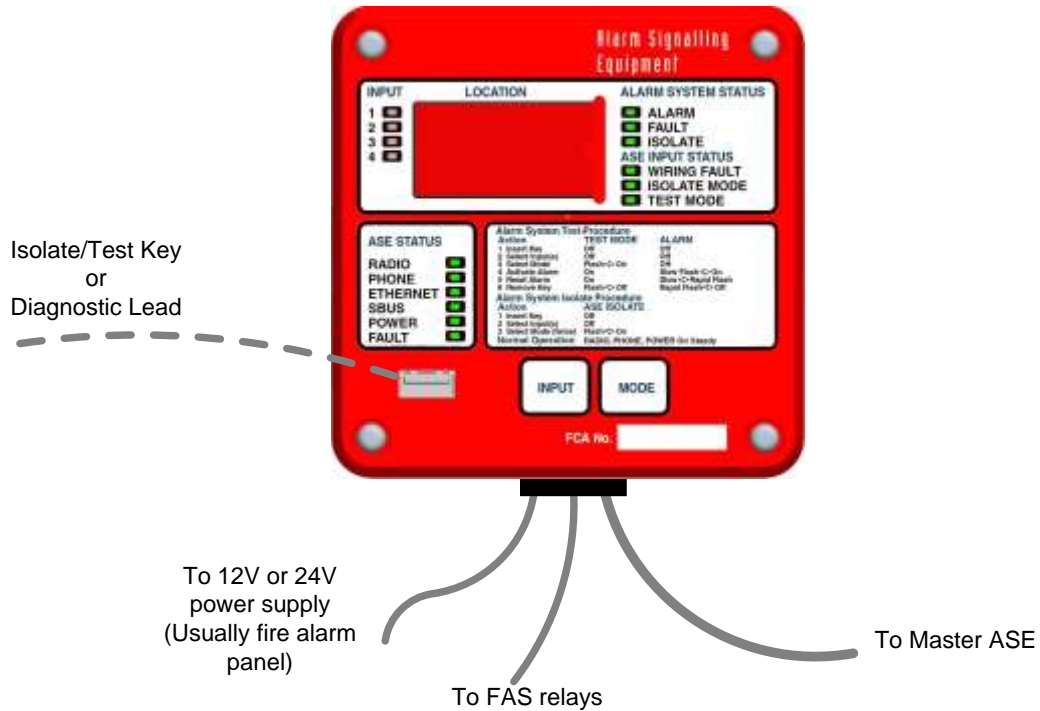# Centaur™ II Cube Slave
Alarm Signalling Equipment
INSTALLATION GUIDE

General Description
This guide provides a summary for installing and configuring the Centaur™ Cube Slave Alarm Signalling Equipment (ASE). It should be used in conjunction with the Centaur™ Cube ASE User Manual (LT0508) and the commissioning guide.

The Centaur™ II Cube Slave ASE supports up to four fire alarm panels or sprinkler systems, each using an FAS input to send Alarm, Fault, and Isolate signals to the Slave. The Slave combines this information together with its own status and sends it to a Master ASE over an RS485 link (Slave Bus).

The Slave is powered from a fire alarm panel at 12 or 24Vdc.

Isolate/Test Key
or
Diagnostic Lead

To 12V or 24V power supply (Usually fire alarm panel)

To FAS relays

To Master ASE

Fig 1 – General Layout – Slave ASE

Checking the kit
Before commencing installation, please ensure that the following items are present and undamaged:
> 1 x Centaur II Cube Slave ASE
> 1 x plastic bag containing 1 x body plug and 4 screws for mounting the front cover

The following will also be needed (provided separately to the Slave):
> 1 x Operating Instructions
> FAS interface units FP0740/2/3 as required for each fire system.

Before applying power
- Check that the circuit boards have received no visible damage during shipment.
- Connect the green earth wire from the termination board to the front panel J2 Earth Tab located in the bottom left corner.
- Carefully fit the 20 way flat ribbon cable (FRC) from the front panel to the termination board. Take care to orient the FRC pin 1 (the red wire) as shown in Fig 2 and thus insert the polarizing pin into the provided hole in the circuit board. Take care not to break the polarising pin off.

Installation – Mounting and Wiring

The Slave must be installed in a location where it can be accessed by service staff and where the cables can be readily attached and conveniently routed.

Generally this will be in the front of a fire alarm panel, or alongside a sprinkler system in a power supply box (a suitable PSU box is FP0969).

Drill mounting holes and attach the Slave back box securely. Run the FAS input, power supply, and other leads out of any convenient cable access hole, first protecting the opening with the body plug supplied. Once wiring is complete, screw the front panel in place using the provided screws.

> **Warning:** This is a class A product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.
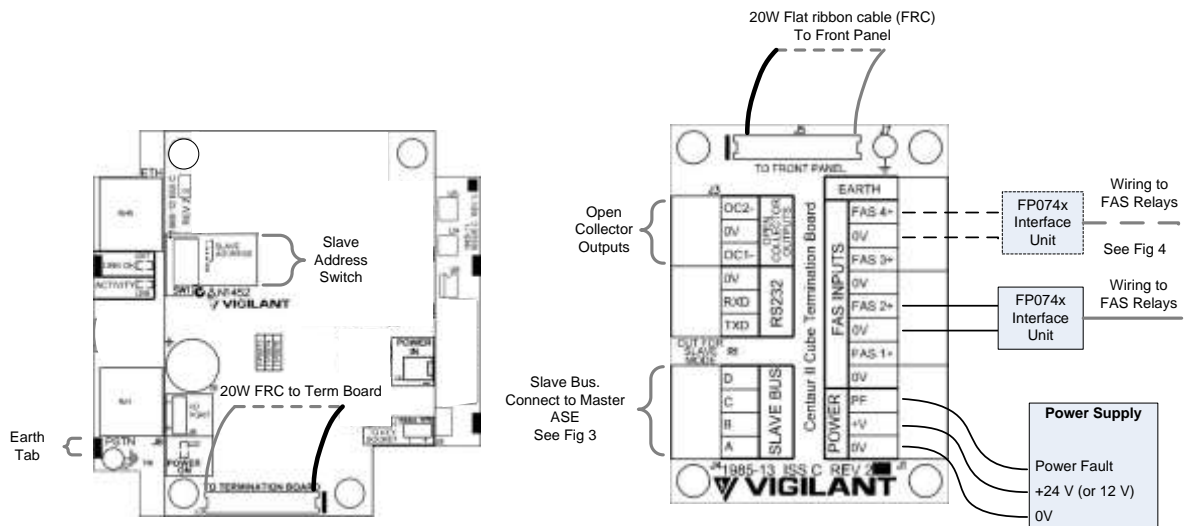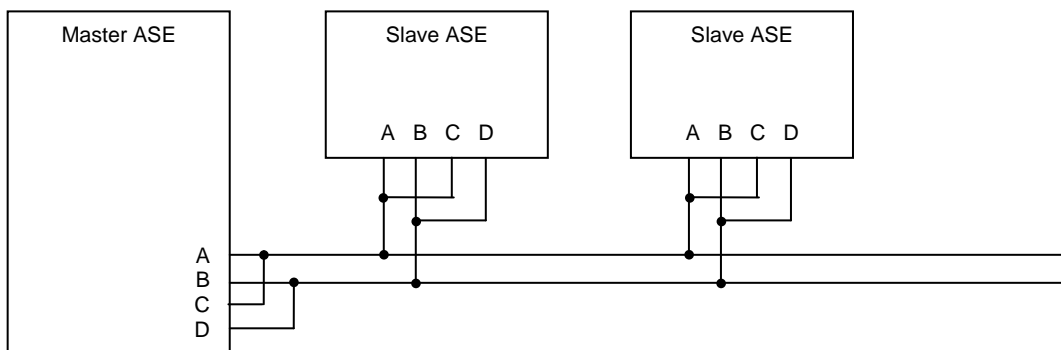

Fig 2 – Wiring Diagram

Slave BUS Connection

The Slave is connected to the Master ASE via the 2-wire Slave Bus as shown in figure 3. The Master ASE can support up to 12 Slave ASEs on the same bus over a total cable length of up to 1000m. At the Master ASE and at each Slave ASE the Slave Bus A and C terminals and the B and D terminals must be joined together as shown in figure 3. The wiring can be arranged as a bus, or star wired out from the Master ASE.

The Slave Bus uses RS485 signalling in half duplex mode.

The Slave BUS wiring is required to be fire rated if the Slave ASE is located away from the Master ASE.

The Slave ASE is electrically isolated from the Slave bus (±50V) to help prevent earth loops between the devices powering the various ASEs.

Fig 3 – Slave Bus Wiring Diagram

Slave Address Switch

Each Slave ASE must be configured with a unique slave address between 1 and 15. The slave address is configured via the Slave Address switch on the back of the front panel (refer figure 2). Table 1 shows the switch positions for each Slave address. Note the switch 'A' and 'B' are not used.

Table 1 - Slave Address Switch

Slave Address	'1'	'2'	'4'	'8'
0 (Disabled)	Off	Off	Off	Off
1	On	Off	Off	Off
2	Off	On	Off	Off
3	On	On	Off	Off
4	Off	Off	On	Off
5	On	Off	On	Off
6	Off	On	On	Off
7	On	On	On	Off
8	Off	Off	Off	On
9	On	Off	Off	On
10	Off	On	Off	On
11	On	On	Off	On
12	Off	Off	On	On
13	On	Off	On	On
14	Off	On	On	On
15	On	On	On	On

FAS Connection

There are three ways in which a fire alarm system can be connected to the Slave ASE.

The first is for a fire alarm panel that has 3 (or 4) relay outputs capable of signalling alarm, fault, and isolate. The fourth relay output is for "Standby" - indicating that the power supply to the panel, or the panel itself, has failed.

The second and third methods are for a fire alarm system that has only a fire alarm contact (e.g. sprinkler system). Different methods are provided for those with normally open and those with normally closed alarm contacts.

The output contacts of the fire alarm system must be voltage-free relay or switch contacts - optocoupler outputs are not compatible.

The FAS Input wiring of the Slave can be extended up to 750m using $1mm^2$ fire rated cable (30Ω max), if it is located away from the alarm system.

Connection of a Fire Alarm Panel to the Slave
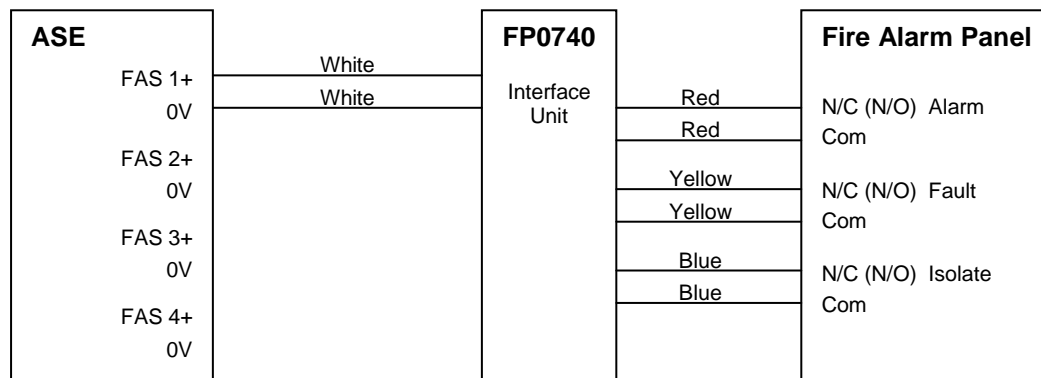
Fig 4 - Connecting Slave ASE to a Fire Panel using the FP0740 Interface Unit

The FP0740 Interface unit is used to connect the Alarm, Fault and Isolate relays of a fire alarm panel to one FAS input on the Slave. Fig 4 shows how the Interface Unit converts the two wires of the ASE's FAS input to six wires for connection to the three fire panel relays.

The Interface Unit also contains an End Of Line resistor which allows the ASE to detect open and short circuit wiring faults between the ASE and the Interface Unit.

Each FAS input on the ASE can be configured from the CMS for connection to either N/C or N/O relays on the fire alarm panel. All three relays connected to a single Interface Unit must be Normally Open, or all Normally Closed, contacts. The relay contacts must be electrically isolated from all other circuitry and from each other (i.e., the relay Common contacts must not be wired together).

Fire panels with a Standby relay should be wired so that the Standby relay is wired in parallel with the Fault relay for N/O contacts and in series for N/C contacts. This will allow a fault to be generated if either the Fault or Standby condition occurs.

If Fault or Isolate relays are not available for wiring to the Interface Unit, then the unused inputs of the Interface Unit must be shorted for Normally Closed operation or left open for Normally Open contacts (sleeve or terminate them so they cannot short or touch any other objects).

If the ASE is not mounted inside the fire alarm panel then the Interface Unit must be mounted inside the fire alarm panel and only the White wires should be extended beyond the fire alarm panel enclosure. Any extension of this cabling must be fire rated.

The FP0740 Interface unit has an IP51 rating and so should not be exposed to excessive moisture, or heat.

Connection of a Fire Alarm System with Alarm Contacts Only

Centaur II Cube ASE		FP0742		Fire Alarm System
FAS +	White	Interface Unit N/O	Orange	N/O Alarm
0V	White		Orange	Com
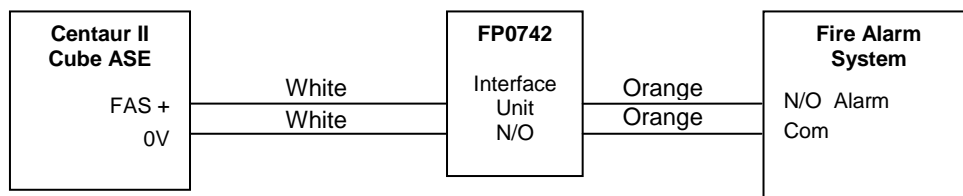
Fig 5 - Connecting ASE to a N/O Fire Alarm System using the FP0742 Interface Unit

Centaur II Cube ASE		FP0743		Fire Alarm System
FAS +	White	Interface Unit N/C	Red	N/C Alarm
0V	White		Red	Com
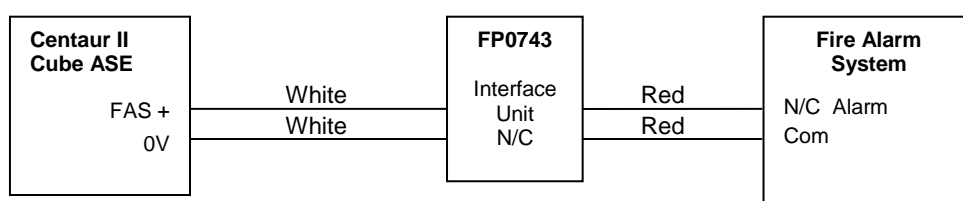
Fig 6 - Connecting ASE to a N/C Fire Alarm System using the FP0743 Interface Unit

The FP0742 and FP0743 Interface units are used to connect fire alarm systems with no Fault or Isolate relays (e.g. sprinkler system) to the ASE FAS inputs. The FP0742 is used for a Normally Open Alarm relay or switch and the FP0743 is used for a Normally Closed Alarm relay or switch. Fig 5 and Fig 6 show how these are wired.

The relay or switch contacts must be electrically isolated from all other circuitry. The Interface Units also contain an End Of Line resistor which allows the ASE to detect open and short circuit wiring faults between the ASE and the Interface Unit.
The FAS input of the ASE must be configured from the CMS as normally open or normally closed to match the installation.

The Interface unit should be mounted within the alarm system enclosure and only the White wires should be extended beyond the enclosure.

Note also that the Interface units have an IP51 rating and so should not be subjected to excessive moisture, or heat.

Power Supply Connection
The ASE will operate from a dc voltage in the range of 9V to 30V so it can be powered from a 12V or 24V fire alarm system without alteration.

A Power Fault input is provided on the Slave ASE for connecting to the Power Supply Fault output, if the Slave has its own monitored power supply. This output can be either an Open Collector output or Relay contact that is Normally Open and pulled to 0V on fault. If the Power Fault input is activated the ASE will flash its green POWER LED.

The Master ASE's power status is combined (ORed) with the power status of each of its connected Save ASEs and the combined power status is sent to the CMS. If the Master ASE or one of its Slaves has its Power Fault activated the power supply for the Master ASE at the CMS will be shown to be in Fault.

Loss of power to a Slave ASE will be indicated at the CMS as wiring faults on the Slave's enabled inputs.

If the Power Fault input is not used it should be left unconnected.

If an ASE is to be operated off the alarm system's existing power supply and batteries, check that there is sufficient spare quiescent current and battery capacity for the ASE.

Open Collector Outputs

Two open collector outputs (transistor pull down, 100mA max to 0V) are available for controlling relays or local indications (e.g., buzzer or LED) to signal pre-determined conditions. They should be powered from the ASE's +V, not from external equipment, so as to maintain electrical isolation.

The ASE Open Collector output operation is site configurable as follows:
  a.   Controlled by the monitoring centre (not currently supported).
  b.   Activated when 1 or more FAS inputs are in alarm (default behaviour - applies to OC2).
  c.   Deactivated when communication is lost between the Save ASE and the Master ASE or when the Master ASE cannot communicate with the CMS on any of its configured communication links (default behaviour - applies to OC1).

Default behaviour:
  OC1- is on (conducts to 0V) when the Slave BUS link is normal and the Master ASE can communicate with the CMS.
  OC1- is off (no conduction) when the Slave BUS link is in fault, or the Master ASE cannot communicate with the CMS, or power to the Slave is lost.
  OC2- is on (conducts to 0V) when any configured FAS input on the Slave is in the alarm condition.
  OC2- is off (no conduction) when no configured FAS inputs on the Slave are in alarm.

Figure 7 shows OC1- wired to a relay to provide an isolated clean contact interface to other equipment. The relay is normally energized, and drops out when the ASE turns OC1- off or the power to the ASE fails. Figure 7 also shows the wiring to a buzzer that will turn on when there is an alarm condition on any configured FAS input.
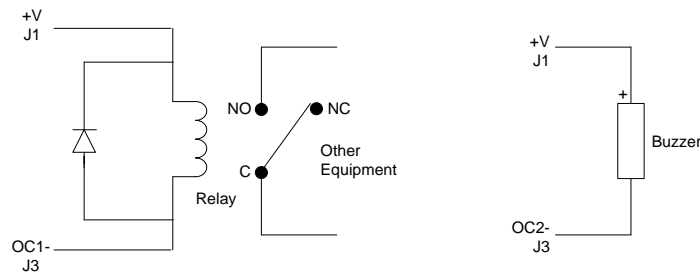
Fig 7 - Open Collector Wiring Example

Location Card

A small card can be slid into a slot on the front of the ASE to label the 4 inputs. This card should have the location of each input typed or written on it, as well as the master ASE's DTE number and fire brigade connection number.

Power up

On power up the following should occur:
- LED self-test - all LEDs and the internal buzzer will turn on for approx 3 seconds then turn off.
- The POWER LED will turn on and remain on (except during the software version display).
- After about 4 seconds the POWER LED turns off and a software version code will be shown on the INPUT LEDs for 3-4 seconds. Table 2 shows the LED combinations for this. If the TEST MODE LED is on as well this indicates the software is a Test version. As of publication of this guide the software version is 1.
- The SBUS communication link LED will start flashing to indicate that the Slave is waiting to receive a poll message from the Master ASE. The LED will go steady when the Master ASE responds.
- One or more of the three communication link LEDs (RADIO/PHONE/ETHERNET) should turn on to indicate the communication status of the Master ASE with the monitoring system.
- If the ASE key is already fitted, all enabled inputs are automatically put into Isolate mode.
- If no key is inserted, the ASE starts as if the key has just been removed, so any enabled inputs in alarm will flash their ALARM and ISOLATE MODE LEDs and the buzzer will beep for 15 seconds. Inserting a valid key during this time will automatically restore Isolate Mode and stop the alarm being transmitted.

Table 2 – Software Version Number Display															
Software Version	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Input 1	ON		ON		ON		ON		ON		ON		ON		ON
Input 2		ON	ON			ON	ON			ON	ON			ON	ON
Input 3				ON	ON	ON	ON					ON	ON	ON	ON
Input 4								ON	ON	ON	ON	ON	ON	ON	ON

Diagnostics and Testing

The 12 Status LEDs and four input selection LEDs indicate the status of the ASE and the configured FAS inputs. Table 3 details the status or fault conditions shown by each of the ASE STATUS LEDs. Additional and more detailed diagnostic information is available from the Diagnostic Port using a laptop or computer. This is described in the Diagnostic Port section below.

Table 3 – ASE STATUS LED Indicators			
Label	**Colour**	**LED State**	**Description**
RADIO	Green	Off	Master ASE's Radio Link not configured.
		Rapid Flash	Master ASE attempting to contact monitoring system after power up.
		1 Flash	No reply from monitoring system, or no monitoring system programmed.
		2 Flashes	Master ASE cannot log on to radio network, insufficient signal strength, no antenna.
		3 Flashes	Radio Modem fault (Master ASE cannot communicate with its radio modem).
		On	Master ASE's radio communications ok.
PHONE	Green	Off	Master ASE's PSTN Link not configured.
		Rapid Flash	Master ASE attempting to contact monitoring system after power up.
		1 Flash	No reply from monitoring system, or no monitoring system programmed.
		2 Flashes	Line Voltage fault, e.g. cable unplugged, broken (open or shorted) connection between the Master ASE and the exchange or PABX.
		3 Flashes	Master ASE PSTN Modem fault (cannot communicate with internal PSTN modem).
		On	Master ASE's PSTN communications ok.
ETHERNET	Green	Off	Master ASE's Ethernet Link not configured
		Rapid Flash	Master ASE attempting to contact the monitoring system after power up
		1 Flash	No reply from the monitoring system
		2 Flashes	Master ASE cannot obtain a local IP address from the network or network cable unplugged
		3 Flashes	Master ASE Ethernet hardware fault (cannot communicate with internal Ethernet IC)
		On	Master ASE's Ethernet Communications OK
SBUS	Green	Off	Slave ASE is disabled (Slave address set to '0').
		On	Link to Master ASE OK.
		Flashing	Link to Master ASE in Fault (e.g., wiring fault, Master ASE not communicating, etc)
POWER	Green	Off	No power applied
		On	Supply voltage OK and no fault.
		1 Flash	Power supply fault (power fault input is activated)
		2 Flashes	Battery low (Slave supply voltage low)
		3 Flashes	Battery failed (Slave supply voltage failed)
FAULT	Yellow	On	No Slave firmware or CRC error. You need to download new firmware.

Rapid Flashing is shown as 0.1 second on, 0.1 second off, repeating, and continues until a response is received from the monitoring system, or the ASE decides an error has occurred, or it times out waiting for a response. The 1, 2 or 3 flashes are shown as a sequence of 1, 2 or 3 x 0.2 second flashes, separated by 0.3 seconds, repeating every 2 seconds.

Tables 4 and 5 detail the meaning of the ALARM SYSTEM STATUS and ASE INPUT STATUS LED indicators. In both cases, an Input LED is lit to show which input has its status displayed. If only one input is off-normal, then its status will be displayed continuously. If more inputs are off-normal, then the ASE will cycle through each off-normal input, displaying its status in turn.

			Table 4 – ALARM SYSTEM STATUS LED Indicators
Label	**Colour**	**LED State**	**Description**
ALARM	Red	Off	Displayed input not in alarm.
		Rapid Flash	In Test Mode only: Test Alarm was acknowledged by the monitoring system and input is no longer in alarm.
		Slow Flash	Displayed Input has changed alarm state (in to or out of alarm), which is being sent to the monitoring system and awaiting acknowledgement.
		On	Displayed input is in alarm and has been acknowledged by the monitoring system. (Check ASE INPUT STATUS LEDs to see if input is also in Isolate mode or Test mode)
FAULT	Yellow	Off	Displayed input not in fault.
		Rapid Flash	In Test Mode only: Test Fault was acknowledged by the monitoring system and input is no longer in fault.
		Slow Flash	Displayed Input has changed fault state (in to or out of fault), which is being sent to the monitoring system and awaiting acknowledgement.
		On	Displayed input is in fault and has been acknowledged by the monitoring system. (Check ASE INPUT STATUS LEDs to see if input is also in Isolate mode or Test mode)
ISOLATE	Yellow	Off	Displayed input not in isolate.
		Rapid Flash	In Test Mode only: Test Isolate was acknowledged by the monitoring system and input is no longer in isolate.
		Slow Flash	Displayed Input has changed isolate state (in or out of isolate), which is being sent to the monitoring system and awaiting acknowledgement.
		On	Displayed input is in isolate and has been acknowledged by the monitoring system. (Check ASE INPUT STATUS LEDs to see if input is also in Isolate mode or Test mode)

All of the LED indicators listed in Tables 4 and 5 will remain off if no inputs have been configured in the ASE operating parameters set by the CMS.

			Table 5 – ASE Input Status LED Indicators
Label	**Colour**	**LED State**	**Description**
WIRING FAULT	Yellow	Off	Displayed input is not in Wiring Fault.
		On	Displayed input is in Wiring Fault (open or short circuit FAS input).
ISOLATE MODE	Yellow	Off	Displayed input is not in Isolate Mode.
		Flash	Isolate Mode has been chosen for the selected inputs; LED will go steady if no further button presses are made.
		On	Displayed input is in Isolate Mode or the input has been isolated from the CMS.
TEST MODE	Yellow	Off	Displayed input is not in Test Mode.
		Flash	Test Mode has been chosen for the selected inputs; LED will go steady if no further button presses are made.
		On	Displayed input is in Test Mode.

ASE Key

The Centaur II Cube ASE uses a key that must be inserted to enable test or isolate modes. After inserting the key, select the inputs to be tested or isolated with the Input button. All enabled inputs which have not been isolated by the CMS are selected when the key is first inserted (shown by all the INPUT LEDs flashing for 5 seconds); each subsequent press of the Input button will step through each enabled input (shown by the flashing INPUT LED) and back to All.

Note that any inputs that have been isolated by the CMS will be shown as being in Isolate Mode. You will not be able to select these inputs or change their Mode using the ASE buttons.

While the selected Input LEDs are flashing use the Mode button to select test mode (1 press) or isolate mode (2 presses). After 5 seconds, the selected (flashing) state will be activated by the ASE and the LED will go steady.

Isolate Mode

When the ASE is in Isolate Mode any input conditions sent to the CMS are marked as being Isolated. This stops the CMS acting on them.

Isolate Mode can be activated by inserting an ASE key, selecting the inputs to isolate and pressing the Mode button twice so the Isolate Mode LED flashes and goes steady after 5 seconds. In Isolate Mode, the Input indicators will cycle round all enabled inputs and show the status of each input, even if the input is normal.

The ASE will remain in Isolate Mode until the key is removed, or it times out after 12 hours. If Isolate Mode times out, or a FAS input is in alarm when Isolate Mode is about to exit (e.g., if the key is removed), the ASE will beep and flash the ISOLATE MODE LED for 15 seconds. Reinserting the key during the 15 second period will restart Isolate Mode with a new 12 hour timeout and prevent the alarm from being sent to the CMS. The alarm should be cleared at the fire alarm panel before attempting to exit again.

Additionally the inputs can be put into or taken out of Isolate Mode by the CMS operator sending specific commands to the ASE.

Test Mode

When the ASE is in Test Mode any input conditions sent to the CMS are marked as being a Test. This stops the CMS acting on them. The CMS still sends an acknowledgement of the new condition back to the ASE. This allows tested conditions to be checked that they can be successfully received by the CMS.

To enter Test Mode insert a valid ASE key, select the inputs to be tested and press the Mode button once so the Test Mode LED is flashing and then goes steady after 5 seconds. The ASE will cycle around all enabled inputs and show the status of each, even if the input is normal.

The ASE will remain in Test Mode until the key is removed, or it times out after 2 hours. If Test Mode times out, or a FAS input is in alarm when Test Mode is about to exit (e.g., if the key is removed), the ASE will beep and flash the TEST MODE LED for 15 seconds. Reinserting the key during the 15 second period will restart Test Mode with a new 2 hour timeout and prevent the alarm from being sent to the CMS. The alarm should be cleared at the fire alarm panel before attempting to exit again.

Key Removal and Timeout

When the key is removed or there is a timeout of Isolate or Test Mode, all input conditions will be sent to the CMS. However, when removing the key there is a 5 second period when the key may be re-inserted to stop the input conditions being sent to the CMS. During this period, the relevant TEST MODE or ISOLATE MODE indicator will flash rapidly. If any of the inputs are in alarm or a mode is timing out then the exit warning period will be 15 seconds and the buzzer will beep throughout. Simply re-inserting the key during this period will restore Test or Isolate mode and stop the alarm being sent to the CMS.

On power up if the key is fitted then all enabled inputs are automatically isolated.

Diagnostic Port

To use the front panel Diagnostic port, connect a PC with a suitable terminal emulator program (such as Hyper Terminal) to the front panel key socket using a Centaur II Diagnostic lead (FP0976).

Configure the terminal software as follows;
38400 bps, 8 bit, no parity, 1 stop bit, Xon/Xoff (software) flow control, and the COM port it is plugged into.

Note that plugging in a laptop/computer may connect the electronics of the ASE (and fire panel) to earth (depending upon the laptop/computer model and whether it is mains-powered). This may damage the laptop/computer and/or cause faults on other devices connected to the ASE if there are any wiring faults to earth. It is recommended that the laptop be running on battery only when it is connected to the ASE.

Table 6 contains a list of basic commands available. For a detailed explanation of all diagnostic commands, refer to the Diagnostic Command Summary in the Centaur II Cube ASE User Manual, LT0508.

Table 6 - Basic Diagnostic Commands		
Command	**Meaning**	**Explanation**
HE	Help	Lists available commands.
AS	Basic ASE Status	Shows the ASE configuration, DTE # and power supply voltage.
CM	Comms Link Status	Displays the Slave Bus status.
FS	FAS Input Status	Displays the programmed configuration and current status of all inputs (1-4).

Specifications

Table 7 – Slave ASE Specifications		
Power Supply	Input Voltage	9 – 30 VDC
	Current Consumption at 12.0V	Typical 50 mA;
	Current Consumption at 24.0V	Typical 36 mA;
Field Wiring	PF Input Threshold	To activate, pull to below 1.5 V (sink current 2 mA maximum).
	FAS Input	Use FP0740, FP0742, or FP0743 Interface Units
	Open Collector Outputs	Maximum load current 100mA; Maximum voltage 30V
	Cabling	All screw terminals have the capacity for 2.5 mm^2 conductors.
Physical	Box Dimensions	110mm H x 110mm W x 60mm D
	IP Rating	IP30
	Material	ABS Plastic
	Colour	Red
	Environmental	-5°C to 45°C, 0 to 95% RH (non-condensing)
Standards Compliance	AS4428.6	Certified by CSIRO Australia – afp 2360.
	CISPR 22	Class A
	AS/NZS60950:2000	Complies
Serial Numbers	DTE	This is printed on a label, placed as shown in Fig 2.
	PCB Manufacture Serial Numbers	Each circuit board is labelled with its date of manufacture and serial number. The ASE may need to be disassembled to view these.
Part Numbers	FP0975	Centaur II Cube ASE, SLAVE, QFRS
	FP0985	Centaur II Cube ASE, SLAVE, ADT
	FP0740	ASE FAS Interface ALM/FLT/ISO
	FP0742	ASE FAS Interface ALM N/O
	FP0743	ASE FAS Interface ALARM N/C
	FP0965	Centaur II ASE Key
	FP0969	Centaur II Cube 12V 0.5A PSU Box
	FP0976	Centaur II ASE, Diagnostic Lead

Related Documents

Centaur II Cube ASE Installation Guide, LT0506
Centaur II Cube ASE Operator Instructions QFRS, LT0507
Centaur II Cube ASE Operator Instructions ADT, LT0517
Centaur II Cube ASE User Manual, LT0508

Contact Details

ADT Fire Monitoring

Office:
47 Gilby Road
Mt Waverley
VIC 3149
AUSTRALIA

Telephone: 1300 360 575 Queensland / Victoria
Telephone: 1300 363 412 ACT / NSW
Fax: 1300 134 847