



Higher National Unit specification: general information

Unit title: Sound Production: Sound Reinforcement 1

Unit code: H1LY 34

Superclass: XL

Publication date: June 2012

Source: Scottish Qualifications Authority

Version: 01

Unit purpose

The purpose of this Unit is to develop knowledge and skills in the use of sound reinforcement equipment at live events. Candidates will be required to provide sound reinforcement suitable for a variety of scenarios, eg music, vocal, audio-visual events, etc. The Unit is designed to enable candidates to apply the correct techniques necessary for reinforcing a variety of sound sources. They will also develop the following soft skills such as communication, planning, organising and working with others.

Successful completion of this Unit will allow candidates to undertake *Sound Production: Sound Reinforcement 2*.

On completion of the Unit the candidate should be able to:

- 1 Prepare for a live sound event.
- 2 Assemble, test, fault-find and sound-check a sound reinforcement system.
- 3 Operate a sound reinforcement system for a live sound event.

Recommended prior knowledge and skills

Access to this Unit is at the discretion of the centre. However, it is recommended that candidates have prior knowledge and skills and/or experience of the equipment used in sound reinforcement. This could be evidenced through the National Progression Award *Sound Production: Live*; NQ Units such as *Understanding the Signal Path* or *Sound: Reinforcement*. The following HN Units also provide knowledge and skills development relevant to this Unit: *Acoustics 1*, *Audio Electronics 1*, *Sound Production Practice 1* and *Sound Production Theory 1*.

General information (cont)

Credit points and level

2 Higher National Unit credits at SCQF level 7: (16 SCQF credit points at SCQF level 7*)

**SCQF credit points are used to allocate credit to qualifications in the Scottish Credit and Qualifications Framework (SCQF). Each qualification in the Framework is allocated a number of SCQF credit points at an SCQF level. There are 12 SCQF levels, ranging from Access 1 to Doctorates.*

Core Skills

Opportunities to develop aspects of Core Skills are highlighted in the support notes of this Unit specification.

There is no automatic certification of Core Skills or Core Skill components in this Unit.

Context for delivery

This is an optional Unit in the framework for HNC/D Sound Production. If this Unit is delivered as part of a Group Award, it is recommended that it should be taught and assessed within the subject area of the Group Award to which it contributes.

Higher National Unit specification: statement of standards

Unit title: Sound Production: Sound Reinforcement 1

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The sections of the Unit stating the Outcomes, Knowledge and/or Skills, and Evidence Requirements are mandatory.

Where evidence for Outcomes is assessed on a sample basis, the whole of the content listed in the Knowledge and/or Skills section must be taught and available for assessment. Candidates should not know in advance the items on which they will be assessed and different items should be sampled on each assessment occasion.

Outcome 1

Prepare for a live sound event.

Knowledge and/or Skills

- ◆ Choice and use of the system components with regard to the performer and venue requirements
- ◆ Effective communication with key personnel associated with the event
- ◆ Production of documentation for setting up and testing the system
- ◆ Health and safety for live events

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ interpret the specific requirements of the venue and the performers
- ◆ correctly specify a reinforcement system to be provided for the event
- ◆ provide an 'Operational Guide' in the form of a document indicating the step-by-step procedure for rigging, testing, using and de-rigging including connection diagrams
- ◆ summarise the key health and safety requirements for the event

A completed assessor observation checklist covering all Evidence Requirements is required as evidence for this Outcome.

Higher National Unit specification: statement of standards (cont)

Unit title: Sound Production: Sound Reinforcement 1

Outcome 2

Assemble, test, fault-find and sound-check a sound reinforcement system.

Knowledge and/or Skills

- ◆ Implementation of Operational Guide
- ◆ Set-up and use of equipment safely, efficiently and correctly
- ◆ Use of correct gain structure for sound-check
- ◆ Appropriate communication with others associated with the event
- ◆ Appropriate use of system parameters to avoid feedback
- ◆ Appropriate use of dynamic, spectral and time domain processing
- ◆ Fault-finding and remedial action
- ◆ Professional handling of equipment and cables

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ demonstrate use of 'Operational Guide' correctly
- ◆ demonstrate safe and efficient working as an individual or part of a team
- ◆ set up and test the system components correctly
- ◆ correctly identify and remedy faults
- ◆ correctly retrieve, use and store equipment including: Microphones, Microphone Stands, XLR and Jack Cables, Multi-core, Speakers/Amplifiers, etc
- ◆ accurately record, store and recall necessary equipment settings

A completed assessor observation checklist covering all Evidence Requirements is required as evidence for this Outcome.

Higher National Unit specification: statement of standards (cont)

Unit title: Sound Production: Sound Reinforcement 1

Outcome 3

Operate a sound reinforcement system for a live sound event.

Knowledge and/or Skills

- ◆ Effective operation of a sound reinforcement system
- ◆ Responding professionally and efficiently to the needs of musicians, venue staff, etc
- ◆ Implementation of safe working practices when working alone and as part of a team
- ◆ Implement appropriate techniques to meet technical and creative requirements
- ◆ Implement post-event systems check correctly
- ◆ Implement correct de-rigging procedure safely and efficiently

Evidence Requirements

Candidates will need to provide evidence to demonstrate their Knowledge and/or Skills by showing that they can:

- ◆ demonstrate due regard to health and safety legislation when working as an individual or part of a team before, during and after the event
- ◆ demonstrate correct use of gain, equalisation, routing, auxiliary sends/returns, dynamic processing and FX
- ◆ implement required changes to system parameters in response to creative performance requirements during the event
- ◆ implement required changes to system parameters in response to technical requirements during the event
- ◆ perform all duties professionally
- ◆ de-rig and pack the system safely and efficiently post the event

A completed assessor observation checklist covering all Evidence Requirements is required as evidence for this Outcome.

Higher National Unit specification: support notes

Unit title: Sound Production: Sound Reinforcement 1

This part of the Unit specification is offered as guidance. The support notes are not mandatory.

While the exact time allocated to this Unit is at the discretion of the centre, the notional design length is 80 hours.

Guidance on the content and context for this Unit

Achievement of this Unit is a three stage process — planning, preparing for and carrying out the task. The planning phase is essential to the whole process and should be carried out as soon as is practical. The set-up and sound-check phase can be accomplished immediately prior to the 'show' phase. Candidates should be given adequate opportunity to become familiar with the operation of the sound reinforcement equipment before being assessed. This will help in the preparation of the 'Operational Guide' and help build confidence with the equipment.

The resources available to the delivery centre will dictate what equipment the candidate will have the use of for this Unit. Opportunities to use a variety of equipment for sound reinforcement should be available. This may include some or all of the following:

- ◆ Analogue mixing desk with/without outboard equipment
- ◆ Digital mixing desk with/without outboard equipment
- ◆ Amplifiers
- ◆ Cross-over
- ◆ Loudspeakers
- ◆ Ground stacked speaker array
- ◆ Flown speaker array
- ◆ Line-array
- ◆ Powered loudspeakers
- ◆ Analogue multi-core system
- ◆ Digital multi-core system

This Unit will provide opportunities for candidates to perform in the role of live sound engineer. As an extension to the underpinning knowledge and experience gained in the *Sound Production Theory 1* and *Sound Production Practice 1* Units, candidates are expected to be able to use their skills in an unfamiliar situation. There will also be an opportunity to practise the knowledge gained should candidates have completed *Acoustics 1*, through a systematic approach to feedback control and other important areas of sound reinforcement such as microphone position, level balancing and dynamic control.

Much of the equipment is common to recording studio practice but this Unit will call on the expertise of the candidate in realising that the two disciplines, though similar, require a different approach, ie the difference between technical and creative techniques in controlling sound and the impact of polar patterns and gain structure on the sound. Candidates should therefore be encouraged to keep reflective logs for comparison of techniques, approaches and the behaviour of system components.

Higher National Unit specification: support notes (cont)

Unit title: Sound Production: Sound Reinforcement 1

The quality of the teaching and learning experience will be enhanced considerably when early opportunities for 'hands-on' experience are provided. To facilitate this, after an introduction to the complete system, it is suggested that teams of candidates be given the chance to investigate the sound reinforcement system components before moving on to the larger task of assembling and testing. Teamwork and integration across Units would be of great value.

The term 'reinforcement' should be the underpinning key skill, in other words, augmenting the sound source rather than substituting for the onstage sound source through excessive or very high sound pressure levels. It should be emphasised that best practice does not mean that sound reinforcement systems should be as loud as possible and candidates should be aware of the resulting health and safety consequences.

For sound engineers and musicians alike, the safe electrical and electronic operation of a sound reinforcement system, ie electrical loading, fuses, RCDs, wiring, dangers of electricity, cannot be over emphasised. It is essential that health and safety legislation be complied with throughout this Unit.

The concept of risk assessment could be introduced but should not be assessed beyond a summary of the key health and safety requirements whilst candidates are operating in the role of sound engineer at the event. Centres and candidates should be aware of the current legislation applicable to the following areas — Noise at Work, Electricity at Work, Manual Handling and Working at Height. Candidates should be encouraged to research the legislation in the context of the *Working in the Creative Industries* Unit. They will find the following two websites useful, the Health and Safety Executive website has all the legislation and the Production Services Agency website is the source for how the legislation impacts on the sound reinforcement industry. <http://www.hse.gov.uk> and <http://www.psa.org.uk>.

The operational guide candidates will produce is intended as an aid for the candidate but could also act as a guide for others, eg in a 'dry hire' self-operation scenario.

It is recommended to include the following:

- ◆ Equipment connection diagrams, power, signal, speaker, etc
- ◆ Intended channel assignment and nominal equipment settings
- ◆ Choice of input devices (microphones and direct injection boxes)
- ◆ Guidelines for use of gain, equalisation, dynamic processing and effects for the system, front-of-house and monitors during sound-check and show
- ◆ Internal signal flow diagrams to include channel assignments, group or VCA bus, AUX/FX bus sends/returns, etc
- ◆ External signal flow diagrams to and from outboard equipment such as dynamics, EQ and FX processing where used

For centres using digital mixing desks it is recommended to include:

- ◆ Internal signal routing/flow diagrams, channel assignments, group or VCA bus assignments, AUX/FX bus sends/returns
- ◆ Allocation of EQ, dynamics and FX plug-ins/inserts, etc

Higher National Unit specification: support notes (cont)

Unit title: Sound Production: Sound Reinforcement 1

Good planning and time management skills can be developed through this Unit. Sound engineering is a profession which requires the candidate to be multi-skilled. This Unit allows the candidate to develop skills with the 'why and how' of a sound reinforcement system and then the practicalities of the 'where and when'.

The ability to control feedback whilst maintaining audio quality, whether in the monitor or front-of-house systems, is a key skill. Negotiating with the performers with regards to backline sound levels is important in realising the best possible sound.

A sufficient amount of time should be allowed for the candidate to acquaint themselves with the use of microphone type, speaker placement and equalisation techniques to control feedback. Automatic feedback destroyers can be used in a system but should not be used as a substitute for learning how to manually control feedback.

It is suggested that teams of three or four candidates carry out tasks together during formative assessment.

Developing and implementing appropriate behaviours and protocol when working with the performers and other venue staff is essential. Candidates should work professionally and conduct themselves appropriately.

Key topics

The following list is not intended to be prescriptive or exhaustive but should form the basic platform for learning and teaching in this Unit:

- ◆ Transducers, ie speakers and microphones
- ◆ Electronic circuits, eg the difference between balanced/unbalanced and the difference between signal, line, speaker and mains
- ◆ The definition and use of high and low impedance circuits
- ◆ Wiring and termination conventions used for cables and connectors, eg XLR, Speakon, TS/TRS jack, Phono
- ◆ How to avoid audible glitches, eg electromagnetic interference, ground loops, incorrect signal/phase polarity, etc
- ◆ Correct gain structure for channel, bus, signal processing and amplifiers
- ◆ System dynamics and the need for headroom
- ◆ Equalisation, eg in controlling plosives and sibilants, filtering sound source and room resonances, etc
- ◆ The limitations of using third-octave equalisers for precise and efficient system and room equalisation
- ◆ Correct equipment handling and storing including cables, microphone stands, equipment racks, etc
- ◆ Planning and the need for good communication skills whether oral, written or graphical
- ◆ The need to develop inquisitive and acute listening skills
- ◆ Systematic fault-finding technique

Higher National Unit specification: support notes (cont)

Unit title: Sound Production: Sound Reinforcement 1

Guidance on the delivery of this Unit

National Occupational Standards

There are two relevant Sector Skills Councils (SSCs) which cover standards that could apply to candidates operating in the role of live sound engineer — Creative and Cultural Skills and Creative Skillset.

They have both produced a variety of standards that it would be beneficial for candidates to be aware of. These standards are unlevelled but offer guidance on what someone should know and be able to do in the workplace. They are available on the respective SSC websites and on the UK Standards website.

Below are two examples of standards available at the time of writing.

- ◆ Creative and Cultural Skills (CCSKILLS) standard CCSTP20.4a Operating sound for a live performance in the theatre
- ◆ Creative Skillset standard S13 Mix Sound Live

Guidance on the assessment of this Unit

Approaches to assessment are not prescriptive and the following is for guidance only. If the assessment is a simulation then the sequencing and the timing of the assessments is at the discretion of the centre. If the assessments are to be undertaken at a live event attended by the public then it is likely that the sequencing of assessments will be dictated by the circumstances of the event.

Outcomes 1, 2 and 3 could be assessed in one integrated assessment event or separately. There is flexibility in the Unit to allow for the circumstances and timing of any actual event to dictate the pace and intervals between the Outcomes.

Teamwork is to be encouraged during the formative stages and each candidate should rotate through specific duties. Summative assessment of teams may be possible at certain types of event, particularly where an event involves more than one act or performer on a bill.

Outcomes 2 and 3 are naturally sequential and, if sufficient time allows, they could form one single assessment opportunity. It would be possible for candidates to be assessed for Outcomes 2 and 3 on separate occasions but not recommended as this may add to the pressure for the candidate to perform Outcome 3 satisfactorily. This scenario might occur if separate assessment events are used and the candidate has not been part of a sound-check event prior to the 'show' phase.

Centres may wish to administer assessments under controlled conditions on certain aspects of this Unit, eg a specific time period allocated to the task of assembling, testing and fault-finding. This would simulate the pressures of real-life working conditions but these should be tailored to the circumstances of the event.

It is anticipated that most centres will assess candidates towards the end of the delivery period for the Unit but candidates should be able to undertake assessments when opportunities and individual circumstances allow.

Higher National Unit specification: support notes (cont)

Unit title: Sound Production: Sound Reinforcement 1

Assessment Guidelines

Outcome 1

Formative assessment for this Outcome could involve case studies and analysis of typical scenarios where sound reinforcement is likely to be encountered by candidates in the early stages of their career development, eg small club/gig but not arena/large hall type events.

Emphasis should be placed on interpreting the channel input requirements, the use of transducers, in particular choosing the correct microphone and its correct placement for the sound source, and context of the performance and the acoustic environment.

The operational guide should be clear and able to be followed by any person performing the role of live sound engineer. Peer assessment should be encouraged whilst preparing it for use.

Outcome 2

Candidates should have ample opportunities to familiarise themselves with the correct operation of the system to be used and also become familiar with the types of fault that are likely to be encountered. A systematic approach to each stage should provide straightforward opportunities to gather the performance evidence required for the Unit.

Formative assessment opportunities using peer assessment should be encouraged, eg small groups could be assessed on their effectiveness in assembling and testing. Depending on the equipment used, the candidate should be able to use on-board and/or outboard processing equipment correctly.

Outcome 3

Though beneficial to the candidate's career development, the assessment for this Outcome does not have to be undertaken in a 'public' setting. Sufficient practice should be provided to ensure candidates can operate comfortably and safely in a situation typical of 'real' public performance events.

Online and Distance Learning

Aspects of this Unit could be delivered by distance or open learning. However, due to the significant practical content of this Unit and the need to underpin the theoretical elements in a practical context, it is unlikely open learning would be practicable.

Higher National Unit specification: support notes (cont)

Unit title: Sound Production: Sound Reinforcement 1

Opportunities for developing Core Skills

Depending on the precise nature of the event and the personnel involved, each Outcome provides opportunities to use and develop aspects of the following Core Skills: *Communication, Working with Others, Problem Solving* and *Information and Communication Technology*.

Outcome 1 — provides opportunities to develop communication, planning for others and self-evaluation, use of *Information and Communication Technology* and *Problem Solving*.

Outcome 2 — provides opportunities to develop planning and implementation, *Working with Others, Communication* and *Problem Solving*.

Outcome 3 — provides opportunities for *Problem Solving, Communication* and *Working with Others*.

Disabled candidates and/or those with additional support needs

The additional support needs of individual candidates should be taken into account when planning learning experiences, selecting assessment instruments, or considering whether any reasonable adjustments may be required. Further advice can be found on our website www.sqa.org.uk/assessmentarrangements.

History of changes to Unit

Version	Description of change	Date

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General information for candidates

Unit title: Sound Production: Sound Reinforcement 1

This Unit is designed to enable you to function in the role of live sound engineer by using a variety of audio equipment forming a sound reinforcement system (PA). You will develop a broad range of knowledge of the why and how of sound reinforcement. This Unit will help your understanding of the technical specification and practical use of the equipment and the practicalities of supplying high quality sound reinforcement in a variety of acoustic spaces. If you are undertaking the HNC/D Sound Production then you may well develop your knowledge and skills from the Sound Production Theory/Practice and Acoustics Units. Completion of this Unit will normally allow you to progress to *Sound Production: Sound Reinforcement 2*.

On successful completion of the Unit you should be able to:

- 1 Plan for a live sound event.
- 2 Assemble, test, fault-find and sound-check a sound reinforcement system.
- 3 Operate a sound reinforcement system for a live sound event.

For Outcome 1 you will interpret the specific requirements of the venue and the performers by specifying suitable components for the sound reinforcement system. You will then produce an 'Operational Guide' in the form of step-by-step procedure for rigging, testing and de-rigging.

For Outcome 2 you will use the 'Operational Guide' whilst working safely and efficiently as an individual or part of a team. You will demonstrate the connection and routing and testing of the system components. You will then sound-check the system before the event. You should be able to correctly identify and remedy faults, correctly retrieve, use and store equipment including: microphones, microphone stands, XLR and jack cables, multi-core, speakers/ amplifiers, etc.

For Outcome 3 you will either attend a live event or take part in a simulated live event. You will demonstrate the correct use of gain, equalisation, routing, auxiliary sends/returns, dynamic processing and FX during the event, whether for technical or creative control of the sound. You must demonstrate and perform all duties professionally and at the end of the show you will de-rig and pack the system safely and efficiently.

Depending on the resources of the centre you are studying at you may have opportunities to use a variety of equipment for sound reinforcement and this may include some or all of the following:

- ◆ Analogue mixing desk with/without outboard equipment
- ◆ Digital mixing desk with/without outboard equipment
- ◆ Amplifiers
- ◆ Loudspeakers
- ◆ Ground stacked speaker array
- ◆ Flown speaker array
- ◆ Line-array
- ◆ Powered loudspeakers
- ◆ Analogue multi-core system
- ◆ Digital multi-core system