware is loaded or that the firmware is corrupted.

- **Left part** of the icon shows current data connection status:



Idle. No data connection is established, the DS is idle (so no icon is displayed);



ARP. The DS is sending ARP requests in order to find the MAC-address of the destination network host (or gateway) before attempting to establish a data connection;



Opening. TCP data connection is being established. This icon cannot be displayed for the UDP transport protocol since there is no connection establishment phase for UDP data "connections";



Established (or being closed), no overrun. TCP data connection or UDP UDP data "connection" is established or TCP connection is being closed (there is not connection closing phase for UDP). Routing buffer overflow is not detected (within current data connection).



Established (or being closed), overrun detected. Same as the above but routing buffer (Ethernet-to-serial and/or serial-to-Ethernet) overflow has been detected.



Reset. TCP data connection has been reset by the network host (not the DS itself). This icon cannot be displayed for UDP data "connections".

- **Right part** of the icon displays current programming status:



No programming. The serial port of the DS is not in the serial programming mode and no network programming session* is opened;

Programming in progress. Either the serial port of the DS is in the serial programming mode or network programming session* has been opened.

- **Central, left, and right icon parts** described above are combined into a single status icon.

Example: the following "combination" icon means that the DS is running in the error mode, data connection is currently established (but no overrun has been detected), and some form of programming (either serial or network) is in progress:



In addition to different states described above the whole status icon can be displayed in full color or grayed (see sample icons below). This only applies to local Device Servers and the auto-discovery mode).



Full color. This means that the DS Manager can communicate with the DS using "normal" IP addressing.

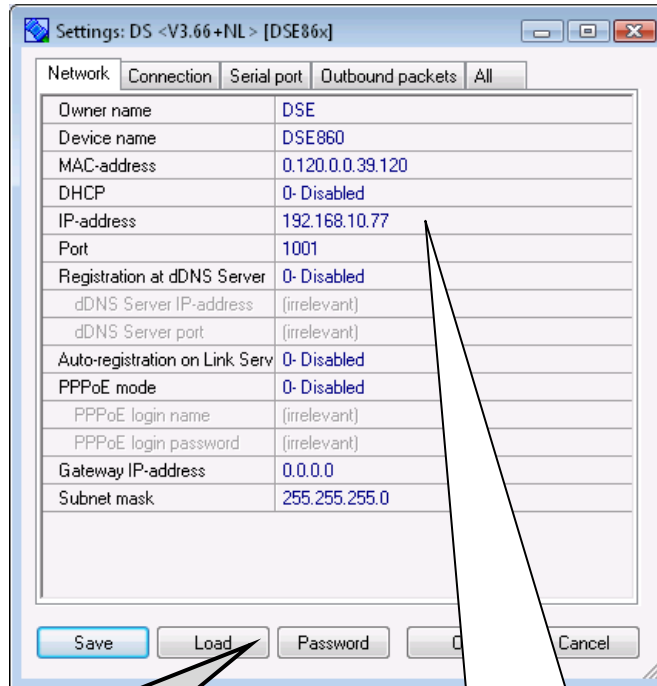


Grayed.** When the status icon is grayed then this means that the DS Manager can see the DS but cannot communicate with the DS using normal IP-addressing. Full details on what this means are provided in the following topics: broadcast access, troubleshooting (auto-discovery mode).

Additional status information for the selected DS (i.e. the DS whose line is highlighted in the device list) is displayed in the status area below the device list. For example, while the status icon may show that some sort of programming is in progress the status area message will detail that the "UDP network programming session is in progress". Each status message has a clickable link that opens a corresponding help topic (all such topics can be found at DS status messages).

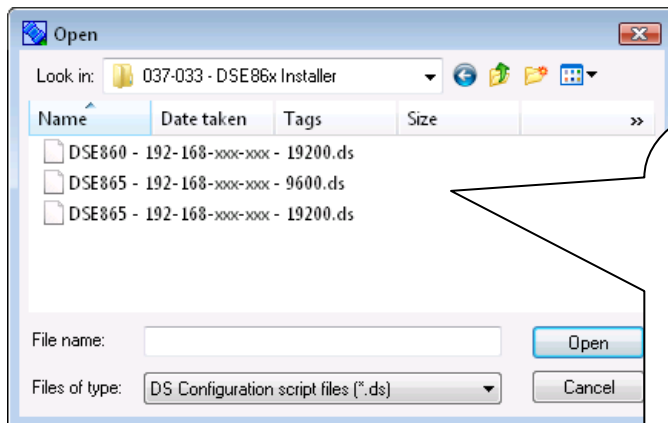
5.1.3 SETTING UP THE DSE860/5 NETWORK SETTINGS

To configure the DSE860 for correct operation on your network you may need to consult your I.T. department or network manager for help with the following settings :



Click LOAD and browse for the .ds settings file applicable to your device as shown below :

AFTER you have loaded the .ds file, set the IP address you require for the module. You may need to discuss this with your I.T. department or network manager.



Select **DSE860** for the RS232 interface.

Select either of the two **DSE865** files for 9600 baud or 19200 baud RS485 operation.

It is recommended to select either of these two DSE865 files even if you require a different baud rate, then modify the baud rate later to suit.

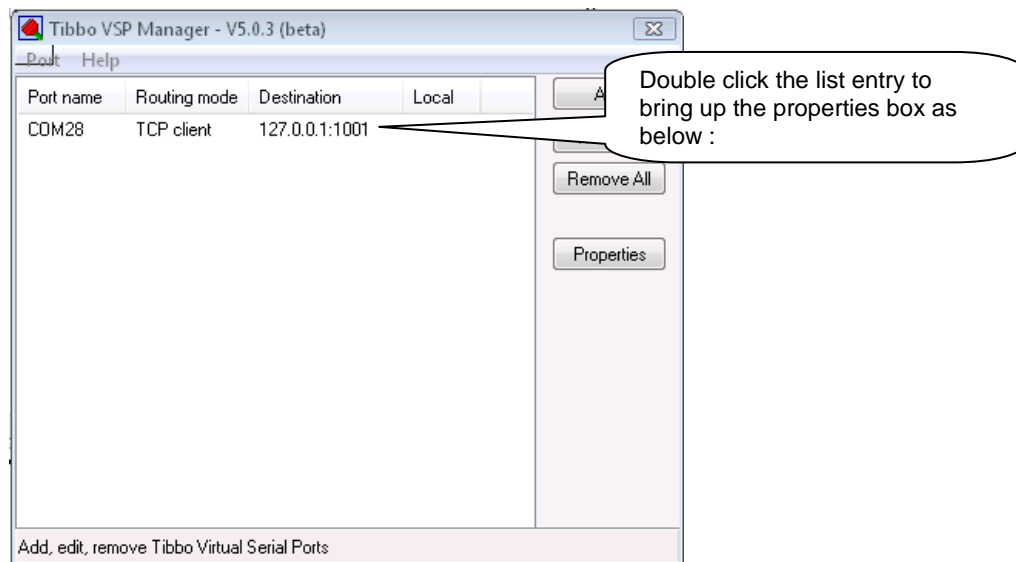
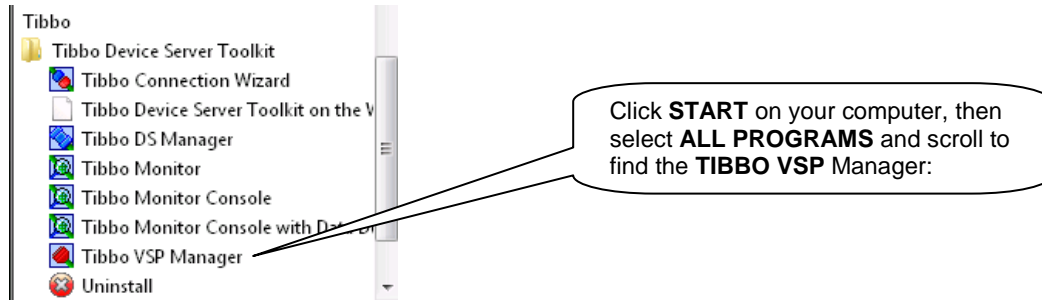
These files can be downloaded from www.deepseapl.com or by contacting DSE Technical Support support@deepseapl.com

5.2 SETTING UP THE PC VIRTUAL COM PORT

The virtual com port is a small software program running on the host PC. This program acts as an interface between the Ethernet and the DSE configuration/communications software.

The DSE software requires a serial COM port to perform its communications. The virtual com port acts as a gateway to the Ethernet.

Setup of the virtual com port is straightforward, select a free com port number for the virtual com port to operate on and enter the IP address of the DSE860/5 that you want to communicate with.



The screenshot shows the 'Tibbo Virtual Serial Port (COM28) Properties' dialog box. It has two tabs: 'VSP Properties' and 'Default Serial Settings'. The 'VSP Properties' tab is active and contains the following sections:

- VSP name:** A text box containing 'COM28'. A callout points to it with the text: 'Name the Virtual Com Port'.
- Networking:**
 - Transport protocol: TCP
 - Transport provider: TDI (default)
 - Routing mode: Client
 - Connection mode: On data
 - On-the-fly commands: Out-of-band
 - Out-of-band OTF port: 65535
 - Listening port: 1001
 - Connection timeout: 5
- Destination:**
 - Destination mode: Single destination
 - Specify by: IP-address
 - IP-address: 127.0.0.1
 - Port: 1001
 - A 'Browse for DS...' button is located next to the 'Specify by' dropdown. A callout points to it with the text: 'Click BROWSE FOR DS... the first time you visit this page. You may get asked to UNBLOCK the program by Windows Firewall.'

At the bottom of the dialog are 'OK' and 'Cancel' buttons. A callout points to the 'OK' button with the text: 'Click OK to save any changes and return to the main screen.'

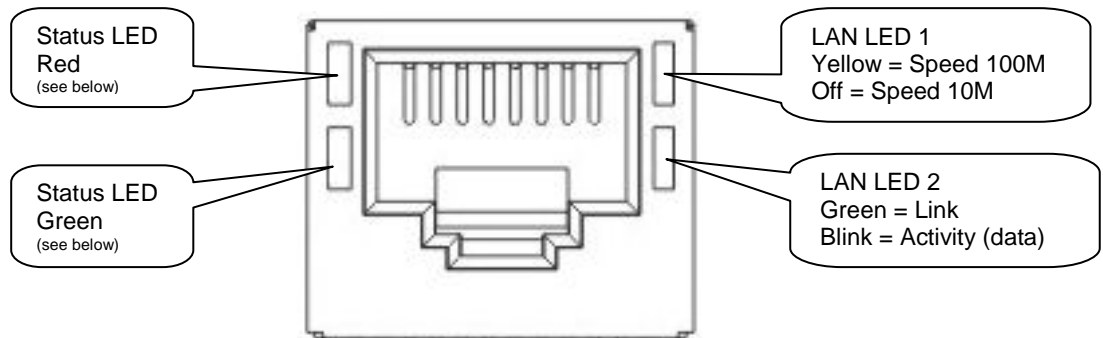
Another callout points to the 'IP-address' field with the text: 'Enter the IP Address of the DSE860/5 you want this comport to communicate with.'

A third callout points to the 'Browse for DS...' button with the text: '! ADVANCED OPTION ! Ethernet port the DSE860/DSE865 will use for communications. This MUST match the port number used by the device in the DS manager settings.'

NOTE:- You will normally obtain a fixed IP address for the DSE860/5. The IP address you enter into the virtual comport setup will either be the IP address of the DSE860/5 itself (in the case of an internal Ethernet connection) or the IP address of an internet router (when the DSE860/5 is connected via external router to the internet).

6 INDICATIONS

DSE860/5 includes indicators to show operation and status of the adaptor. They are located on the Ethernet socket (RJ45). There are no other indicators on the product.



6.1 STATUS LED PATTERNS

LED light patterns that are done only once.

<p>Diagram showing two LEDs (Red and Green) both illuminated. A horizontal arrow below indicates the duration of the pattern.</p>	<p>Power up pattern. This pattern is played when the DSE860 is switched on.</p>
<p>Diagram showing two LEDs (Red and Green) both illuminated. A horizontal arrow below indicates the duration of the pattern.</p>	<p>Buzz pattern. Both LEDs blink fast- this pattern is played when the DSE860 receives the Buzz command from the configuration tool.</p>

LED light patterns that are repeated until another LED light pattern takes over.

	<p>Serial programming mode. Indicates that the serial port is now being used to configure the DSE860 from the Configuration Tool software</p>
	<p>Error mode.</p>
	<p>Ethernet port failure. Indicates that the Ethernet port hardware is malfunctioning and network communications with the DSE860 is not possible.</p>
	<p>[V3.54+]: PPPoE login failed. Occurs at start up and means that either PPPoE Login name and password Name and PPPoE Login Password settings) are incorrect or PAP authentication protocol used by the DSE860 is not supported by Access Concentrator.</p>
	<p>IP-address not obtained. Occurs at start up when DHCP setting is (enabled) and the DSE860 has not yet obtained its IP-address from the DHCP server. [V3.54+]: PPPoE link is being established. Occurs at start up when PPPoE Mode setting is 2 (on power up).</p>
	<p>Adapter in Standby mode and Data connection is closed. This pattern means that no data connection (TCP or UDP) with any network host is currently established</p>
	<p>Sending ARP. Displayed when the DSE860 is sending ARP requests to find out MAC-address of the destination network host with which the DSE860 is about to establish a connection. [V3.54+]: PPPoE link is being established. This happens when PPPoE Mode setting is <i>on connection</i> and the DSE860 needs to create a PPPoE link in order to connect to remote network host.</p>
	<p>TCP connection reset (rejected) by the network host. Means that the TCP connection has been reset (using RST packet) by the network host to which the DSE860 has tried to connect.</p>
	<p>TCP connection is being opened. Indicates that TCP connection (either incoming or outgoing) is being established (i.e. SYN-SYN-ACK exchange is in progress).</p>
	<p>Link Server login failed. Means that data connection to the Link Server could be established but the server has rejected this DSE860 (because the data in the Owner Name, Device Name, or Password setting is incorrect or for some other reason).</p>
	<p>Link Server login in progress. Means that the DSE860 has already established TCP connection to the Link Server and is now attempting to login.</p>
	<p>Data connection is established or being closed. Means that data UDP connection or TCP connection is currently established or that TCP connection is being closed</p>
	<p>Data is being routed, no overruns detected. This pattern is displayed when the data connection is established and the data is being routed through the DSE860 to the serial port.</p>
	<p>Buffer overrun, no data routing. This pattern is displayed when the data connection is established and the routing buffer overrun has been detected (within the present data connection)</p>
	<p>Buffer overrun + data routing. Data routing and overrun can be displayed at the same time.</p>

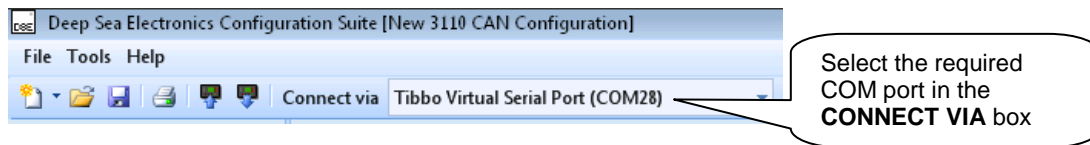
7 DSE860 OPERATION

The DSE860/5 is transparent in operation. Once the virtual com port has been set up, communication to the control module is made with the relevant DSE configuration / communication software. Consult the operator manual of the relevant PC software and select the virtual com port in the 'setup' area. This instructs the PC software to communicate with the virtual com port. The virtual com port then performs all read/write operations to the configured IP (internet protocol) address.

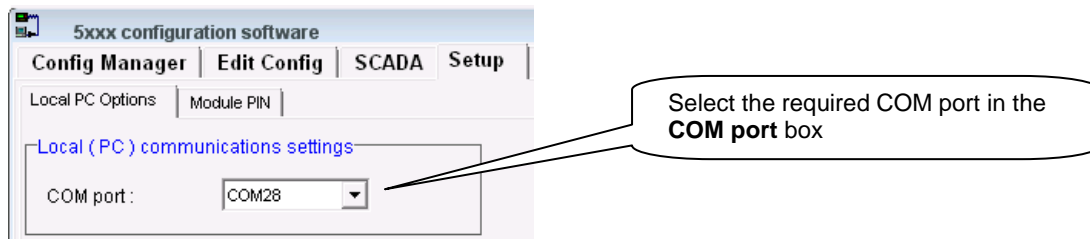
Once connected to the DSE Configuration Software, full control of the module via the PC software's SCADA section is possible along with complete read/write and edit of the module's configuration. Selected DSE modules have PIN codes to lock out unauthorised access.

Full details of the operation of the PC configuration software is contained in the relevant software manual. See Section entitled *Bibliography* elsewhere in this document.

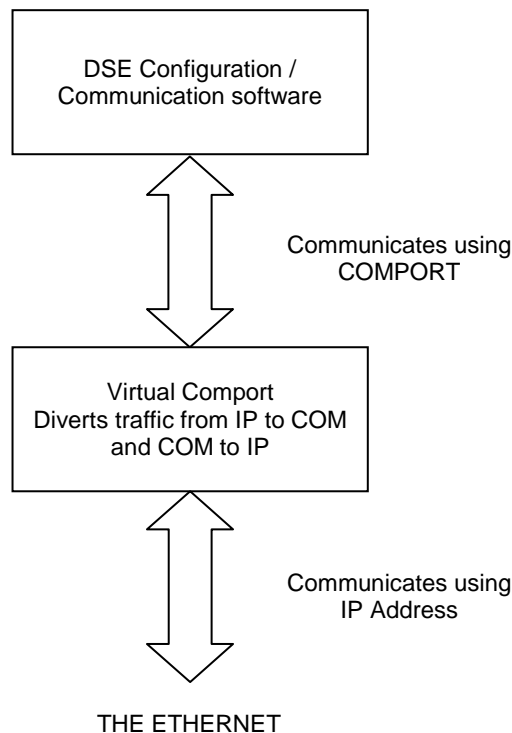
7.1 EXAMPLE USING CONFIGURATION SUITE.



7.2 EXAMPLE USING DSE5XXX / DSE75XX CONFIGURATION SOFTWARE



7.3 EXAMPLE OF VIRTUAL COMPORT OPERATION



8 GLOSSARY OF TERMS USED

To enable Ethernet communications a layered structure is defined within the international standard IEEE 802.3 and it consists of several layers:

- Application Layer
- Transport Layer
- Network Layer
- Data Link Layer
- Physical Layer

PPPoE	P oint to P oint P rotocol O ver E thernet. Used for connect on-demand connections, this is usually the Internet S ervice P rovider (ISP).
DHCP	D ynamic H ost C onfiguration P rotocol is a protocol used by networked devices (clients) to obtain the parameters necessary for operation in an Internet Protocol network. This protocol reduces system administration workload, allowing devices to be added to the network with little or no manual configurations. Addresses are assigned at the time of start-up from the DHCP server.
TCP	T ransmission C ontrol P rotocol. With TCP a connection is made between two machines over which data can be exchanged reliably and in-order. TCP supports many of the internet's most popular application protocols such as the world wide web and email.
IP	I nter network P rotocol an IEEE 802.3 standard for Ethernet transmissions and is linked with TCP to form the TCP/IP protocol.
UDP	U ser D atagram P rotocol. UDP does not provide the reliability and ordering guarantees that TCP does, data packets may arrive out of order or go missing without notice. Due to the lack of the reliability overhead, UDP is faster and more efficient for time sensitive purposes.
ARP	A ddress R esolution P rotocol. Is commonly used to convert from addresses in a layer 3 protocol such as Internet Protocol (IP) to the layer 2 MAC address. On broadcast networks, such as Ethernet, It thus forms the basis of most of the layer 2 networking upon which higher OSI Layer protocols are built to produce complex, functioning networks.
MAC address	MAC address allows each host to be uniquely identified and allows frames to be marked for specific hosts.
IP address	Unique Ethernet/Internet address assigned to each connection.
COM port	PC Serial port, either RS232 or RS485
Serial port	Connection between two devices, either RS232 or RS485 in the case of the DSE860/5