

# MEDIA TRAINING

Media Training is becoming a very important part of general education as it helps students develop valuable skills in self expression and the ability to present these to an audience

Traditional media such as Newspapers and Magazines are now being overtaken by the more immediate media of Television, Radio and Webcasting

For the purposes of this article, we are here only concerned with Sound or Audio, and mainly concentrating on describing and listing the equipment required for Radio Journalism and Radio Presenter training

The presentation skills acquired by the student from a Media Training Course will be extremely valuable and useful in a future career, whether he or she wishes to become a Professional Radio Journalist or Presenter, or use these skills in Sales and Marketing or Corporate Management.

## Sound or Audio

This subject includes Recording of Interviews, Audio Editing, and Radio Presenting

Recording of Musical Groups falls under "Audio Engineering" and is not discussed here

## The Radio Broadcast Training Studio

The Audio Mixer, or Audio Control Panel, is the central and most important piece of equipment in a Radio Broadcast Studio whether it is used for Professional or Community Broadcasting, or for Media Training

Broadcast On-Air Mixers are highly developed and specialized units, which at first glance seem very simple and basic when compared to Stage or Public Address Mixers

Stage or PA Mixers usually feature a multitude of Control knobs and switches, but lack the essential standard features of On-Air Mixers making these unsuitable for use in Radio Broadcasting

Broadcast On-Air Mixers are actually quite complex, designed to be easy to operate, have very good audio performance and benign overload characteristics able to handle accidental excessive audio levels

**Essential features on On-Air Mixers** are, Silent Channel On-Off and Cue Switching, Selectable Monitor Facility, Automatic Monitor Mute with Microphone On, On-Air Light Relay Contacts closing with Microphone On, Accurate and Easy to read Audio Level Metering, Overload and Phase Fault Indicators, Cue Loudspeaker and Cue Level Metering, Announcers Headphone Output with Split Cue Function, Guests Headphone Output, Manual Monitor "Dim" or Mute and Phase Check Switches

## Essential Equipment in a typical small Radio Broadcast Training Studio

- 1: 1 x Radio Broadcast type Audio Mixer having the essential required features
- 2: 2 x Broadcast Quality Microphones
- 3: 1 x Microphone Boom Arm for Presenters Microphone
- 4: 1 x Microphone Table Stand for Guest Microphone
- 5: 1 or 2 Microphone Pop Guards (Desirable)
- 6: 2 x Pairs of Good Quality Headphones
- 7: 1 x High Quality Monitor System including Loudspeakers
- 8: 2 x Commercial CD Players
- 9: Audio "Spot Delivery" Equipment

## Desirable Additional Equipment

- A: Audio Recording Equipment
- B: Audio Processor
- C: On-Air Light

## **Equipment details**

### **1: 1 Radio Broadcast type Audio Mixer**

The Elan Audio "MERLIN" is designed specifically for use as a Media Training Mixer and is the ideal choice for a basic High School or College media training studio, or similar use in a Community Radio Station where it can also be used for Basic Production and Outside Broadcasts

The "MERLIN" operates exactly like a full sized Radio Broadcast Station "On-Air" Mixer making the change from a training studio to a Radio Station Broadcast Studio very easy for the student

It features full Broadcast Performance Specifications, and does not require fixed installation being as easy to set up as the average Hi-Fi System

### **2: Broadcast Quality Microphones**

Quality of Microphones must be acceptable for Radio Broadcasting, the Presenter and Guest Microphones should preferably be identical, but not absolutely essential

Cheapest acceptable types are the AKG D770 II and D880 M types of Dynamic Microphones, considerably better and unfortunately more expensive, is the AKG C1000 S Electret Condenser Microphone

These and other types and makes are available from Elan Audio

### **3: Microphone Boom Arm for Presenters Microphone**

An articulated Boom Arm is required for the Presenters Microphone to allow easy adjustment, and keep the area in front of the mixer clear, a second Boom Arm for the Guest Microphone would be ideal

We recommend the K&M 23850, and K&M 23855 Table Mounting Flange available from Elan Audio

### **4: Microphone Table Stand for Guest Microphone**

Any reasonably heavy Microphone Banquet Stand is suitable

### **5: Microphone Pop Guards**

Microphone Pop Guards are much more effective than "Foam Rubber Socks" in preventing the troublesome popping sounds caused by inexperienced presenters pronouncing "Plosive" words, and also more Hygienic than Foam Rubber Socks which can and will become a "Health Hazard"

Experienced presenters trained in correct Microphone Technique, should be able to use a Microphone not fitted with a Pop Guard or Foam Rubber Sock

We recommend the K&M 23956 Pop Guard available from Elan Audio

For training purposes, we suggest the student be taught to use Microphones not fitted with Pop Guards or Foam Rubber Socks

### **6: Good Quality Headphones**

Two Pairs of Medium Quality Headphones should be available for use in the studio

Generally for Health and Personal reasons, Student and Presenters supply their own Headphones

Cheapest acceptable type are the AKG K44, this and higher quality types are available from Elan Audio

### **7: High Quality Monitor System including Loudspeakers**

The importance of a High Quality Monitor System to allow the student to accurately judge the audio quality of the project being worked on, cannot be overstated

It is virtually impossible to accurately judge audio quality using ordinary Computer Speakers, and even the best and most expensive Headphones available can be misleading if used for quality monitoring

Existing Hi-Fi Equipment such as a High Quality Amplifier and pair High Quality Loudspeakers in good condition may be suitable, or we suggest as follows for guaranteed good results

Altec Lansing AL-MX 5021 Active Speaker System consisting of 1 Sub Woofer and 2 Satellite Speakers

Elan Audio RMA-01 Monitor Amplifier and 1 pair of Energy Connoisseur C3 Bookshelf Speakers

Elan Audio RMA-01 Monitor Amplifier, Athena ASP-4000 Sub Woofer and 2 W-15 Satellite Speakers

All available from Elan Audio

## **8: Commercial CD Players**

We recommend that only Commercial or Professional CD Players be considered, DVD Players will play CD's, but are virtually unmanageable suffering from a very long loading time, and are practically impossible to cue to the start of a track, in addition, the sound quality on most is not particularly good

Ordinary moderately priced Hi-Fi CD Players are becoming difficult to obtain, sound quality is generally good, but they are also difficult to cue to the start of a track, and will run into the next track if not stopped

Commercial CD Players will automatically Cue to the start of a selected track, start on command, and stop at the end of a track, they offer excellent sound quality and a number of other practical features including wired Remote Control Start and certain practical programming features

DENON DN-C615 Entry Level Commercial CD Player, Plays MP3, perfect match to the "MERLIN" Mixer

DENON DN-C635 Intermediate Level Commercial CL Player, Plays MP3, Spin Dial Track Selector

All available from Elan Audio

## **9: Audio "Spot Delivery" Equipment**

All Commercial and Community Radio Broadcasting involves the delivery to air of Pre-Recorded "Spots" such as Messages, Commercials and Sponsorship Announcements, this should be simulated and form part of the training

Several options exist, Mini Disk, Flash Card Player, CD Player and Personal Computer

Mini Disk, although it is a vanishing format and suffers from a number of disadvantages, particularly that of being fragile and difficult to handle is still used by a number of Community Broadcasters for "Spot" Delivery

Flash Card Players, such as the EDIROL-R1, and the more professional Marantz PMD 660 or Rack Mounting PMD 570 can be used in place of Mini Disk and are less fragile and easier to handle or manage

A Commercial CD Player can also be used for "Spot" Delivery with the required material "Burnt" on to a CD

Best, most convenient and the most commonly used method, is to use a Stand-Alone Personal Computer, or as is common for virtually all Commercial Broadcasters, a Networked Computer Based Audio Delivery System, loaded with suitable Audio Delivery Software, and the required audio material

The Stand-Alone PC together with the "MERLIN" Mixer, can also be used to produce and Edit the "Spots" which in itself gives valuable training

Needless to say, the PC, can also be used to deliver Recorded Music Tracks, but for the purposes of Media Training, this is just too easy and not likely to help the student develop Broadcast Presentation Skills

Hum and other electrical noise problems are often experienced connecting PC's to Audio Mixers

Elan Audio has developed a Hum Reducer, the MIM-01 connecting between the PC and the "MERLIN" Mixer to eradicate or reduce this problem

## **Desirable Additional Equipment**

### **A: Audio Recording Equipment**

A Recording of the output from the "MERLIN" Mixer is necessary to allow the Media Teacher and the Student to critically evaluate the quality of student performance, presentation, and progress

A Cassette Tape Deck is satisfactory for this provided the recording is to be used purely for evaluation or examination purposes with Compact Audio Cassettes being cheap enough to keep as permanent records

If the recording is to be used for Public Presentation or Radio Broadcasting, a Professional Solid State, "Flash Card Recorder" such as the Edirol R1 or Marantz PMD-660 or a Personal Computer is a better choice for use as a recording system

Professional Flash Card Recorders operated at 44.1 KHz 16 Bit Linear sampling, produce standard CD Quality Recordings which can be transferred to the "Spot" Delivery PC via USB for Editing and Cleanup, and then burnt to CD for possible later Broadcast or Auditioning and Examining by the Media Teacher

Editing and Cleanup may be undesirable for program material recorded specially for examination, but very practical for material recorded for later broadcasting

Notes regarding the use of PC's for Audio Recording and "Spot" Delivery is included later in this article

### **B: Audio Processor**

An Audio Processor is an Automatic Level Controller, normally connected between a Broadcast Studio and a Transmission System to prevent Over Modulation, or between an Audio Mixer and Recording Equipment to keep audio levels from becoming excessive

Excessive Audio Levels normally overload the recording equipment and causes audible distortion

Audio Processors range from basic and inexpensive units to very complex and expensive Digital Multi-band Systems usually incorporating Pre-Emphasis Circuitry and Multiplex Stereo Generator as required for FM

There are many different makes and types of Audio Processors on the market, most of which are specialized for different applications such as Recording, or for AM, FM or TV Broadcasting, Web Casting etc

Audio Processors are commonly called AGC Amplifiers, Audio Levelers, Compressors or Limiters

An advanced Audio Processor is very forgiving, and will help the presenter maintain correct recording or modulation levels probably making things a little too easy for the student

Bit like driving a car with Automatic versus Manual Transmission, and here suggest initial training be given to the student without the benefit of an Audio Processor

Elan Audio can supply suitable Audio Processors

### **C: On-Air Light**

Standard practice in Radio Broadcasting, is to have an On-Air Light, mounted outside the Studio Door, and arranged to Light-Up whenever a Microphone is switched on

The Elan Audio AAL-01 On-Air Light operates from a safe 12V DC from the "MERLIN" Mixer which activates when a Microphone is turned on

## Interviews

Part of Media Training involves the Recording of Interviews and editing of the recorded material with several different types of portable Audio Recorders in common use for this purpose

Micro Cassette, and Solid State Dictation type Note Takers may be adequate for interviews to be transcribed to written text, but does not have the audio quality required for Broadcast Interviews

Portable Compact Cassette Recorders were, and are even now quite popular for Interviews with some high quality Compact Cassette Recorders manufactured by Marantz still available

Mini Disk Recorders were popular for a time, good Audio Quality, rather fragile, and are now almost extinct

Professional Flash Card Recorders such as the Edirol R-1 and Marantz PMD 660 are displacing other types offering CD Quality Recording, Ruggedness and the ability of easy transfer to a PC via USB for Editing and Clean-up and is in the opinion of the writer, the only way to go

Although all Flash Card Recorders feature a "Built-In Microphone", or two in the case of the Edirol R-1, a High Quality External Microphone or in some cases two, will produce much better results

The Interviewer will also require a pair of suitable Headphones such as the AKG K141 or better

Professional Flash Card Recorders, Microphones and Headphones are available from Elan Audio

## Audio Editing

Virtually all Audio Editing these days is done on a Personal Computer loaded with suitable software, examples being Adobe Audition (Cool Edit), Audacity or others

Interviews may be done in "Stereo" using one Microphone for the Interviewer, and one for the Interviewee

This allows the level of the two voices to be adjusted or balanced and converted to Mono in the Editing Process in which unwanted words and mistakes can also be removed

Basic Audio "Spots" including Background Music and Effects can be produced easily, using the "MERLIN" Mixer, and Edited on the PC

Complete Radio Programs intended for eventual later broadcasting, complete with Announcements, Music and "Spots" can be produced on the "MERLIN", recorded on a PC, or Flash Card Recorder and then Edited on the PC to take out minor mistakes

During Editing, the student can also make Time Corrections to make the program the exact duration specified by the lecturer and finally "Burn" this to CD for later Broadcast or Archiving

Using a Flash Card Recorder to record the "Raw" Program, is a very practical method, as only one PC will be required in the Training Studio

## Some Thoughts about Media Training

Microphone Pop Guards or Foam Rubber Wind Socks, Computer Based Audio Delivery Systems loaded with Music Tracks, Audio Processors and PC Based Audio Editing Systems are all very practical aids to the Broadcast Presenter, intended to make his or her life easier and are virtually essential to live broadcasting

Pop Guards or Wind Socks reduces the need for “Good Microphone Technique”, Computer Based Audio Delivery Systems loaded with Music Tracks puts these tracks a “Scroll and Mouse Click” away from being played to air making things too easy, Audio Processors reduces the need for accurate Audio Level Keeping and Audio Editing allows the student to remove some mistakes from recorded programs intended for later broadcasting

All good stuff, all intended to be forgiving and make Broadcast Presentation easy, possibly too easy and should not be used during training

Most Professional Radio Presenters can operate without using any of the listed aids

The aim is to train the student to a similar level of professional competency as listed below

- 1: Development of proper “Microphone Techniques”
- 2: Selection and Preparation of all Music Material before the “Show” and present this in its intended order complete with commentary relating to it
- 3: Maintain Correct Audio Levels
- 4: Achieve exact specified program duration

Editing out of mistakes, is of course impossible during a “Live Presentation”

## Some Thoughts about Personal Computers

A modern PC provided with a USB Port, Sound Card and CD Burner, loaded with suitable software is an absolute necessity for Media Training as well as for Simulated and Live Broadcasting

### A few applications are suggested here

- A: Transfer of Recorded Field Interviews and other from Flash Card Recorder to the PC using USB
- B: Live Recording in the Studio of, Interviews and Voice Over segments for use in “Spots”
- C: Recording of Basic Music and Songs
- D: Editing of Interviews and other recorded Material
- E: Creating “Spots” by combining Voice, Music and Effects by Editing
- F: Compressing or “Ripping” edited and other recorded material to MP3 or other compressed format
- G: Storage of Recorded Audio Material including “Spots” and Music Tracks for later playback
- H: Playback of stored “Spots” during training
- I: Playback of stored “Spots” and Music Tracks during Live Broadcasting
- J: Transfer from Recorder, and possible Editing of Recorded Programs for later Broadcasting
- K: Burning Recorded Material to CD for Archiving or later Broadcasting

We suggest, if budget permits, that a Compact Flash Card Recorder be used rather than a PC for recording of Field Interviews as well as recording of Complete Programs for later Broadcasting, more on this later

### A few useful Software Programs are suggested here

**Audacity:** <http://audacity.sourceforge.net/>

Available free from the Internet, Audio Recording and Editing Software Package, easy to use, works well

**Alto MP3 Ripper:** <http://www.yuansoft.com/>

Available for US \$ 29.95c from the Internet, probably the best Wave to MP3 converter or “Ripper”

**MP3 Gain:** <http://mp3gain.sourceforge.net/>

Available free from the Internet, the best Audio Level Normalizer we have come across

**Windows Media Player:** <http://www.microsoft.com/windows/windowsmedia/default.mspx>

Normally part of Microsoft Windows Operating System, upgrades available free from the Internet, useful as a very basic "Spot" Playback utility, not particularly good, but it works

**DirEttore:** <http://www.mixtime.com/>

Basic version available free from the Internet, basic Broadcast Automation Package, very useful for "Spot" and Music Track Playback, looks good on PC Monitor Screen, works rather well

**Rivendell:** <http://www.salemradiolabs.com/rivendell/>

Available free from the Internet, not fully tested by Elan Audio, looks like an advanced and very promising Broadcast Audio Delivery and Automation Package, reputed to be very stable, runs on the Linux operating system, difficult to install on a PC but probably worth the trouble

**Please note**, OK to use DirEttore during training for playback of "Spots" but not recommended for playback of Music Tracks as this makes presentation "Too Easy", OK to use for Music Tracks during Live Broadcast

## More about Equipment for Media Training

High Performance, Reliable, Robust and Easy to Use Equipment is essential for Media Training

The Audio Mixer is the central piece of equipment in the Training Studio and in order to be of value for training purposes must operate and perform exactly like the full sized Broadcast On-Air Mixer the student will encounter in a Radio Broadcast Station

The Elan Audio "MERLIN" is a small Broadcast On-Air Mixer featuring full Broadcast Specifications

## Suggested Equipment

The following list show suitable Equipment guaranteed to work well in a Media Training Studio

Except for the "Merlin" Mixer, it may be possible to use already existing or cheaper types of equipment although good results cannot be guaranteed

1:	1 x Elan Audio "Merlin" Broadcast Audio Mixer	Elan Audio
2:	2 x AKG D 880M Dynamic Microphones	Elan Audio
3:	1 x K&M 23850 Microphone Boom Arm	Elan Audio
4:	1 x K&M 23855 Table Flange for Boom Arm	Elan Audio
5:	1 x Heavy Duty Microphone Table Stand	Elan Audio
6:	1 x K&M 29656 Microphone Pop Guard	Elan Audio
7:	2 x AKG K44 Headphones	Elan Audio
8:	1 x Altec Lansing AL MX-5021 Active Loudspeaker System	Elan Audio
9:	2 x Denon DN C-615 Commercial CD Players	Elan Audio
10:	1 x Elan Audio MIM-01 Merlin to PC Adapter	Elan Audio
11:	1 x PC with USB Port, Sound Card and CD Burner	Any Vendor
12:	1 x selection of PC Software, Audacity, Alto MP3 Ripper, MP3 Gain, DirEttore	Some Free
13:	1 x Set of Assorted Connecting Cables etc	Elan Audio
14:	1 x Edirol R-1 Compact Flash Recorder	Elan Audio
15:	2 x 1 GB Compact Flash Cards for Edirol R-1	Elan Audio

**Estimated Total Cost (Professional Price) Inc GST \$ 9000.00c**

Additional Desirable items

1:	1 x Elan Audio AAL-01 On-Air Light	Elan Audio
2:	2 x AKG D 880 M Microphones for use with Edirol R-1	Elan Audio
3:	1 x Microphone Cable for use with Edirol R-1	Elan Audio
4:	1 x AKG K 44 Headphone for use with Edirol R-1	Elan Audio

**Estimated Total Cost (Professional Price) Inc GST \$ 800.00c**

For Live To-Air Broadcasting, additional equipment is required, actual items depends on each individual case, please contact Elan Audio to discuss various options and a firm quotation for equipment

## **A few words about “Solid State” Compact Flash Card Recorders**

Current trend is to use Digital Audio Recording Equipment such as PC's with Standard, Special High Performance Sound Cards or External Adapters such as the Edirol UA-25, Dedicated Multi Channel Hard Disk Recorders, or Compact Flash Card Recorders for Audio Recording

Compact Flash Card Recorders such as the Edirol R-1 and Marantz PMD 660 are affordable, portable, mechanically silent, reasonably robust and capable of very high Audio Quality and ideal for use in Media Training for Interviews and General Recording applications

More expensive Flash Card Recorders with additional features are available but probably not warranted for Media Training

All current models will record in CD Quality, 44.1 KHz 16 Bit Linear or Wave, and also at reduced quality using MPEG Compression including MP3 at various Bit Rates

Both the Edirol R-1 and Marantz PMD 660 have built in basic Compressor-Limiter, which is very useful when recording Interviews and also, if used with discretion, when recording programs for later broadcasting

The Compressor-Limiter should not be used when recording practice programs which are to be auditioned or examined by teaching staff as this makes “Life Too Easy” as the Compressor-Limiter will tend to hide minor imperfections in regard to level keeping

## **A few words about Digital Recording and Audio Compression**

All original audio recording and recording of programs for later broadcasting, should be done in CD Quality using the 44.1 KHz 16 Bit linear format

“Spots” and Music Tracks to be stored on the Studio PC, may be compressed using MP3 at a minimum Bit Rate of 160 K Bits per Second or preferably 192 K Bits per Second

The commonly used rate of 128 K Bits per Second is too low and in reality unsatisfactory for broadcasting

All Audio Compression systems operate on the Loss Principle by throwing subtle information away which it is assumed will not be missed or noticed and can be done only once without noticeably affecting audio quality

The detrimental effects of “Cascaded Audio Compression” is not discussed here

## **Examples of various types of Recordings**

### **Field Interview Recording**

Record using the Edirol R-1 or Marantz PMD 660 using a good quality Microphone or two Microphones for either Stereo or Two Channel Recording

Record using 44.1 KHz 16 Bit Linear Format - Transfer to PC using USB – Edit recorded material as necessary using Audacity – Burn Copy to CD at 44.1 KHz 16 Bit Linear for Archiving if required – Convert or “Rip” to MP3 using Alto MP3 Ripper at 44.1 KHz 160 K/Bit Sec or higher – Normalize Audio Levels using MP3 Gain – Save File on PC for future use

### **Creating and Recording a “Spot” announcement**

A “Spot” usually contains one or more Voices, a Music Background, and sometimes Sound Effects involving several individual sound tracks which must be Mixed or combined in the Editing Process

The Studio PC can be used for this as simultaneous recording and playback is not needed, all tracks must be recorded in the same Digital Format to permit Editing and Mixing with 44.1 KHz 16 Bit Linear best choice

Record Voices first using Audacity – Manually correct Audio Levels – Perform “Top and Tail Edit” – Transfer Music and any required Sound Effects from CD to the PC using separate Tracks – Mix Voice, Music and Effects to a separate track - Burn Copy to CD at 44.1 KHz 16 Bit Linear for Archiving if required – Convert or “Rip” to MP3 using Alto MP3 Ripper at 44.1 KHz 160 K/Bit Sec or higher – Normalize Audio Levels using MP3 Gain – Save File on PC for future use

### **Recording a Program for later Broadcast or other Public Presentation**

The PC connected to the “MERLIN” is required to deliver stored “Spots” and possibly also deliver stored Music Tracks making it difficult if not impossible to use it to record a program at the same time and therefore suggest using a Compact Flash Recorder (preferred) or another PC for this

Record Output from Mixer to Compact Flash Recorder or PC - Use 44.1 KHz 16 Bit Linear – OK to use the Compressor/Limiter on the CF Recorder (With Care and Discretion) - Transfer to Studio PC using USB – Edit Recorded material if necessary using Audacity – Burn material to two CD’s, one for Archiving and one for the Broadcast – Do Not Rip to MP3 for Broadcast Copy

### **Recording a Program for Examination**

Use a Cassette Deck, Compact Flash Recorder or another PC as recorder – OK to use Studio PC for “Spot” Delivery – Do not use Studio PC for Music Delivery - A Compressor/Limiter should not be used – If using CF Recorder or PC, Transfer to the Studio PC using USB – Recorded material should not be Edited – Burn material to CD for examination

### **Operating “Merlin” Studio System for “Live Broadcast” or other Live Public Presentation**

Basically the same as recording for later Broadcast – OK to use Studio PC for “Spot” and Music Delivery – An External Audio Processor must be connected to the Mixer Output to protect the Transmission System against Overload and Over Modulation – Being “Live”, Editing is of course not possible

### **Suggestions re Broadcasting or Public Presentation**

A great morale boost to Media Students would be the facility to present programs to listeners by transmitting these on the standard AM or FM Broadcast Bands, or reaching an audience by some other method with a number of suggested methods listed in the following

#### **Wireless or Radio Broadcasting on the standard AM or FM Broadcast Bands**

AM Broadcasting is in the frequency band 522 KHz to 1728 KHz, unfortunately due to a fairly complex Antenna System, AM is expensive to set up and probably not worth considering for Schools Broadcasts

FM Broadcasting is in the frequency band 78.5 MHz to 108.1 MHz with all usable frequencies (with very few exceptions) allocated to Broadcast Services, which will unfortunately make it next to impossible for a School or College to be given a Transmission License

Government and Commercial Broadcasters generally use High Power Transmitters

Some Community Broadcasters including a number of which are operated by Universities use fairly High Power Transmitters while others operate Transmitters of 50 Watts to 500 Watts

Some Specialized Broadcast Services are Semi Commercial and classified as HPON (High Power Open Narrowcast) using 50 to 100 Watt Transmitters

Other Specialized Broadcast Services such as Tourist and Racing Radio are classified as LPON (Low Power Open Narrowcast) operating on 87.6 MHz, 87.8 MHz and 88.0 MHz use as little as 1 Watt in Metro Areas and 10 Watts in Country Areas

As it is highly unlikely that a Government or Commercial Broadcaster will allocate transmission time to Schools or College Broadcasting, and coverage from LPON Services being too limited to be of serious use leaves three practical options

- 1: Make an association with your local Community Broadcaster for your program to be broadcast
- 2: Hire transmission time from a HPON Broadcaster
- 3: Install a number of very low power FM Transmitters on the School or College Grounds to cover the area

Three options exists for conveying the School or College program to the associated broadcasters studio

- 1: UHF Radio Link, expensive and maybe impossible due to nearly all link frequencies are allocated
- 2: TieLine Codec via Dial Up telephone Line, expensive, possibly share TieLine Codec with others
- 3: Physically deliver a "Burnt CD" containing program, cheap and effective

### **Wired Broadcasting using Internet WEB Casting or Schools PA System**

- 1: Internet Streaming

Internet Broadband, a PC and a suitable Audio Processor is required

- 2: Using Schools or College PA System

Workable, but quality not likely to be satisfactory

Schools PA Systems are generally designed for Speech only, an Audio Processor is required to prevent overload

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