

VoW™ - Wise™

Maintenance Manual
Voice over Web Contact &
Windows Information System (Extended)

Bletchley LLPA

(Long Line Public Address)

Operators Manual produced exclusively for Thales Telecom Services UK,
Version As Footer
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1. Glossary of Terms:

WISE™ RCIS™	Windows Information System Extended, Railway Customer Information System, descriptive trademark for this system.
PC, IBM PC™ Terminal, User Terminal, Node	System Computer and /or User Terminal (“PC” derived from “Personal Computer”).
Screen, Monitor	PC Monitor
Displays	Public Displays
DVC’s	Data to Video Converter. Controls cycling information on Displays
DOS, MS DOS™	Disk Operating System
Windows, MS Windows™	Refers to the user application operating system and visual user environment

Window	A frame that is visible on screen that contains and groups menus and tools such as buttons, text box’s,
Highlighted Window , Active Window, Window with Focus	A Window that has a darker border to indicate that it is active and therefore the only window that will accept keyboard input
Key , keyboard, keys, keypress	All refer to the user keyboard
Mouse , Mouse button, Click, Mouse Key	All refer to the use of mouse or mouse keys
Click , clicked	Means to click the left mouse key
Double Click	Means to click the left mouse key twice quickly. See Mouse Details on page.
Pointer	Refers to the mouse pointer
Cursor	Refers to the text insertion point pointer
Button, Control , Icon, Box	This is an object on screen that can be clicked to perform an action
ESC key (See also Keyboard Chapter 6).	Refers to the key marked “ESC” at the top left of the keyboard. Pressing it will “escape” from the current function
Enter Key (See also Keyboard Chapter 6).	Refers to the key marked ↵ on the keyboard. There is another duplicate key marked “Enter”. Pressing it will “enter” or perform the current function
Cursor Keys (See also Keyboard Chapter 6).	Refers to the keyboard cursor ←↑↓→ keys. For allowing the user to go up and down lists, and to assist text editing.
CIF	A CIF (common interface file) is a file format associated with files that are output by TRUST.
SWOB	A SWOB (station working order book) is a file format associated with train timetables. It includes all train information required to construct a train record.

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1.1. **Cautions:**



This equipment contains high voltage components and cabling. Additionally the equipment is fragile and care should be exercised in use and maintenance. Safety precautions should include observation of electrical safety regulations and frequent power safety checks. For maintenance, this manual at all times assumes the application of skills by technically qualified authorised individuals who have attained suitable certification in electronics and computer studies and electrical safety and assumes individuals are competent with such equipment. For usage, this manual assumes that users will only consist of authorised trained competent staff.

Physical precautionary checks and frequent maintenance should also be carried out for structural safety and obstruction safeguard including the inspection of heavy equipment, suspended equipment, sharp edged equipment and cable layout.

Disclaimers:

This manual is not intended for use by untrained or inexperienced individuals. No liability by the originators is meant or implied, financial or otherwise, in terms of safety, functionality or performance by the contents of this manual or the system it describes.

1.2. **Health and Safety**

The installed PC's and their associated LCD screens conform with the Health and Safety (Display Screen Equipment) Regulations 1992.

RoHS – Equipment and accessories supplied, complied with regulations current at the time of installation.

WEEE - Equipment and accessories supplied, complied with regulations current at the time of installation.

2. Introduction

This manual aims to provide Engineers with the information they need to maintain and repair the system. This manual covers technical information that is not available in the operator manuals. See the section on Reference Documents later in the manual.

3. System Overview

The Bletchley LLPA comprises 21 stations linked to a Control PC system located at Bletchley.

Each station has a SCIS (Satellite Customer Information System) computer installed. SCIS computers are linked via a LAN network of cables, hubs & routers that form a chain link connection between each of the remote stations.

Each SCIS operates independently from the Control Computer, but relies on it for all instructions, updates and announcements. The Control Computer monitors all of the remote SCIS computers and reports their status on a system map. The Control Computer is responsible for sending the remote SCIS computers announcement requests.

Announcements can take the form of

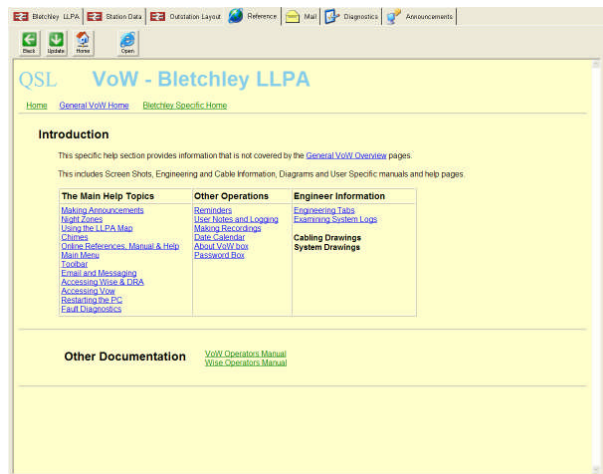
- DRA – Digitally Recorded Announcements (pre-recorded played from train record scripts)
- SRA – Schedule Recorded Announcements (repeating recorded messages played between scheduled times)
- URA – User Recorded Announcements (these are pre-recorded announcements that the user can manually request)
- Live Announcements – An announcement made by the user that is played back at the remote location within a second of the user speaking the words.

4. Reference Documents

There are several sources of associated documentation. This manual covers technical details of the system for maintenance and repair. Engineers may need to refer to one or more of the following documents for further information.

- VoW - Operator Manual for details on how to use the VoW application. This manual is available as a printed manual and is also available as an online documents. To view the online version go to the Control Terminal ensure that the VoW program is running then :
 - If the reference tab is visible click on the tab header to open the tab and view the online reference screen. All VoW manual pages can be viewed as html pages (in an internet browser format).

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- Alternately use the main menu to open the tab by selecting the View menu, then the Maps and Help Points option and finally Online reference.
- Wise – Operators Manual for details on how to use the Wise / DRA application. It should be noted that any engineers familiar with RCIS will have no problem understanding how to use Wise, although the applications appearance is different.

5. Equipment Overview, Images and Descriptions

5.1. UPS – Uninterruptible Power Supply.

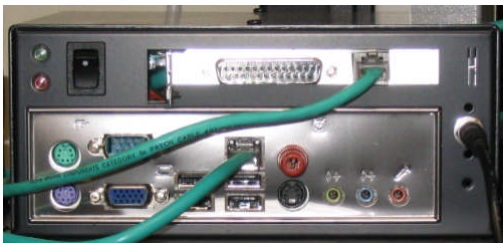
Each Control room computer has a UPS that provides surge protection and allows the safe shutdown of the Control computers at approximately 10 minutes after power failure.

The UPS may in turn be powered from either the mains or a master UPS that provides several hours of UPS backup support. This will result in a greatly extended period of backup prior to the system shutting down. It is important to understand how the system is powered for safety reasons and in order to test for power faults.

The supplied UPS has a hot swappable battery system allowing replacement with having to power down the UPS.

5.2. SCIS – Satellite Customer Information System

Each of the SCIS units operates independently under the control of the Control Room computer. They are fitted with a QSL ZoneR PCI card that is used to communicate with the Amplifiers normally via a ZSU5 Zone Selector box.



At the back of the SCIS there is also a speaker output via the green jack socket, this carries the audio output to the amplifier.

There is also a phono connector which has a blank 75R resistor fitted, this helps keep the video output live, which makes it possible to connect monitors without the need to reboot the PC. This provides a composite video output suitable for use with standard PAL station monitors. The blank connector should not be removed unless a monitor is connected in its place. If the connector is removed it will not be possible to connect a monitor and view the

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screen without rebooting the system after connecting it. The connectors allow an engineer to quickly plug in a monitor to check the status when needed without interrupting the operation of the SCIS. When a monitor is removed the blank connector should be replaced.

A VGA connector is also provided as an alternate to the PAL monitor connector. Either or both devices can be connected at the same time. When using the VGA connector it is not necessary to remove the phono blanking adaptor.

Mouse and Keyboard connection is via a USB socket. There are 4 sockets fitted as standard. If PS/2 mice and keyboard are in use it will be necessary to reboot the PC after connection.

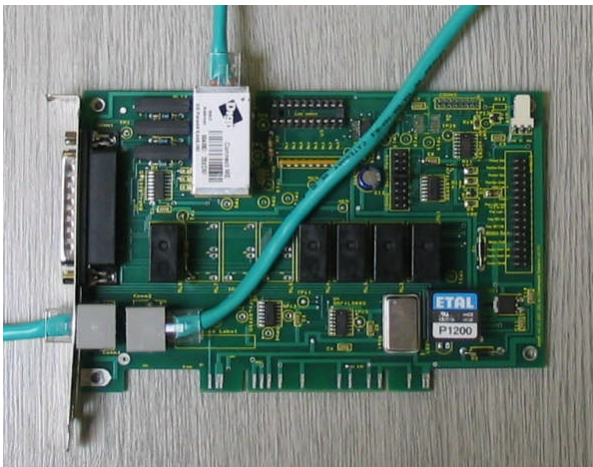
There are connectors for a keyboard and/or mouse. These will only become active after the device has been connected and the SCIS has been rebooted. In order to get instant access to keyboard and mouse controls use USB devices to connect to the SCIS.

Sound output can be tested by use of powered speakers.

The SCIS has its own RJ45 LAN connector which is used for communications with the Control computer.

5.3. ZoneR – Zone Router

The ZoneR is connected to a ZSU5 or Var4 via a 25 pin parallel port connector and cable. The wiring configuration may vary between some sites, particularly where there is more than one local microphone input.



A RJ45 connector is also fitted to the ZoneR which connects via patch cables to a hub, switch or router. This enables the Control computer to communicate directly with the ZoneR card independently from the SCIS operating system.

The Digi connector (under the white label) on the ZoneR card needs to be connected to the LAN. This is achieved via a short patch cable between an internal piggyback RJ45 socket and the external LAN RJ45 socket.

5.4. Control Room Computers

There are two computers in the Control Room. An Online and an Offline. The Online computer is usually referred to as the Master Terminal. This is the only Control computer that will connect to the remote SCIS devices. It is essential that only one control room terminal may control the system at any one time so that the remote SCIS devices know where to send messages, get updates and receive requests from.

The master computer is used to control and monitor all aspects of the LLPA, DRA, SRA and live announcements. Without a master terminal the system will not work.

Audio levels have been preset for optimal use with the system and the equipment provided. It is strongly recommended that these are not changed by the user or engineers. If audio levels need to be adjusted they should be changed using the station amplifier controls only.

There are numerous programs running on these control computers. They work together to provide services and communication with the remote outstations. These applications include :

Wise – Provides the DRA train announcements, see the Wise Operations Manual for more information

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VoW – All other LLPA operations, see the VoW Operations Manual for more information

XPSHELL – System monitor and application starter. Described later in this document.

UPSbat – UPS battery and shutdown monitor. Described later in this document.

Watchdog – Program interface for reboot and shutdown services. Described later in this document.

AoiP – Communication drivers for the remote SCIS devices. Described later in this document.

UpdateServer – Communication driver to identify new remote or replaced devices. Described later in this document.

There are several connectors on the front and back of the control room computers as follows :

VGA connector for 1 monitor. The monitor should be capable of at least 1280 by 1024 resolution.

Keyboard connector colour coded mauve, any standard keyboard may be used.

Mouse connector colour coded green, any standard ball or optical mouse may be used.

4x USB connectors on the rear. One rear connector is used to connect a USB cable to the UPS. The UPS cable is essential to ensure safe shutdown of the system in the event of power loss.

2x on the front USB connectors, Not used.

Parallel port, Not used.

Front audio line in and line out, not used.

Audio Line In (Blue) takes the input from the pre-amplifier.

Audio Line Out (Green) provides an audio output for local speaker use.

Microphone connection is made via a pre-amplifier. The microphone is also connected via a 9 pin serial connector to comm port 1 on the rear of the computer. This is used to monitor the microphone activation switch which activates the CTS line of the comm port.

RJ45 LAN port for connection to the network. This is a 100Mb LAN connector.

5.5. Control Room Microphones

A Microphone is provided for each Control room computer allowing users to record their own messages. On the master terminal it is also used to make live announcements at remote locations. Use of a different make of microphone may require adjustments to system audio levels, this should only be done as a last resort and will require testing to ensure the correct audio settings are achieved.

The microphones have been adapted to provide two connectors :

A 6.5mm jack is used to provide an audio feed to a pre-amplifier.

A 9 pin serial connector is also provided for connection to the computer comm port. This is used to monitor the microphone activation switch.

5.6. Pre-Amplifier

The Pre-Amp is used to boost the microphone input to a suitable audible level for use with the computers line In connector.

6. Maintenance Tasks

6.1. UPS – Uninterruptible Power Supply

The UPS should be tested at least once per year, and should be allowed to fully discharge every 6 months. The manufacturer recommends battery replacement at 3 yearly intervals.

6.2. SCIS – Satellite Customer Information System

These remote computers have cooling fans inside, the internal chassis fan is used to move air around to reduce the potential for hot spots to develop from either internal components or external devices, these should be checked at regular intervals, not exceeding 1 year to ensure that they are operational. These fans should move freely and almost silent. Any excessive noise indicates that the system is either overheating or the fan is reaching the end of its life. Faulty fans should be replaced as soon as the fault is detected to avoid more serious damage to the rest of the computer.

6.3. Control Room Computers

The control room computers have cooling fans, these should be checked at regular intervals, not exceeding 1 year to ensure that they are operational. These fans should move freely and almost silent. Any excessive noise indicates that the system is either overheating or the fan is reaching the end of its life. Faulty fans should be replaced as soon as the fault is detected to avoid more serious damage to the rest of the computer.

Check that the connectors and cables are not damaged, frayed or loose. Repair or replace as necessary.

Check the mouse and keyboard for ease of operation. Buttons and keys should not be sticking and the mouse movement should be smooth. Replace any found to be faulty and dispose of the faulty parts.

Delete Log files from the C:\vb\voip\sites\silvelink\system directory at approximately yearly intervals to keep the number of log files at a reasonable level. This is not an essential task, but will make the hard drive more efficient and make it easier for users to find and access the more recent logs when needed.

6.4. Microphone

Check that the connectors and cable are not damaged, frayed or loose. Repair or replace as necessary.

6.5. Pre-Amplifier

Check that the connectors and cable are not damaged, frayed or loose. Repair or replace as necessary.

7. Rebooting Procedure

7.1. SCIS – Satellite Customer Information System

7.1.1. Rebooting Locally

Rebooting Locally can be achieved in three ways:

- If the PC is working normally press the on/off switch for half a second. This will safely shut down the PC without risk or damage to the system. Shut down can take up to 1 minute depending on how busy the system is.
- If the PC has frozen or does not shut down under the above procedure. Hold down the power button until the PC shuts off. This can take around 4 seconds.
- The third method is to be avoided if possible but may be necessary in extreme situations where there has been extreme network problems or the LAN connectors are not able to make contact with remote devices even after a reboot. (If possible always shut down the PC first by one of the previous methods).
- Turn the power off completely to the SCIS and remove the power connector. Wait for at least 20 seconds for the power to discharge then restore the power.

7.1.2. Rebooting Remotely

Rebooting Remotely can be achieved in several ways as follows:

- Using EyesAFar - Log on to the required SCIS and use the Start menu reboot procedure. See the section on using EyesAFar for further details.
- Using the UpdateServer program - Select the required remote device and reboot it or reboot all as required. Use of the UpdateServer should only be attempted under guidance from a QSL technician.
- Using the VoW program - Select the required remote on the map and select the required reboot option from the Maps menu. See the VoW Manual for further details
- Using the ZoneR reset instructions to shutdown or restart the SCIS, this should only be attempted if there is no other solution available. This is a very high level command and should only be attempted by an experienced engineer who is aware of the risks of using this technique. The following steps should be followed, some must be undertaken within a specific time interval as stipulated below.
 - First identify the IP Address for the ZoneR on the remote SCIS device.
 - Start an Internet Browser and enter the address in the address bar, it will be similar to the following. <http://192.168.123.110>
 - If the device is available the login screen will appear. Enter the username "root" and the default password. Once logged on locate the **System Information** option in the left menu and then select the GPIO link on the System Information page.
 - **For a safe shutdown :**
 - On Pin 5 set the radio button to **De-asserted** and click Set Pins.
 - **NOTE:** the next steps should be undertaken within 3 seconds of each other.

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- On Pin 4 set it to **De-asserted** and click **Set Pins**. Wait approx 1 second then click the **Asserted** radio button and click **Set Pins** again.
- Finally set the Pin 5 back to **Asserted** and click **Set Pins**.
- This will shut down the remote SCIS device safely.
- To restart the SCIS set both Pin 4 and 5 to **De-asserted** and then click the **Set Pins** button. Wait approx 1 second and set both pins back to **Asserted** and click the **Set Pins** button again.
- **For an unsafe shutdown** : use this method only when the safe shutdown does not work. This method does not safely shutdown windows first, it just powers off the PC and should only be used if the remote is completely frozen and no other methods are available.
 - Set both Pin 4 and 5 to **De-asserted** and then click the **Set Pins** button. Wait at least 8 seconds and set both pins back to **Asserted** and click the **Set Pins** button again. *(This is equivalent to holding down the power down on most PC's to force a shutdown). NB: This only shuts down the PC.*
 - To restart the SCIS set both Pin 4 and 5 to **De-asserted** and then click the **Set Pins** button. Then immediately (within 4 seconds) set both pins back to **Asserted** and click the **Set Pins** button again. *(Tip: if you are unable to Set the Reset these quickly enough due to internet/browser delays, try pre-setting Pin 5 to De-asserted initially and then Re-asserting it again once Pin 4 action has been completed as above. i.e. Pin 5 does not need to be actioned during the rapid part of the sequence).*

Depending on the reboot method used in the above sections, the SCIS should restart automatically when the power is restored or the system is rebooted. If it fails to start it may be necessary to power up the system locally by pressing and release the power button.

When the SCIS starts up the red light should flash to indicate hard drive activity. It should never remain constantly on for longer than 30 seconds. If this happens and the PC fails to respond or complete its reboot cycle it may have frozen due to a hardware issue. Reboot the PC locally as described previously.

7.2. Control Room Computer

The control room computers can be rebooted in several ways as follows:

If the Operating system has frozen and there is no access to the either the mouse or keyboard press the On/Off button on the front for at least 4 seconds. This will shut the system down.

- If this fails then turn off the power using the power switch at the rear of the computer.

If the Operating system and software is working then one of the following methods can be used.

- From Windows if the operating system has not been locked down and password protected that users can use the Start menu to shut down and reboot the computer.
- From VoW reboot the computer from the Maps menu by selecting Reboot and then This Computer.
- From Wise / RCIS open the Configuration form and click the Reboot Self button.
- From XPSH shell use the Tools menu and select Reboot PC.

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The computers should restart automatically when the power is restored. If it fails to start, press and release the power button on the front.

7.3. Hubs and Switches

It is unusual for hubs or switches to require rebooting, but this is sometime required. Rebooting these devices should not seriously effect the system, however there is likely to be short period during which communication with devices will be lost.

Communication will normally be re-established automatically. Some switches and particularly DSL routers will take several minutes to connect. Hence reconnection can take between 30 seconds and 6 minutes. They should rarely take more than 10 minutes.

If the contact cannot be established beyond the switch or router device it may be necessary to investigate other parts of the system for faults.

7.4. Routers and their effect on the system

Routers are a little more complicated than the hubs or switches. The loss of a router can seriously effect the health and reliability of parts of the system.

Unlike the hubs and switches, routers direct network data to its destination and if the router stops working the system will start searching for alternate ways to get the data to its destination. This is useful if only one router has a fault and there are alternate routes to the remote location. However if no alternate route is found the system may become sluggish and may even increase network traffic as the routers try to locate the remote device. With a single fault the effect on the remaining part of the system will be negligible as far as making announcements are concerned.

If a router has been faulty for a long period, several hours or days any computers that have been blocked by that fault may not have been able to contact the master terminal for some time and it may be necessary to manually reboot them so that they reset their connections.

The router should retain their settings when powered off, so a power off and on reset will normally take no more than 30 seconds. However many of the routers may need to handshake with other routers over a DSL telephone connection which can take several minutes to re-establish their full network connectivity.

If the router has a DSL light that continues to flash then there may also be a problem with the router at the other end of the line. See the section on Fault Finding for more information.

Routers can be rebooted remotely if they are can be contacted via the internet browser logon screens.

8. Unit or Spares Replacement Procedures

8.1. Recommended IP Address Table / Range

In order for the system to operate correctly the IP addresses must be configured in a manner that can be easily determined by the engineer and identified by the master/control computer.

An IP Address is made up of 4 numbers separated by dots, for example 192.168.1.10

The first three numbers define the network address range and the last the individual device number. In most cases the main network address will be defined in the range of 192.168.123..... but this may be different for some systems, once you know this address all devices attached to the same network group will use these first three numbers.

Most computers and devices require IP addresses and will need to be assigned one of the following unique numbers. These numbering sequences are flexible and can therefore overlap when needed. The IP details are always provided in the Maintenance manual for each site or system as devices and equipment can vary.

Routers and other external devices use the range 200 to 255 as the last number.

Platform NTI & Summary Displays etc.. can be with the range from 2 to 99 as the last number.

The Bletchley Control Computers are set to 107 (master) & 108 (offline) as the last number.

SCIS and ZoneR devices use the range 100 to 199 as the last number.

The DHCP server if used will be set to 1 as the last number (hence use <http://192.168.123.1> to view the router settings)

The following tables detail the predefined IP address. All SCIS, ZoneR and Control room PC's must use these addresses in order for the system to communicate correctly.

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8.1.1. Table of Static IP Addresses

Device Location / Name	Operating System LAN IP	ZoneR PCI Card IP	Router IP Addresses
Control Room Master / Online computer	192.168.123.107	N/A	N/A
Control Room Master / Offline computer	192.168.123.108	N/A	N/A
Spare / Hot Standby PC	192.168.123.106	N/A	N/A
Northampton	192.168.123.161	192.168.123.131	Primary line 192.168.123.220
			Remote line 192.168.123.221
Wolverton	192.168.123.162	192.168.123.132	Primary line 192.168.123.218
			Remote line 192.168.123.219
Milton Keynes Central	192.168.123.163	192.168.123.133	Primary line 192.168.123.216
			Remote line 192.168.123.217
Bletchley	192.168.123.164	192.168.123.134	Bedford Branch 192.168.123.230
			Primary line 192.168.123.200
			Remote line 192.168.123.201
Fenny Stratford	192.168.123.165	192.168.123.135	192.168.123.231
Bow Brickhill	192.168.123.166	192.168.123.136	192.168.123.240
Woburn Sands	192.168.123.167	192.168.123.137	192.168.123.232
Aspley Guise	192.168.123.168	192.168.123.138	192.168.123.239
Ridgmont	192.168.123.169	192.168.123.139	192.168.123.233
Lidlington	192.168.123.170	192.168.123.140	192.168.123.238
Millbrook	192.168.123.171	192.168.123.141	192.168.123.234

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8.1.1. <u>Table of Static IP Addresses</u>			
Device Location / Name	Operating System LAN IP	ZoneR PCI Card IP	Router IP Addresses
Stewartby	192.168.123.172	192.168.123.142	192.168.123.237
Kempton Hardwick	192.168.123.173	192.168.123.143	192.168.123.235
Bedford St. Johns	192.168.123.174	192.168.123.144	192.168.123.236
Leighton Buzzard	192.168.123.175	192.168.123.145	Primary line 192.168.123.202
			Remote line 192.168.123.203
Cheddington	192.168.123.176	192.168.123.146	Primary line 192.168.123.204
			Remote line 192.168.123.205
Tring	192.168.123.177	192.168.123.147	Primary line 192.168.123.206
			Remote line 192.168.123.207
Berkhamsted	192.168.123.178	192.168.123.148	Primary line 192.168.123.208
			Remote line 192.168.123.209
Hemel Hempstead	192.168.123.179	192.168.123.149	Primary line 192.168.123.210
			Remote line 192.168.123.211
Apsley	192.168.123.180	192.168.123.150	Primary line 192.168.123.212
			Remote line 192.168.123.213
Kings Langley	192.168.123.181	192.168.123.151	Primary line 192.168.123.214
			Remote line 192.168.123.215

8.2. SCIS – Satellite Customer Information System

Replacement of a SCIS is relatively straight forward, but does require the following procedure to be followed.

- Shutdown the SCIS if it is still running.
- Turn off or unplug the power supply transformer, remove the power supply connector from the PC.
- Remove all connectors from the SCIS.
- Remove the SCIS from the rack, attach a label stating what has failed and/or the symptoms.
- Install the replacement SCIS in the rack.
- Reconnect all connectors.
- Reconnect the power connector.
- Plug in and turn on the power supply transformer.
- Test if it is communicating with the control room master terminal.

If it is contacting the control terminal make a test announcement. It may take some time for all the audio and pre-recorded data files to be automatically synchronized with the replacement unit.

If it is not able to contact the control room master terminal it may need additional configuration. See Configuring SCIS Computers for more information.

8.3. ZoneR PCI Card

This card is mounted in a PCI riser slot inside the SCIS units. It can be replaced independently of the SCIS unit as follows:

- Shutdown and disconnect the power from the SCIS unit as described above.
- Remove the SCIS from the rack and remove the lid.
- Make a note of the cables and their positions on the ZoneR card.
- Unscrew the ZoneR board and take off the cable connectors.
- Insert the new card and screw into position.
- Replace the cables as previously noted.
- Replace the lid and insert back into the rack as previously described above in items 5 to 9.
- To test the ZoneR make test announcements to each zone. The relays in the ZSU5 should trip as each zone is changed and is normally heard even with the lid on.

If the ZoneR is not able to connect to the control room computers there may be either:

- A cable issue – Check the cabling, especially the LAN cables inside and outside the SCIS.
- A Router / DHCP issue.
- Try pinging the ZoneR card from a Windows Command (DOS) box on another PC connected to the LAN.

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- Check if it is visible in the DHCP router table (if accessible). If it is visible in the list check the configuration settings and adjust if necessary. If not visible it may be a cable / router problem.
- It may need configuration. See the section on ZoneR configuration later on.

8.4. UPS – Uninterruptible Power Supply

Whilst the batteries may be hot swappable it is often quicker and easier to replace the UPS completely and or replace the battery packs in a workshop.

To replace a UPS shut down all connected equipment and turn the UPS off.

Unplug the UPS and remove it.

Insert the replacement and reconnect all cables before connecting it to the mains and turning it on.

8.5. Control Room Computers

Each of the control room computers can be shut down and replaced independently. The replacement procedure is as follows:

- Shutdown the computer.
- Turn it off at the power switch to stop it from automatically restarting.
- Disconnect the cables from the rear of the computer.
- Remove the computer and attach a label to it detailing the fault(s) or symptoms that may be useful to the repairer.
- Install the replacement unit and re-connect the cables, attach the power cable last. It is best not to connect the LAN cable until the configuration settings have been checked or changed.
- If the computer does not automatically start up, check the power switch at the back is on and press the power button on the front.

The computer may need to be configured, it is advisable to check the configuration settings immediately. See the section on **Configuring Control Room Computers** for more information.

8.6. Routers / Hubs

Each control router will have a static IP Address assigned. The default address will be marked on the case and can be used if the unit is reset to its factory default. The replacement unit must use the same IP address. Make sure that the new unit is correctly set-up with its Static IP. See the section on Configuring Routers for more information and a list of router IP's.

9. Fault Finding & Diagnosis

9.1. Cable Diagram and Schematics

Several diagrams and wiring schematics are provided on the VoW maps and in the Online Reference documentation. They are also provided in this document. Engineers may need to refer to these in order to identify possible fault locations and diagnose where that fault could be.

9.2. Diagnosing Faults

9.2.1. Establishing connectivity

VoW has a fault Diagnostic Tab. This tab enables users and engineers to have easy access to the LAN / Internet ping command via manual checks or using the diagnostic map to automatically check the remote devices and display those results. The VoW LLPA map also provides contact information when available by displaying the status messages from the SCIS locations.

The VoW Diagnostic map allows enables engineers to open a diagnostic connection to the remote device by clicking on the appropriate item on the map.



Once the map is open identify the required location on the map and click on the device green message to open it. If there are faults on the system you may need to wait for this to be displayed. Once clicked the page will be opened in the Online Reference Tab and VoW will automatically switch to it and display the login page.

Note that if the device name is shown in red it is probably offline and therefore unreachable.

The ping command is used to send a simple message to a remote device, the remote device sends a reply back confirming it received the ping. In this way it is possible to check cabling and device operation.

See the VoW manual for information on using the Diagnostic Tab.

The Ping command can also be used in a Windows command prompt window by entering the command followed by the destination IP address.

i.e. PING 192.168.1.202

```
Pinging 192.168.123.24 with 32 bytes of data:
Reply from 192.168.123.24: bytes=32 time<1ms TTL=128
Reply from 192.168.123.24: bytes=32 time<1ms TTL=128
Reply from 192.168.123.24: bytes=32 time<1ms TTL=128
Reply from 192.168.123.24: bytes=32 time<1ms TTL=128

Ping statistics for 192.168.123.24:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milli-seconds:
        Minimum = 0ms, Maximum = 0ms, Average = 0ms
```

The TraceRT (trace route) command can also be used. This must be entered in a Windows Command (DOS) window. The advantage of using this command is that it shows how far the cable connection goes before a fault occurs. Each router accessed is shown by its IP address in the window in the sequence in which it is encountered on the way to the destination IP. To use this command enter it on the command line followed by the destination IP address.

i.e. TRACERT 192.168.1.202

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```

1 <1 ms <1 ms <1 ms 192.168.123.254
2 1 ms 1 ms <1 ms 217.3.17.46.ppp.onetel.net.uk [217.8.17.46]
3 22 ms 20 ms 20 ms 212.67.122.49
4 21 ms 20 ms 20 ms 212.67.124.123
5 20 ms 20 ms 23 ms 212.67.124.253
6 166 ms 206 ms 200 ms 212.67.120.78
7 20 ms 23 ms 23 ms 212.67.118.129
8 22 ms 20 ms 20 ms Gi1-3.lon-wal-access-3.interroute.net [84.233.45.1]
9 28 ms 23 ms 23 ms Gi10-0.lon-wal-core-1.interroute.net [217.132.21.1]
10 23 ms 23 ms 20 ms Gi0-0.lon-002-inter-1.interroute.net [84.233.102.1]
11 22 ms 20 ms 23 ms 195.50.118.169
12 20 ms 23 ms 20 ms ae-0-51.bbri.London1.Level13.net [4.68.116.1]
13 23 ms 23 ms 26 ms ae-1-0.bbri.London2.Level13.net [212.187.128.1]
14 21 ms 20 ms 23 ms ge-4-1.head.London2.Level13.net [4.68.117.7]
15 23 ms 23 ms 23 ms 195.50.112.102
16 22 ms 20 ms 23 ms ge-3-1.bas-al.uk1.yahoo.com [217.12.2.200]
17 24 ms 20 ms 23 ms alteoni.34.uk1.yahoo.com [217.12.6.6]
18 22 ms 23 ms 23 ms rci.vip.uk1.yahoo.com [217.12.6.29]
Trace complete.

```

The IPConfig (IP configuration) command can be used to identify the current IP address and other network setting on the current computer. This must be entered at the prompt command in a Windows Command (DOS) window. The resulting information will look like the following.

i.e IPCONFIG

```

Ethernet adapter Local Area Connection:
Connection-specific DNS Suffix . : 
IP Address. . . . . : 192.168.123.24
Subnet Mask . . . . . : 255.255.255.0
Default Gateway . . . . . : 192.168.123.254

```

9.2.2. Identifying LAN Faults

LAN faults can be difficult to identify as there can be numerous cables, hubs, switches, routers and telephone cables used throughout the network.

The first thing to establish is the extent of the fault. Use the ping and trace route command mentioned above to diagnose the approximate location of the fault. Once established from both cable directions it should be possible to identify the cable or at least the station at which the fault has occurred.

9.2.3. Identifying Port / Device Faults

It is not always possible to identify a fault from a remote location like the Control Room or equipment room. It will sometimes be necessary to take a portable computer to the nearest hub/switch to the device with a problem and to contact it from that point.

Accessing via the nearest network hub ensures that there will be no inference or blocking from other equipment that may potentially be faulty.

Use the Ping command to make contact with the device. If that fails try to ping the portable from the device. All devices including the routers have a facility to do this.

9.2.4. ZoneR Card

There is very little that can go wrong with this device, however cable issues can prevent contact. Access to the device can be checked by ping and tracert commands as previously described. If the device is reachable via the LAN it is possible to connect to it directly using a Telnet application. However this is not recommended as incorrect changes to the configuration can make the device unusable.

If the IP address can be pinged successfully then it is working.

See the section on Configuring ZoneR cards for more information.

9.2.5. SCIS – Satellite Customer Information System

All SCIS devices have remote diagnostic tools built in. The device will report its current status to the Control Room Master Terminal. This status message is displayed on the VoW LLPA map. See the VoW Operators Manual for more information about the Map Status Buttons.

If there is no VGA monitor image when a monitor is connected –

- Connect monitor and reboot
- Connect a portable PC to the switch and try to connect to the SCIS using EyesAFar,
- Ping it from a command prompt
- or use one of the other available diagnostic tools.

If the fans are noisy or have stopped working.

- If the fan is a processor fan turn the computer off immediately and either replace the fans or return the PC for repair. Do not leave it in service as this can result in serious damage to the computer.
- If it is a system cooling fan then the repair is not quite as urgent, but it needs to be attended to urgently to avoid more serious faults occurring.

9.2.6. Control PC Online & Offline

Always reboot the terminal before attempting to diagnose a fault, a reboot will set the system into a known operation state. If the fault continues then follow the following steps:

If the problem is loss of contact with a remote.

- Check the remote is working. A site visit may be necessary.
- Check the UpdateServer program on the master control room computer to see if it is still in contact with it, then the fault may be with the ZoneR rather than the software.
- If the remote cannot contact with the UpdateServer program then reboot the remote PC. Note that it can take several minutes for a rebooted PC to make contact with the controlling computer.

If the problem is an audio issue.

- Check if the remote can play any audio, i.e. DRA, scheduled, Live announcement and chime.
- If nothing plays:
 - Check the remote Amplifier and Zone selector are turned on.
 - Check that the remote local microphone has not been left on.
- If it will play some messages but not others then files may be corrupt or missing on the remote SCIS computer. Reboot the SCIS and try syncing all audio files from the VOW diagnostic tab.

If the Zone switching is not working on a remote SCIS computer or all locations at a station are reporting a fault or error.

- Check that the local microphone has not been left turned on.

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- Completely power off the remote SCIS computer and remove the power supply plug for at least 20 seconds. Then reapply the power. When it first powers up all zones should open and remain open until it makes contact with the control terminal, then they will all shut.
- If it fails to open the zone switches, then there could be a fault with the ZoneR card, check with QSL.
- If it fails to close the zone switches then there may be a fault in the cable from the ZoneR card to the hub/switch. If the lid has been removed from the SCIS recently then check that the internal green LAN patch cable is connected and is not sitting directly on top of the Digi connector. If the cable is connected correctly the Digi RJ45 LED's should be on and/or flickering occasionally.

If the problem is a hard drive issue that cannot be fixed by running scandisk return it for repair as soon as possible to reduce the risk of further damage to the hard drive.

If the fans are noisy or have stopped working.

- Turn the computer off immediately and either replace the fans or return the PC for repair. Do not leave it in service if the fan is a processor fan as this can result in serious damage to the computer.

9.2.7. Hubs & Switches

These are fairly basic. It is rare that they stop working completely. Taking the power off the device and restoring it after a few seconds will normally be all that is required to reset it. To diagnose any possible problems follow these guidelines:

- Check that the power is ON. The device will normal have LED's which will be lit when working. They all have a power LED indicator. Note that LAN LED's indicate connectivity through the cable and not necessarily that the hub is working.
- Check that the LED's are flashing. On the LLPA system this will normally be a very frequent event, occurring multiple times a second.
- Note that these should not be permanently on (other than the power LED). If they are seen to be on for long periods then the system may be excessively busy which can lead to communication problems. A live announcement or a file sync can cause the LED's to be on for long periods in normal use.

9.2.8. Routers

These are very similar to the Hubs and Switches and the same checks can be carried out as previous described above. Turning off the power for few seconds and then on again can resolve many of the problems likely to occur with these devices. However they can be damaged by lightning strikes and other electrical or telephone cable surges. Loss of the configuration settings may occur under these conditions, causing them to be reset to their factory settings or the firmware to be blanked completely.

If the Router has a DSL light it should be permanently ON. If this is not the case reboot the device and watch to see if the DSL connects. If it has not connected within a few minutes it may be necessary to reboot the router at the other end of the line. If a connection still cannot be establish then there is likely to be a telephone line fault between the two devices.

Routers also have built in diagnostic and configuration tools that can be accessed via the LAN and an internet browser. To access this information enter the routers IP in the browser address bar. This will be similar to the following <http://192.126.123.202> the actual IP address can be found attached to the router on in the section on configuring

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the routers. Enter the username and password if requested/required. This is often stated on the router label too.

Check the configuration settings are correct. There will also be a status display and diagnostics page which may be useful.

See the section on Configuring DSL Routers for further information.

9.2.9. Branch Line Routers

These are installed as a loop. The loop is controlled by a router ring master located in the Bletchley rack. The ring master controls the direction of data flow. When a fault occurs on a cable or remote router, the ring master will redirect data flow in the both directions.

It can take several minutes until this alternate data flow is activated and the SCIS devices can re-establish a link back to the control room.

Once the fault has been repaired the routers will transmit data in both directions until the ring master detects this and stops it occurring. The data ringing will disable most LAN devices, and will lead to the system losing contact with most (if not all) of the SCIS devices. The ring master will eventually force single direction data transfer back on, enabling the SCIS devices to contact the control room again. It can take some time to re-establish connections with all devices, so a certain amount of patience will be required should this happen.

9.2.10. Data Ringing

Data ringing is an effect that can occur on a LAN usually the result of a cable fault. A LAN must never be connected as a ring or loop as this results in messages being constantly repeated between switches and routers until they eventually stop working. They will eventually become overwhelmed by the data and will reset themselves.

To resolve these issues it is essential to cure the fault. Turning off PC's will not help or effect the fault finding exercise. It will be necessary to work around the LAN checking cable connections. This type of fault is usually caused by a miss placed cable.

The DSL routers in the branch line can also cause data ringing. This effect can occur when a cable or router fault has been repaired. The router ring master located in the Bletchley rack will eventually detect this situation and correct it automatically by only permitting data movement in a single direction again.

9.2.11. Pre-Amplifier for Microphone

There is very little that goes wrong on these devices. If there is no power light then check the power transformer, it should be warm to the touch if operational.

10. Use of EyesAFar

10.1. To access a SCIS from the online Control PC

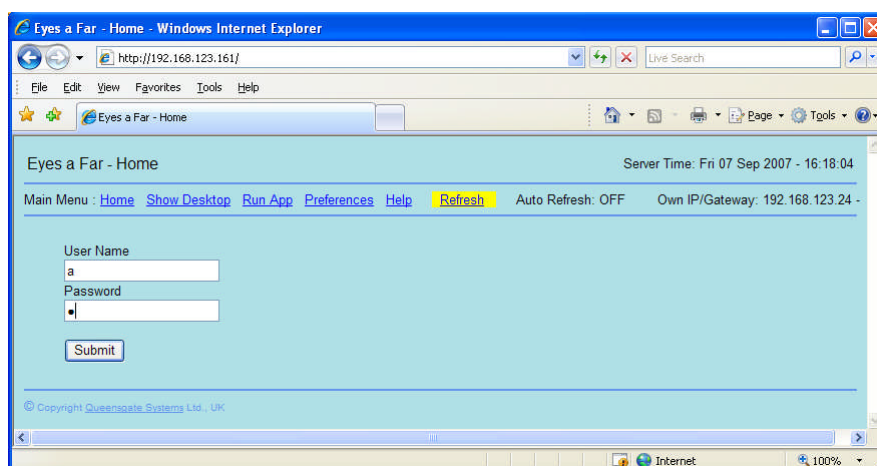
There are several ways to open a connection to the remote EyesAFar location.

- Bring the Update Server to the top of the open windows, identify the IP number of the device you wish to access and then double click in the IP address cell.
- Alternatively on VoW open the Diagnostic Tab and select the appropriate Map button.



Once the map is open identify the required location on the map and click on the device green SCIS message next to it. If there are faults on the system you may need to wait for this to be displayed. Once clicked the EyesAFar link will be opened in the Online Reference Tab and VoW will automatically switch to it and display the login page which will be similar to one below.

Note: If the SCIS word is in red the PC is probably offline and therefore unreachable.



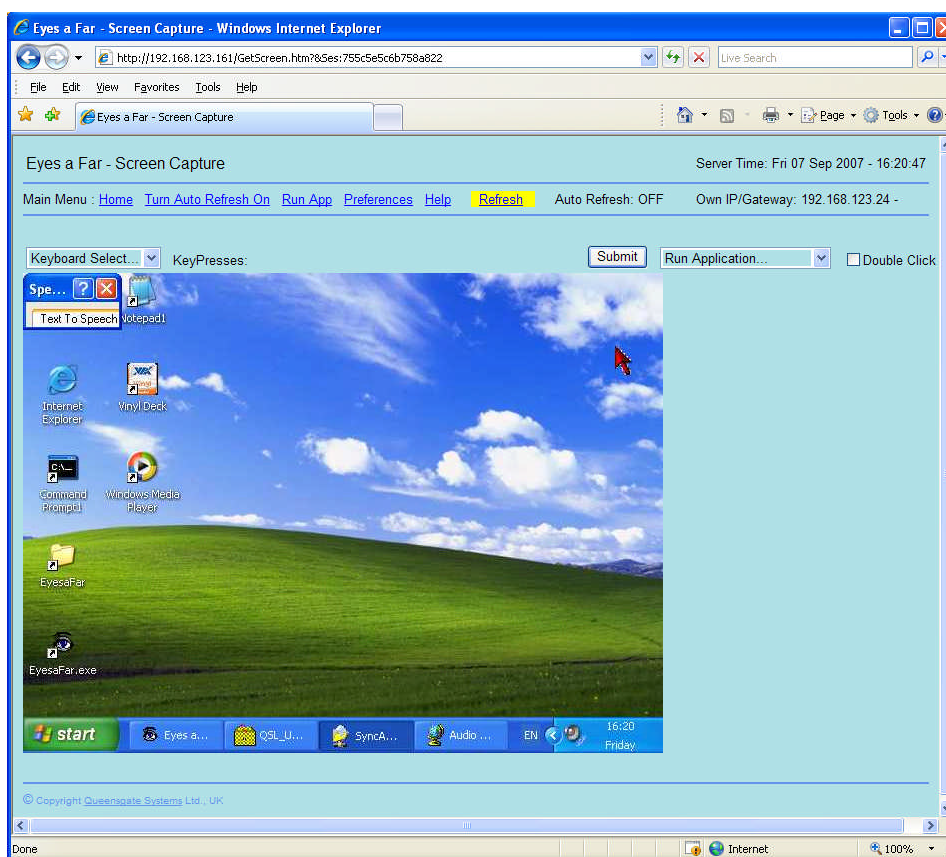
EyesAFar password screen in a Browser Window

Depending on the method used to open EyesAFar. This will either open the connection in an Internet Explorer window or the VoW Reference tab, and should present the logon page for the remote PC. The username and password must be entered to access the remote device.

Once the username and password are entered correctly you will see an image of the desktop on the remote PC, and a menu of commands that can be used to access programs and perform predefined operations at that remote location.

For ease of use this Username and Password have been set to "a".

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EyesAFar opened access to a remote desktop

Take care when closing or changing settings as these may effect the system operation and may leave the PC un-contactable by remote applications, if settings have not been changed on the remote then a reboot of that PC will normally restore it to full operation.

10.2. To access the Control PC from a LAN terminal

The control terminal can be accessed from any PC on the same network group. This can be achieved by opening Internet explorer and entering the IP address of the control room PC.

For the Master computer identified as "Bletch-a" with Wise set to "Bletchley LLPA" this is <http://192.168.123.107:23>

For "Bletch-b" with Wise set to "Bletchley Offline" this is <http://192.168.123.108:23>

Each IP address is followed by the port number of the program in this case both control computers are set to use port 23.

When the password screen appears enter the username and password and click the submit button. Once entered correctly the screen shot and menu will be shown providing full access to the control room terminal.

Take care when closing programs or changing settings as these may effect the system operation and may leave the PC un-contactable by remote applications, if settings have not been changed then a reboot will normally restore full operation.

10.3. To access the Control PC from the Internet or other Remote Locations.

Access to the system can be achieved from remote locations on the LAN network, via a broadband connection or via a dial-up internet connection. This may be disabled to prevent

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unauthorised access to the system, passworded or given a special port number for access. It is also possible to restrict access to only allow a computer with a specific IP to have remote access to the system.

This may be limited by network speeds, communication devices and operation status of the system.

Connection methods and accessibility are as previously described.

11. Use of VoW Engineering Tabs

Engineering tabs have been provided to aid diagnostics of system faults and allow access to some of the settings that can be changed without serious side effects to the system operation.

The Engineering tabs are password protected to prevent unauthorised access to them. The logon details should not be disclosed to the users and other system operators.

12. Hard Drive Directories

VoW – C:\vb\voip\sites\Silverlink - The main LLPA application. Needs to be running at all times.

Wise – C:\vb\Wise - Providing DRA services from train timetables. Needs to be running at all times.

CifTip – C:\vb\ciftip\BletchleyLLPA - Extracts CIF files for use with Wise. This program only runs when called from Wise. The CIF file backup directory is located at c:\vb\ciftip\BletchleyLLPA\cif\cifback.

XPShell – C:\vb\misc\XPshell - Locks XP to help prevent improper user activity

EyesAFar – C:\vb\EyesAFar - Enables secure remote system access. Needs to be running at all times when remote access is required. It runs hidden on the control room computers.

Update Server – C:\vb\install\UpdateServer – Retrieves and saves a list of current IP addresses and processes program and data update requests from remote SCIS devices. Needs to be running at start-up and should be running at all times, however it can be closed down for short periods without effecting the system.

AoIP_and_ZoneR Controller – C:\vb\AoIP – This controls all communications with the remote SCIS devices. Needs to be running at all times. Some forms are run hidden from normal user viewing, but are accessible when required.

UPSbat (UPS Battery Monitor) – C:\vb\Watchdogs\upsbat\ - Monitors the battery state and performs a safe shut down following power failure. This program runs hidden from users. Needs to be running at all times.

Watchdog (XP Rebooter) – C:\vb_net\watchdog - This program runs hidden from users. Needs to be running at all times.

SyncApp – C:\vb\voip\SyncApp – This program enables background syncing with remote devices running a copy of the same application. It ensures that identical files are located on all remote computers by checking size, checksum and name against those on the server. Needs to be running at all times when the system is in use.

VoIP – C:\vb\AoIP\ - This program is the primary communications program on the remote SCIS computers. Needs to be running at all times or communication will be lost with that device.

Scheduled Audio Files – C:\vb\voip\sites\silverlink\audio - Audio files are located in the VoW sub directory. They are required in order for the system to make scheduled announcements at remote locations. These file can be amended, deleted created and replaced by the users, via

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the user recording form and the play list form (both available from the VoW announcement menu).

DRA Audio Files – C:\dat\audio1 and C:\dat\wordlist - These are permanent files that are used for Wise DRA announcements. These files cannot be amended by the user, and must not be deleted otherwise DRA playback will be effected.

Station Train Records – C:\rdd\Silverlk - These are essential for Wise DRA announcements. Without these files no DRA announcements can be made.

Log files are located in the C:\vb\voip\sites\silverlink\system directory. They may be deleted at any time without any effect on the system operation.

12.1. System Logs

System logs are located in a single directory. They have been date named (the applicable date is included in the name). A separate file is created for each day that an item is written to the log file. Log files are available for specific operations as follows. The ?? represent a date.

- L01-??-??-???.dat - Announcements Log
- L02-??-??-???.dat - Email Log
- L03-??-??-???.dat - Maintenance Log
- L04-??-??-???.dat - Reference / Web Access log
- L05-??-??-???.dat - Settings Log
- L06-??-??-???.dat - Other Apps Access Log
- L07-??-??-???.dat - User Login Log
- L08-??-??-???.dat - File Sync tracking

These files can be deleted at any time without effecting the system.

Logging can be activated or deactivated using the Engineers Logging Tab.

12.2. Making and Recovering Backups

Backups can be made of most directories either locally or over the network. However the Windows Operating System will prevent the copying of specific security files. This makes it impossible to completely backup the hard drive and clone it without the use of special software.

12.3. User Directories

Some directories contain files for the users personal use. These include Logs, Notepad files, Reminders and Emails. Whilst these can be deleted without effecting the system the user should be approached before doing so.

User Logs c:\vb\voip\sites\silverlink\logs

User Notes c:\vb\voip\sites\silverlink\text

13. Installing Updates

Some updates can be made remotely using the remote diagnostic programs. However many of the primary program cannot be updated in this way as any running programs are protected by the Operating System.

14. Configuration

14.1. SCIS Computers

The SCIS may need to be reconfigured or set-up if the registry or hard drive has become corrupt. This is usually detected by loss of drivers or other unrecoverable failure to communicate with other computers on the system.

In most cases configuration requires an engineer to connect a monitor, keyboard and mouse and follow telephone guidance when needed.

14.2. Control Room Computers

Control computers are configured differently depending on the computer use.

Basic differences are the

- IP Addresses
- Settings applied to XPSHELL
- SCIS Drivers running
- Settings applied to Wise

When changing any IP addresses or testing XPSHELL start settings it is advisable to disconnect the PC from the network to avoid potential IP conflicts or accidental resetting of the remote SCIS devices. Incorrect settings, conflicts or multiple SCIS drivers running can cause loss of contact with the remote SCIS devices and/or other parts of the system.

NOTE: If the Master PC is taken offline or rebooted it can take several minutes for all SCIS units to reconnect depending on the connection status when the connection was closed. In some instances.

14.2.1. Changing a Control Room PC

Before changing a Control PC make sure that the PC being replaced has been shut down and removed from the system. Running two PC's with the same configuration can cause unexpected side effects such as conflicts or loss of contact with the remote SCIS devices and/or other parts of the system.

When swapping two live PC's it is important to disconnect both from the LAN to avoid conflict issues.

If a replacement PC is being moved to the new position.

- Connect all cables to the replacement PC except the LAN cable.
- Only connect the LAN once all settings have been checked and set correctly.

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If the secondary PC is to be used without moving it to the master PC location it can be re-configured live without removing it from the LAN.

Apply the settings for each PC as detailed later in this section.

14.2.2. The Master PC

The Master PC requires XPSHell to be configured to start the SCIS drivers. The master PC is the only PC on the system that should run these drivers.

The top row (Program 1 To Run) of the XPSHell line should show the path and filename of the UpdateServer application.

C:\VB\Installer\UpdateServer\UpdateServer.exe

The bottom row (Program 4 To Run) should show the path and filename of the SCIS driver and diagnostic application.

C:\VB\AoIP\AoIP_and_ZoneR.exe

The IP address must always be set to 192.168.123.107.

Wise must be configured to be the only terminal with the network settings set to "Check Links to Displays" and "Set as Server". To check the settings click the Wise network icon in the icon panel to the right of the Wise display window.

14.2.3. The Offline - Secondary PC

The offline PC must not have the SCIS drivers running. The SCIS drivers can however be run manually on the PC if they have been shutdown on the Master PC.

The Top and bottom lines of the XPSHell program must be empty and no reference should be made to the UpdateServer or AoIP_and_ZoneR applications.

The IP address must always be set to 192.168.123.108.

Wise must be configured to be the only terminal with the network settings set to "No Display Check" and "Set as Terminal". To check the settings click the Wise network icon in the icon panel to the right of the Wise display window.

14.2.4. The Spare – Hot Standby / Spare PC

The spare PC must not have the SCIS drivers running. The SCIS drivers must never be run on the spare whilst configured as the spare.

The Top and bottom lines of the XPSHell program must be empty and no reference should be made to the UpdateServer or AoIP_and_ZoneR applications.

The IP address must always be set to 192.168.123.106.

Wise must be configured to be the only terminal with the network settings set to "No Display Check" and "Set as Terminal". To check the settings click the Wise network icon in the icon panel to the right of the Wise display window.

14.3. DSL Routers

One of the routers will be configured to be a DHCP server. This will issue IP addresses to all non-static devices requiring dynamic IP address allocation. All routers will be assigned their own static IP address (not dynamic). The use of a Dynamic DHCP service on the system will enable engineers to connect to the network and diagnose faults more easily, and without the need to assign static IP addresses to their own computer terminals.

The DHCP server can be configured using an Internet Browser by entering this address in the address bar <http://192.168.123.1> All routers providing external access will have password protection.

All DSL routers need to have dip switch 5 set on to activate the static IP Address. When this dip switch is set off the default factory setting applies.

The IP addresses used to configure the DSL routers are included in the IP table in section 8.1.1 on page 15.

14.3.1. Specific DSL settings

All routers on the Main line use the default settings with just the static IP set.

All routers on the branch line need to be set for unidirectional data flow so that data only flows one way around the system.

The main router for the branch line installed at Bletchley (IP address 230) must be set as the ring master. Ring Masters control the direction of the data flow. If a connection is lost in the loop the ring master will redirect the data flow in the opposite direction if necessary broadcasting in both directions at the same time until the fault is corrected.

14.4. The ZoneR

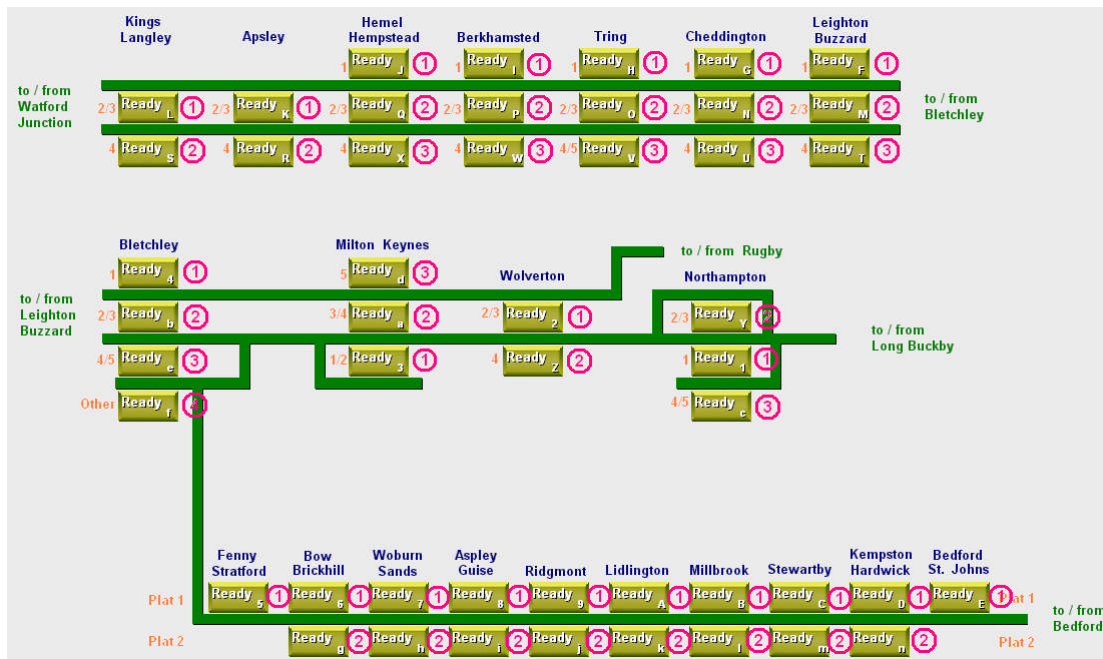
The ZoneR devices should only be reconfigured with express guidance from the QSL.

It is possible to remotely change the IP address, however is not recommended as it can lead to loss of contact with the device. Once contact has been lost it can become virtually impossible to reconnect to it, requiring it to be returned to the workshop to be reset and/or reprogrammed.

15. Technical Diagrams and Schematics

15.1. VoW System Screen

The Zones are shown in red circles to the right of each location button. Platform numbers are in orange to the left of the buttons.



Station / Track Layout

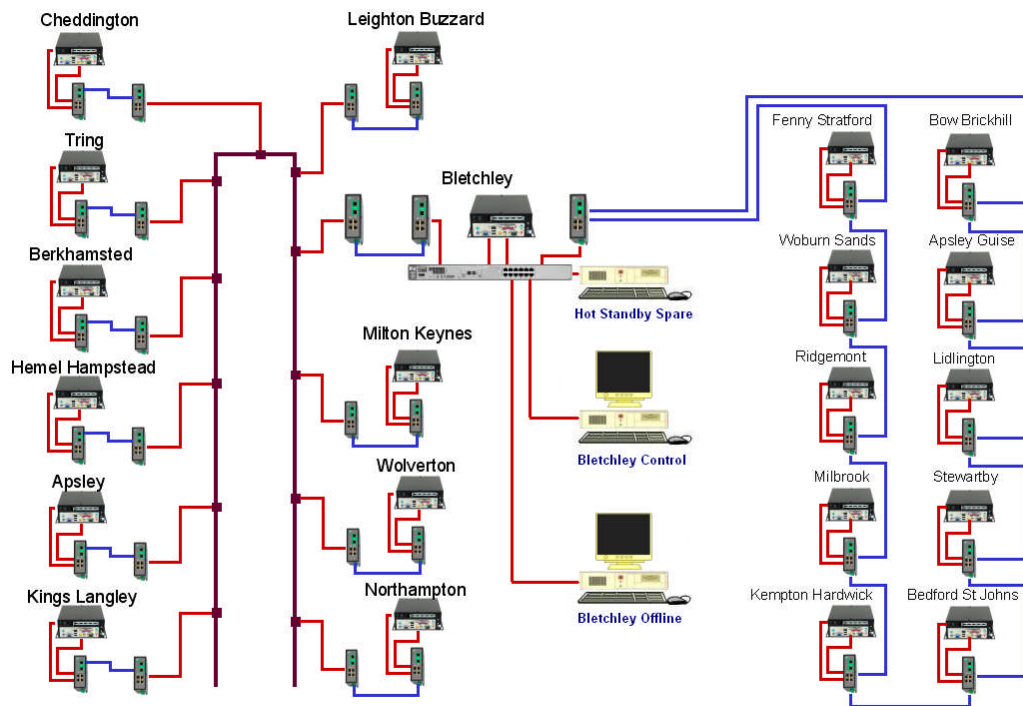
This diagram shows the station layout as a route map. The SCIS designation numbers and configuration are also shown in a table. This information is also displayed on the second VOW tab.



SCIS No.	Station	LLPA	DRA	Schedule
1	Northampton	Yes	Yes	Yes
2	Wolverton	Yes	Yes	Yes
3	Milton Keynes Central	Yes	Yes	Yes
4	Bletchley	Yes	Yes	Yes
15	Leighton Buzzard	Yes	Yes	Yes
16	Cheddington	Yes	Yes	Yes
17	Tring	Yes	Yes	Yes
18	Berkhamsted	Yes	Yes	Yes
19	Hemel Hempstead	Yes	Yes	Yes
20	Apsley	Yes	Yes	Yes
21	Kings Langley	Yes	Yes	Yes
	Bletchley	Control	Control	Control
5	Fenny Stratford	Yes		
6	Bow Brickhill	Yes		
7	Woburn Sands	Yes		
8	Aspley Guise	Yes		
9	Ridgmont	Yes		
10	Lidlington	Yes		
11	Millbrook	Yes		
12	Stewartby	Yes		
13	Kempston Hardwick	Yes		
14	Bedford St Johns	Yes		

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15.2. Cabling



15.3. SCIS - ZoneR to Rack cable pin outs.

25 Way D type Pin	Colour used	QSL Assignment	Din rail	To ZSU5	To Mic	Notes
1	Black	Zone relay common	24	N/C-1	nc	Normally 0v unless mute
9	White/Brown	Audio out balanced	11	-Sig Mic2	nc	
10	White	Amp relay common	24	N/C-1	nc	N/C = Normally closed
11	Grey	Amp relay	23	Z5	Mic Z5	nc = no connection
17	Yellow/Brown	Audio out balanced	10	+Sig Mic2	na	
18	Pink	Sense relay 1 common	18	Mute	Mic PPT	
19	Cyan	Sense relay 1	26	+24v DC	+24v DC	
12	Violet	Zone 7 relay	tba	nc	nc	
13	Blue	Zone 6 relay	tba	nc	nc	
21	Green	Zone 5 relay	tba	nc	nc	
22	Yellow	Zone 4 relay	22	Z4	Mic Z4	
23	Orange	Zone 3 relay	21	Z3	Mic Z3	
24	Red	Zone 2 relay	20	Z2	Mic Z2	
25	Brown	Zone 1 relay	19	Z1	Mic Z1	
14	Green/Red	Sense relay 2 & 3 common	28	nc	nc	Extra sense options
15	Red/Blue	Sense relay 2	27	nc	nc	Extra sense options
16	Red/Black	Sense relay 3	tba	nc	nc	
20	Red/Brown	422 Tx / Reserved	tba	nc	nc	
6	Inners	Audio Input	nc	nc	nc	Cut down pre moulded
7	Screen	Audio Input	nc	nc	nc	lead & join inners

Notes

- 1 18 wire cable with flexible conductors 7/0.2mm Def 7-2-18A
- 2 Thumb lock cover for 25 way D type connector colour Green
- 3 25 way D type socket solder bucket
- 4 50mm heat shrink sleeving
- 5 Cut down pre moulded 3.5mm stereo jack plug lead join the two inner cores together separate inner cores from screen outer and tin screen

1230mm Overall cut length

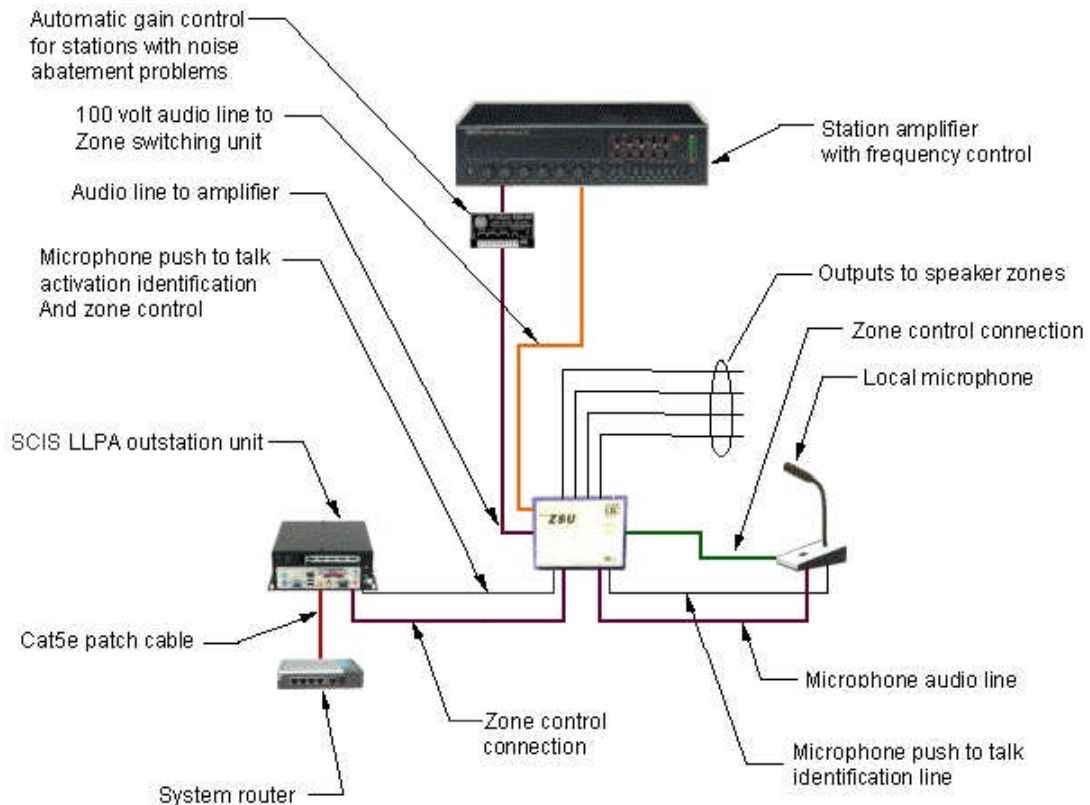
Drawing Produced By Queensgate Systems Ltd		Produced	DFB	11/07/07	Title SCIS LLPA Cable Interface	Scale	Not to scale
Version	2	Checked				Drawing No	1293395802
Date	02/08/07	Approved					

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15.4. Simplified SCIS Diagram

Actual cable configurations vary dependant on ZSU5 or Var4 usage at each site. See Thales drawings for further details.

Typical LLPA Outstation Layout



15.5. Rack Layout

Layouts vary between racks. Please see Thales drawings for details.

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Revision Record

Version	Description
1.0	Initial release of this document.
2.0	Updated release 2 nd October 2007
3.0	Drawings added 6 th November 2007