- 1 -

THE UNIVERSITY OF EDINBURGH

TELEPHONE INSTALLATION PROJECT GUIDELINES

Version of April 2011

Telephones and Security Systems Section (TSS)
IT Infrastructure Division
Information Services
The University of Edinburgh

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Table of Contents

1   Introduction

1.1   Telephones and Security Systems Section (TSS)

TSS operates the University's telephone infrastructure, including its switchboard (0131 650 1000), and provides a single point of contact (accessible through extension 50 3300 and by email to telsuper@ed.ac.uk) to support users of the telephone system. Users can request facilities such as conference calls, report faults, ask for minor changes (*e.g.* swapping extensions, new extensions), or can simply ask for advice on using their telephone handset. TSS engineers will go on-site to fix hardware faults or replace handsets.

TSS also provides an installation service, which includes designing, procuring and commissioning the telephony provision in a new build or refurbishment. This is done in close partnership with the University's Estates and Buildings department, and with representatives of the building's users. The contact point for this service is phones@ed.ac.uk.

Aspects of telephony not covered by TSS include:

- Telephony provision in student residences. This is currently managed by Accommodation Services.

- Mobile phones. These are sourced and managed at a local level throughout the University.

- Telephone peripherals (e.g. fax machines, headsets etc) not supplied by us. We do have recommendations for such items, but expect vendors to support them.

TSS also manages the University's access control door system.

Further information about TSS, including a staff list, is available here:

http://bit.ly/ajw2lQ

1.2   Strategy

The University's telephony system is based on NEC (formerly NEC-Philips) equipment. There is an analogue system of (at the time of writing) about 8,500 extensions, based on seven iS3000 analogue nodes; and a Voice over Internet Protocol (VoIP) system of about 2,000 extensions, based on three Univerge SV7000 VoIP nodes.

A key principle is that the University should have a single, integrated telephone infrastructure, such that a University extension can be called by dialling the *same* number from any telephone within the University[1]. This militates against the introduction of small independent PBXs, which would require an "access code" to be dialled in order to call, or be called by, other University extensions.

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[1] Thus, for example, University Security can be contacted from *anywhere* on campus by dialling 2222.

The University's policy is to move from analogue telephony to VoIP as quickly as possible. This is driven by:

- The expected end of life of the iS3000 nodes. Our plans assume that (perhaps around 2015-2017) the supplier will no longer be able to maintain this equipment. VoIP will be the dominant alternative.

- The desire to reduce costs by eliminating maintenance of the analogue network. VoIP uses the University's existing data network.

At present, no funding has been explicitly earmarked for migration to VoIP. The strategy is to migrate gradually, as opportunities arise, through redevelopment of the University's estate.

It has therefore been agreed that *no new analogue telephone extensions will be installed* (except for "emergency" use). All new extensions, and all significant refurbishments and new builds, will be provided with VoIP.

Three Univerge VoIP communications nodes have been installed – currently there is one node in the George Square area, one at Kings Buildings and one at Easter Bush. The Univerge nodes are specialist appliances which can support several thousand VoIP telephone extensions. They are interconnected such that together they comprise a single telephony system which is closely integrated with the University's analogue telephony infrastructure. It is possible that one further Univerge node will require to be purchased in order to provide for a complete migration to VoIP.

2 The Installation Process

The Installation Process can be thought of in three distinct stages, namely…

1. **Planning**

2. **Installation**

3. **Completion**

2.1 Planning

To ensure the effective delivery of a project, early engagement between TSS, the users of the building and the design team is essential. This early engagement will allow time for necessary planning activities, including:

- Clarifying requirements with users

- Determining implications for central telephone infrastructure

- Liaison with ITI Networks Team

- Understanding space requirements

- DECT[2] survey (if required)

- Costing

- Scheduling installation within overall TSS programme

The time required to undertake these tasks and the follow on discussions should not be underestimated. TSS would expect to meet with the design team at the earliest opportunity.

It's important that TSS has early access to building plans. A large-format paper copy is preferred. We also need to be kept up to date as plans change, and for this, PDF files are preferred.

2.1.1 User requirements

The planning process starts by establishing a conversation with a "client" – in other words, a user representative, often a senior administrator. TSS will nominate a Telephone Project Manager from its own staff, who will be primarily responsible for liaising with the client throughout the project.

The conversation, which may be held over a number of meetings involving the Telephone Project Manager, the client, the E&B Project Manager and other stakeholders, will address issues including:

- Scale of the project. Roughly how many extensions are involved?

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[2] DECT (Digital Enhanced Cordless Telecommunications) is a standard for cordless telephone handsets.

- Timescales. When will the extensions be required?

- Numbering. Is this a move of existing numbers[3] or are new numbers required?

- Fixed or DECT (mobile) telephones? Which handset model(s)[4]?

- Analogue telephony requirements (*e.g.* lift phones, fax machines, chip & pin machines)[5]?

- Any other special features or requirements?

- Budgetary cost estimates. Typically TSS will quote a cost per extension.

It is important that the E&B Project Manager is involved in the conversation, in order that budgetary, planning and other practical implications of the various telephony options are fully considered.

2.1.2   Implications for central telephony infrastructure

TSS will determine what implications users' requirements will have for the University's central telephony infrastructure. Issues of call capacity and network resilience will be considered, to ensure that a reliable and cost-effective service can be provided.

If any space is required at the customer site (*e.g.* for a server, analogue-to-VoIP converter etc), that requirement will be highlighted to the ITI Network Section (since they usually have a similar requirement for space) , to the client and to the E&B Project Manager.

2.1.3   Liaison with ITI network section

Note that the Network Section is a sister unit of TSS, both sections being part of the IT Infrastructure Division. The sections do work closely together, but have distinct budgets. Therefore, when generating electronic Internal Transfer instructions, please ensure that they are passed to a representative of the correct section.

At present, much of the liaison between the two sections is on an informal day-to-day basis. A TSS representative attends regular Network Section meetings. The sections are moving towards greater integration of their job management procedures.

TSS will advise Network Section regarding the infrastructure requirements for telephones (in terms of space, cabling, ports, VLAN tagging etc). Network Section will incorporate these requirements into their plans.

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[3] Note that we cannot incorporate existing numbers outside the 0131 650 xxxx and 0131 651 xxxx ranges into the University's telephone system.

[4] TSS currently recommends two fixed handset models (a "standard" model and a "heavy user" model for receptionists/secretaries) and one DECT handset model.

[5] We recommend two emergency analogue phones per floor – see the Technical Appendix.

2.1.4   Handset location

Handset locations should be determined in good time, to inform the planning of the data network and structured cabling system.

Technical information regarding handset location is provided in Section 4 of this document.

2.1.5   DAP location

If the client requires DECT telephony, a DECT survey will normally be required in order to identify the optimum number of and locations for DECT Access Points (DAPs). The survey may be carried out by NEC, and the cost will be included in the final charge which TSS makes to the project.

Discussion will be needed regarding the optimum time to perform the survey. For instance, in the case of a building project, all internal walls/partitions will need to be in place.

2.1.6   Costs

Costs for *fixed IP handsets* are calculated on the basis of a fixed charge per handset. These costs will change depending on pricing from the supplier, which depends on the currency markets among other things, so please check the website for current prices at the following URL:

<div align="center">

http://bit.ly/bmdN1J

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 If there are any special requirements, prices may be different – this will be highlighted during the planning conversation.

These costs include:

- Handset

- Mains power unit

- IP extension license

- Share of VPIM license

- Share of central campus infrastructure

- Physical installation by TSS

- MAC address registration, software configuration, extension allocation and commissioning by TSS

The costs do not include the provision of a data network port or mains power socket.

The cost of *DECT installations* will vary depending on the circumstances (*e.g.* whether a DAP Controller is already available). A *rough guide* to the costs is available at the web address mentioned above. The costs need to be discussed and agreed during the planning conversation, since they will depend on the particular circumstances of the project.

The costs of an analogue line and handset (for use as an emergency phone) are also set out at the above web address. Note that TSS does not supply fax machines or other specialist telephone units (though we may be able to advise on suitable products).

2.1.7   Finance

Before TSS places any purchase orders with suppliers or commences any installation work, an electronic Internal Transfer order (eIT) to cover the estimated cost must be raised. This should normally come from the E&B Project Manager or their delegate (in the role of "Purchaser Originator" in eIT system terminology), and should normally be sent to the Telephone Operations Supervisor (currently Ms Sue McGruer). Within the eIT system, TSS staff can be found under Information Services Group / IT Infrastructure Division.

The eIT will be held in TSS until the installation is complete and the phones are working. At that point it will be processed.

2.1.8   Place order

TSS will place orders for any necessary equipment, lines or services with the relevant suppliers. It is TSS's responsibility to ensure that local procurement rules and national/European procurement legislation is complied with. There are (or will be) framework agreements and contracts in place for most goods and services, which should reduce delay and guarantee compliance.

2.1.9   Scheduling installation

TSS needs to be informed of the date when the project expects to be ready for phones installation.   In busy times, it is possible that a number of projects will all require telephones to be installed simultaneously, and TSS will advise Project Managers if this is likely to be a problem.

DAP installation should take place at the same time as Wireless Access Point (WAP) installation.

2.2   Installation

2.2.1   Equipment delivery

Equipment will be delivered to TSS at Kings Buildings. We need access to the equipment in order to program the telephone exchange in preparation for installation, and this will normally be done in our offices.

Equipment will be brought on-site by TSS engineers as required during installation.

2.2.2   Data network point installation

This is normally done by contractors, under instruction from the ITI Network Section.

2.2.3   DECT access point installation

This can be done either by TSS engineers, or by a building contractor. It involves fixing the DAP unit according to the instructions, and connecting it to a PoE data network port.

2.2.4   IP handset installation

IP handset installation depends on the following being completed:

- Data network installed and working

- Electrical power available

- Decoration complete (avoiding risk of damage to handsets)

- Furniture in place (so there are desks to put phones on)

- DAPs installed (IP DECT phones only)

Project Managers should note that installing telephones on site is not a trivial task. Each handset needs to be taken to its destination location, unpacked, checked, assembled, plugged in, configured, tested, and packaging disposed of. Allow about one week of elapsed time per 100 handsets (assuming two engineers are allocated).

2.2.5   Analogue handset installation

Analogue handset installation is straightforward, requiring only:

- Analogue wiring to the phone point is in place. Typically this will be provided by a building's structured cabling system (for newer buildings).

- Furniture is in place.

Lifts typically provide an analogue telephone for emergency use. A CW1308 3-pair telephone cable needs to be installed from the lift connection point to the main telephony distribution frame (MDF).

2.2.6   Other equipment installation

If other equipment (*e.g.* an analogue-to-VoIP converter to support fax machines) is to be installed on the premises, TSS will liaise with the client regarding how and when this will be done.

2.3   Completion

Once installation has been completed, telephone handsets will be in place and working; however they will not normally have extension numbers allocated.

2.3.1   Allocating numbers

Where staff with existing UoE telephone numbers are to move into the new/refurbished building or area, there is a preferred procedure for allocating numbers to handsets.

Preferred procedure:

1. The main administrative contact for the new building will be supplied by TSS with a blank Excel spreadsheet in which they can supply the desired extension number and traffic

class for each telephone, together with the date on which the relevant member of staff will move into the new building.

2. TSS will endeavour to migrate the extension number from its old location to the new handset at some time during the day of the move. We can give no guarantee about what time of day this will happen.

Where the staff moving into a new/refurbished building or area do not have an existing UoE telephone number, the above procedure will be followed, but it may be possible to have numbers allocated to handsets prior to the move (since they will all be new, unused numbers).

For some smaller installations (less than about 20 new extensions), and depending on the current workload in TSS, an alternative procedure may be possible.

Alternative procedure:

1. Beside each handset, TSS engineers installing the handsets will leave a note of instruction, advising users to call TSS.

2. During occupation, users will call 50 3300 and will indicate which extension number they wish to have allocated to that telephone (normally their previous extension number). TSS will then allocate that number and corresponding traffic class to the new handset, normally within a few minutes.

Under either procedure, we prefer a gradual approach to building occupation, to avoid having to migrate a large number of extension numbers on the same day.

2.3.2   Using the phone handset

Information for end users on how to use the telephone handsets is available here:

http://bit.ly/9tbanF

Note that TSS does not provide training in how to use the telephone.

2.3.3   Charging arrangements

In order to charge for calls and for extension rental, TSS needs to know the Cost Centre, Job Code and Account Code (normally 4021) to which this charge will be allocated. Charges are computed monthly, and will be automatically deducted from the given CC/JC/AC by the University Finance Office. We also require the name and postal address of an administrative contact to whom a monthly report on calls and charges will be sent.

Where existing staff are moving into a new building, taking their numbers with them, the existing information held by TSS regarding charging for calls from those numbers will continue to be used, unless we are advised otherwise.

Where new numbers have been created, for instance as part of a merger, TSS must be advised of the CC, JC and AC to which extension rental and calls from these numbers will be charged.

2.3.4   Maintenance arrangements

Telephone faults should be reported to TSS on 50 3300 or to telsuper@ed.ac.uk.   If a fault cannot be fixed remotely, an engineer will attend as soon as possible.   Faulty equipment (including faulty TSS-supplied handsets) will be replaced without charge to the end user.

The exception is faulty or life-expired rechargeable batteries in DECT handsets – users are expected to purchase replacement batteries as required. TSS can advise on suitable batteries.

3   Minor Telephone Extension Changes

This table shows what our default position is regarding requests for minor telephone extension changes. *The guiding principle is to avoid investing in new analogue telephony equipment or new analogue wiring[6]*. This will ultimately be wasted investment.

	Live analogue socket available in new location	**Analogue socket (not live) available in new location**	**No analogue socket available in new location**
Existing analogue extension number	No charge	£20 charge	VoIP handset required
New extension number required	VoIP handset required	VoIP handset required	VoIP handset required

Any exceptions must be agreed with Telephones Manager, who will wish to consult the requesting unit's management.

When the extension is currently, or will be, part of a hunt group or similar arrangement, such that this would not work if the extension were to be changed from analogue to VoIP, the default position should be that the requesting user is invited to move the entire group to VoIP.

Should the requesting user balk at the cost, they should be asked to identify another analogue extension to be moved to VoIP. The analogue handset and the corresponding equipment in the exchange can then be re-purposed to provide an analogue extension in the hunt group. The charge will be as for VoIP.

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[6] Apart for wiring for emergency telephones.

4   Who Does What

The schedule below describes who is responsible for what tasks in a new build or major refurbishment project.

Task	TSS Section	Networks Section	E&B Project Manager	User
Invite TSS to meet with design team			✓	
Provide building plans to TSS			✓	
User telephone requirements gathering	✓		✓	✓
Produce budgetary estimate	✓			
Approve budget and generate eIT			✓	
Determine telephone network requirements and supply to Networks Section	✓			
Incorporate telephone network requirements into network planning and implementation		✓		
Provide handset location schedule or plans				✓
Arrange DECT survey (if required)	✓			
Order handsets, licenses and other equipment	✓			
Provide cable between network outlet and telephone handset	✓			
Plan and schedule telephone installation	✓		✓	✓
Extension number allocation	✓			✓
Data network install and commission		✓		
Telephones install and commission (aligned with staff moving in)	✓			
Supply call charging details to TSS				✓

Task	TSS Section	Networks Section	E&B Project Manager	User
Compute final cost for eIT and return to E&B	✔			
Pass eIT for payment			✔	
Snagging and subsequent maintenance	✔			

5 Technical Appendix

5.1 Handsets

5.1.1 Fixed IP handsets

For fixed IP handsets, it is important that the planned locations are provided with (a) a 13A electrical power outlet with sufficient clearance around it to allow plug-mounted power unit to be inserted and (b) a data network port.

Fixed IP handsets will plug into the data network port. Underneath the handset is a socket into which a PC's network cable may be plugged, such that the PC is "daisy chained" off the back of the VoIP handset. This arrangement means that a single data port can support both an IP handset and a PC, thus saving money. (However, it does complicate fault finding somewhat.)

5.1.2 IP DECT handsets

IP DECT handset location is not so critical, since these are inherently mobile units. However, they do have a charging cradle which requires to be plugged into the electrical mains somewhere. Furthermore, each handset is registered to a "base" DECT Access Point (DAP), and while it will (obviously) function with any DAP on the DECT system, ideally it should be located near to its base DAP.

5.1.3 Analogue extensions

Analogue extensions do not depend on the data network, and can thus (usually) be relied on during an electrical power failure. In addition to lift phones, **TSS recommends that one or two analogue extensions are provided on each floor of a building.**

Equipment such as fax machines which require an analogue extension can be supported by using an analogue-to-VoIP converter – this is a unit which typically supports a number of analogue extensions, connected to a single network point. For new builds or large-scale refurbishments, we recommend that at least one eight-port analogue-to-VoIP converter is provided.

Analogue handsets can use the structured cabling system. Where this is not feasible, handset locations must be determined in good time, so that dedicated analogue wiring can be installed at the optimum stage of construction. The responsibility for the installation of this wiring rests with E&B or their contractors.

5.2 DECT Access Points

Reference has been made earlier to the need for a DECT survey to determine DECT Access Point (DAP) locations

Each DAP must be provided with a dedicated data network port, which must provide Power over Ethernet (PoE). A separate mains power socket is therefore not required for DAPs.