



Deep Sea Electronics Plc

Link5000^{plus}
Communications
Software
Manual

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INTRODUCTION

DESCRIPTION

The **Link5000^{plus}** software allows the 5510, 5520 and 5560 modules to communicate with a PC. The computer can be connected to the module either directly (P810), via a modem (RS232)* or via an RS485 link**.

The operator is then able to remotely control the module, starting or stopping the generator, selecting operating modes, etc. The various operating parameters (such as output volts, oil pressure, etc.) on the remote generator can also be viewed.

Each module can be configured with its own Password Identity Number (PIN) this is used to prevent unauthorised access to the module.

The information contained in this manual should be read in conjunction with the appropriate module documentation. This manual only details the operation of the communications software and how it should be used. The operation of the module is detailed in its own relevant manual.

**NOTE:-**

*** If modem communications is a requirement, then it is important to order the correct 55xx module with the RS232 communications fitted. This provides a 9-way D-type connector suitable for connection to the modem and a dedicated DC supply to provide power to the modem in normal operating conditions. Please refer to the connection section of this manual for details of how the system should be configured.**

**** If RS485 communications is required, then it is important to order the correct 55xx module with the RS485 communications fitted. This provides a 4-way terminal block for connection of the RS485 link. Please refer to the connection section of this manual for details of how the system should be configured.**

CLARIFICATION OF NOTATION USED WITHIN THIS PUBLICATION.



Highlights an essential element of a procedure to ensure correctness.



Indicates a procedure or practice which, if not strictly observed, could result in damage or destruction of equipment.



Indicates a procedure or practice, which could result in injury to personnel or loss of life if not followed correctly.



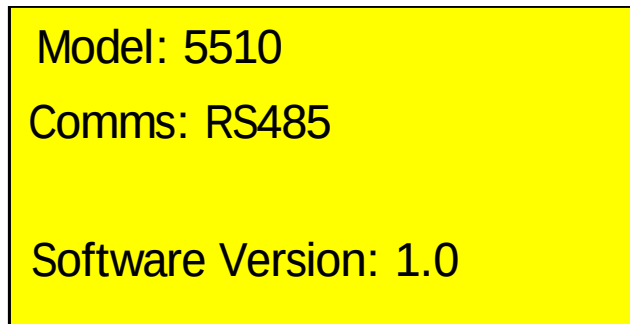
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MANUAL STRUCTURE

This manual is designed to assist users of the **Link5000^{plus}** software; this is the common communications software for the modules 55xx. The actual configuration of the module is covered in the document '5xxx series configuration software for Windows TM'. Module operation and use is covered in the relevant module operator's manual. The RS485 output from the module is detailed in the 'Communication Protocol' manual.

POWER UP LCD DISPLAY

On application of the DC supply the module LCD will display information about the module.



Model:

Indicates what the model number of the module is, 5510, 5520 or 5560.

Comms:

Indicates which communication option is fitted, RS232 or RS485.

Software Version:

Indicates the version of software contained within the module.

COMMUNICATIONS OPTION CONNECTIONS

The 55xx Modules can be obtained with a communications board fitted. This can be either RS232 or RS485 output.

DESCRIPTION

The **Link5000^{plus}** software allows the 55xx modules to communicate with a PC. The computer can be connected to the module either directly (P810), via a modem (RS232)* or via an RS485 link**.

The operator is then able to remotely control the module, starting or stopping the generator, selecting operating modes, etc. The various operating parameters (such as output volts, oil pressure, etc.) on the remote generator can also be viewed.

The information contained in this manual should be read in conjunction with the appropriate module documentation. This manual only details the operation of the communications software and how it should be used. The operation of the module is detailed in its own relevant manual.

NOTE: - *If modem communications is a requirement, then it is important to order the correct 55xx module with the RS232 communications board fitted. This provides a 9-way D-type connector suitable for connection to the modem. Please refer to the connection section of this manual for details of how the system should be configured.

****If RS485 communications is required, then it is important to order the correct 55xx module with the RS485 communications board fitted. This provides a 3-way terminal block for connection of the RS485 link.**

MODEM TO CONTROLLER CONNECTION

To connect a 55xx to a modem the following items are required: -

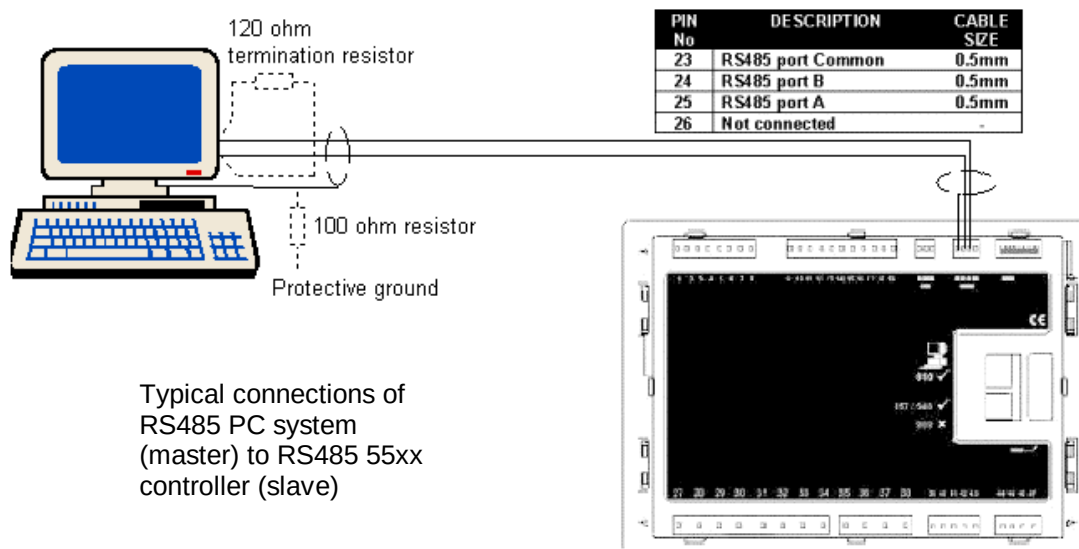
CAUTION! - The modem must be powered from a suitably stabilised supply, preferably supplied with the modem (see below). Failure to ensure continuity of supply will result in communication difficulties at such times as Mains failure or during cranking. An uninterruptible power supply arrangement is recommended (AC or DC depending on modem power requirement).

- 5510/5520 or 5560 Module with RS232 Communications Interface
- Compatible RS232 Modem (PSTN or GSM)
- Suitable connection leads
- Power supply for the modem
- The **Link5000^{plus}** software (Supplied on DSE software CD).
- Access to a PSTN Line or GSM network.

RS485 LINK TO CONTROLLER

The RS485 enabled 55xx modules are able to communicate with a PC or other RS485 enabled device over a standard RS485 connection.

- The **Link5000^{plus}** software RS485 is capable of communication over a distance of 1.2km where suitable 120Ω RS485 cable is installed.
- Connection to a building management to allow mains, generator and engine parameters/alarm conditions to be displayed along with information from other devices (air conditioning, fire alarm system etc).



NOTE: - The RS485 system will comprise of one MODBUS master (typically a PC) and up to 31 MODBUS slaves. The 55xx modules are always MODBUS slave devices. To ensure correct operation a suitable 120Ω terminal resistor must be fitted to each end of the RS485 connection bus.

Caution! - The A and B lines of the 485 network should be terminated at each end with a 120Ω resistor.

Some RS485 devices (PC cards in particular) are already fitted with a terminating resistor. However if they are not installed as an 'end of line' device then such terminating resistors must be removed. Other RS485 devices may be fitted with a 'switchable' resistor, again this must be switched out if the device is not installed as an 'end of line' device.

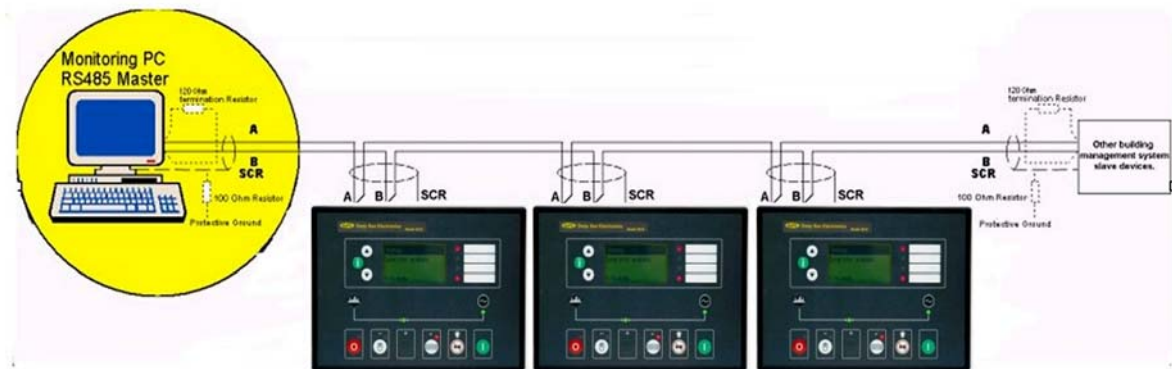
MODBUS™

The RS485 output uses Modbus™ communications protocol. This uses a master-slave technique to communicate. Only the Master can initiate a packet transaction, called a 'query'. When appropriate the slave (55xx Module) responds to the query and provides the information requested by the master.

All supported data can be read and written as specified in the register table (documentation is available from Deep Sea Electronics PLC.).

When the 55xx Module receives a query it will respond by either supplying the requested register data or performing the requested action. A slave device (the 55xx module) will never initiate communications on the Modbus™ link. The 55xx can only be configured as a slave device. The Master can only query individual slaves. Refer to the Modbus™ protocol document for more details.

Direct connection to a remote PC running **Typical Building Management scheme using RS485 MONITORING**



! CAUTION! -. RS485 cabling must be 120Ω impedance cable, specified for use with RS485. 120Ω terminating resistors must be fitted to the first and last devices on the bus. Some PC RS485 cards are already fitted with this resistor, and in this case should not be fitted externally. If in doubt, consult the supplier of your PC RS485 card. If the 55xx controller is the 'last' device on the bus, then it's RS485 connection must be suitably terminated with a 120Ω resistor as detailed in the specification laid out in the RS485 standard.

Recommended cable **BELDEN 9841 120Ω RS485 cable**.
DSE part number **016-030**.

▲ NOTE: - The RS485 output uses 'MODBUS' protocol. It is possible to use third party software to monitor and control the 55xx module via this protocol. Please refer to Deep Sea Electronics Plc for details.

INSTALLATION INSTRUCTIONS

MINIMUM SYSTEM REQUIREMENTS

Processor	486 66Mhz
Operating System	Windows 95/98/2000/XP. Windows NT V4 or V5
Ram	16Mb
Monitor	14 inch SVGA (640x480 resolution)
Fixed disk	10Mb free (80Mb minimum)
Disk drive	CD-ROM drive for software installation
Communications	A USB port or an RS232 comms port is needed to communicate with the 810 interface. An RS232 comms port is needed to communicate with an External Modem. Else, a suitable internal modem is required. (An RS485 comms ports is required if an RS485 link is intended.)

INSTALLING **LINK5000^{plus}** PROGRAM FROM SOFTWARE CD – (WINDOWS95/98/NT/2000/XP)

▲NOTE:- As **Link5000^{plus}** is a 32-Bit application it will not operate on Windows 2.0, 3.0, 3.1 or 3.11.

▲NOTE:- Exit all other programs before installing the **Link5000^{plus}** software. It is recommended that any earlier releases of the software are uninstalled prior to installing this version.

Insert the Software CD into the CD-ROM drive on the PC. The CD should then Auto-run.

Alternatively:

Double click on **My Computer** :

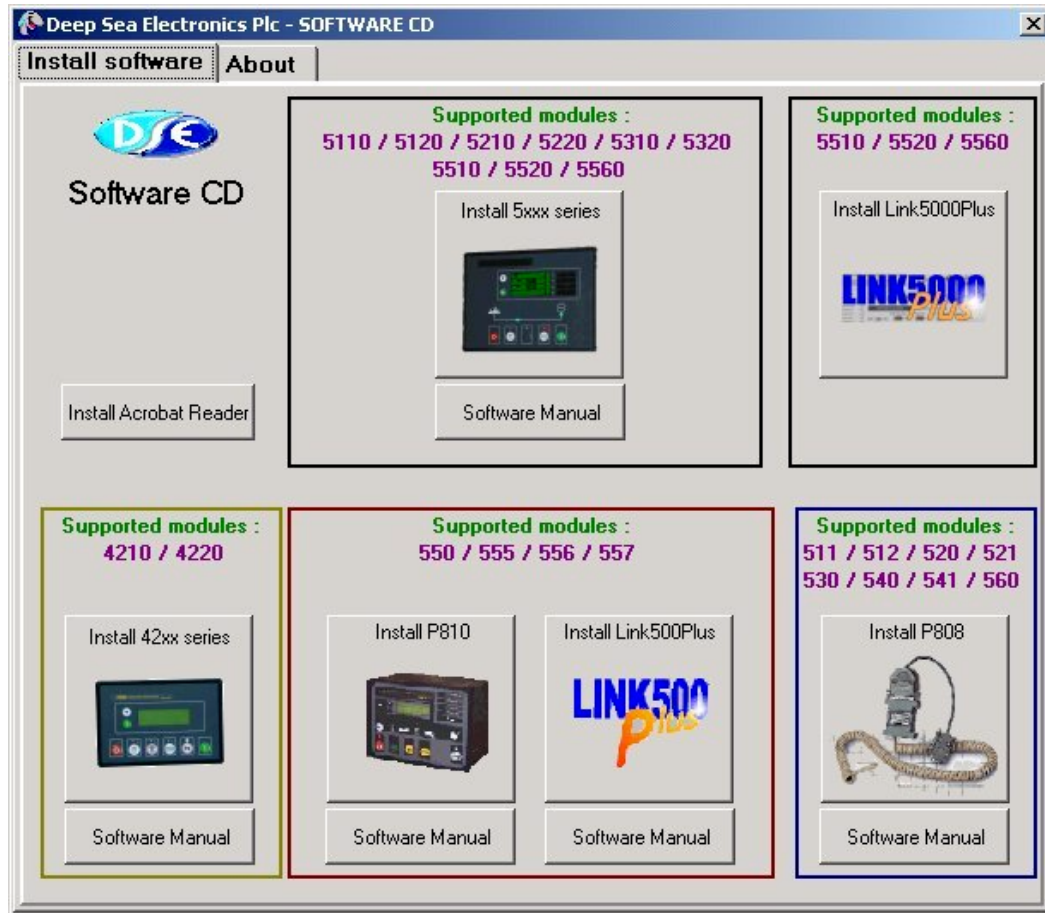


Then double click on **CD-ROM Drive**:

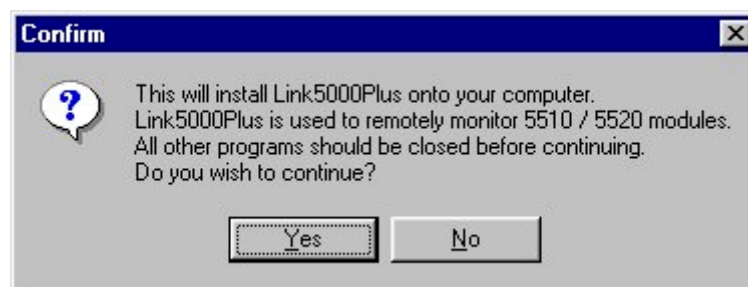
There will be a short delay while the CD-ROM is accessed, then the install program will run



Click on the **Link5000^{plus}** button to install the software onto your PC in its own folder (directory). It will also create 'START MENU' items.



You will receive a confirmation notification, if you wish to continue select yes



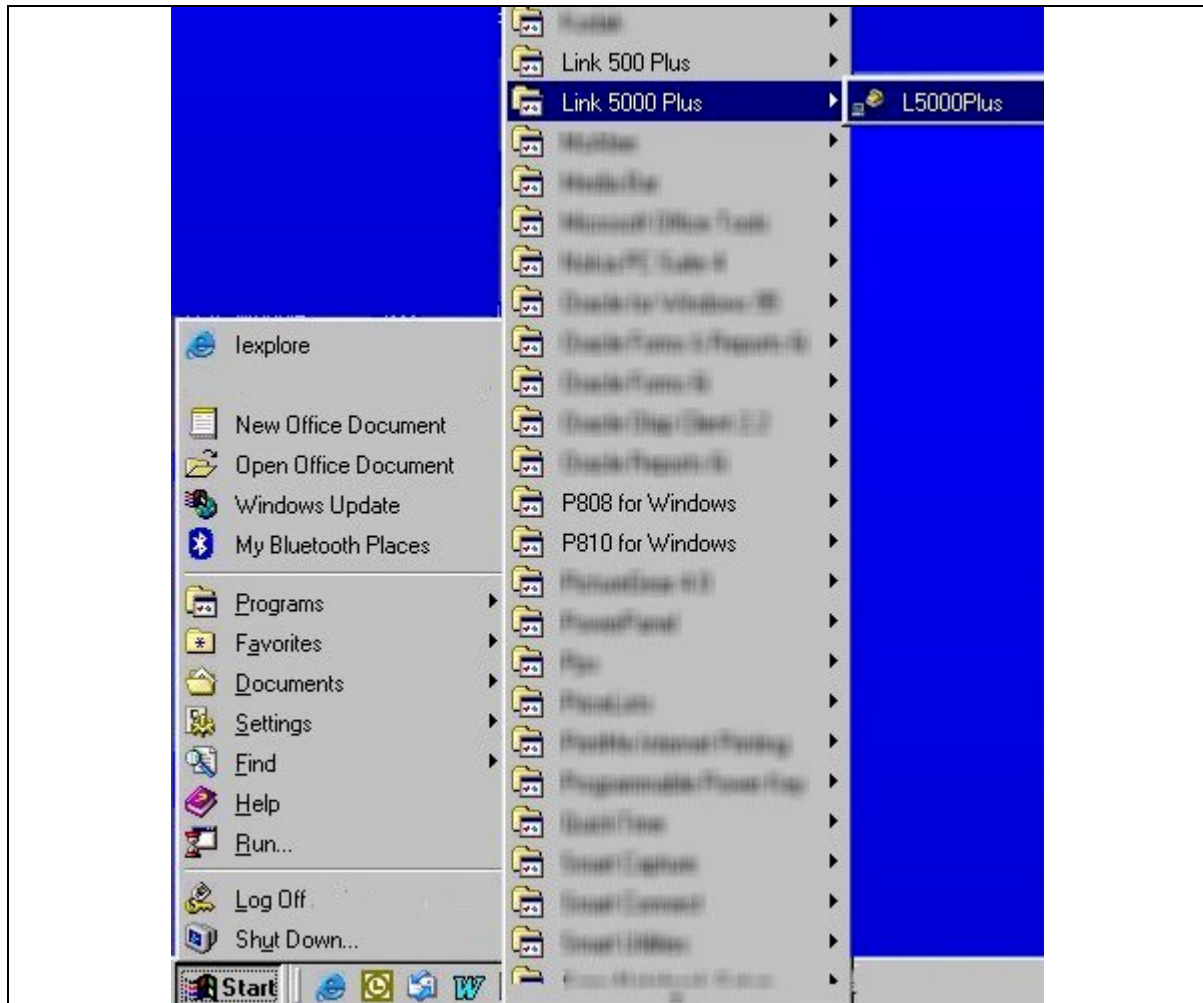
Set-up will now automatically install **Link5000^{plus}** onto your PC in its own folder (directory).

TO RUN **LINK5000^{plus} PROGRAM**

Press the :



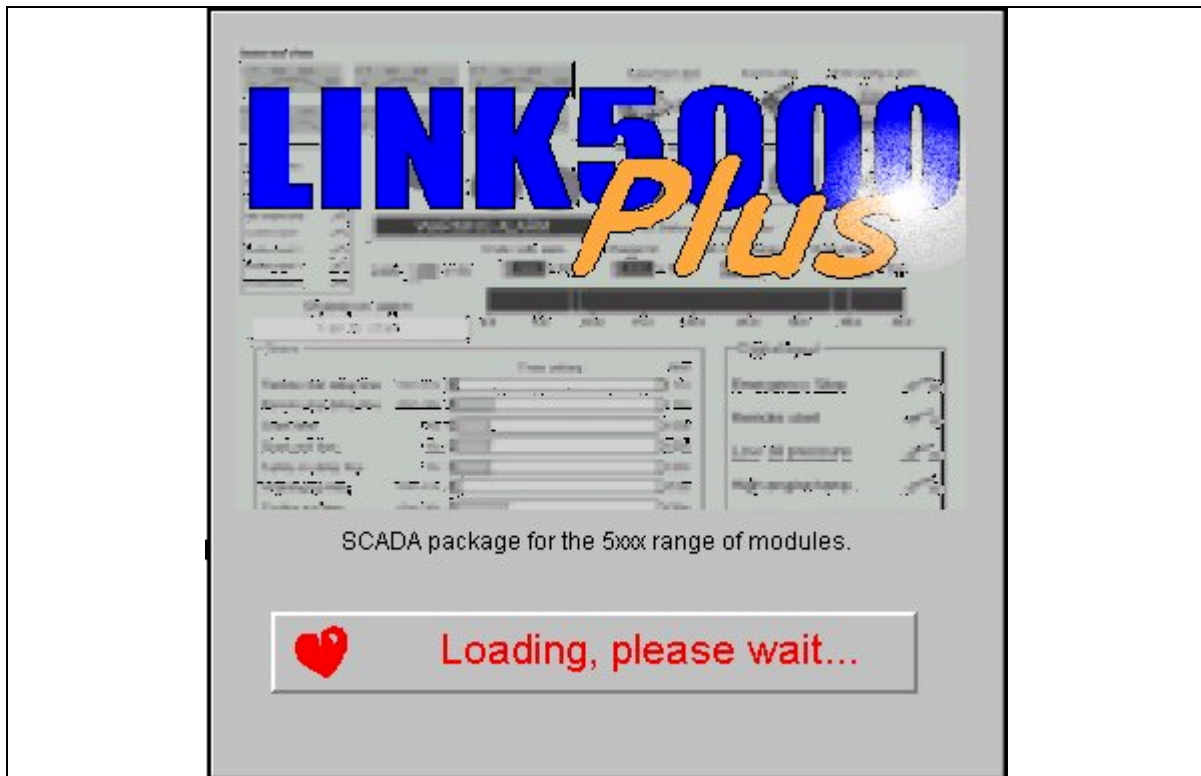
And then select 'Programs' - '**Link5000^{plus}**' as shown below:-



NOTE:- Alternatively locate the ' **Link5000^{plus}** ' Directory on your hard drive and Click on the icon:-



The screen will then display:-



The password page will appear after a short delay.



The software provides three levels of password protection. The first level is the operator level, if the operator password is entered it will only be possible to connect to the module via the communication link. Telemetry information can then be viewed, but remote control will only be possible if enabled. Module function and telemetry address lists cannot be changed at all.

The second level of password is the Engineer level, if this password is entered all of the module communication functions can be configured, and remote control can be enabled or disabled. Password for Operator and Engineer levels can also be changed.

It is intended that the engineering password only be given to qualified engineers who are responsible for initial configuration of the unit, or modification of settings at a later stage.

The operator password is intended to be given to personnel who will not need to be altering the configuration of the module, but need to monitor the operation of the generator remotely, view diagnostic information from the module and, if enabled, remotely control the generator.

Users without a password will not be able to gain access to the software at all.

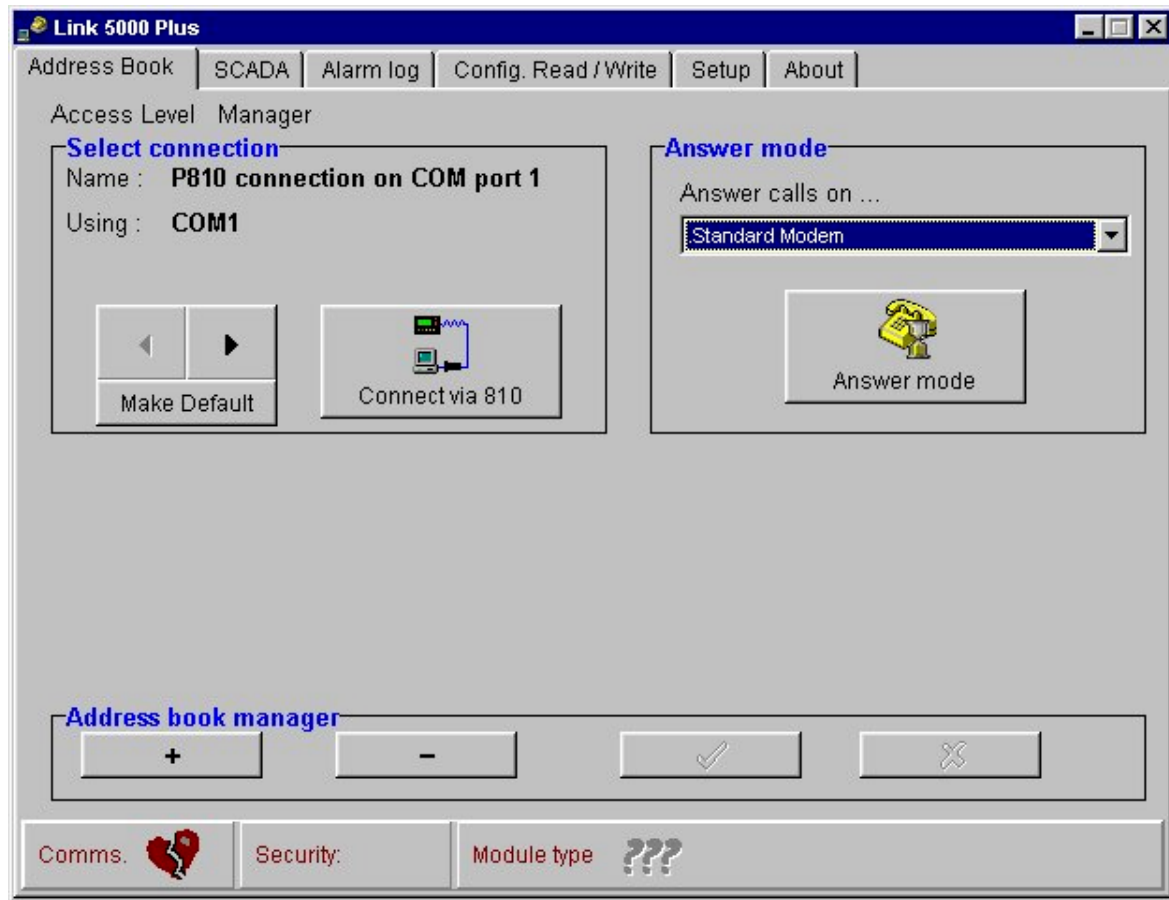
Enter the correct password for the required access level then; Click 'OK'.

The final password level is the 'Manager' level – This level provides the same access as 'Engineer' level but in addition it provides a facility to remotely access a module and change configuration settings. The software will allow the manager to read or write configurations from the module and the load and save configurations from disk. To actually make any changes the remote PC must also have the Link5000plus configuration software installed. This is an additional safe-guard to ensure that it is not possible to accidentally change the remote module configuration.

 NOTE:- The default Engineer password is blank and when a password is requested, Click 'OK'.
--

ADDRESS BOOK MENU

Once loaded the '**Address Book**' Menu is now displayed.



USING THE ADDRESS BOOK

Connection Name:- This is a user-defined name used to identify the site to which communication is to be made. Each connection has an associated Name, telephone number (if appropriate) and connection details (i.e via Modem or via a COM port).

Connect using:- This indicates the device on the PC which will be used to establish the connection. This will be either a Modem fitted to the PC or via a COM port and the 810 interface.



Telephone number:- This indicates the telephone number that the software will use to contact the remote module via modem. If 810 connection via COM port is used then a telephone number is not relevant.. **(Only Available with Modem Installed)**

◀ ▶ :- These buttons are used to scroll forward or backwards through the 'Address book' entries and are used to find the appropriate connection to the remote generator from the list of entered addresses. These buttons are only active when there is no communications link active. (Use the 'Close Connection' button to close an active connection)

Make Default:- This is used to make the address that is currently displayed the default connection. Whenever the **Link5000^{plus}** program is started this address will be selected ready for a link to be established.



This is used to open a connection to the module via the PC COM port and the 810 interface. This can be used in situations where a modem is not required, such as communication to the module within the same building etc.

The maximum distance recommended using the 810 interface is 100 metres (refer to Deep Sea Electronics for Cable details).

(Only Available with Modem Installed on PC)



This is used to initiate a connection with the remote module via modem. When the 'Dial' button is pressed the PC will attempt to connect to the telephone number displayed in the address book for that connection. A dialogue box will open and indicate progress of the call.

(Only Available with RS485 PC port Installed on PC)

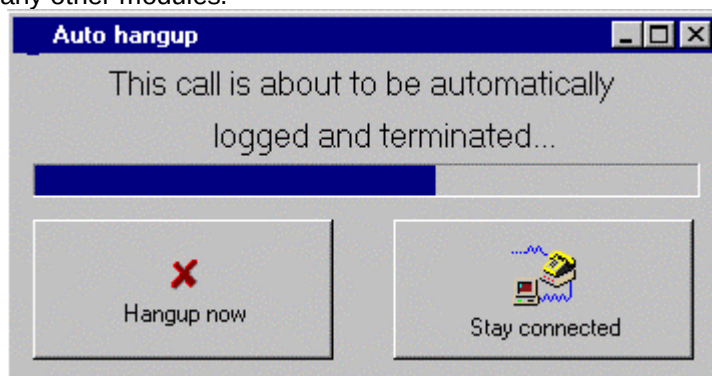


This is used to open a connection with the remote module via RS485.



(Only Available with Modem Installed on PC)

This is used to place the PC into its answer mode. In this mode the PC will monitor it's modem for incoming calls. Once one is received the link will be established and the nature of the fault reported by the remote module is logged. The connection will then be automatically terminated to clear the line for any other modules.



Address Book Manager:- This allows the operator to create a list of remote generators, which can then be contacted at the touch of a button.

+ :- This is used create a new entry into the address book. You will then be able to provide; Name, Telephone number and connection device detail for the new record.

- :- This is used delete the current record from the address book.

⚠ CAUTION!:- Pressing the '-' button will permanently delete the address book entry currently displayed. Therefore it is important to set-up the address book carefully and then once complete use 'Operator' level password to access the Link5000plus program.

✓:- This is used to enter the newly created record into the address book. The new record will automatically be selected as the current connection, until either a different address is selected or created or the program is restarted.

✗:- This is used to cancel the new record creation without saving the new details.

⚠ NOTE:- Address Book Manager is not available to 'Operator' level users. This allows 'Engineer' level users to set-up the address book entries to suit the installation and then ensure that they are securely installed.

IF USING P810 INTERFACE CONNECTION:-

Connection Name:- This is a user-defined name used to identify the site to which communication is to be made. Each connection has an associated Name and a COM port.

Connect using:- This indicates the device on the PC which will be used to establish the connection. This will be via one of the COM ports and the 810 interface.

Module Password:- This allows the address book to store the PIN number required to access the addressed module. This means that the operator does not need to be told the PIN number as the software will request access automatically. Each module in the address book can have its own PIN number stored. If the PIN number is incorrect it will still be possible to connect to the module – Though it will not be possible to control it.

IF USING MODEM LINK CONNECTION:-

Enter new record

Connection name: Modem Connection

Connect using: Standard Modem

Module password: 1 2 3 3

Telephone number: 01234567890

Site identity: Hillside Lodge

Genset identity: 250Kva Auto Start

The module's site and genset identity are required if a password-protected module is configured to dial out on alarms.

Address book manager

+ - ✓ ✗

Comms. Security: Module type ???

Connection Name:- This is a user-defined name used to identify the site to which communication is to be made. Each connection has an associated Name, telephone number (if appropriate) and connection details (i.e via 28K Fax-Modem).

Connect using:- This indicates the device on the PC which will be used to establish the connection. This will be a Modem fitted to the PC.

Module Password:- This allows the address book to store the PIN number required to access the addressed module. This means that the operator does not need to be told the PIN number as the software will request access automatically. Each module in the address book can have its own PIN number stored. If the PIN number is incorrect it will still be possible to connect to the module – Though it will not be possible to control it.

Telephone number:- This indicates the telephone number that the software will use to contact the remote module via modem. (If 810 connection via COM port or RS485 is used then a telephone number is not relevant).

Site Identity:- This is used to store the name of the site at which the remote module is installed – This should match the Site ID stored in the remote module and is used as a security check when connection is made to the module in the event of an alarm.

Gen-set Identity:- This is used to store the name of the gen-set at which the remote module is installed – This should match the gen-set ID stored in the remote module and is used as a security check when connection is made to the module in the event of an alarm.

IF USING RS485 INTERFACE CONNECTION:-

Connection Name:- This is a user-defined name used to identify the site to which communication is to be made. Each connection has an associated Name, telephone number (if appropriate) and connection details (i.e via Modem or via a COM port).

Connect using:- This indicates the device on the PC which will be used to establish the connection. This will be either a Modem fitted to the PC or via a COM port.

Module Password:- This allows the address book to store the PIN number required to access the addressed module. This means that the operator does not need to be told the PIN number as the software will request access automatically. Each module in the address book can have its own PIN number stored. If the PIN number is incorrect it will still be possible to connect to the module – Though it will not be possible to control it.

Slave ID:- This determines the identification of the module as a slave device. Each slave device on the RS485 network must have a unique slave ID. (Default 10)

Baud Rate:- This determines the speed of data transfer from the module to the RS485 network. (Default 19200).

! CAUTION!:- Changing the Slave ID and Baud rate of the connection should only be necessary if the modules have been configured to operate as Multiple slaves

COMMUNICATIONS STATE INDICATION

Comms:- A small icon in the bottom right of the screen indicates that the link to the module is healthy.

	Communication Link is OK when 'beating Heart' is displayed.
	Communication Link is OK when 'beating Heart' is displayed.
	Communication Link is not functioning, not data is being received. Check 'Set-up' and ensure module is connected. You may need to click on 'Dial' or 'Connect via 810/RS485' to establish the link.

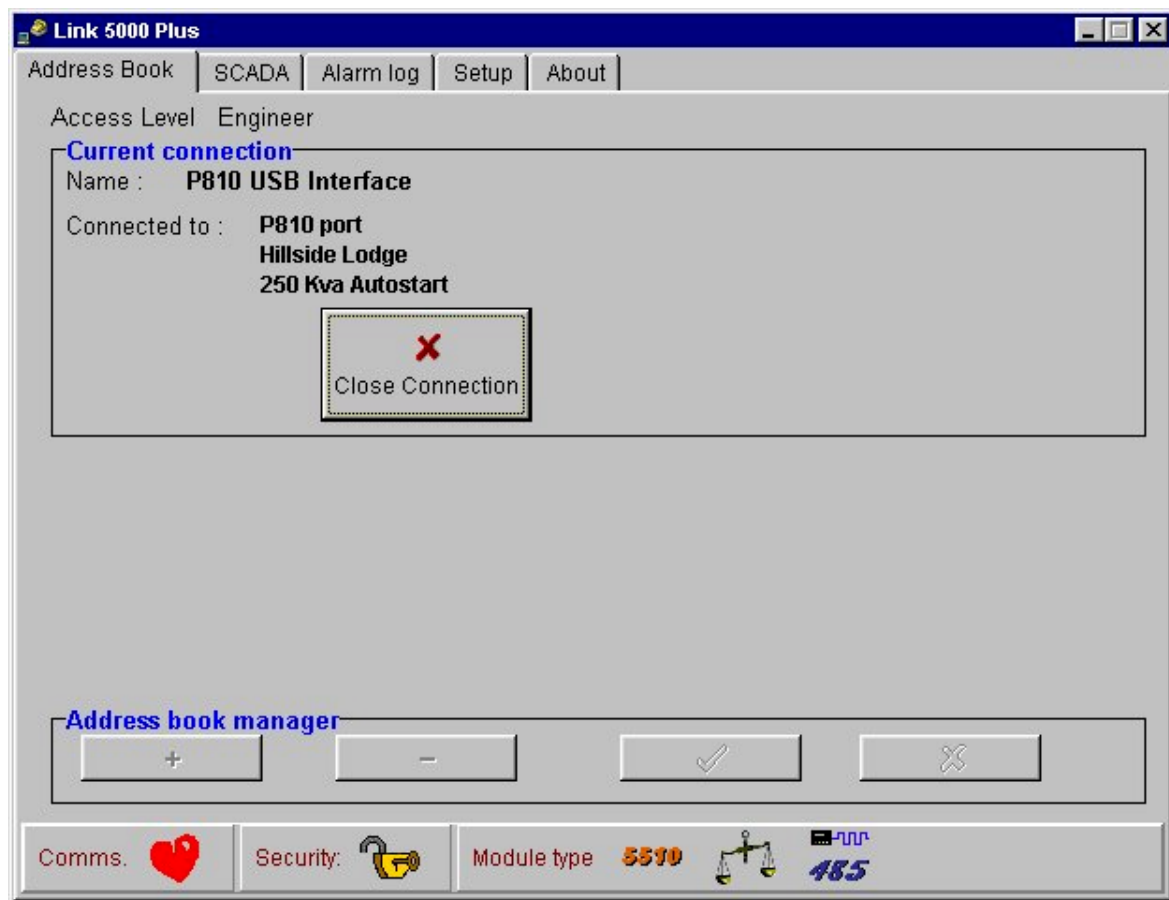
Security:- A small icon indicates the security state of the link to the module.

	No valid PIN has been entered for the currently connected module. Read only access – Operator can view module parameters but can not change operating mode or reset alarms, etc.
	Valid PIN entered, full read/write access – Operator can view module parameters and control the module, resetting alarms etc.

Module Type:- A small icon in the bottom left of the screen indicates the type of module and any options fitted.

	Module type unknown (prior to comms link being made or when link is lost)
	Currently connected module is 5510 Automatic Start Module
	Currently connected module is 5520 Automatic Mains Failure Module
	Currently connected module is 5560 ATS / Mains Controller Module
	Currently connected module has check sync with auto synchronisation and load share capability
	Currently connected module is a load control module for single set parallel with the mains (utility) supply
	Currently connected module has RS232 communications card fitted
	Currently connected module has RS485 communications card fitted

DISPLAY WHEN CONNECTED



SCADA MENU

REMOTE CONTROL AND TELEMETRY

A particularly useful feature of the module is its ability to provide real-time telemetry to the PC. This can be used to give on-screen details of the operation of the module and generating set performance.

Once connected the **Link5000^{plus}** software will ask the module to send details of its internal configuration. This is then used by the SCADA display to provide more detailed information about the operation of the module and the remote site.

A number of different telemetry displays are available:-

The first display is Mimic Display, This provides at-a-glance monitoring of the system, all non-essential information is hidden. Clear graphical displays allow easy control and performance monitoring. Should an alarm occur this is clearly displayed by an 'Alarm' legend. This page provides the normal operator control interface for remote operation (if enabled)

The second display is the Alarm Display this allows the user to see details on any alarm conditions which are currently active. The module internal firmware revision details are also given; this is to aid DEEP SEA ELECTRONICS technical staff in the event of a query.

The third display is the Status Display this allows the user to see at a glance the values of all measured inputs and the status of any of the digital inputs. State of the output relays are also displayed. As the displays are real-time the opening and closing of the inputs and outputs can be viewed this can assist in system performance monitoring and fault finding.

The fourth display is the Engine Instruments, this allows the user to see at a glance most of the engine measured values to allow monitoring of the engine performance. The engine display also has the option to view the engine instruments through via J1939, if connected to a J1939 enabled engine.

The fifth display is the Generator Instruments, this allows the user to see at a glance most of the generator measured values, to allow monitoring of the generator performance.

The sixth display is the BUS instruments and is available when connected to a 5560 module. This allows the user to monitor the bus values in a synchronising system.

The seventh display is the Mains Instruments and is available when connected to a 5520 module. This allows the user to monitor the mains voltages, frequency etc.

The eighth and final display is the Event Log, this allows the user to interrogate the Event log stored in the module, allowing recent shutdown (also mains fail and return logs on the 5520) events to be viewed.

NOTE:- The display screen are updated by information sent from the module, if the communications link to the module is lost the information displayed could be incorrect and is therefore 'greyed out'. A small icon in the bottom right of each display indicates that the link to the module is healthy.



Communication Link is OK when 'beating Heart' is displayed.



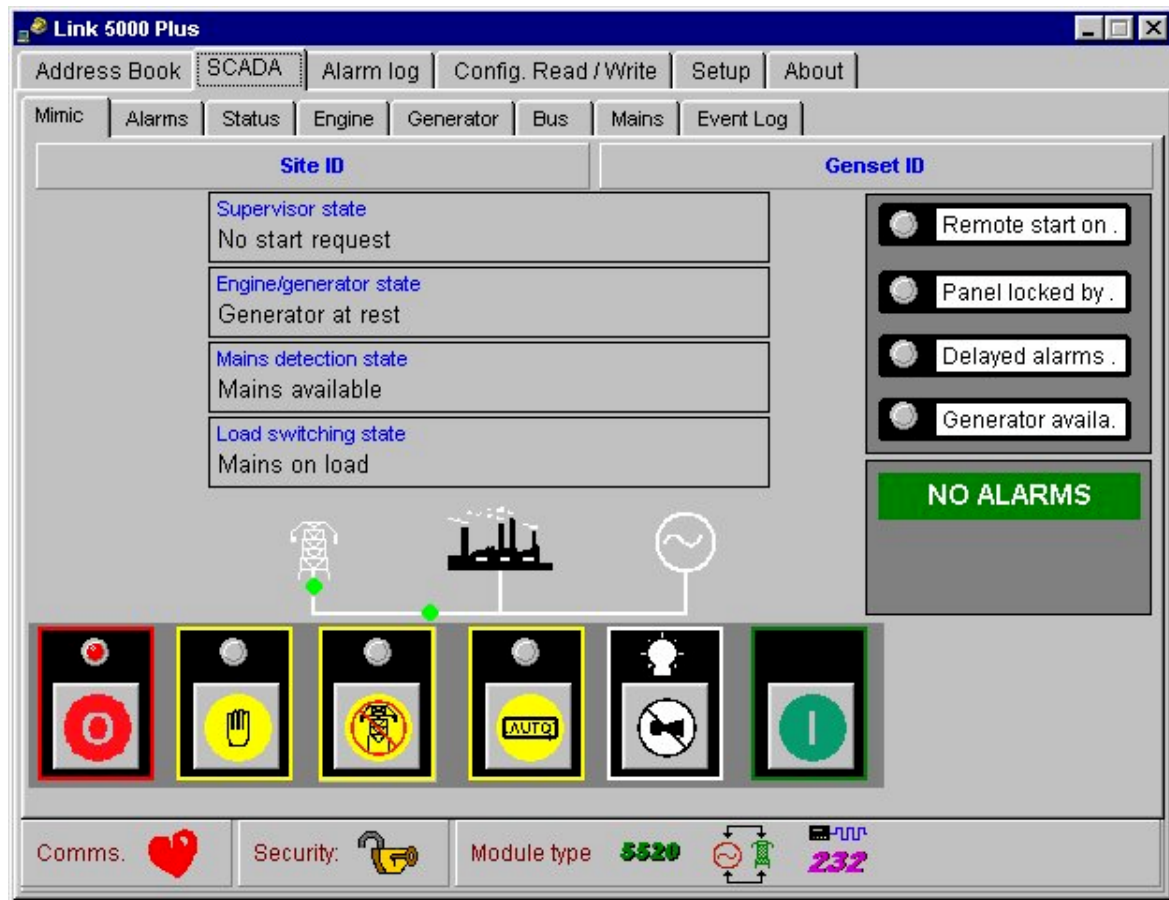
Communication Link is OK when 'beating Heart' is displayed.



Communication Link is not functioning, not data is being received. Check 'Set-up' and ensure module is connected. You may need to click on 'Dial' or 'Connect via 810/RS485' to establish the link.

MIMIC PAGE

If the Mimic Display option is selected the display will show:



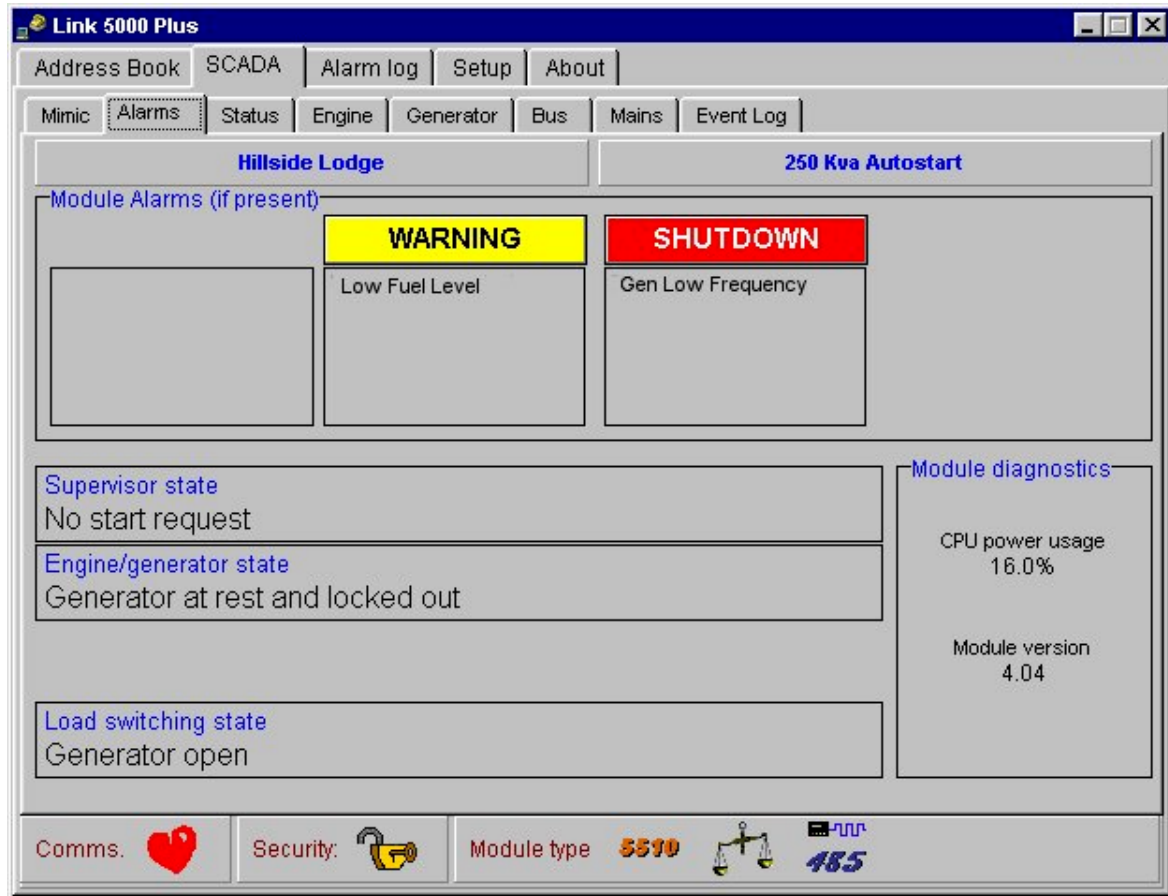
NOTE:- Using the Mouse to 'click' on the buttons will allow the module to be operated from the PC screen. This function can be used to provide remote control of the 55xx module via the communication link.

The remote control and/or remote load switching facility can be disabled from the 'Set-up' tab if remote monitoring only is required.

CAUTION!:- If the module has a PIN security number set, then it will not be possible to send remote control commands to the module, unless the correct Security Access is given.

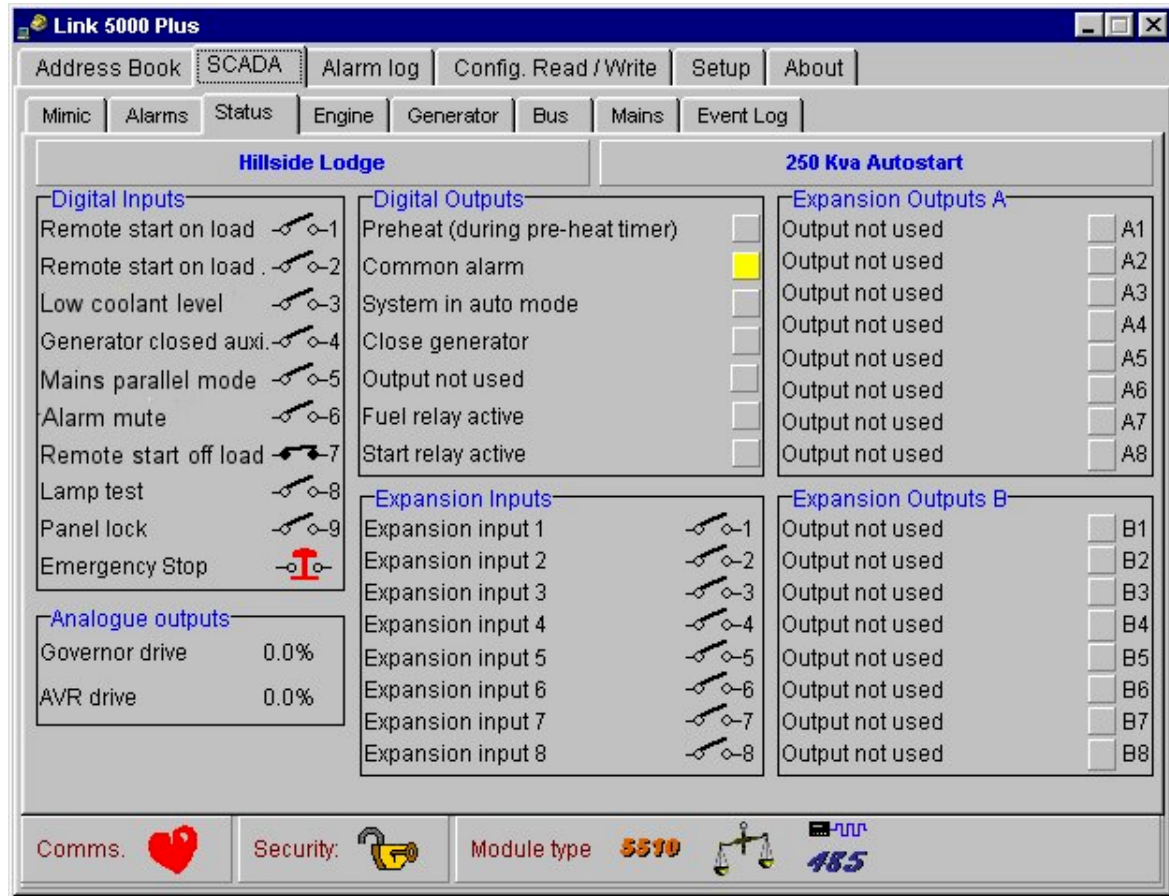
ALARMS PAGE

If the Mimic Display option is selected the display will show:



STATUS DISPLAY PAGE

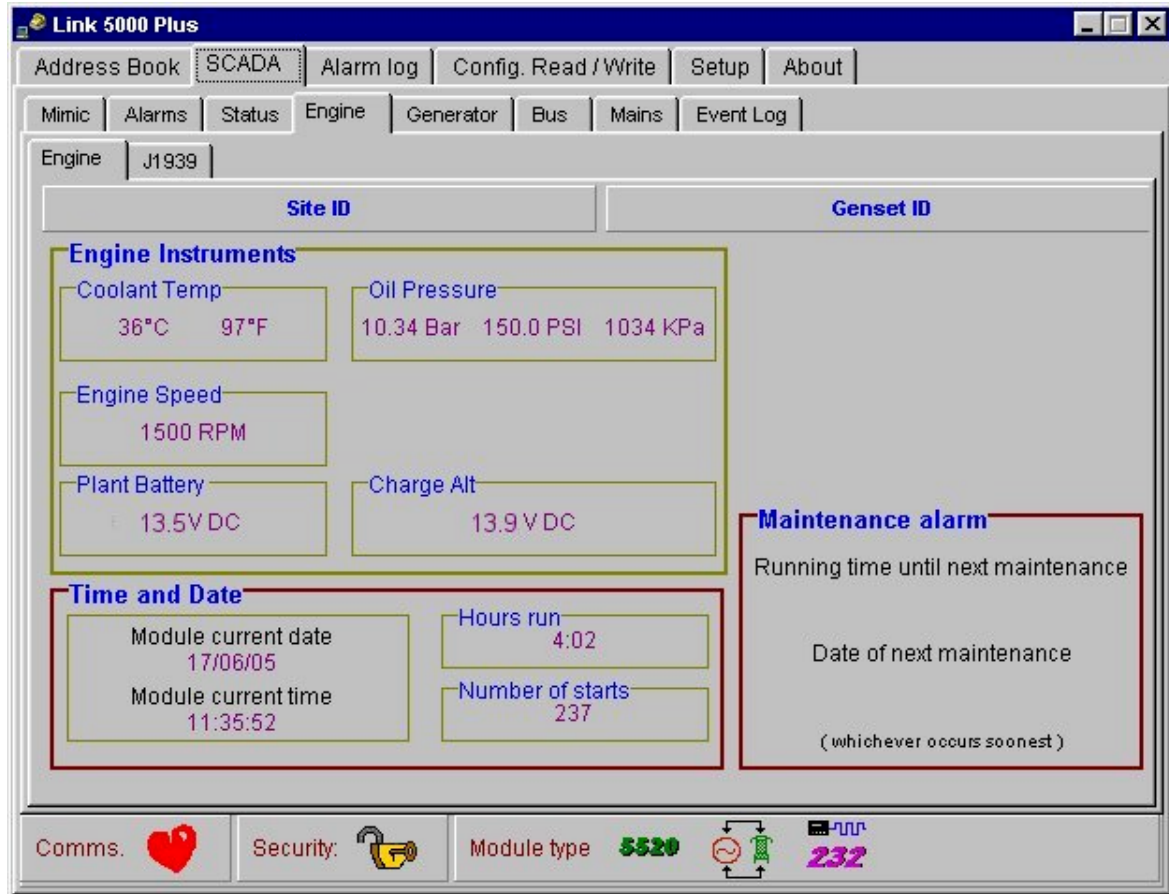
If the Status Display option is selected the display will show:



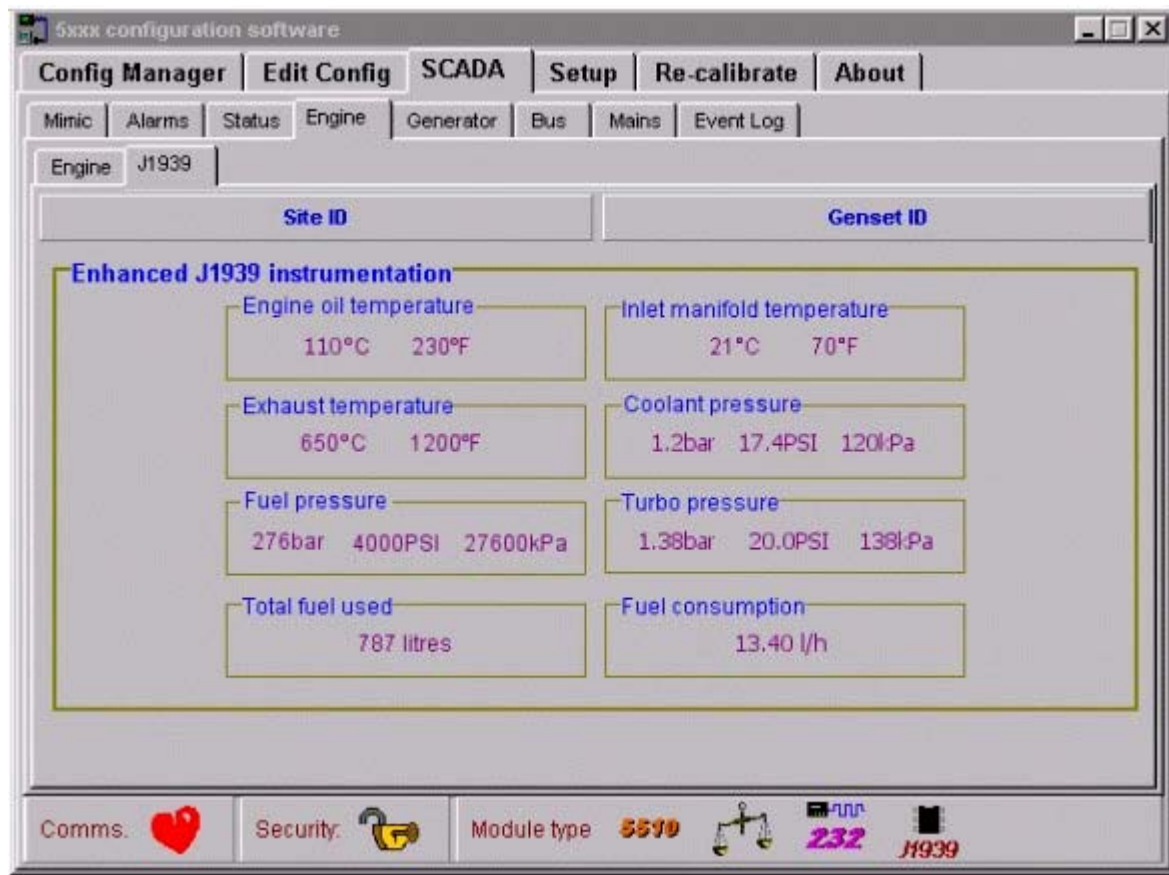
ENGINE PAGE

If the Engine Display option (not applicable to the 5560 module) is selected the display will show:

Engine Instrumentation – Standard input configuration

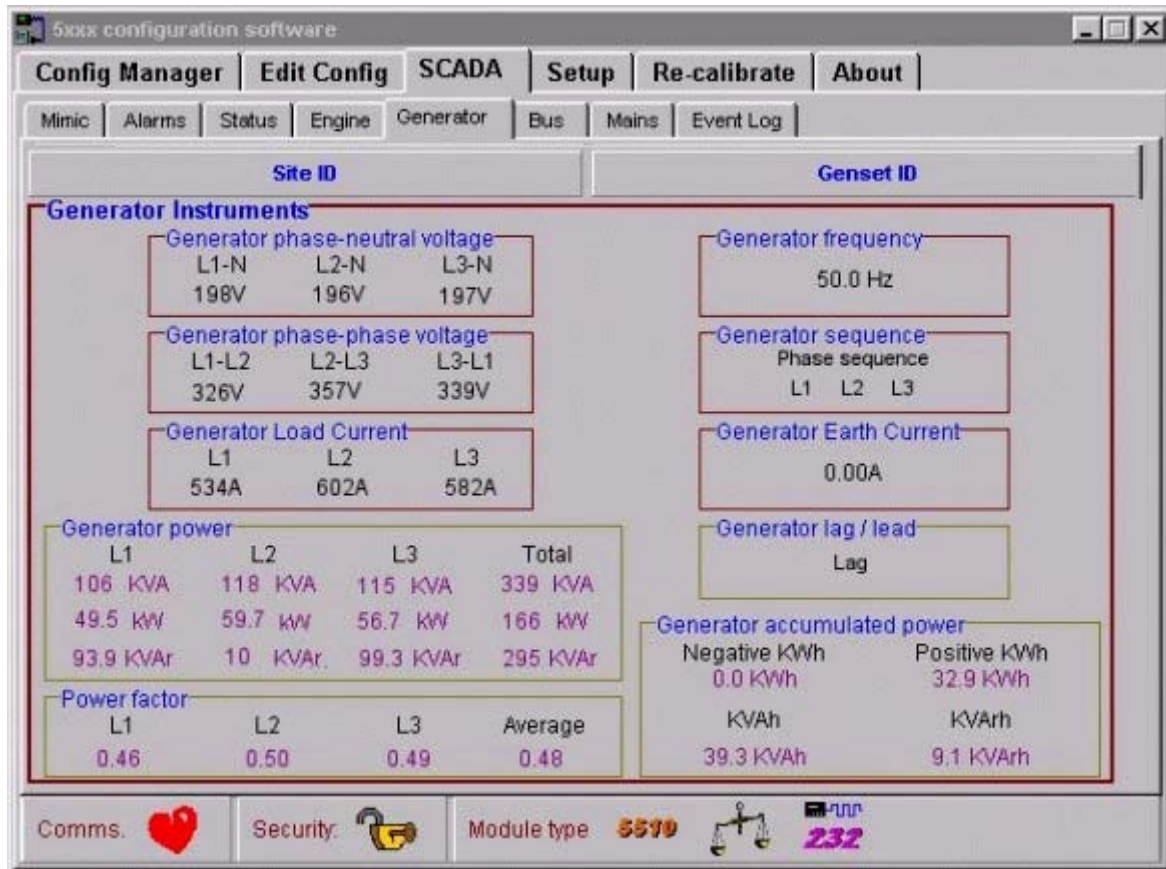


Engine Instrumentation – with J1939 option selected.



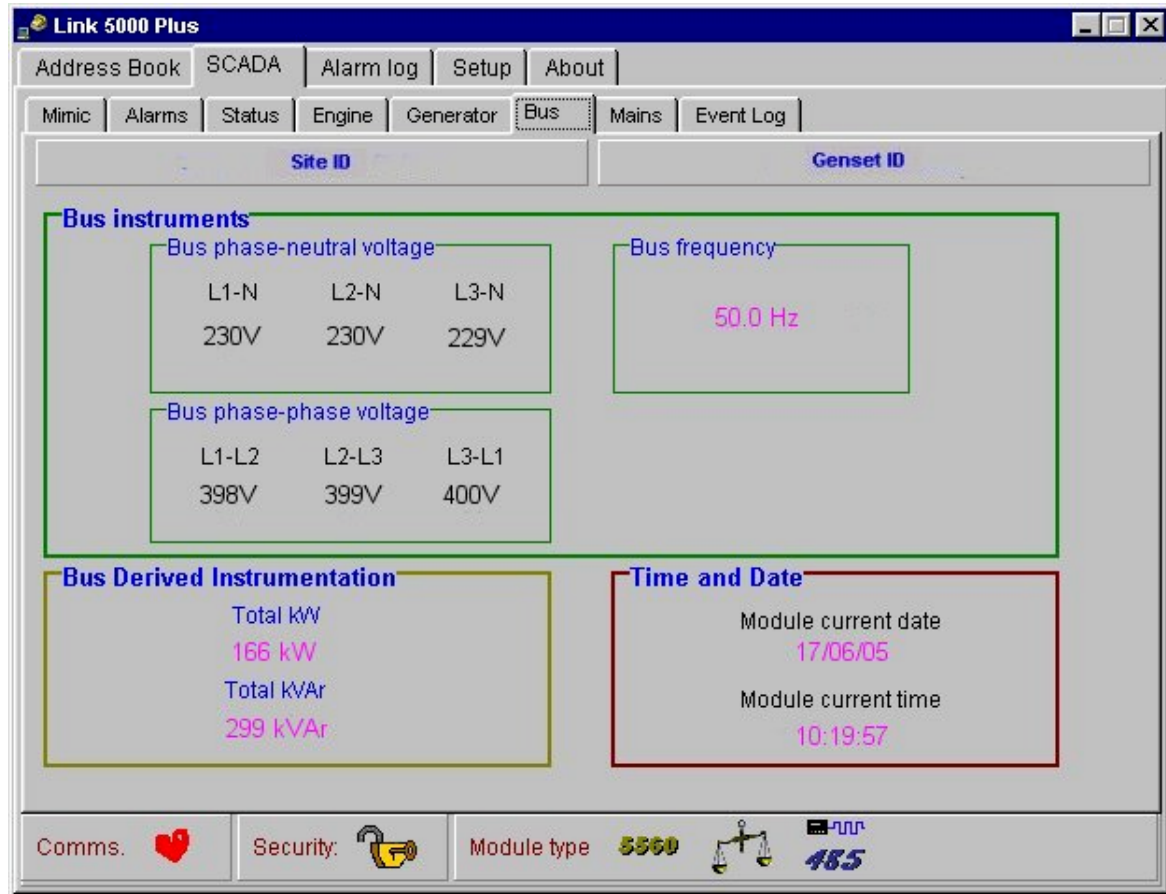
GENERATOR PAGE

If the Generator Display option (not applicable to the 5560 module) is selected the display will show:



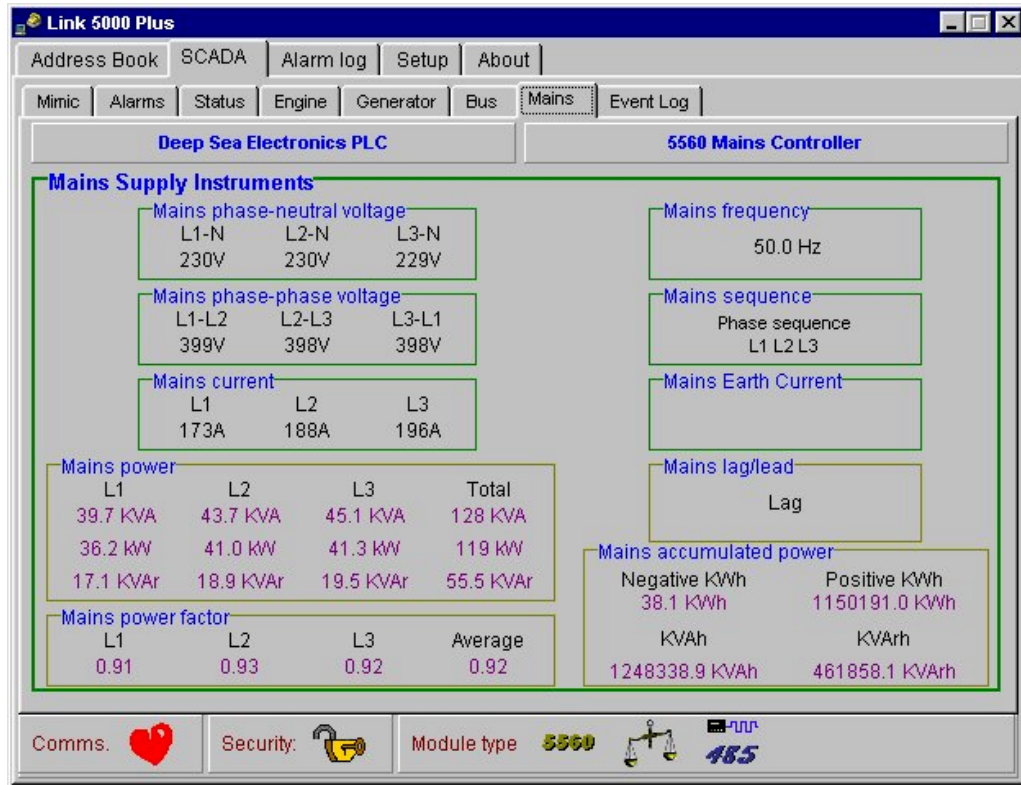
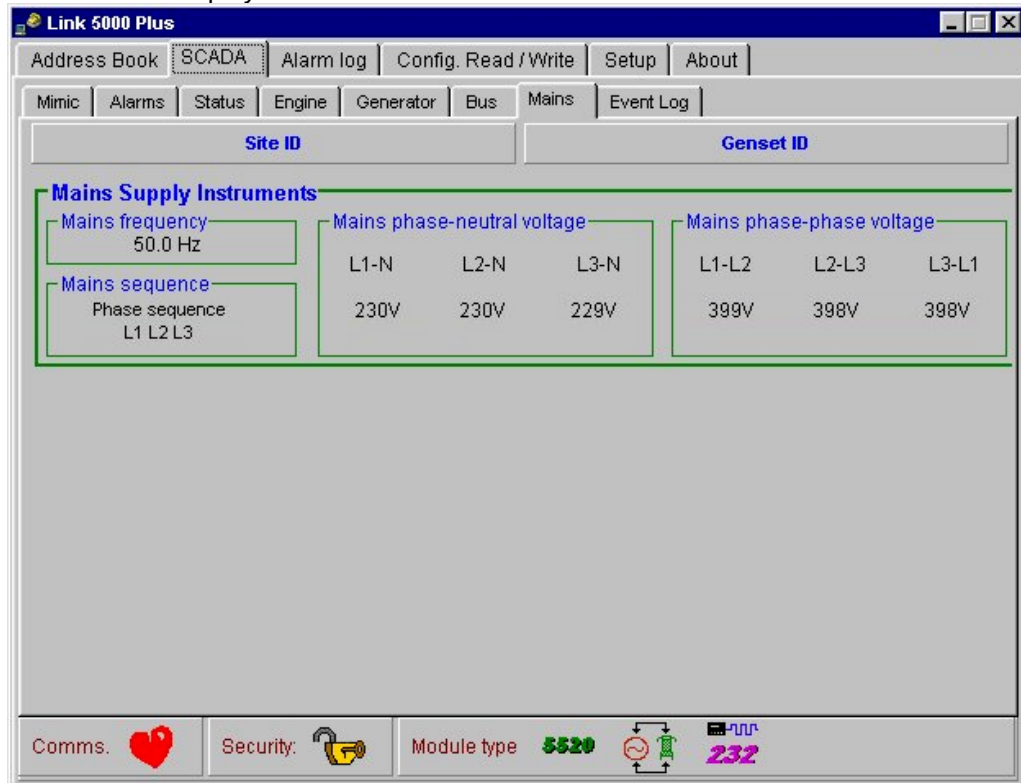
BUS PAGE

If the Bus Display option (5560 modules only) is selected the display will show:



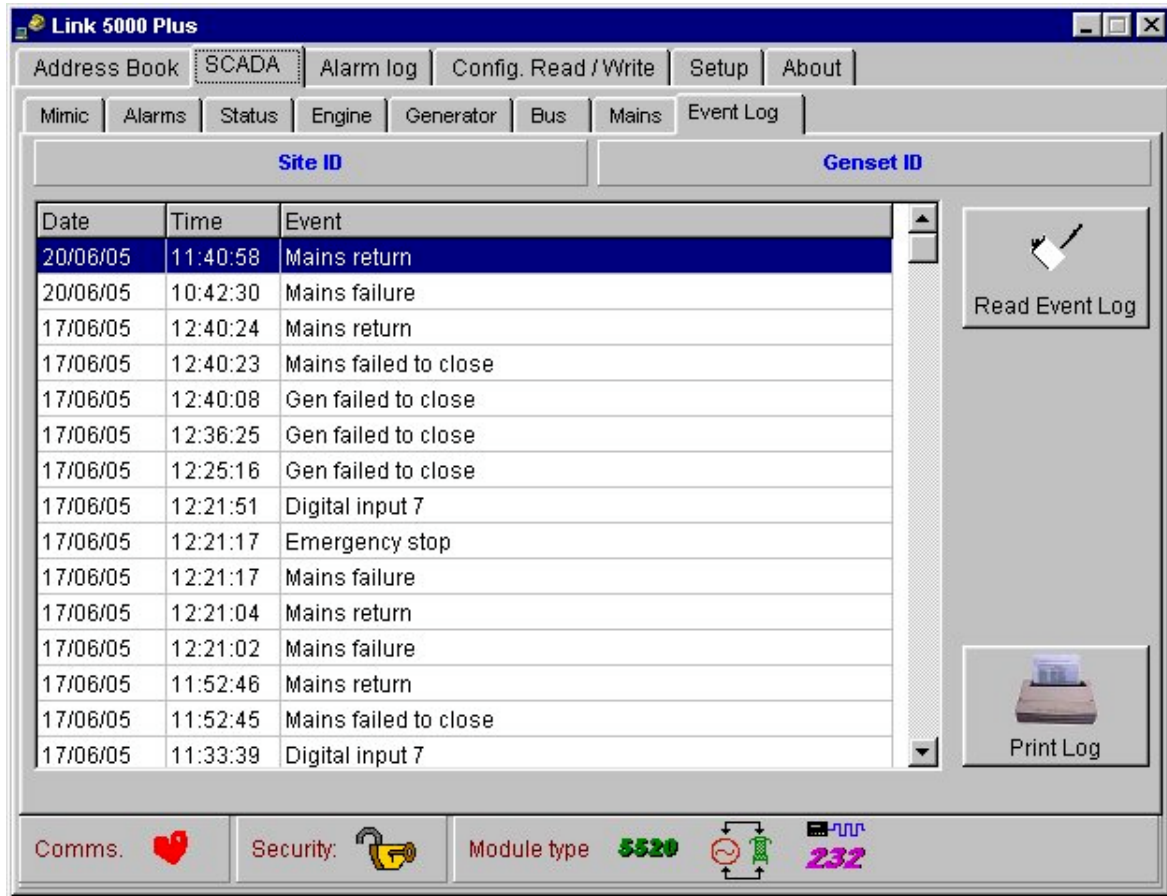
MAINS PAGE

If the Mains Display option (5520 / 5560 modules only) is selected the display will show:

5560 Module Display**5520 Module Display**

EVENT LOG PAGE

If the Event Log option is selected the display will show:

**READ EVENT LOG**

To interrogate the module's onboard event log the 'Read Event log' button must be operated. The module will then send the contents of its Event log to the PC.

PRINT LOG

This button will generate a print-out of the displayed event log.

NOTE:- The event log display is only updated when the 'Read Event Log' button is operated. Any subsequent events stored in the module will not appear on the PC unless an update is requested. To prevent possible user confusion the event log display is cleared whenever a different page in the Link5000plus is selected, or if the link to the module is lost.
It is not possible to 'Clear' the module event log.

ALARM LOG

LOGGING ALARMS

If the **Link5000^{plus}** software is placed in answer mode, it will monitor the modem for incoming calls from remote generating sets reporting alarm conditions. This log can be viewed by clicking on the 'Incoming Call Log' page. Additionally an audible alarm will be (if configured) issued from the PC speaker.

NOTE:- The alarm log will record any alarm conditions detected while the **Link5000^{plus}** software is actively connected to the module. Any shutdown alarms which occur at any other time will be stored in the modules own event log memory.

Time logged	From	Site ID	Genset ID	Status	Alarm code
20/06/05 12:58:36	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Gen high voltage
20/06/05 12:58:16	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Gen high voltage
20/06/05 12:57:52	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Gen high voltage
20/06/05 12:51:21	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Fail to start
20/06/05 12:49:57	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Emergency stop
20/06/05 12:49:36	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Gen high voltage
20/06/05 12:46:17	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Low oil pressure
20/06/05 12:44:29	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Fail to start
20/06/05 12:43:30	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	High coolant temp
20/06/05 12:43:03	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	Emergency stop
20/06/05 12:42:39	810	Hillside Lodge	250 Kva Auto	SHUTDOWN	High coolant temp
20/06/05 12:42:02	810	Hillside Lodge	250 Kva Auto	ELECTRICAL	Mains failed to close
20/06/05 12:41:34	810	Hillside Lodge	250 Kva Auto	WARNING	Gen failed to open
20/06/05 12:41:25	810	Hillside Lodge	250 Kva Auto	ELECTRICAL	Gen failed to close
20/06/05 12:39:44	810	Hillside Lodge	250 Kva Auto	WARNING	Mains failed to open

Each incoming call is logged with the following information being recorded:-

Time Logged:- This is the time and date that the call was received by the PC.

NOTE:- This is not the time that the fault actually occurred, but when it was logged by the PC.

From:- This is the telephone number of the module which reported the fault. This is taken from the module's internal configuration. If the connection is not via telephone then this will just indicate the connection method – i.e. 810.

Site ID:- This is the Site Identity of the module which reported the fault. This is taken from the module's internal configuration.

Gen-set ID:- This is the Gen-set Identity of the module which reported the fault. This is taken from the module's internal configuration.

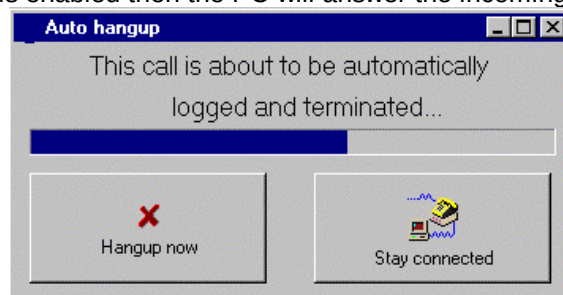
Module Status:- This indicates the severity of the alarm reported by showing the module operating status.

Alarm Code:- This is the actual alarm that has initiated the dial-out to the base PC.

The log will record all incoming alarms in turn and there is no limit to the number of alarms which can be logged. A slider bar allows the log contents to be viewed.

- :- This is used delete the current log entry from the incoming call log

If automatic call logging is enabled then the PC will answer the incoming call and log the alarm.



A call is logged when this screen is displayed

The alarm will be logged and the module instructed to suspend the call. The PC audible alarm will remain active until muted with the 'Mute' button.



CONFIG. READ/WRITE MENU

Note:- This page is only visible if 'Manager' level access is available.

This page is provided to allow access to the remote module configuration file to allow changes to the configuration to be made over a modem link. It is intended to be used by suitably qualified engineers to make small operational changes to the module configuration. It should not be used to attempt to resolve reported alarm conditions – these must be investigated locally before any configuration changes are made.

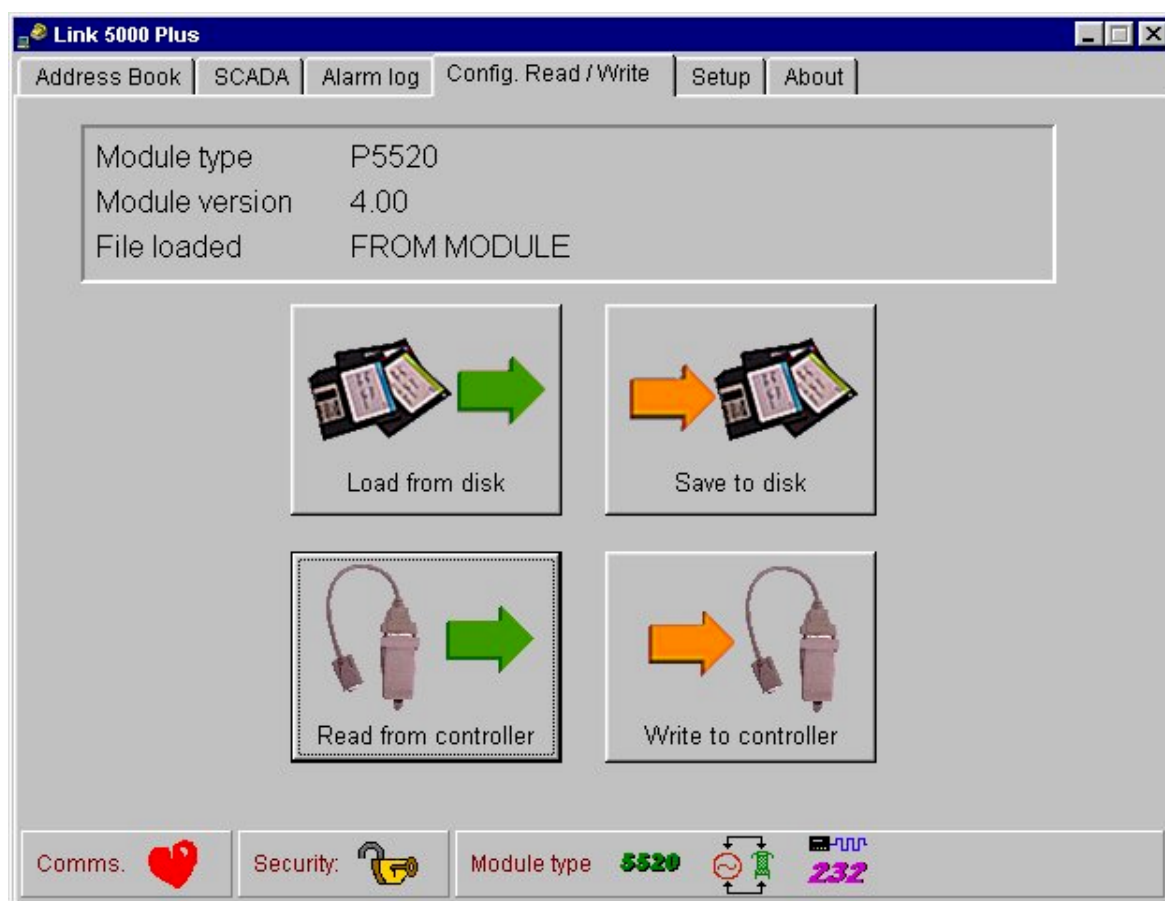
Note:- To give maximum security to this feature the following must be available to the remote operator" PC:-

The correct 'Manager' level password entered into **Link5000^{plus} when prompted.**

The correct PIN number for the remote module to be reconfigured.

The 5xxx Configuration software is required to make any changes and the correct level password will be required for this software also.

Once loading the '**Config Read/Write**' Menu is now displayed.



Module Type:- This indicates the type of module for which current file in the **Link5000^{plus}** software is configured. This will automatically be selected to the correct module when a configuration file is 'Loaded' from disk or 'Read' from the module.

Module Version:- This indicates the firmware version of module for which current file in the **Link5000^{plus}** software is configured. This will automatically be selected to the correct module when a configuration file is 'Loaded' from disk or 'Read' from the module.

! CAUTION!:- It is only possible to send the correct version configuration file to any given version of module. If your configuration file is not correct it will not be accepted by the module. If in doubt use the SCADA pages to check the module firmware version number. Load the configuration file into the 5xxx software and use the Edit Config, Module page to set it to the correct version.

File Loaded:- This indicates name of the configuration file currently loaded into the **Link5000^{plus}** program. If the configuration was 'Read' from the module then 'FROM MODULE' will be displayed.

Load from Disk:- This is used to load an existing configuration from disk into the **Link5000^{plus}** program. The file could then be 'Written' to the module. To load a file, simply click this button and enter the name of the file to be loaded in the dialog box. Then click 'OK'. The 'File Loaded' will then be indicated.

Save to Disk:- This is used to save the current configuration file to disk. The required filename for the configuration can be typed in the dialog box. Then click 'OK'. This file could then be accessed for editing using the 5xxx program.

Read from Controller:- This is used to 'Read' the configuration which exists in the module. The module must be connected to the PC via the 810 interface or modem and have a DC supply feeding it. It is possible to read from the module while the generating set is running. Clicking the 'Read' button will transfer the current configuration to the **Link5000^{plus}** program to allow the setting to be saved for inspection or modification by the 5xxx program.

Write to Controller:- This is used to write a new configuration to the module. To write to the module it must be connected to the PC via the 810 interface or modem and be fed from a suitable DC supply. Additionally the module must be in the correct operating mode in order for re-configuration to be accepted.

Should the module not be ready to receive data i.e. generator not at rest in stop mode, the software senses that the engine is running and a message at the bottom of the screen will be displayed. Steps should then be taken to ensure that the engine is at rest and the module is in the 'STOP' mode before attempting to write to the module.

! CAUTION!:- Unless the correct PIN number is sent to the module when the connection is established it will not be possible to 'Write' a new configuration to the controller.

OVERVIEW OF UPDATING A SETTING IN A REMOTE MODULE.

1. Ensure all items listed above are available to the remote PC.
2. Start the **Link5000^{plus}** software and enter the correct Manager Level password.
3. Select the remote module and connect using the Address Book (This may hold the correct PIN for the remote module so step 11 may not be required)
4. Click on the Config. Read/Write Tab
5. Click on Read from module
6. Once the config has been read – Click the Safe to Disk button and give the file a suitable name.
7. Start the 5xxx for windows software and enter the correct password for access to the values to be edited (Normally Technician or Engineer level)
8. Once the changes have been made Click the Config Manager tab and the Save the configuration to disk and give it a suitable name.
9. Return the **Link5000^{plus}** software and click the Load from Disk Button – locate the file and click OK.
10. Check the File Loaded display is correct and then click the Write configuration button.
11. IF prompted enter the correct PIN number
12. Once the transfer is complete, it is recommended that a remote run is performed to ensure that the remote site is operating as expected following the changes.
13. When finished close the remote link and exit the software.

SETUP MENU

SETUP COMMS

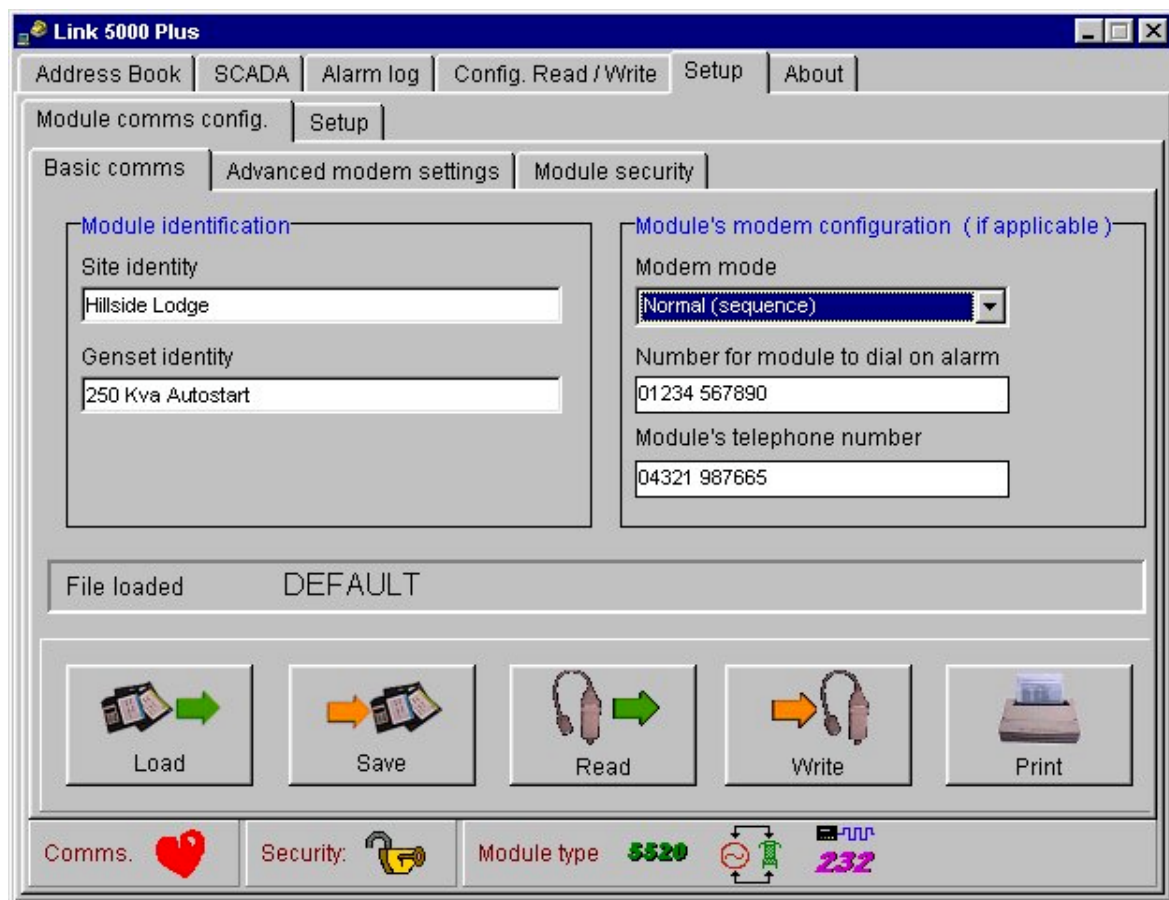
This menu is used to access the modules communications configuration file, to customise the way the module communicated with the PC system and to customise the operation of the PC software. When selected the following is displayed :

MODULE COMMS' CONFIG'

This menu allows the operator to configure the module communication parameters to select how communication with the PC is to be achieved.

BASIC COMMS

This menu is used to configure the few items essential for correct communication with the PC. It also provides the controls for sending the configuration to the module.



BASIC COMMS	Function
Module's Modem Configuration	Communications setting configure how the module is to communicate with the modem. Module Identification - Site Identity = This is used to allow the operator to identify the location of the gen-set which is being communicated with. This is held in the unit and will be transmitted to the PC whenever the link is established. ! CAUTION!:- Make a careful note of the exact text used to described the site ID – this will be needed when configuring the address book for this module. The address book entry is used to store the PIN number and this is checked against the Site ID. Gen-set Identity = This is used to allow the operator to identify the exact gen-set at the location which is being communicated with. This is held in the unit and will be transmitted to the PC whenever the link is established. ! CAUTION!:- Make a careful note of the exact text used to described the gen-set ID – this will be needed when configuring the address book for this module. The address book entry is used to store the PIN number and this is checked against the Gen-set ID.

BASIC COMMS	Function
Module's Modem Configuration	Modem Mode - No Modem = If no modem is selected the module will not attempt to communicate with the PC. All communications must be performed through the 810 connection.(Or the RS485 port if fitted) Incoming Calls Only = The P55xx module will only respond to incoming calls. It will not attempt to dial out in the event of an alarm condition. This function should be selected if remote control/ telemetry from the generator is required, but it is not possible for the PC to monitor alarm calls 24 hours a day. Normal (Sequence) = Normal mode of operation using a modem. Module will respond to incoming calls from the PC and will dial out in the event of an alarm. If the PC does not respond to the alarm call the module will retry. Once the pre-set number of re-tries have been made, the module will attempt to contact a second telephone number (if configured), if this is not successful it will then try the 3rd and forth numbers etc. This function could be used if the modules are required to contact the base PC during working hours, after hours the calls will then be ignored and the module will continue to contact the Engineers' home PC for example. Normal (Cyclic) = Normal mode of operation as above, but only one attempt will be made at each number before the next number is attempted. Useful if there is no base PC and only one Engineer on call from a Pool of possible Engineers. Outgoing Alarms Only (sequence) = Module will NOT respond to incoming calls from the PC but will dial out in the event of an alarm. If the PC does not respond to the alarm call the module will retry. Once the pre-set number of re-tries have been made, the module will attempt to contact a second telephone number (if configured), if this is not successful it will then try the 3rd and forth numbers etc. This function could be used if the modules are required to contact the base PC during working hours, after hours the calls will then be ignored and the module will continue to contact the Engineers home PC for example. Outgoing Alarms Only (cyclic) = Operation as above, but only one attempt will be made at each number before the next number is attempted. Useful if there is no base PC and only one Engineer on call from a Pool of possible Engineers. Number for module to dial on alarm- This is the telephone number of the modem connected to the monitoring PC. In the event of an alarm condition the module will dial this number and establish a link with the monitoring PC and report the alarm. Module's telephone number- This is the telephone number of the modem connected to the remote module. This is used to identify which module has reported an alarm to the monitoring PC.

BASIC COMMS	Function
Configuration Control Buttons	These buttons are used to manipulate the current configuration. File Loaded:- This indicates name of the communications configuration file currently loaded into the Link5000^{plus} program. If the communications configuration was 'Read' for the module then '<i>FROM MODULE</i>' will be displayed. Load from Disk:- This is used to load an existing communications configuration from disk into the Link5000^{plus} program. The file could then be edited (if required) and then 'Written' to the module. To load a file, simply click this button and enter to name of the file to be loaded in the dialog box. Then click 'OK'. The '<i>File Loaded</i>' will then be indicated. Save to Disk:- This is used to save the current communications configuration file to disk. The required filename for the communications configuration can be typed in the dialog box. Then click 'OK'. Read from Controller:- This is used to 'Read' the communications configuration which exists in the module. The module must be connected to the PC via the 810 interface or via modem and have a DC supply feeding it. It is possible to read from the module while the generating set is running. Clicking the 'Read' button will transfer the current communications configuration to the Link5000^{plus} program to allow the settings to be inspected or modified. Write to Controller:- This is used to write a new communications configuration to the module. To write to the module it must be connected to the PC via the 810 interface* or modem and be fed from a suitable DC supply. Additionally the module must be in the correct operating mode in order for re-configuration to be accepted. NOTE:-* If the module is not already configured to use a modem, then it is only possible to send the initial communication configuration via the 810 interface. Once the Modem has been enabled it will then be possible to send and receive communication configurations via the modem also. Therefore, it is recommended that if local re-configuration of the module via the 810 interface is not going to be viable, the module is shipped to the end user with the communications configuration pre-set. If details such as the module and monitoring PC telephone numbers are not available at time of shipping, ensure the module is configured to receive 'incoming calls only'. This way it is possible to call up the module on site once it's telephone number is known and update it's communications configuration to suit accordingly, via modem. NOTE:- The Correct PIN number is required to 'write' a new comms config to the module. Print:- This is used to produce a print-out of the current communications configuration. You will be prompted to enter your name (to allow it to be easily identified). A list of all the communications settings will then be produced.

ADVANCED MODEM SETTINGS

This menu is used to configure the more advanced setting available when communicating with the PC. In normal use, these should seldom need to be changed unless a specific problem is encountered or one of the advanced settings requires modification.

The screenshot shows the 'Link 5000 Plus' software window. The 'Setup' tab is selected, and within it, the 'Advanced modem settings' sub-tab is active. The interface includes a menu bar at the top with 'Address Book', 'SCADA', 'Alarm log', 'Config. Read / Write', 'Setup', and 'About'. Below the menu bar, there are sub-tabs: 'Basic comms', 'Advanced modem settings', and 'Module security'. A warning message states: 'These settings for advanced users only. Incorrect configuration of module may cause it to stop responding. Please refer to the operating manual for further information.'

The settings are organized into two main columns:

- Left Column:**
 - Other numbers to dial (if no answer):** A text box containing '01234 789011' and two empty text boxes below it.
 - Modem initialisation strings:**
 - Modem init (not auto answer):** A text box containing 'E0S7=60S0=0&S0&C1&D3'.
 - Modem init (auto answer):** A text box containing 'E0S7=60S0=2&S0&C1&D3'.
 - Modem hangup string:** A text box containing 'H0'.
- Right Column:**
 - Connection settings:** A group box containing five spinners:
 - Master inactivity timeout (s): 5
 - Connect delay time (s): 60
 - Number of retries on each number: 4
 - Delay between retries (s): 60
 - Delay between repeat cycle (s): 300
 - Enable SMS messaging:** A checked checkbox.
 - SMS message centre number:** A text box containing '+44 87075 3322'.
 - SMS recipient number:** A text box containing '07778 423974'.

At the bottom of the window, there is a status bar with several indicators: 'Comms.' with a red heart icon, 'Security:' with a yellow padlock icon, 'Module type' with '5520' in green, a green double-headed arrow icon, and '232' in purple.

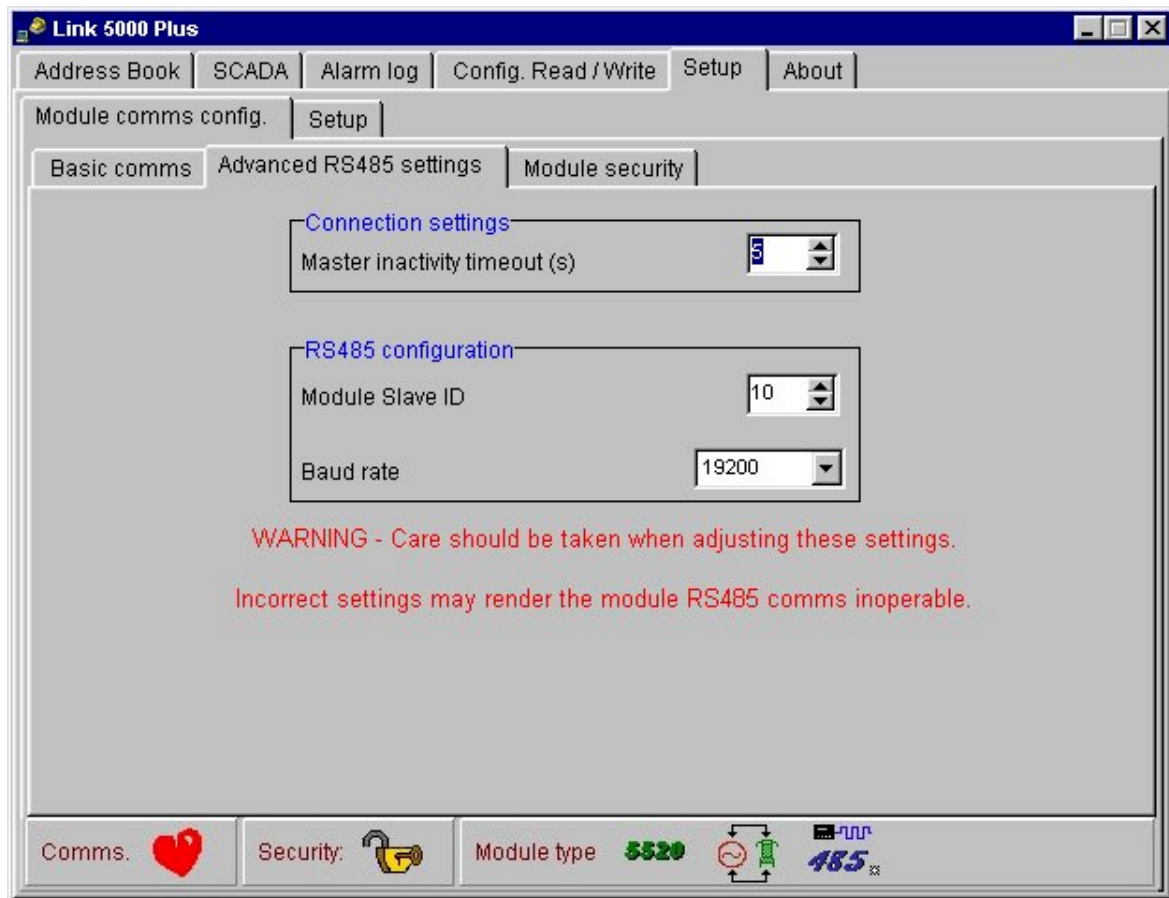
⚠ CAUTION!:- Do not attempt to make changes to these settings without fully understanding of the affect of modifying a value. Incorrect 'Advanced comms' settings can prevent the module from communicating correctly with the modem. In extreme circumstances, it may be necessary to return the module to DSE for rectification following incorrect comms configuration. If in doubt of the required settings please contact out Technical support department for assistance.

ADVANCED MODEM SETTINGS	
Other Numbers to dial	These settings are used set alternative numbers for the module to attempt to connect to in the event of the primary number not connecting.
Item	Function
Connections Settings	These setting are used to configure the way a connection is established:- Master inactivity timeout - This timer is used to determine how long the module will continue to monitor its last used communication port before monitoring all ports again. This setting should not normally need adjustment in the field. (Default 5 seconds) Connection delay -time This setting is used to tell the module how long to wait for a link to be established after the modem has been answered. If a successful link has not been established when this timer expires the module will instruct the modem to 'hang up' the line. (Default 60 seconds) Number of retries o each number - This is the number of attempts that will be made to contact each number. Once this has expired then next number in the list will be contacted. (Default 4 attempts) Delay between retries - This is the time the module will wait between dialling attempts in the event of a failure to connect on the first attempt. (Default 5 seconds) Delay between repeat cycle - This is the time that the module will wait for, once all the numbers in the list have been attempted. If no connection is established after the last retries of the last number. The module will cease dialling out for the duration of this timer, once it expires the module will resume trying to establish the connection starting with the first number in the list. (Default 10 seconds)
Item	Function
Modem Initialisation Strings	These setting are to configure the modem. Each modem will require a specific set of strings to be sent to ensure that it operates correctly. This information should be available from the modem manufacturer:- Modem Init (not auto answer) - Modem 'AT' commands used in the 'Outgoing calls only' modes. Modem Init (auto answer) - Modem 'AT' commands used in all other calls modes. Modem Hang-up - Modem 'AT' command used to instruct the modem to hang-up.

Item	Function
Enable SMS Messaging	These settings are used to allow the module to send a short text message (SMS message) to a GSM cellular telephone. This function is to allow the module to notify an engineer personally, prior to attempting to report the fault to the main monitoring PC. ⚠ CAUTION!:- This function can only operate if the module is connected to a suitable GSM Modem. Refer to the appendix for suitable modems. ⚠ NOTE:- The GSM SMS service is a one-way service and will not notify the sender if the message is not delivery. Therefore the SMS message should be considered as an addition alarm notification and not a replacement to the remote monitoring PC link Enable SMS Messaging - ☐ = When an alarm is detected the module will not attempt to send an SMS. ☒ = When an alarm is detected the module will first attempt to send an SMS message detailing the Site ID, Gen-set ID, Alarm details and the time and date. Once this message has been transmitted the module will then revert to normal communications and attempt to call the remote PC. No further SMS messages will be set unless a further alarm is triggered. SMS Message centre Number - This is the number for the SMS message centre provided by the GSM Modem SIM card service provider. Please refer to your GSM Service provider for details. SMS Recipient Number - This is the cellular telephone number of the Engineer or other individual to whom the SMS message is to be sent.

ADVANCED RS485 COMMS

This menu is used to configure the more advanced RS485 setting available when communicating with the PC via RS485. This page can only be accessed if 'Enable RS485' is selected in the 'Setup this software' menu, and the module is set to operating with 'No modem' in the basic comms settings.

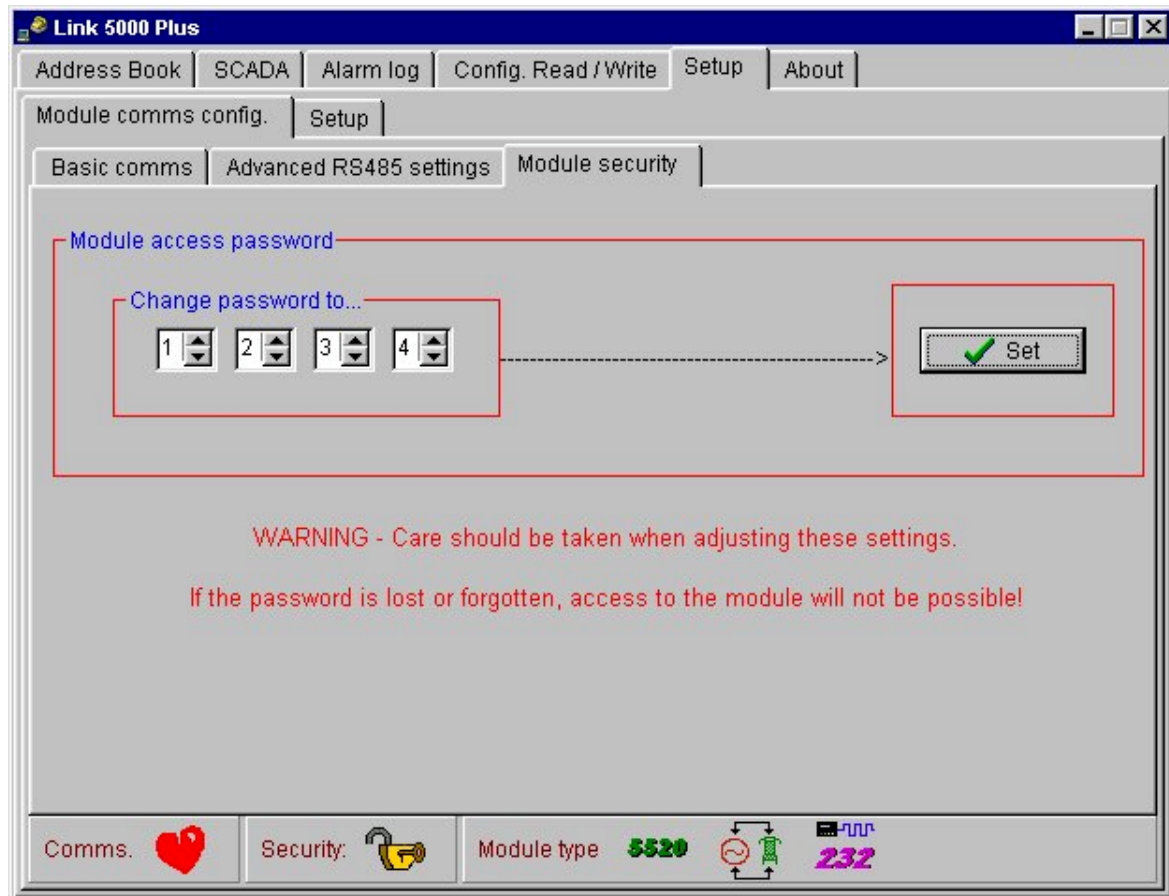


! CAUTION!:- Do not attempt to make changes to these settings without fully understanding of the affect of modifying a value. Incorrect 'Advanced RS485 comms' settings can prevent the module from communicating correctly with other RS485 devices. In extreme circumstances, it may be necessary to return the module to DSE for rectification following incorrect comms configuration. If in doubt of the required settings please contact out Technical support department for assistance.

MODULE SECURITY

To prevent unauthorised access to the module a Password Identity Number (PIN number) can be stored in the module. Unless this PIN number is entered it will not be possible to re-configure the module using the 5xxx software, or to operate the remote control SCADA pushbuttons.

! CAUTION!:- Ensure that you make a note of the PIN number when you allocate it to a module. With out the correct PIN number it will be impossible to gain configuration access to the module. If the PIN number is lost the module will need to be returned to DSE to be re-initialised – All module setting will however be lost in this operation.



Using the four selectors rotate the numbers until the required PIN number is displayed and the screen. Make a note of the Pin number and keep it safe. Press the 'SET' button to write the new pin number to the module.

! NOTE:- If the module is to be addressed using a Modem and is listed in the address book, ensure that a careful note of the PIN, SITE ID and GEN-SET ID is made. When making the address book entry ensure that this information is careful copied into the address book. This will then ensure that full access is granted automatically whenever a connection is made with the module via the operators PC and modem.

! NOTE:- Once access is gained to the module it is possible to turn off the PIN protection by re-setting the Pin number to the default "0000".

Once a PIN number has been set the module will not respond to any requests to change its operating mode, clear alarm flags or allow its main or comms configuration files to be changed.



If the password used in the address book connection is invalid or the 5xxx software is used, the following screen will be displayed:-

Using the selectors the correct PIN should be selected and then the OK button selected. The PIN entered will be compared against the module PIN and if a match is found access will be granted.

This access will remain active for as long as the connection is maintained by the **Link5000^{plus}** software. If the user selects to close the communication link the module will be instructed to secure itself again, and if the link is re-established the password will be requested again before control of the module is possible. Should the link to the PC be broken due to a comms error the module will wait a short period of time and if the comms link is not re-established it will secure itself again and request a correct PIN.

By ensuring that the correct PIN for any given module is stored in the Address Book entry the above process will happen automatically and will be invisible to the user.

If an incorrect password is sent to the module the following screen is displayed:-



The module will allow three attempts to enter the PIN number – If this is exceeded it will stop responding to attempts for a period of 60 seconds. The following message will be displayed:-



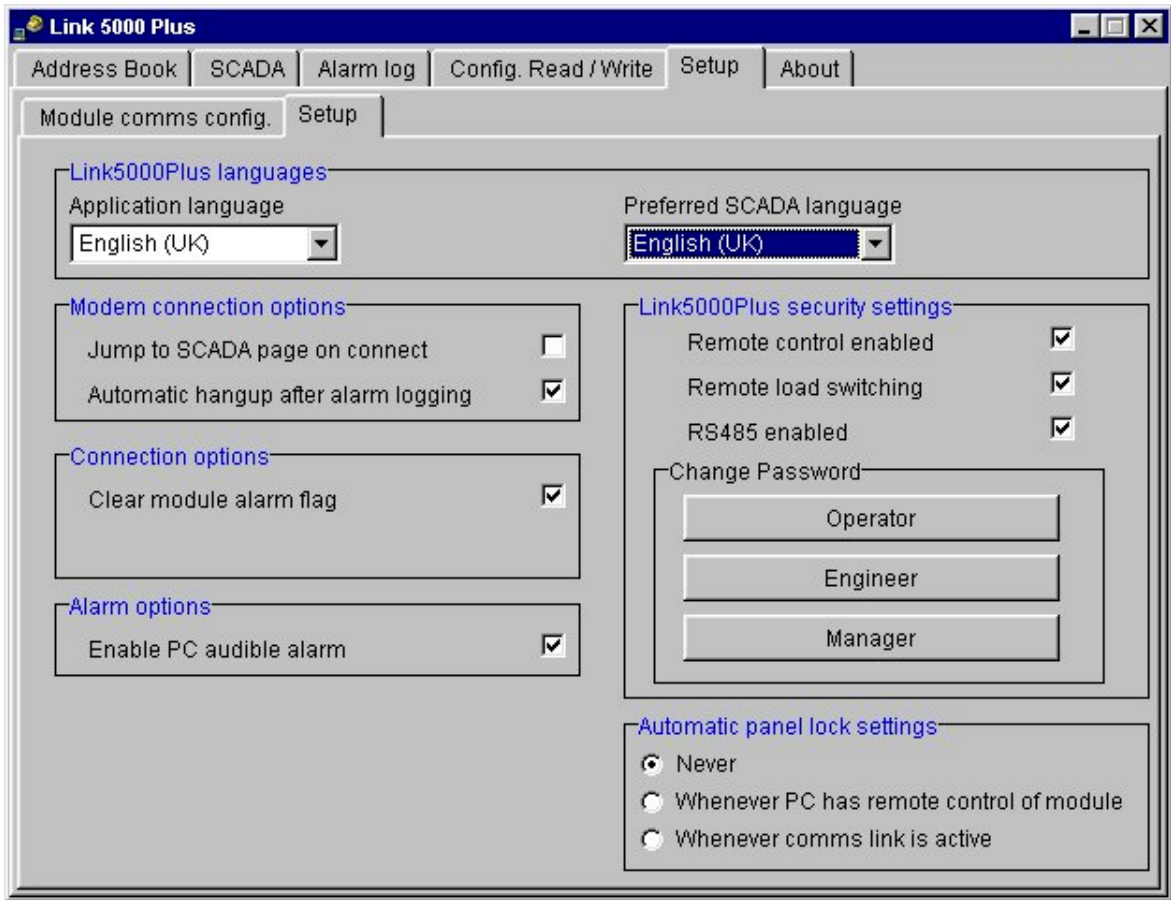
After this period the module will start checking the PIN numbers again and a further two attempts will be granted. If these are both incorrect the module will again stop responding for double the previous period. This will continue to a maximum wait period between retries of 64 minutes. This is to prevent a more determined attack on the security of the module via a remote link.

! CAUTION!:- Ensure that you make a note of the PIN number when you allocate it to a module. With out the correct PIN number it will be impossible to gain configuration access to the module. If the PIN number is lost the module will need to be returned to DSE to be re-initialised – All module settings will however be lost in this operation.

! CAUTION!:- Setting a PIN number in the module will stop all access to the module via the 5xxx software in addition to the RS232 and RS485 ports. Therefore it is important to ensure that any field service personnel who are likely to need access to the module configuration as advised of the PIN number prior to visiting site. Without the correct PIN number the module will not allow changes to its configuration.

SETUP

This menu allows the operator to configure the **Link5000plus** Software to select how communication with the PC is to be achieved.



SOFTWARE SETUP

Function

Link5000plus Languages

These options allow the user to configure the **Link5000plus** program to use a number of different languages.

Application Language -

This is used to select the language of the **Link5000plus** program. This is selected by simply selecting the required language from the drop down list. Once a language is selected all text in the **Link5000plus** program will appear only in that language.

Preferred SCADA Language -

This is used to change the language of the text displayed in the SCADA pages of the **Link5000plus** program. All other text remains in the 'Application Language' chosen above. The preferred language is transmitted to the 55xx module and it is instructed to use its own language translator to transmit to the **Link5000plus** program. Once configured it will always transmit in the chosen language until a different one is selected.

SOFTWARE SETUP	Function
Modem Connection Options	These options determine how the modem is controlled by the Link5000^{plus} program Jump to SCADA page on connect ☐ = When a call is answered, the software will remain on the 'Address Book' page. ☒ = When the call is answered, the software will automatically switch to the SCADA page to allow the user to monitor the generating set. Use Automatic hang-up after alarm logging ☐ = When a call is answered, the software will maintain the connection. It will NOT log the incoming call. ☒ = When the call is answered, the software will automatically log the incoming call and then hang-up after a delay. This then clears the line for other module to call in to the monitoring PC.
Connection Options	These options determine how the modem is controlled by the Link5000^{plus} program Clear Module alarm flag - ☐ = When a call is answered, the software will not instruct the module to clear its dial out alarm. Therefore the module will keep trying to contact the PC. This function is useful if remote access from other than the normal remote monitoring PC is made. ☒ = When the call is answered, the software will automatically instruct the module to clear its alarm dial out flag to prevent further calls from the module on this alarm. Subsequent alarms will re-trigger a dial-out. This is the default setting.  CAUTION!:- This setting must be selected for correct GSM Modem operation.
Alarm Options	Enable PC audible alarm - ☐ = When an alarm is received the PC will not issue any audible indication that an alarm is present. ☒ = When an alarm is received the PC will issue an audible alarm to draw the users attention to the presence of an alarm on one of the monitored gen-sets

SOFTWARE SETUP	Function
Security Settings	These options are used to set up certain security features, which will affect users with lower level passwords. Remote Control Enabled- ☐ = If the remote control facility is disabled then the facility is removed from the 'Mimic' SCADA display in all password levels. ☒ = If the remote control facility is enabled then a set of control buttons will be displayed in the 'Mimic' SCADA display in all password levels. If these are operated (by using the mouse and clicking on them) then the appropriate command is sent via the communication link to the 55xx module. Remote Load Switching- (only visible if Remote Control is Enabled) ☐ = If the remote load switching facility is disabled then the facility is removed from the 'Mimic' SCADA display in all password levels. ☒ = If the remote load switching facility is enabled then a set of control buttons will be displayed in the 'Mimic' SCADA display in all password levels. If these are operated (by using the mouse and clicking on them) then the appropriate command is sent via the communication link to the 55xx module. RS485 Enabled- ☐ =The 'Link5000plus' software is not being used to connected to RS485 linked modules. All reference to RS485 will be removed from the software menu's. ☒ = The 'Link5000plus' software is being used to connected to RS485 linked modules. Additional selections for RS485 will be present in the software menus.
Automatic Panel Lock settings	These options determine if local module control is available when the PC link is established. Never - The module has local control at all times, regardless of the PC connection. Whenever the PC has remote control of module - If the PC software is displaying the MIMIC SCADA page and remote control is enabled, then local control will be removed from the module and only the PC will be able to control the module. Whenever comms link is active - If the PC software has established a link to the module, then local control will be removed from the module and only the PC will be able to control the module.

OPERATOR PASSWORD

This option is used to change the operator level password used to access the software. In operator, only communication with the module is possible. If it not possible to re-configure the module and remote control is only possible if enabled.

The operator level password can only be changed if the Engineering level password is known; this is to prevent unauthorised password changes being made.

NOTE:- The passwords are only to give access to the software , not for access to the module itself.

When the option is selected the following will be displayed:

A dialog box titled "Change Password" with a blue header bar. It contains two text input fields, each preceded by a label: "Enter new password :" and "Re-enter new password :". Both fields contain a series of asterisks (*****). At the bottom, there are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

Type in the NEW password, this password is limited to 20 characters maximum, any combination of numbers and letters can be used. The software IS case sensitive.

Re-enter the NEW password, press the 'OK' button.

The passwords will be verified and if they do not match, the screen will display:

An "Information" dialog box with a blue header bar. It features an information icon (a lowercase 'i' inside a circle) on the left. To the right of the icon, the text reads: "New passwords are not the same. Please try again". At the bottom center, there is an "OK" button with a green checkmark icon.

ENGINEERING PASSWORD

This option is used to change the engineering level password used to access the software.

If the software is accessed using the engineering password, all values are available for modification including the complete module communications configuration.

NOTE:- The passwords are only to give access to the software , not for access to the module itself. The default passwords are blank and when a password is requested press the 'OK' button.

When the option is selected the following will be displayed:



A dialog box titled "Change Password" with a blue header bar. It contains two text input fields, each preceded by a label: "Enter new password :" and "Re-enter new password :". Both fields contain a series of asterisks (*****). Below the fields are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

Type in the NEW password, this password is limited to 20 characters maximum, any combination of numbers and letters can be used. The software IS case sensitive.

Re-enter the NEW password, press the 'OK' button.

The passwords will be verified and if they do not match, the screen will display:



An "Information" dialog box with a blue header bar. It features an information icon (a lowercase 'i' in a circle) and the text "New passwords are not the same. Please try again". At the bottom is an "OK" button with a green checkmark icon.

MANAGER PASSWORD

This option is used to change the manager level password used to access the software.

If the software is accessed using the manager password, all values are available for modification including the complete module communications configuration, and to access the configuration stored in the module.

NOTE:- The passwords are only to give access to the software , not for access to the module itself.

When the option is selected the following will be displayed:



A dialog box titled "Change Password" with a blue header bar. It contains two text input fields, each preceded by a label: "Enter new password :" and "Re-enter new password :". Both fields contain a series of asterisks (*****). Below the fields are two buttons: "OK" with a green checkmark icon and "Cancel" with a red X icon.

Type in the NEW password, this password is limited to 20 characters maximum, any combination of numbers and letters can be used. The software IS case sensitive.

Re-enter the NEW password, press the 'OK' button.

The passwords will be verified and if they do not match, the screen will display:



OPERATION OVERVIEW

USING THE **LINK5000^{plus}** SOFTWARE

This section details the steps necessary for setting up communication with the remote module and monitoring PC.

▲NOTE:- It is important that the module is configured to use a modem if remote modem communication is required. This can only be achieved by sending a configuration via the 810 interface initially. Remote modem comms is only possible if using the RS232 comms version of the 55xx module.

COMMISSIONING A REMOTE MODEM COMMS SITE

1. Install the **Link5000^{plus}** software on the monitoring PC with a suitable modem fitted.
2. Set-up any passwords required. (Set-up, Set-up this software).
3. Using a P810 interface and the Link5000plus software establish a link to the Module locally.
4. Create a communications configuration for the module using the **Link5000^{plus}** software and enable Modem Comms, setting up telephone numbers if required.
5. Send the configuration to the module via the 810 interface.
6. Close the P810 interface and Link 5000plus connection on the PC
7. Install the module on site
8. On the monitoring PC make an 'Address Book' entry for the new remote site.
9. Dial the remote module and confirm communication can be established.
10. The Link is now established.

APPENDIX

LINK5000^{plus} COMMS CONFIG FOR 55XX MODULE.PAGE 1 OF 1

Created by - Miles Revell on 23/08/01

Filename - DEFAULT

Basic settings

Module Identity

Site ID	<i>Site ID</i>
Gen-set ID	<i>Gen-set ID</i>

Modem configuration

Modem mode	<i>Incoming calls only</i>
Number to dial on alarm	
Telephone no. of module	

Modem Initialisation strings

Modem Init (Not auto Answer)	<i>E0S7=60S0=0&S0&C1&D3</i>
Modem Init (auto Answer)	<i>E0S7=60S0=2&S0&C1&D3</i>
Modem Hang-up	<i>H0</i>

Advanced settings

Connection Settings

Master Inactivity timeout	<i>5</i>	<i>Seconds</i>
Connect delay time	<i>60</i>	<i>Seconds</i>
Number of retries on each number	<i>4</i>	
Delay between retries	<i>60</i>	<i>Seconds</i>
Delay between repeat cycle	<i>300</i>	<i>Seconds</i>

Other Numbers

Second Number
Third Number
Forth Number

SMS Settings

SMS Messaging Enabled	<i>No</i>
SMS Message Centre Number	
SMS Recipient Number	

APPROVED PSTN MODEMS

Manufacturer: 'MultiTech Systems'

Type: MultiTech Systems external modem V.90 MT5600ZDXVE-

GB (Britain and Europe)

CN (China)

HK (HongKong)

TP (Taiwan)

KP (Korea)

DC powered c/w a separate mains power supply unit.

This modem uses the default communications configuration file supplied with Link5000plus V4.xx.

Manufacturer: 'MultiTech Systems'

Type: MultiTech Systems external modem V.90 MT5634ZBA-GL

Global version

DC powered c/w a separate mains power supply unit.

This modem uses the default communications configuration file supplied with Link5000plus V2.xx.

Manufacturer: 3com/US Robotics

Type: "Courier V.Everything external modem, model No 010955"

AC powered and c/w a separate mains power supply unit.

Produced for professional applications and according to 3com/US Robotics, has guaranteed long-term availability and specification stability.

Deep Sea plc approve this modem for use with their 55xx.

This modem uses the default communications configuration file supplied with Link5000plus.

Manufacturer: Westermo

Type: TD-32 DC

DC powered (12 to 63 volts 200mA)

Produced for professional applications and according to Westermo, has guaranteed long-term availability and specification stability.

Designed for interior panel mounting on DIN rail.

Deep Sea plc approve this modem for use with their 55xx products. However it is not suitable for use with 12-volt plant batteries as these will fall below the modem's minimum limit during cranking. It is suitable for use with 24-volt plant batteries, or any other 12 to 63 volt DC supply.

APPROVED GSM MODEMS

Manufacturer: 'Brodersen'

Type: UCM-91.912/918 /1

DC powered (8v (5v Min) to 24volts (28v Max) DC. 35 to 200mA) from local DC supply.

This modem uses a special GSM communication configuration file supplied with Link5000plus V4.0.

UNAPPROVED PSTN MODEMS

Many other modems may work satisfactorily with the 55xx product range but Deep Sea plc can not be held responsible for applications that fail to operate with any modem other than those which they approve. An example of such an un-approved modem is:

Manufacturer: 3com/US Robotics

Type: "56K Faxmodem, model No 5630"

AC powered and c/w a mains power supply unit.

Produced mainly for the domestic PC market and according to 3com/US Robotics has no guaranteed long-term availability or specification stability. For these reasons Deep Sea plc do NOT approve this modem for use with their 55xx product range but have tested it and found it to work correctly.

This modem uses the default communications configuration file supplied with Link5000plus.

Powering AC mains powered modems

If an uninterrupted mains voltage supply is available, then it is normal to use this to power the modem's AC power supply unit. If this is not the case then the communications link will be lost at times when there is no AC supply. This may be acceptable but if it is not then a small UPS should be used to power the modem's AC power supply unit.

Deep Sea Electronics Approved UPS

Manufacturer: APC (American Power Corporation)

Type: 300VA Back-ups

Deep Sea plc approve this UPS for use with their approved AC modems.

DATA COMMUNICATIONS OVERVIEW

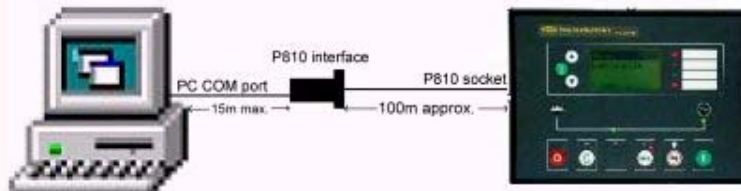
Data Communications between two electronic devices has increased in use over recent years. This document is intended to clarify the main points of serial data communications over two of the most widely used hardware interfaces, RS232 and RS485.

Data communication covers many applications, from the simple monitoring of a piece of equipment to the control of a complex plant operation. (This is often called S.C.A.D.A., which stands for Supervisory Control And Data Acquisition).

As different manufacturers often supply the control and monitoring equipment, industry standards were defined to specify the interface between the equipment.

DSE P810 DESCRIPTION

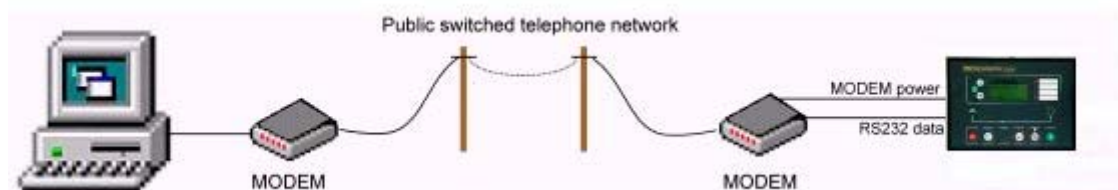
Direct RS232 cable connection between the equipment is the simplest and most often used communication interface. Care should be taken however to provide proper electrical isolation between the equipment. The Deep Sea Electronics P810 interface is used to provide this isolation between the 55xx series range of modules and the Personal Computer connected to the module. Using the P810 interface has another advantage in that the operating range of the communication link is increased to over 100m! (Maximum RS232 cable length is 15m).



RS232 DESCRIPTION

Defined officially as the “interface between data terminal equipment and data communications equipment using serial binary data exchange”, RS232 specifies only the hardware interface between the equipment, and not the protocol (electronic language) that the equipment communicates in. Protocols are discussed further below.

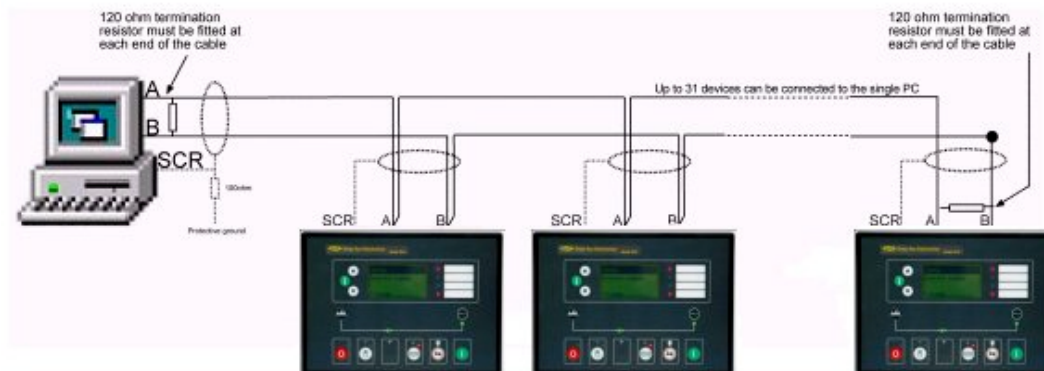
Data terminal equipment is typically a PC monitoring the system, while Data communications equipment is typically a modem or other communications device. A modem (stands for Modulator / Demodulator) is used to convert electrical signals from the equipment into audible signals suitable for transmitting over the public switched telephone network (PSTN).



NOTE:- . For more detailed RS232 connection details of the DSE 55xx controllers, including recommended modem type, please consult the Link5000Plus manual.

RS485 DESCRIPTION

Again the RS485 communication standard defines only the connection between the equipment, not the communication protocol which is described below. RS485 is a two-wire interface, capable of allowing up to 32 devices to communicate with each other. This feature is called 'multi-drop'. It allows, for instance, a single Personal Computer equipped with RS485 interface to communicate with between 1 and 31 generating set controllers on the same site, with only one cable between them. The cable is connected from one device to another in 'daisy-chain fashion'.



⚠ CAUTION!:- . RS485 cabling must be 120Ω cable, specified for use with RS485. 120Ω terminating resistors must be fitted to the first and last devices on the bus. Some PC RS485 cards are already fitted with this resistor, and in this case should not be fitted externally. If in doubt, consult the supplier of your PC RS485 card. The DSE 55xx modules are not fitted with internal terminating resistors, so if a 55xx unit is the 'last' device on the bus, a terminating resistor **MUST** be fitted externally. Recommended cable BELDEN 9841 120Ω RS485 cable. (DSE part number 016 030).

⚠ NOTE:- . For more detailed RS485 connection details of the DSE 55xx controllers, please consult the Link5000Plus manual.

COMMUNICATION PROTOCOLS

Once all the pieces of equipment are connected together (RS232, RS485 or other), they must both speak in the same electronic 'language' to enable each piece of equipment to understand each other. These 'languages' are called protocols.

A simple protocol is ASCII (American Standard Code for Information Interchange) which is simply the transmission of data as single characters using a simple code (i.e. letter A = 65, letter B = 66, a space = 32).

More complex protocols may include some form of error checking to test the data to ensure it has not been corrupted during the 'conversation'.

The DSE 55xx module utilises the Modbus™ protocol for its communication. Modbus is a very robust and secure master/slave protocol, widely used and supported by many pieces of equipment and PC software. The 55xx module itself performs a 'slave' operation, maintaining silence on the communication link until being sent instructions by the 'master' (normally a PC running 5xxx or Link5000Plus). The master can either request information from the module, or instruct the module to perform a certain task, such as starting or stopping the engine. In the case of multiple module (RS485) installations, the 'master' must include in its request, the identity of the module (SlaveID) it wishes to communicate with. Each module must have a unique SlaveID so that only one module will interpret the request and perform the task asked of it by the 'master'.

GSM NETWORK CONNECTION

It is up to user to choose which GSM Network you would like to use, but please be aware that there are three different frequencies used for GSM communications, 900, 1800 and 1900 Mhz. For instance in the UK, Vodafone and O2 use 900Mhz and One to One and Orange use 1800Mhz. The recommended GSM modem is a 'dual-band' device and will function on both 900 and 1800Mhz GSM networks. It will not function on 1900Mhz Systems. Please check with your GSM service provider to ensure that you GSM modem will operate with their system.

When opening your GSM account please ask your Network Provider for a Data Account. Data Accounts usually have a much lower monthly charge than Audio Accounts.

Regardless of the type of account you have, Data or Audio, you must ensure that the SIM card you receive is DATA ENABLED. Even if you have a Data Account, please check to confirm that it has been Data Enabled, sometimes this is not done automatically.

You will normally receive three telephone numbers with each account, one for Audio (probably won't work on a Data Account), one for Fax and one for Data. Obviously the Data number is the one to use. If you do not have a separate Data number please confirm with your Network Provider that the number you have is a Data number. The reason for this additional numbering is that not all the analogue fixed-line exchanges/switches can process and route the digital data that the digitally-based GSM networks use. Thus the digital data must be fed through an appropriate incoming voice, data, or fax number.

Once you are satisfied that you have an Enabled Data Account, please check that the SIM card PIN number is not enabled. To do this place the SIM card in a normal GSM phone and check that the need to insert the PIN number, when the power is switched on, is disabled.

You may now place the SIM card in your UCM-91, power it up and check the Network connection (refer to Users Manual). On power up the LED on the front of the unit will be lit steady, this means power is on, but no Network Connection is available. After a short period of time the LED will start to flash, short time lit and longer time dark, this means a Network Connection is established.

CONFIGURATION

Ensure that the module has the appropriate Comms Config file written to it and also make sure that GSM compatibility mode is selected on the remote monitoring PC.

COVERAGE

The signal strength available to the GSM modem will directly affect the module's ability to communicate. To ensure trouble-free GSM data links ensure that the GSM antenna is sited as high as possible on the installation and check that there is sufficient signal strength available at the chosen location. Consideration should be given as to the suitability of GSM communications links and the proposed location. For example if the Generator is to be sited in a remote valley surrounded by hills – unless line of site is possible with the GSM transmitter tower then it is very unlikely that it will be possible to use the GSM modem at that location.



WARNING!:- GSM coverage is variable and cannot be guaranteed – therefore it is not recommend for the alarm status indication of critical sites unless suitable redundancy is available via other signalling methods.