

## Smart Display Unit



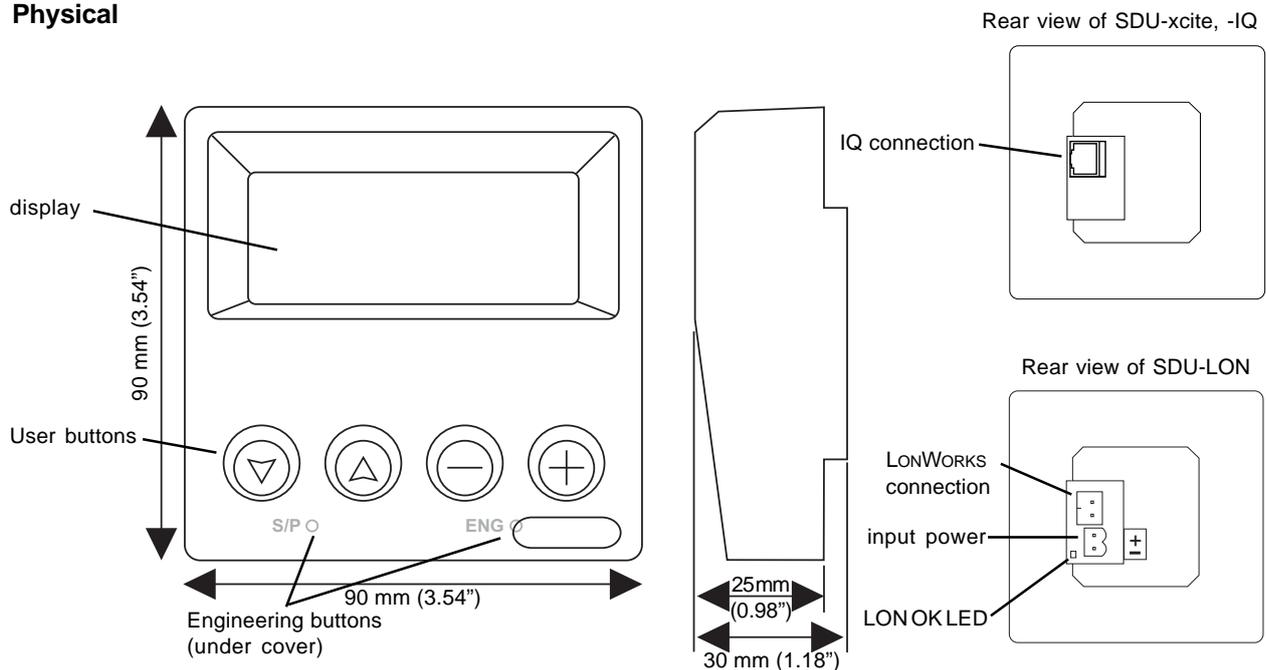
### Description

The Smart Display Unit (SDU) enables the user to view and adjust selected controller parameters within the controller. It provides all the facilities necessary for the operation of a stand-alone building control system. It is a 4 line by 20 character display panel for mounting on a standard electrical back box. The IQ and xcite versions connect directly to the controller local supervisor port and the LONWORKS® version connects to the LONWORKS network and is associated with an IQL controller; the SDU can only access information in the connected controller. All the adjustments from the SDU can be PIN protected using the controller's built-in security system. The accessible display pages can be selected by setting the SDU mode (Unrestricted, Display and Directory mode etc.).

### Features

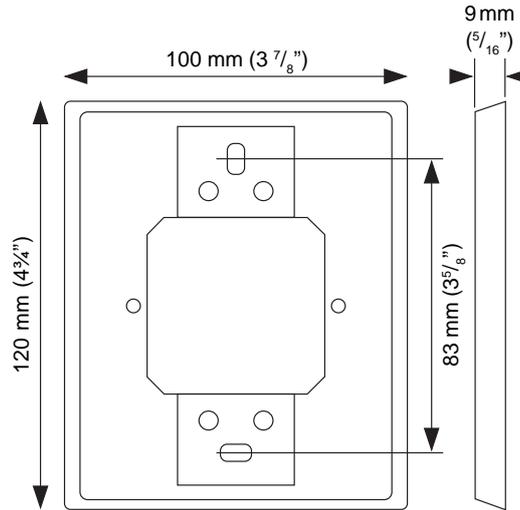
- Electroluminescent 4 x 20 character display
- 4 illuminated buttons for selection and adjustment
- Allows viewing and adjustment of HVAC equipment parameters, and occupation times
- Allows viewing of IQ alarm log (IQ2xxV3, IQ3V1.2 or greater)
- xcite, IQ, and IQL versions (-xcite, -IQ, -LON)
- Programmable SDU mode specifies accessible parameters
- Single IQ connection for signal and power (IQ3, IQ2xx)
- Programmable SDU text language
- Provides time zone for IQL
- IQL real time clock with daylight saving
- Compatible with all IQLs, IQ3s, and IQ2xxs (excluding IQ250)
- Contrast adjustment for hot/cold ambient temperatures.

### Physical



**Physical** (continued)

WSA Wall Sensor Adaptor Plate



**FUNCTIONALITY**

The SDU, Smart Display Unit, provides a user interface only to the connected (or associated, in the case of an IQL) controller. It presents the information on a 4 row by 20 character backlit display. The required data can be selected or changed by 4 LED illuminated pushbuttons. The SDU mode of operation, its restricted page set, and the language of the standard text displayed by the SDU can be programmed from the SDU Tool (Toolset applet). For SDU-xcite, -IQ, the download adaptor cable (SDU DOWNLOAD ADAPTOR) must be used when connecting the PC running the SDU Tool to the SDU. The SDU will fit onto various standard electrical back boxes.

**FIRMWARE**

**SDU Modes**

The SDU mode defines the pages available for display. The mode can be changed from default (mode 0) by pressing the ENG button in conjunction with the  $\ominus$  button. This process is explained on page 4 . The modes are shown in the table below:

Mode	Page Set	Home Page	Alarm Log
0	Unrestricted	No	Yes
1	Unrestricted	Yes	Yes
2	Unrestricted	No	No
3	Unrestricted	Yes	No
4	Restricted	No	No
5	Restricted	Yes	No
6	Restricted	No	No
7	Restricted	Yes	No
8	Display and Directory	No	No
9	Display and Directory	Yes	No
10	Display and Directory	No	No
11	Display and Directory	Yes	No

Note that only those modules that have labels set up will be accessible (i.e. similar to 2DP). Display pages within Directory modules work differently -see page 4.

The features available on SDU versions are shown below:

	-xcite	-IQ	-IQL
Unrestricted	yes	yes	yes
Restricted	yes	yes	yes
Display and Directory	yes (dynamic text items only i.e. item variables, not static text)	yes (not on IQ2xx pre V3)	no (modes 8 to 11 not selectable)
Home Page	yes	yes	yes
Alarm Log	no (can be enabled)	yes	no (permanently disabled)

Note that the alarm log page should be disabled on SDU-IQ with IQ controllers whose firmware version is less than IQ2xxV3 as selecting the alarm log page can cause the SDU to require a power reset before it can continue operation (see SDU Mode Selection).

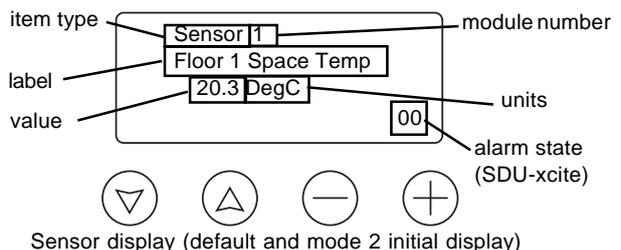
The SDU-xcite has the alarm log disabled (set to mode 2 by default) but for IQ3 V1.2 or greater it can be enabled by setting to mode 0 using SDU Tool or by using the Eng button (see page 5). The Mode Types are as follows:

- Unrestricted:** All the accessible item types are displayed.
- Restricted:** A restricted set of sensor, knob, switches, driver, digital input and time zone modules (restricted list) is defined using the SDU Tool, and only these modules will be accessible. If powered up in Restricted mode with an empty restricted list, the SDU will reprogramme itself to be in Unrestricted Mode (i.e. subtracts 4 from the mode number); it will remain in Unrestricted mode next time it powers up.
- Display and Directory:** All the display and directory modules set up in the controller are accessible.

If the mode has **home page** enabled, it becomes the power up initial display, and it is displayed after a reset.

**Unrestricted Modes**

When the SDU is powered up it will illuminate all segments, then give a blank display followed by 'Trend SDU Vx.x' (where x.x is firmware version). For SDU-xcite it shows SDU-xcite vx.x. If communications are successful, it will display the first page.



Sensor display (default and mode 2 initial display)

**FIRMWARE** (continued)

For SDU-IQ, SDU-IQL if there are no labelled modules for that module type it will jump to next module type (for sensors, knobs, switches, drivers, digital inputs).

For SDU-IQxcite if there are no modules of that type configured it will show 'None' (for sensors, knobs, switches, drivers, digital inputs).

For the default mode (mode 0) and mode 2, it will display the first labelled sensor (with the underline cursor) resting under the first character of the first row. For modes 1 and 3 it will display the home page.

The SDU-xcite will show the module alarm state if an alarm is present. This is an enumerated value showing the highest priority alarm present on the particular module. The alarms are listed below.

	alarm	item type	priority
01	Digital input	Digital Input	1
02	High	Sensor	2
03	Low	Sensor	1
04	Out of Limits	Sensor	3
05	Read	Sensor	4
06	SP Deviation	Loop	1
07	pv Fail	Loop	2
08	Maintenance	Driver	1
09	Readback	Driver	2

**Item type selection:** The ⊕ button will then step through the list of item types displaying the first labelled module in each case (where relevant). The following list shows the item type order and parameters shown:

- Sensors** label, value, units
- Knobs** label, value, units
- Switches** label status
- Driver** label, value or status
- Digital Inputs** label, status
- Time zones** label, start and stop times (SDU-xcite also has exceptions)
- Alarms** (mode 0, default, and mode 1 only - not available on SDU-LON)  
label of module producing alarm, alarm type as text (e.g. Sensor High), reported state (clear or alarm), date, and time of alarm
- Time** time, date, daylight saving change by (hours), and start and stop dates
- Calendars** (Not available on SDU-xcite as replaced by exceptions in time zones)  
Use (next, free, every), start and stop date, and the special day type for each time zone that is set up.

Further use of the ⊕ button after the last item type on the list will cause the list to roll round and start again at the sensors page. The ⊖ button will roll through the list in the opposite direction (calendar function to sensors page).

**Module selection:** Once the required item type is selected, the ▾ button should be pressed which will bring the cursor down to the first character on the second row. The particular module can then be selected by using the ⊕ and ⊖ buttons. The ⊕ button will roll round the list when it reaches the highest numbered module, but the ⊖ button will stop at the lowest numbered module. When the user has finished with the module, the ▲ button will return the cursor to the first character, first row enabling another item type to be selected.

For SDU-IQ, SDU-IQL only labelled modules will be shown (for sensors, knobs, switches, drivers, digital inputs)

On SDU-xcite, if no modules of that type have been configured, the word 'None' is shown and no further selection is possible (for sensors, knobs, switches, drivers, digital inputs).

**Adjustments:** Knobs, Switches, Time zones, Time and Calendar modules can be adjusted. Generally, having selected the relevant module to adjust, the ▾ button is pressed again and the particular adjustment is highlighted.

The ⊕ and ⊖ buttons are then used for the adjustment; for a digital status, the ⊕ button sets it ON, and the ⊖ button sets it OFF and for an analogue value the ⊕ button increments and the ⊖ button decrements. As the value or status is changed, it is written to the controller and the display will show the value read back from the controller. If the controller is PIN protected, a valid PIN will be required to be entered before the change can be accepted by the controller as explained below.

When the adjustment is completed, the ▲ button should be pressed, and the cursor will return to the first character, second row, ready for module selection.

**Knobs:** The first press of the ▾ button places the cursor under the units and the ⊕ and ⊖ buttons change the units. An additional press of the ▾ button places the cursor under the tenths, and the ⊕ and ⊖ buttons change the tenths. A further press of the ▾ button enables the hundredths to be changed.

If a parameter is adjusted to a value that is outside the knob range, as set in the controller, when it is sent to the controller it will be rejected, so the value will not change on the display.

**Switches:** Work exactly as described above for a status change.

The adjustments of Time zones and the Time module are described below.

**PIN Protection:** If a write to the controller is unaccepted, either the SDU has no PIN and the controller requires one, or the PIN is of insufficient authority. The following page is displayed:



The cursor will be under the first PIN digit, enabling the PIN to be entered. The digit can be changed in the range 0 to 9 by using the ⊕ or ⊖ buttons. Once the correct digit is displayed the next digit is selected by pressing the ▾ button, the screen then changes to: **PIN: \* 5 \* \***

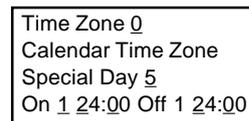
This is repeated for all digits. Once the PIN number is completed, the ▾ button will cause the PIN to be used to make another attempt to write the changed value to the controller. If the write message is unacknowledged, the value will not be changed, but if it is acknowledged, the value will change. The cursor then moves back under the value.

The PIN entry display will timeout 10 seconds after the last button press. The PIN itself will remain active for 2 minutes after the last button is pressed after which it will expire.

**Timeout:**

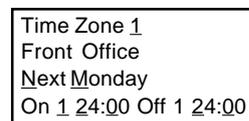
The SDU will timeout 20 s after the last keypress; the display and button illumination will be extinguished, and the SDU will show the Home page (if enabled), or the top level of the current display (e.g. from a knob adjustment to the knob selection).

**Time Zones:** Once the time zone item type is selected, time zone zero is first displayed except for SDU-xcite which does not have calendars and will show the first time zone configured.



Time Zone 0 defines the special days used by the calendar. It has five special days numbered 1 to 5. The setting of time zone 0 is similar to setting the other time zones as described below except 'Day of Week (1 to 14)' is replaced by 'Special Day (1 to 5)'.

Pressing the ▾ button will enable the particular time zone to be selected:



**FIRMWARE** (continued)

Pressing the  $\nabla$  button will enable the day of week to be selected using the  $\oplus$  or  $\ominus$  buttons (days 1 to 14). Days 1 to 7 are 'Next' Monday to Sunday (current week), and days 8 to 14 are 'Every' Monday to Sunday (standard week).

Once the day is selected, pressing the  $\nabla$  button again will enable the time period to be selected using the  $\oplus$  or  $\ominus$  buttons (periods 1 to 3).

Once the time period is selected the  $\nabla$  button can be used to select progressively the start hours then minutes, then stop hours then minutes, with the  $\oplus$  and  $\ominus$  buttons being used for adjustment at each stage.

- Time zone module x
- Day of week (1 to 14)
- Period (1 to 3)
- Start hours
- Start minutes
- Stop hours
- Stop minutes

The  $\triangleleft$  button can then be used to step back up the above list.

The **IQ3 time zone** has different SDU displays because some of the 'calendar' features are incorporated in the IQ3's time zone as 'Exceptions'. Also the IQ3 has a normal week instead of a standard week.

Time Zone 1	On
Front Office	
Monday	
P01 8:00	On

With time zones selected, the + or - button will select the required time zone. Pressing the  $\nabla$  button for the first time selects the time zone label. Pressing the  $\nabla$  button again selects the Monday of the normal week but pressing the + or - button instead of the  $\nabla$  button will select the Exceptions for that time zone.

Pressing  $\oplus$  from Monday selects the days of the normal week. Pressing the  $\nabla$  button will select the first occupation change time with the cursor under the P. In IQ3 the occupation period is defined by two occupation change times, one which switches occupation on, an one which switches occupation off. The + or - button will select the occupation change time number, and the  $\nabla$  button can be used to select the hours, minutes and state (On or Off) in sequence (the + or - button being used at each stage to change the values).

*Note that if an occupation change time is incremented to meet the next change time, both times increment together. Similarly decrementing a time moves both times back.*

If no change times are set up the word 'None' is shown and  $\nabla$  will have no effect.

Time Zone 1	On
Front Office	
Exception	

When Exceptions are selected, pressing the  $\nabla$  button will select the first exception for the time zone (e.g. Christmas Day).

Time Zone 1	On
Christmas Day	
Every 25/12 - 25/12	
P01 8:00	On

Pressing the  $\nabla$  button first selects the exception mode (off, next, every), which defines how the exception is to be used.

- Off:** not used,
- Next:** next occurrence of start /stop date only (after which it will set itself off),
- Every:** Every occurrence of the start/stop dates

If there are no exceptions set up the word 'None' is shown and  $\nabla$  will have no effect.

Further presses of the  $\nabla$  button select start day/month, stop day/month and then the occupations periods to be used during that exception defined by occupation change times as for the normal week times described above (the + or - button being used at each stage to change the values).

**Time:** Once Time is selected at the item type level, the following page is displayed.

IQ Time
+ 00 hours
00/00 - 00/00
24/9/02 -12:07

The SDU-IQ time module display accesses the IQ controller time module, but the SDU-LON time module is held in the SDU itself and sends current time to the IQL (see Time module and Time zone below). Pressing the  $\nabla$  button will enable the daylight saving change by hours to be adjusted using the  $\oplus$  and  $\ominus$  buttons. The  $\nabla$  button may be used to select the following in sequence:

- Change by hours
- Daylight saving on: day
- Daylight saving on: month
- Daylight saving off: day
- Daylight saving off: month
- Date: day
- Date: month
- Date: year
- Time: hours
- Time: minutes

The  $\triangleleft$  button can then be used to step back up the above list. *Note that the day of week will be calculated from the date and sent to an IQ controller, but is not displayed.*

*Note that the IQ3 timemaster function cannot be set from the SDU whereas the IQ2xx timemaster function can be (by setting 'Change by hours' to non zero).*

**Calendars:** The calendars page is not shown on SDU-xcite as it has the exception days shown under the time zone.

Calendar 1
Use: Next
08/04 - 01/05
Time Zone 1: = 00

Pressing the  $\nabla$  button will enable the particular calendar to be selected.

Pressing the  $\nabla$  button again selects the use (next, free, or every). The  $\nabla$  button may be used to select the following in sequence:

- Use (next, free or every)
- Calendar start: day
- Calendar start: month
- Calendar stop: day
- Calendar stop: month
- Time Zone number: (1 to 5)
- Time Zone occupation: (0 to 6)
- 0, non occupied
- 1, normal occupation
- 2 to 6, follow special day 1 to 5 defined in time zone zero

**Home page:** For SDU modes 1 and 3 (also 5, 7, 9, 11), the home page becomes the initial displayed page after the 'splash' screen on power up, a reset, or a timeout.

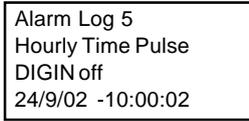
Plant Room 1
20/3/02 08:04

It shows the controller identity label, R(D), and the time and date.

*Note that for the SDU-xcite, -IQ, the controller's identifier [R(D)] should be set up, otherwise the first line of the home page will show the label of the previous item displayed.*

**FIRMWARE** (continued)

**Alarm Log:** IQLs do not have alarm logs so the alarm log page is not available on the SDU-LON. The alarm log is not accessible on SDU-IQ with IQ2xx less than v3 firmware. The SDU-xcite mode is set by default to 2, which does not enable alarm log. It can be set to mode 0 or 1 by using SDU Tool or the Eng button (see page 5) to view the alarm log on IQ3 >=V1.2. The alarm log page shows the item label, its alarm state the date and time.



The alarm log page may be removed from the SDU-IQ by setting the SDU mode to mode 2 or 3.

**Restricted Modes**

The modules that are to be accessed have to be enabled using the SDU Tool. When the SDU is powered up or reset, it will be first behave as for the Unrestricted operation, and then for modes 4 and 6, it will display the first module, whereas, for modes 5 and 7 it will display the home page.

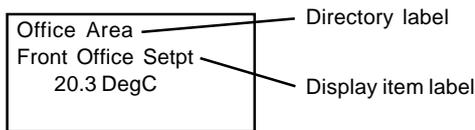
The first module shown is the first module enabled in the item type selection sequence shown on page 2 that has its label set up; modules without labels will be skipped. So if no sensors are enabled, it will be followed by the first knob enabled with a valid label.

The ⊕ button will step down the complete list of enabled modules so there isn't the two stage selection of item type, and module number used in the Unrestricted mode. So for an adjustment module pressing ⊖ will highlight the parameter to be adjusted. The ⊕ button steps down the enabled modules list, and the ⊖ button steps up, with the list rolling in both directions. There is no alarm log in restricted mode.

**Display and Directory Modes**

Note that this mode is not available on SDU-LON. When the SDU is powered up or reset, it will be first behave as for the Unrestricted operation, and then for modes 8 and 10, it will show the first labelled directory module, whereas, for modes 9 and 11 it will display the home page.

The ⊕ and ⊖ buttons step down or up through the labelled directory modules as a rolling list. When the required directory is shown, pressing the ⊖ button displays the first display module item attached to that directory with its parameters as detailed in the list on page 2.



The ⊕ or ⊖ buttons will then step down or up through the list of displays in that directory module. If the display module is unlabelled there will still be an unlabelled page to step through. The display and directory modules are shown regardless of PIN level, but the normal PIN security is applied to adjustments.

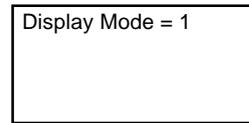
There is no alarm log in display and directory mode.

For SDU-xcite, only those display modules with dynamic text items (i.e. module variables) will be shown.

If the display module is a knob or a switch it can be adjusted in a similar way to the adjustment in the Unrestricted mode by pressing the ⊖ button and using ⊕ and ⊖ buttons for adjustment.

**SDU Mode Selection**

The SDU mode is set by removing the cover, and pressing the ENG button in conjunction with button 3, ⊖. The default SDU mode is mode 0, so the first time ENG + ⊖ are pressed, mode 1 is selected. The following page will be shown momentarily:



Each time ENG + ⊖ are pressed the next mode is selected (modes 0 through to mode 11 and back to mode 0 again). The full mode table is shown on page 1. The SDU can become 'confused' by repeated mode changes; in this case perform manual reset as described in 'Engineer Resets' below.

**Modes 0 to 3:** Unrestricted modes: All parameters accessible. With or without Home page, with or without Alarm log (SDU-xcite and SDU-IQ with IQ2xx v3 or greater).

**Modes 4 to 7:** Restricted modes: Only restricted parameters accessible if set up in SDU Tool. With or without Home page, no Alarm log.

**Modes 8 to 11:** Display and Directory modes (SDU-xcite, -IQ only): Only display and directory modules that have been labelled in the controller are accessible. With or without Home page, no Alarm log.

*Note that some of these modes and features are not available on the different SDU types as shown on page 1.*

*Note that the alarm log page should be disabled from IQ controllers whose firmware version is less than IQ2xxV3 by setting to a mode number in the range 2 to 11.*

*Note that the alarm log can be enabled for SDU-xcite for use with IQ3 >=V1.2 by setting the mode number to 0 or 1.*

**Engineering Resets**

**Reset to Mode 0:** Pressing all 4 buttons simultaneously for more than 5 s (less than 10 s) will temporarily return the unit to default mode 0. This is for engineer use, and will return to the last selected mode 20 s after the last button is pressed.

**Manual reset:** Pressing all 4 buttons for more than 10 s will cause a manual reset (equivalent to a power reset). This will return the controller to the power up state.

**Language set**

Most of the text shown on the display comes directly from the controller, and translation would be required in the controller (e.g. module labels, alarms). However, some text is added by the SDU (e.g. next, every). A non-English language version of this text can be created and downloaded using the SDU Tool.

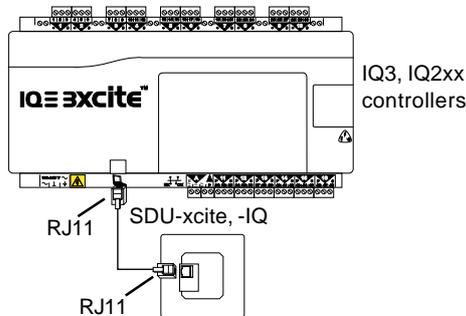
**Contrast adjustment**

The display will get fainter as the ambient temperature rises, and darker as the temperature falls. The SDU has a contrast adjustment to compensate for temperature change. Pressing ⊖ and ⊕ simultaneously will darken the display (for higher temperatures). Subsequently pressing ⊕ and ⊕ simultaneously will set it back to normal. Pressing ⊕ and ⊕ simultaneously will lighten the display (for lower temperatures). Subsequently pressing ⊖ and ⊕ simultaneously will set it back to normal.

## SYSTEM

### IQ3, IQ, Connection

The SDU-xcite, -IQ, connect to a controller by way of its local supervisor (RS232) port. In all IQ3 and more recent versions of IQ2xx controllers the RJ11 connector carries both signal and 24 Vdc input power. The connection to an IQ is by way of an RJ11 to RJ11 cable; this cable is available in two lengths, 3 m (9' 10") and 10 m (32' 10"), or details for wiring a non-standard length are available (see connections section).



For early IQ2xx controllers an adaptor is available which is used in conjunction with the standard cable described above to connect to the RJ11, but also to break out the power onto a two wide screw terminal plug for connection to the controller's auxiliary output supply (RD/SDU-ADAPTOR IQ2xx).

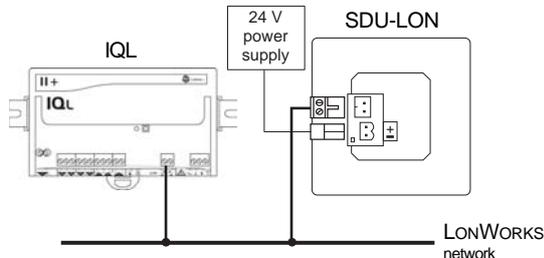
The SDU communicates with the controller at 9k6 baud, 7 bits, odd parity.

*Note that the IQ controller should have its local supervisor port CNC address set to zero for local connection, (not any other address which implies network communication).*

### IQL Connection

For details about LONWORKS terminology and Trend's LONWORKS Products, see the Trend LONWORKS Products Engineering Manual (TE200292).

The -LON version connects to the FTT free topology LONWORKS bus. It is then 'associated' with its IQL controller.



**Self installation:** The association between the SDU and its IQL can be set up or changed either by using the software tool IQLTool2 or by pressing buttons on the SDU and its IQL.

IQLTool 2 runs within SET v5.1 (or greater) and connects to the LONWORKS network by way of an LCI/USB. It is able to scan the LONWORKS segment and list the Neuron® IDs. By selecting an SDU's ID a popup box enables the IQL to be selected from a list of IDs; this also can be done vice versa by selecting the IQL and then selecting its SDU from a list. IQLTool 2 also enables an existing association to be examined by right clicking on the SDU and selecting 'Show Association'.

To associate the SDU with an IQL using the buttons, the cover should be removed, and the ENG button pressed in conjunction with button 1, (⊖). The service pin button on the IQL should then be pressed. The IQL will then transmit its Neuron ID message which will be received by the SDU. The SDU then uses the Neuron identity to interrogate the IQL for its LONWORKS node and subnet address, and it sets its own LONWORKS node address to the IQL LONWORKS node address and its LONWORKS subnet address to 255 minus the IQL LONWORKS subnet address (this will put it outside the IQL self addressing scheme, and stop address clashes with other SDUs).

The SDU will use the default message code (64) for its neuron identity poll, but since this may have been changed in the IQL, if the SDU fails to get a response, it will cycle through other possible message codes, and, if unsuccessful, will revert to being unassociated.

Once Trend communications are established, the SDU will request the IQL for its R(m,b,g) parameters (message code, buffer size, and generator number) to ensure it can fully communicate with the IQL. If communications are lost, the SDU will try to find the IQL using its Neuron ID, re-establish the message code, and then re-read its R(m,b,g) parameters.

**Installation on LonWorks Management Tool:** Normally self installation is used, but if the Trend LONWORKS products have been installed on a LONWORKS Management Tool then the SDU must also be installed in this way (details of installation using an LMT are given in the Trend LONWORKS Products Engineering Manual). The SDU's service pin button (S/P) is used for this purpose.

*Note that the association of an SDU with its IQL must also be done using the LMT.*

When installing the unit on an LMT, the following LONWORKS network variables should be set up in the SDU by the LMT:

**nciInstallState:** (Type SNVT\_config\_src) This should be changed from CFG\_LOCAL to CFG\_EXTERNAL if the node is installed on an LMT.

**nciHostNodeAddr:** (Type: SNVT\_count) This should be set to the LONWORKS node address of the associated IQL.

**nciHostSubnetAddr:** (Type: SNVT\_count) This should be set to the LONWORKS Subnet address of the associated IQL.

**nciMsgCode:** (Type SNVT-count) This should be set to the Message code of the associated IQL.

**nciDomainIndex:** This should be set to the Domain index of the associated IQL.

These variables are more fully described in the Trend LONWORKS Products Engineering Manual.

**Time module:** Whereas the SDU-LON has a real time clock, an IQL has only a software clock. The SDU will periodically send its time and date and calculated day of week to its IQL. The daylight saving parameters (change by hours and start and stop dates) are not implemented in the IQL so the SDU will implement this functionality and change its time on the appropriate dates and resynchronise the IQL.

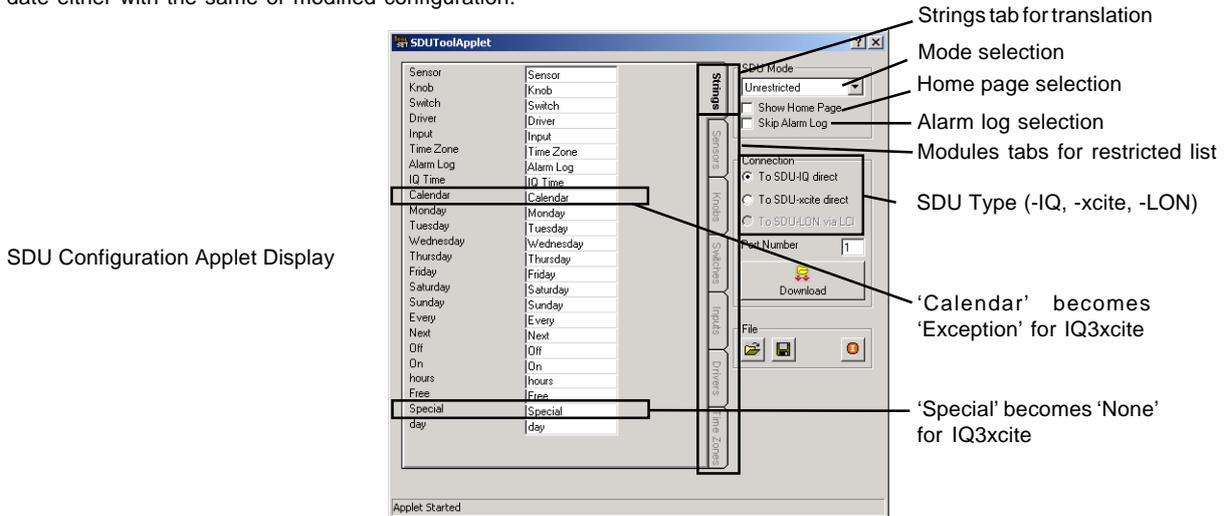
If there is a system Timemaster in operation, the SDU will receive the time synchronisation message from the LONWORKS bus, and resynchronise its clock. If the 962 is centrally synchronising time it should do so using a system Timemaster.

**Time Zone implementation:** The IQL controller does not have a time zone, but the SDU will implement a single time zone (zone 1) for the IQL. This is in addition to time zone 0 which is used for the calendar special days (see page 2). Time zone 1 has the full IQ time zone implementation of 14 days where days 1 to 7 are current week (this week), and days 8 to 14 are standard week (every week), and each day has three occupation periods. The SDU will set Knob 6 in the IQL to 0 (Occupied) or 1 (Unoccupied) by comparing the SDU start and stop times with the current time in the SDU time module. Note that Knob 6 (K6, "Remote Occ") is used to define occupation in the IQL standard strategies. The SDU time zone is invisible to software tools; if the 962 is to centrally control the IQL's time zone then the SDU time zone's times should be left nulled at 00:00.

**SDU Programming**

The SDU Tool is a Toolset applet and is able to set up the SDU mode, its Restricted list, and its Language

This applet creates a file which can then be downloaded to the SDU. The file should be saved for reprogramming the SDU at a later date either with the same or modified configuration.



SDU Configuration Applet Display

**Connection:** The type of SDU being configured is selected by clicking on the appropriate button, either 'To SDU-IQ direct', 'To SDU-XCITE direct', or 'To SDU-LON via LCI'. When SDU-xcite is selected the display changes so that text strings 'Calendar' and 'Special' become 'Exception' and 'None' respectively.

**SDU Mode:** The SDU mode is set either to Unrestricted, Restricted or Display and Directory from a drop down menu (Display and Directory cannot be selected on SDU-LON). The Show Home Page and Skip Alarm Log options are selected by tick boxes (Skip Alarm Log is always set for SDU-xcite and SDU-LON, and should be set for IQ2xx with firmware less than v3, the Skip Alarm log can be deselected for IQ3xcite >=V1.2).

**Language:** The applet 'Strings' tab presents a list of all the text strings used in the SDU, and enables a translation of each string to be entered. If several languages are required, a file should be saved for each language.

**Restricted List:** The list of modules accessible in Restricted mode is created using the applet. There is a tab for each module type (sensors, knobs, switches, digital inputs, drivers, and time zones), and then there is a tick box to select each individual module.

Module Type	First 'n' modules
Sensor	24
Knob	24
Switch	16
Digital Input	24
Driver	16
Time Zone	2 (-LON)* 6 (-IQ) 8 (-xcite)

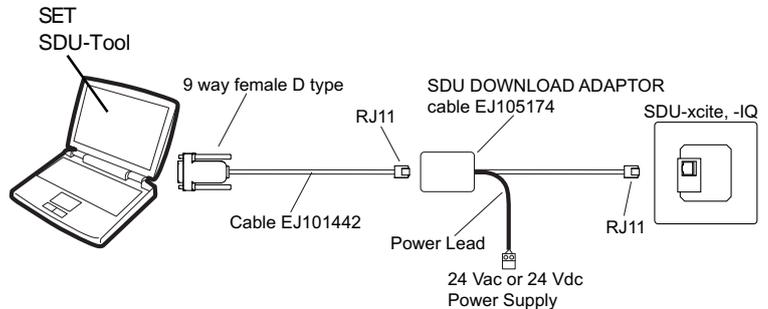
\* Zones 0 to 5, SDU-IQ,  
Zones 0 or 1, SDU-LON  
Zones 1 to 8, SDU-xcite

For each type of module only the first 'n' modules can be selected as shown in the table. If the controller type has more modules than this, they cannot be on the restricted list.

*Note that if the SDU powers up with an empty restricted list, the SDU will reprogramme itself to be in Unrestricted Mode; it will remain in Unrestricted mode next time it powers up.*

**Connection to the SDU Tool:** The applet should be running on a PC which already has SET installed. The SDU needs to be connected both to the PC, and also to a 24 V ac/dc power supply.

The **SDU-xcite, -IQ** can be connected to the PC by an RJ11 to 9 way female D type, CABLE/EJ101442 used in conjunction with a special RJ11 socket to RJ11 plug plus 2 wide power terminals download adaptor cable, SDU DOWNLOAD ADAPTOR.



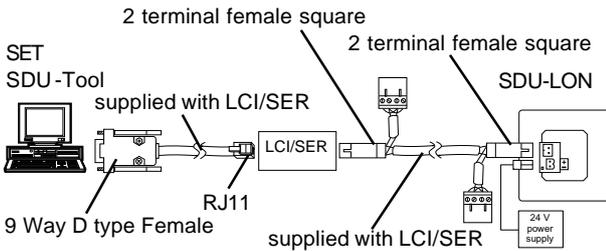
The SDU must be put into download mode by pressing the ENG button in conjunction with button 2, (A). The download page is then displayed on the SDU.



The download button is then pressed on the SDU Tool, and the download commences. As the data is received by the SDU, a bar progresses across the screen. When the download is complete the Toolset applet displays 'Download Complete', and the SDU returns to its previous display page.

**SDU Programming** (continued)

The **SDU-LON** can be connected to the PC using an LCI/SER.

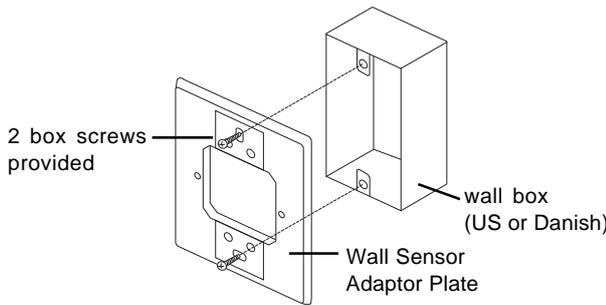


The SDU S/P button should be pressed first to identify the SDU (Neuron ID) to the SDU Tool so it can communicate with the SDU. The download button is then pressed on the Configuration applet and the download commences. When the download is complete the Configuration applet displays 'Download Complete'.

**HARDWARE**

**Unit:** The unit consists of a plastic electronics assembly with a plastic clip-on front cover. The electronics assembly will mount on to a standard electrical back box or a front panel using two mounting holes. Two 3.5 x 35 mm screws are provided for mounting on a standard electrical back box.

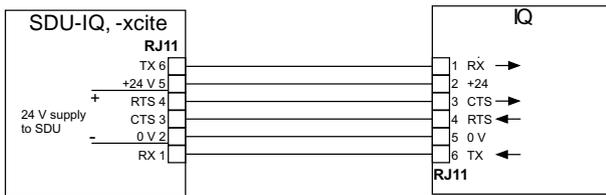
The WSA wall sensor adaptor plate enables the SDU to be mounted on US and Danish standard wall boxes.



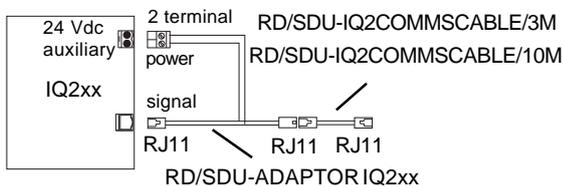
It is supplied with 2 plate covers to cover up the screws attaching the wall box, 2 wall box screws, and two 3.5 mm screws to fit the SDU to the adaptor plate.

**Input Power:** The unit requires 24 Vac or 24 Vdc at 15 mA.

The SDU-xcite and SDU-IQ always take their supplies from the RJ11 connector.



If the IQ does not support the power supply through the RJ11, the IQ 24 Vdc Auxiliary output supply may be used to supply the SDU-IQ (if adequate current is available). The 'RD/SDU ADAPTOR IQ2xx' adaptor cable consists of an RJ11 to RJ11 plus a two wide screw terminal block which is used in conjunction with a standard cable to connect to the auxiliary output supply for early IQ2xx controllers. Note that an IQ controller with a 24 Vac output supply will internally earth (ground) the 'neutral' side of its 24 Vac supply, so if the SDU-IQ shares this supply, the 'neutral' side must be connected to the lower supply terminal (the RD/SDU adaptor obeys this rule).



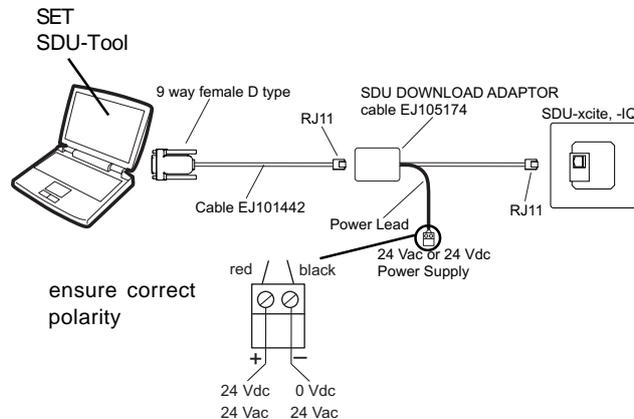
The SDU must now be put into download mode by pressing the ENG button in conjunction with button 2, (A). The following page is displayed:

As the data is received by the SDU, a bar progresses across the screen. When all the data is transferred the SDU returns to its former display page.



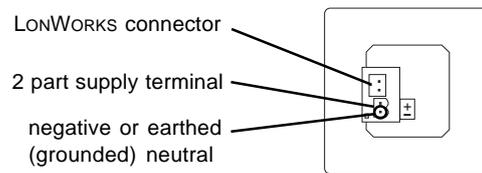
For all types of SDU, it can only be returned from download to normal operating modes by successfully completing a download, or by cycling the SDU's input power supply off and on.

When used with SDU-Tool, the SDU-xcite and SDU-IQ both use the SDU DOWNLOAD ADAPTOR.



Care should be taken to ensure that the negative side of a 24 Vdc supply or the 0 V side of an earthed (grounded) 24 Vac supply is connected to the black wire (negative) terminal.

The SDU-LON always takes its supply from its lower, 2 part, connector. Care should be taken to ensure that the negative side of a 24 Vdc supply or the 0 V side of an earthed (grounded) 24 Vac supply is connected to the lower (negative) supply terminal. Most of the IQL controllers have a 24 Vac auxiliary supply output which can be used to supply the SDU.



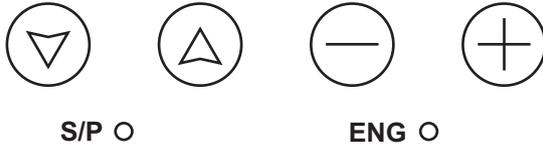
A separate isolated 24 Vac power supply to either type of SDU has no polarity restrictions.

**Backup:** The mode, restricted modules list, and language set are stored in EEROM which is non-volatile to power interruptions.

**Display:** A 4 row, 20 character electroluminescent display. The backlight will switch off 20 secs after the last button is pressed to preserve the life of the display.

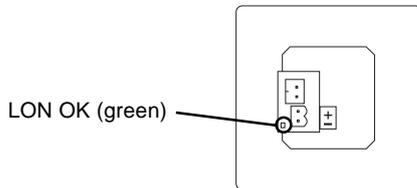
**HARDWARE**

**Buttons:** The front panel has four user buttons accessible with the cover fitted. They are illuminated by 4 LEDs when the display is illuminated (see above). It also has two other buttons only accessible with the cover removed labelled S/P on the left button and ENG on the right button.



The use of the four user buttons and the ENG button is described in the firmware section. The S/P button is used in the -LON version to send the SDU's service pin (Neuron ID) over the LONWORKS network for use by the SDU Tool or by a LONWORKS Management Tool.

**LON OK LED:** The -LON version has a green LON OK LED adjacent to its LONWORKS connector. It will flash as it communicates over the LONWORKS network. When it is associated with an IQL it will turn solidly on.



**RJ11 Connector:** The -xcite, -IQ versions have an RJ11 connector for connection to an IQ controller. All IQ3 controllers and the more recent versions of IQ2xx controllers have the SDU input power supply carried through this connector in addition to the signal.

**COMPATIBILITY**

**SDU-xcite**

The SDU-xcite is compatible only with IQ3 controllers. If connected to an IQ2xx controller a warning is displayed:

**“IQ3xcite only”**

**SDU-IQ**

The SDU-IQ is compatible with all IQ2xx controllers (excluding IQ250). However, if post fitting to a controller, the local supervisor port should not already be in use (i.e. by RD-IQ, IQView (RS232), XW/R/IQ wireless sensor receiver, NDP or local PC).

The standard IQ2xx connection is by way of an RJ11 to RJ11 cable.

For the following controllers this connection will give RS232 + power: later IQ21x, IQ204, IQ22x, IQ241/242, IQ246.

For other controllers (early IQ21x, IQ251), the power connection should use the IQ 24 Vdc auxiliary output supply connected using an adaptor cable (RD/SDU ADAPTOR IQ2xx) .

If an SDU-IQ is connected to an IQ3, some of the item displays may operate depending on the strategy. However, the time zone, calendars and alarm log will not operate.

*Note that the SDU-IQ is not compatible with /ADL, /ATM, or XNC220 controllers as the RS232 port is already used.*

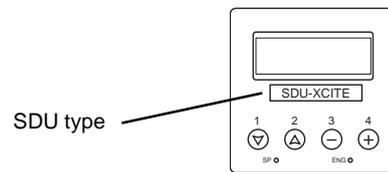
**LONWORKS connector:** The -LON version has a two terminal two part connector for the LONWORKS bus connection. This uses the special 'square' terminals used by Trend for LONWORKS network.

**Real Time Clock:** The -LON version has a Real Time Clock which can be used to provide real time functionality for the IQL. During power fail the power supply to the clock is maintained by a supercap. This will support the clock for up to 4 days in the case of power failure under normal operating conditions.

**Communication:** Communication between the SDU and its controller uses normal Trend text communications.

**Recognition:** The SDU-LON version can be distinguished from the other two versions as it has the square LONWORKS connector and the LON OK LED; both -xcite and -IQ versions have the RJ11 connector (see page 1). However, the SDU-xcite and SDU-IQ are supplied with a film label stuck across the display indicating their type; this should be removed before use.

All three versions have an identifying label attached to the unit below the display. This can be seen by removing the cover.



The packaged unit can be identified by the order code label on the box.

**SDU-LON**

This is compatible with all IQL controllers. For the time zone implementation to operate, the controller must be running a standard strategy or have knob 6 used to define occupation state (K6=0, Occupied; K6=1, Unoccupied).

**Modules**

The modules displayed in Restricted mode can only be chosen from a limited number of modules as explained on page 5. The alarm log is not available from IQ3xcite or IQLs, and is not accessible on IQ2xx with less than v3 firmware. IQL display and directory modules are not accessible.

## INSTALLATION

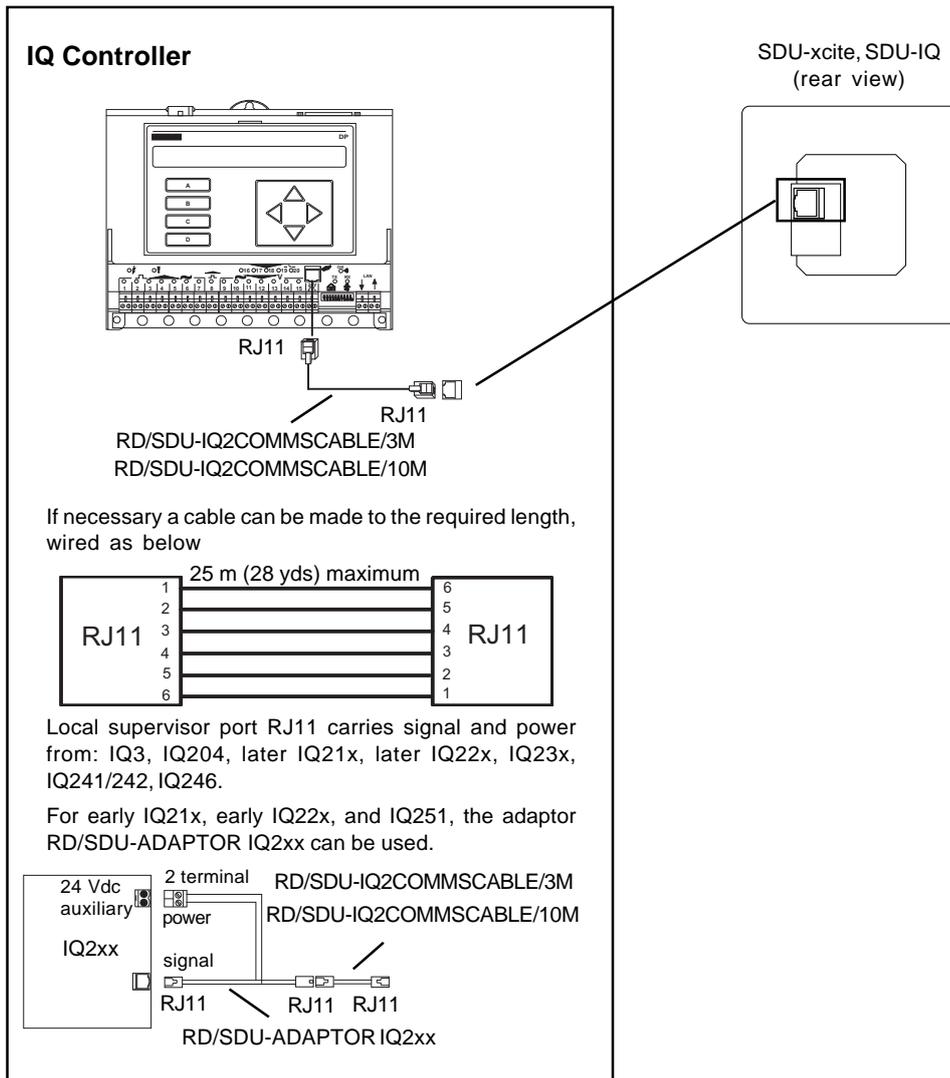
The SDU should be mounted on an electrical back box using two screws. The installation involves:

- Configure SDU (if required)
- Install back box
- Connect power (if necessary)
- Connect to IQ (RJ11) for SDU-xcite, or SDU-IQ
- Connect to a LONWORKS network for SDU-LON
- Test

The installation procedure including configuration is covered either by the SDU-xcite Installation Instructions TG200643, SDU-IQ Installation Instructions TG200560, or by the SDU-LON Installation Instructions TG200599. Use of the SDU Tool to configure the SDU is described in SDU Tool Manual TE200600. Installation of the WSA wall sensor adaptor plate is covered by TG200842.

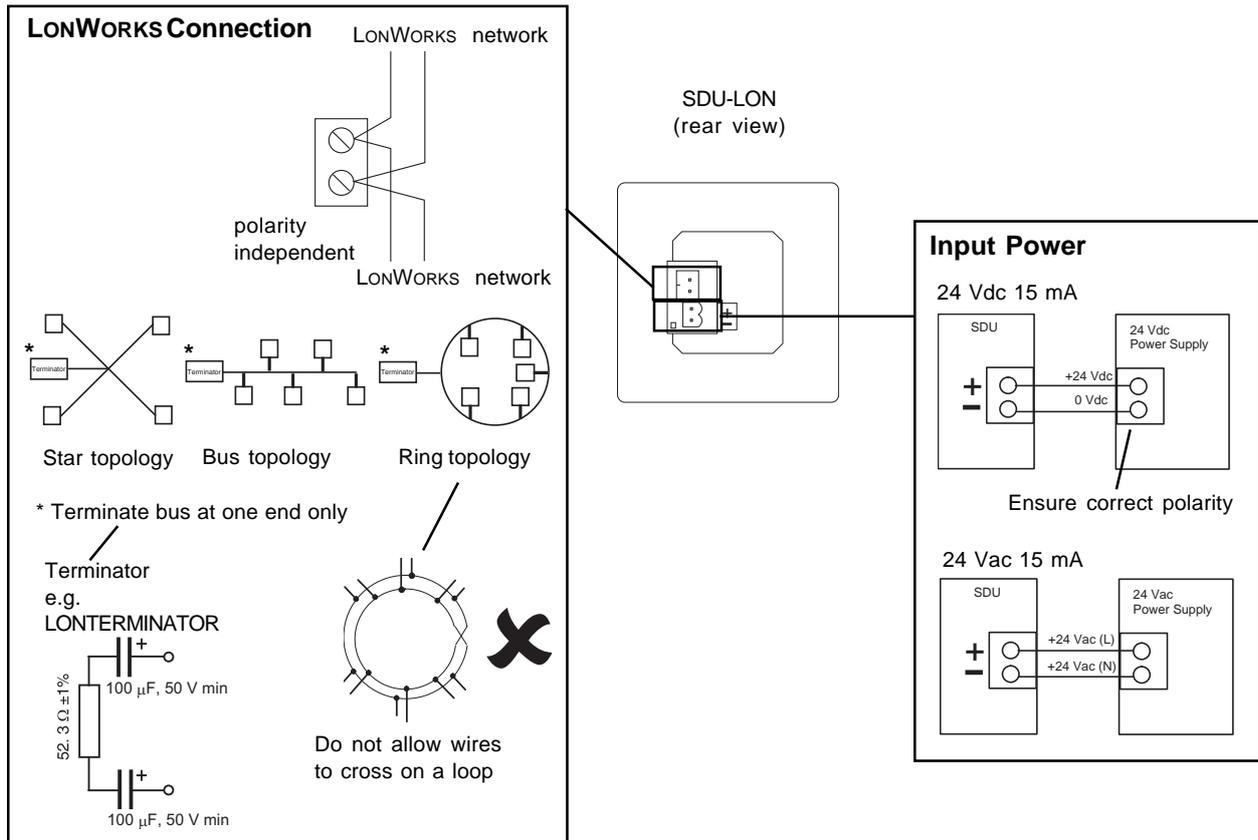
## CONNECTIONS

### SDU-xcite, SDU-IQ



CONNECTIONS (continued)

SDU-LON



ORDER CODES

<b>SDU-XCITE/UK</b>	Smart Display Unit for use with IQ3 controller with UK label set, and two mounting screws for standard electrical back box (not available in USA)
<b>SDU-XCITE/WSA/USA</b>	As above but with wall sensor adaptor plate to facilitate mounting SDU on US wall box (available in USA)
<b>SDU-IQ/UK</b>	Smart Display Unit for use with IQ controller with UK label set, and two mounting screws for standard electrical back box (not available in USA)
<b>SDU-IQ/WSA/USA</b>	As above but with wall sensor adaptor plate to facilitate mounting SDU on US wall box (available in USA)
<b>SDU-LON/UK</b>	Smart Display Unit for use with IQL with UK label set, and two mounting screws for standard electrical back box (not available in USA)
<b>SDU-LON/WSA/USA</b>	As above but with wall sensor adaptor plate to facilitate mounting SDU on US wall box (available in USA)
<b>RD/SDU-IQ2COMMSCABLE/3M</b>	RJ11 plug to RJ11 plug cable (3m, 9' 10") for SDU-xcite, SDU-IQ connection to most IQ controllers (connects RS232 and power for IQ3, and most IQ2xx controllers - see text)(available in USA)
<b>RD/SDU-IQ2COMMSCABLE/10M</b>	RJ11 plug to RJ11 plug cable (10m, 32' 10") for SDU-xcite, SDU-IQ connection to most IQ controllers (connects RS232 and power for IQ3, and most IQ2xx controllers - see text)(available in USA)
<b>RD/SDU-ADAPTOR IQ2xx</b>	RJ11 socket to RJ11 plug + 2 wide power terminals adaptor cable used in conjunction with standard cable (RD/SDU-IQ2COMMSCABLE/3M or /10M) for SDU-IQ connection to early IQ2xx controllers (available in USA)
<b>CABLE/EJ101442</b>	9 way D type socket to RJ11 plug, used in conjunction with download cable SDU DOWNLOAD ADAPTOR below to configure SDU-xcite and SDU-IQ. (available in USA)
<b>SDU DOWNLOAD ADAPTOR</b>	RJ11 socket to RJ11 plug, download cable used in conjunction with CABLE/EJ101442 above to configure SDU-xcite and SDU-IQ. (available in USA)
<b>SDU-Tool</b>	Toolset applet to configure SDU (runs within Toolset container, e.g. SET). It is available from the Trend website or on the SET CD and requires a valid licence to run. It connects to a LONWORKS network using an LCI/SER.(available in USA)
<b>IQLTool2</b>	Toolset applet to set up and examine the association of SDU-LON with its IQL (runs within Toolset container, e.g. SET). It is available from the Trend website or on the SET CD and requires a valid licence to run. It connects to a LONWORKS network using an LCI/USB (see below). (available in USA)
<b>LCI/USB</b>	LONWORKS Commissioning Interface complete with RS232 cable (USB type A to USB type B) and LONWORKS cable (two terminal female to two terminal female, and 2 short 4 terminal male spurs) for use with IQLTool 2. (available in USA)
<b>ACC/SMBOX/16/10</b>	16 mm depth surface mount box for SDU (pack of 10 boxes). (not available in USA)
<b>WSA/10/USA</b>	Pack of 10 wall sensor adaptor plates to facilitate mounting SDU on US or Danish wall boxes. Each plate complete with 2 plastic covers, 2 back box screws, and two 3.5 mm SDU screws. (available in USA)

## DISPOSAL

COSHH (Control of Substances Hazardous to Health - UK Government Regulations 2002) ASSESSMENT FOR DISPOSAL OF SDU. No parts affected.

### RECYCLING.

All plastic and metal parts are recyclable. The printed circuit board may be sent to any PCB recovery contractor to recover some of the components for any metals such as gold and silver.

### WEEE Directive :



At the end of their useful life the packaging and product should be disposed of using a suitable recycling centre.  
Do not dispose of with normal household waste.  
Do not burn.

## SPECIFICATIONS

### Electrical

Input Power	: 24 Vdc (20 to 33 Vdc), 24 Vac ±10% 50/60Hz
Consumption	:15 mA
Buttons	:4 Buttons on front panel (△, ▽, ⊖, ⊕), 2 buttons under cover (S/P, ENG). Illuminated by LEDs
Display LED	:4 rows 20 characters, electroluminescent :LON only; LON OK LED (green) visible from rear of SDU-LON. If off, no communication; if flashing, communication to IQL being attempted; if solidly on, communication to IQL OK
Communication	:Values monitored/updated by terse text comms
-xcite, -IQ	:9k6 baud, 7 bit, odd parity, RS 232 EIA/TIA/232E, V28
-LON	:FTT LONWORKS network. FTT - free topology, 78 kbaud, transformer isolated, Single termination (RC network)
Distance	
xcite, -IQ	:25 m (28 yds)
-LON	:Dependent on cable type. see table below:

Recommended Cables	Max bus length	Max node to node
Belden 85102	500 m (545 yds)	500 m (545 yds)
<b>IQ system</b> <b>TP11/0/16/HF/200</b> (Belden 8471)	500 m (545 yds)	400 m (430 yds)
UL Level IV, 22 AWG	500 m (545 yds)	400 m (430 yds)
JY(St) Y2 x 2 x 0.8	500 m (545 yds)	320 m (350 yds)
TIA568A Cat. 5, 24 AWG	450 m (490 yds)	250 m (270 yds)

Note that this does not include cable recommended for the IQ system current loop Lan.

CPU	:PIC18F252
Flash	:16 kbyte
EEROM	:256 byte
Clock accuracy	:30 s per month (typical)

### Mechanical

Dimensions	:90 mm (3.54") x 90 mm (3.54") x 25 mm (0.98") from back box 90 mm (3.54") x 90 mm (3.54") x 30 mm (1.18") maximum
Material	
Cover	:ABS
Front	:Polycarbonate
Back	:ABS
Buttons	:Shore 80 PVC
Weight	:126 g, 0.28 lbs
Protection	:IP30, NEMA 1
Connections	
SDU-xcite, -IQ	:IQ Controller plus Power. Maximum distance 25m (28yds). RJ11 also connects power. For IQ3xcite and most IQ2xx controllers (see text) use RJ11 to RJ11 cable RD/SDU-IQ2COMMSCABLE/3M, or /10M. For early IQ2xx use additional adaptor cable RJ11 to RJ11 + 2 wide power, RD/SDU-ADAPTOR IQ2xx.
SDU-LON	:LONWORKS network. 2 part connector with 2 screw terminals for 0.5 to 2.5 mm <sup>2</sup> cross section area (14 to 20 AWG) cable
SDU-LON	:Power. 2 part connector with 2 screw terminals for 0.5 to 2.5 mm <sup>2</sup> cross section area (14 to 20 AWG) cable

### Environmental

EMC	
Emissions	:EN50081-1
Immunity	:EN50082-2
Safety	:EN61010
Ambient limits	
storage	:-10 °C (14 °F) to 50 °C (122 °F)
operating	:0 °C (32 °F) to 40 °C (104 °F)
humidity	:0 to 90 %RH

### Version

firmware	:SDU-IQ, -LON v2.05; SDU-xcite v1.07
board	:AM104875 v1

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