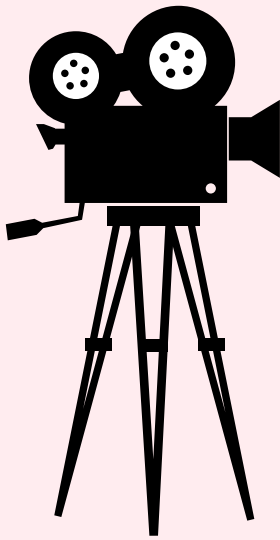


NIGHTSPOT CINEMA'S
NIGHTSPOT
CINEMA
GUIDE TO FILM
SOUND



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INTRODUCTION

A GUIDE TO FILM SOUND

ORIGINALLY FILMS WERE SILENT, THOUGH IN CINEMA EXHIBITION THIS WAS NEVER TRULY THE CASE. AS EARLY AS 1895, MUSICAL ACCOMPANIMENTS WERE BROUGHT IN TO ENGAGE CINEMA AUDIENCES ALONGSIDE THE NEW SPECTACLE OF THE MOVING IMAGE. EVEN THIS EARLY ON, IT WAS RECOGNISED JUST

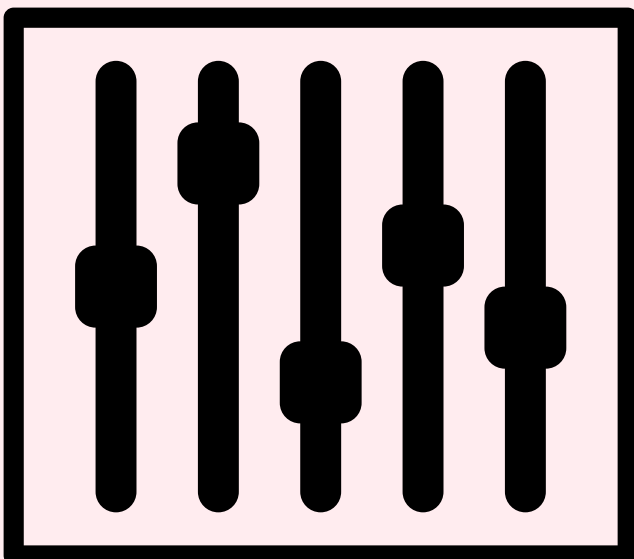
HOW IMPORTANT SOUND WAS TO ACHIEVING AUDIENCE IMMERSION. TITLE CARDS INTERSPERSED THROUGHOUT THE PICTURE WOULD RELAY IMPORTANT SPEECH, SOUNDS OR PLOT POINTS FROM THE NARRATIVE THROUGH TEXT. PIANISTS, ORGANISTS AND EVEN FULL ORCHESTRAS WOULD PROVIDE CAREFULLY CRAFTED 'SOUNDTRACKS' TO CREATE AMBIENCE.

SOME SHOWS EVEN HAD ACTORS SPEAKING FROM BEHIND THE SCREEN, WHILE OTHERS CREATED EFFECTS FOR SOUNDS, SUCH AS THUNDER OR GALLOPING HORSES, TO ADD TO THE ATMOSPHERE.

WITH PATENT RACES FORGING FRESH AVENUES IN NEW AND BETTER FILM EQUIPMENT, SOUND TECHNOLOGY GRADUALLY BEGAN TO EMERGE IN CINEMA EXHIBITION. AT THE START, SOUND WAS PLAYED SEPARATELY AND HAD TO BE SYNCHRONISED TO MATCH THE IMAGE ON SCREEN. OFTEN, DUE TO SEVERAL FACTORS (AND THE EXACTING NEEDS OF SYNCHRONISATION), THESE METHODS OF FILM WITH SOUND WERE UNRELIABLE. BUT WHEN ELECTRIC MOTORS SUPERSEDED HAND CRANKED RECORDING AND PROJECTION,

AND CINEMAS STARTED MOVING EQUIPMENT INTO PROJECTION BOXES, VAST IMPROVEMENTS WERE MADE TO FILM PRESENTATION. SOUND-ON-DISC SYSTEMS LIKE VITAPHONE, WHERE A PHONOGRAPH PLAYER WAS MECHANICALLY 'INTERLOCKED' TO THE PROJECTOR, WERE DEVELOPED, ENABLING RELIABLE SYNCHRONISED SOUND. IT WAS AT THIS POINT THAT CELLULOID FILM WAS STANDARDISED AT 24 FRAMES PER SECOND, AS SOUND REQUIRED THE SAME FRAME RATE FROM PRODUCTION THROUGH TO EXHIBITION.

INDEPENDENT CINEMA OFFIC



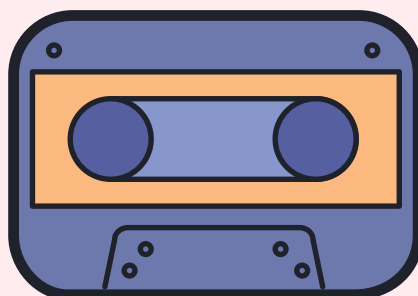


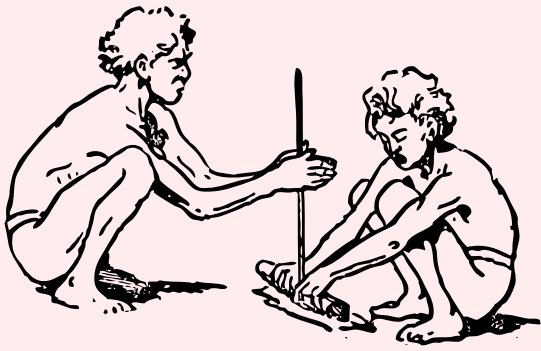
A GUIDE TO FILM SOUND

ALTHOUGH SOUND ON FILM (WHERE THE SOUNDTRACK IS SITUATED ON THE CELLULOID ITSELF) HAD BEEN CONTINUALLY EXPERIMENTED WITH, IT TOOK UNTIL THE LATE 1920S TO MID 1930S FOR SYNCHRONISED SOUND TO BE ACCEPTED, PRODUCED AND EXHIBITED IN CINEMAS. TECHNOLOGY CONTINUED TO EVOLVE WITH NEW AND BETTER RECORDING AND PROCESSING TECHNIQUES LEAPING FORWARD EVERY FEW YEARS – FROM OPTICAL TO MAGNETIC TO DIGITAL, FROM A SINGLE CHANNEL OF SOUND TO ADVANCED SURROUND SOUND FORMATS – AND TODAY, STUDIOS AND POST-PRODUCTION HOUSES CAN ENCODE INDIVIDUAL SOUNDS IN A MULTITUDE OF DIFFERENT WAYS TO DELIVER IMMERSIVE OBJECT-BASED SOUND DESIGN.

SOUND COVERS A VERY COMPLEX AND EXPANSIVE AREA IN RELATION TO CINEMA EXHIBITION, PARTLY DUE TO THE FACT THAT MANY OF THE OLDER ANALOGUE TECHNOLOGIES ARE STILL IN USE. THERE IS A LARGE BACKLOG OF FILMS, SPANNING OVER A CENTURY, WHICH STILL EXIST IN THEIR ORIGINAL MEDIUMS (OR RE-PRINTED) WITH THEIR ORIGINAL SOUNDTRACK CONFIGURATIONS; NOT FORGETTING THE MANY MODES IN WHICH IT IS POSSIBLE FOR CINEMA EXHIBITION TO TAKE PLACE. THIS GUIDE GIVES YOU AN OVERVIEW OF MODERN CINEMA SOUND ACROSS A VARIETY OF DIFFERENT FORMATS AND SET-UPS. IT STARTS WITH A BASIC OVERVIEW OF THE COMPONENTS REQUIRED FOR BEGINNERS AND EVOLVES INTO A MORE DETAILED REFERENCE GUIDE FOR THOSE WHO ALREADY HAVE A GROUNDING. IN SOME PLACES, MORE COMPLEX INFORMATION HAS BEEN INCLUDED TO GIVE YOU A BETTER UNDERSTANDING OF WHEN AN AUDIOVISUAL OR ELECTRICAL ENGINEER MAY BE NEEDED AND WHY. IN OTHERS, WE HAVE SIMPLIFIED TECHNICAL CONCEPTS TO INCREASE ACCESSIBILITY. FOR MORE DETAIL, APPENDIX 2 LISTS SUGGESTIONS FOR FURTHER READING.

DB =DECIBEL. THE DECIBEL LEVEL IN AUDIO APPLICATIONS IS A RATIO OF TWO VALUES, MANIPULATED TO APPEAR IN MORE MANAGEABLE LINEAR UNITS. THE HUMAN EAR CAN DETECT A HUGE RANGE OF WHAT WE PERCEIVE AS 'LOUDNESS'. USE OF THE DB – WHICH USES LOGARITHMIC ALGORITHM, WHICH MIMICS HOW OUR EARS NATURALLY HEAR – ALLOWS FOR A MORE TANGIBLE SENSE OF WHAT IS BEING MEASURED. THE DB CAN BE USED IN DIFFERING APPLICATIONS TO MEASURE POWER, VOLTAGE AND PRESSURE. TO BETTER UNDERSTAND ITS USE IN A PARTICULAR SCENARIO, SUFFIXES ARE UTILISED TO INDICATE WHAT IS BEING MEASURED.





SETUP AND EQUIPMENT

THERE ARE TWO MAIN WAYS OF SHOWING FILMS.

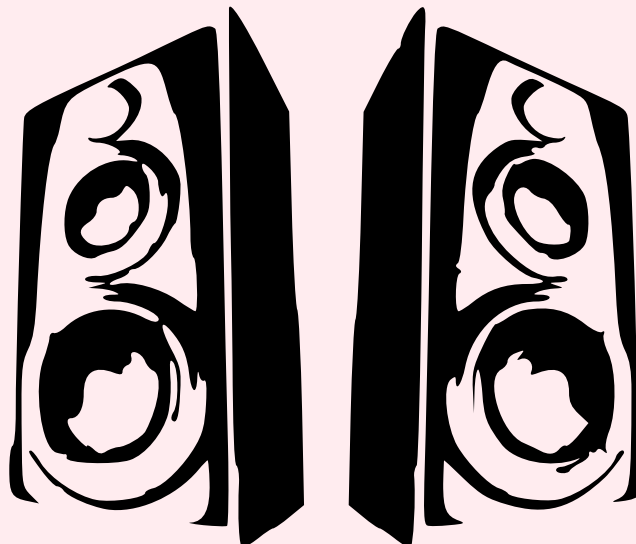
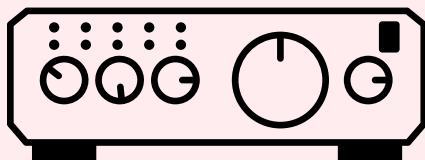
A. DIGITAL CINEMA PACKAGE (DCP): ENCRYPTED FILES WITH KDM (DECRYPTION KEY). DCP PLAYBACK REQUIRES A SPECIALISED DCI (DIGITAL CINEMA INITIATIVE) COMPLIANT DIGITAL CINEMA PROJECTOR AND SERVER. IN THIS GUIDE, DCP SET-UPS ARE REFERRED TO AS 'PURPOSE-BUILT' CINEMA SET-UPS, THOUGH THERE ARE EXCEPTIONS TO THIS IN PRACTICE.

B. BLU-RAY/DVD/DIGITAL FILE: PLAYBACK ONLY REQUIRES A VIDEO PROJECTOR. WHEN SCREENING FROM DISC, YOU WON'T BE ABLE TO PLAY NEW RELEASES (WHICH ARE ONLY AVAILABLE ON DCP TO BEGIN WITH); ALSO, FILM COPYRIGHT LICENSING IS STILL REQUIRED. VIDEO PROJECTOR SET-UPS ARE REFERRED TO AS 'SMALLER/TEMP' OR 'EVENT' SET-UPS IN THIS GUIDE, THOUGH NON-DCP MEDIA ARE ALSO EXHIBITED PERIODICALLY IN PURPOSE-BUILT CINEMAS.

ANCILLARY EQUIPMENT WILL WORK WITH BOTH SET-UPS.

BASIC PURPOSE-BUILT CINEMA SET-UPS TYPICALLY CONSIST OF:

- › FILM PROJECTOR (DIGITAL AND/OR CELLULOID, E.G., 35MM) WHICH PROJECT THE PICTURE
- › FILM SERVER OR IMB (INTEGRATED MEDIA BLOCK) TO PLAY DCPS
- › SOUND PROCESSOR
- › MONITOR FOR THE PROJECTIONIST
- › AMPLIFIERS, STAGE SPEAKERS, SURROUND SPEAKERS AND CROSSOVERS
- › SCREEN
- THERE IS USUALLY ANCILLARY EQUIPMENT AS WELL, SUCH AS:
- › BLU-RAY/DVD PLAYERS, COMPUTERS TO PLAY MEDIA FROM FILE, VIDEO AUDIO SWITCHER OR SCALER, CD-MP3 COMPUTER AND/OR AUDIO PLAYERS
- › ACCESS EQUIPMENT SUCH AS: T-LOOP AND RECEIVER HEARING SYSTEMS, INFRARED EMITTERS AND RECEIVERS FOR AUDIO DESCRIPTION
- › MIXING DESKS, PA SYSTEMS, MICROPHONES AND RECEIVERS



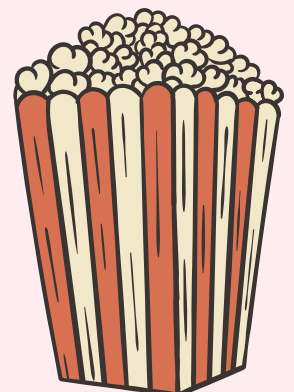
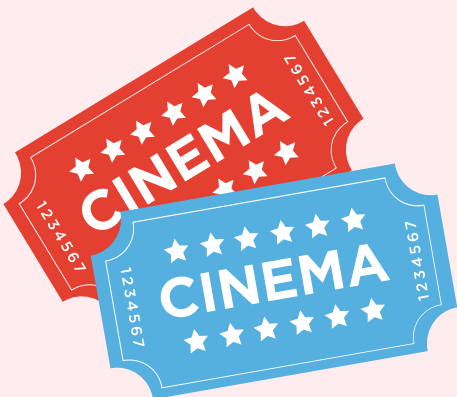
SMALL AND POP UP CINEMA SET-UPS:

- › SOUND PROCESSORS AND AMPS, OR AN AV RECEIVER OR MIXING DESK (WITH AMPS)
- › BLU-RAY/DVD PLAYERS, COMPUTERS FOR FILE MEDIA (INSTEAD OF FILM SERVERS OR TMS)
 - › PA SYSTEMS (INSTEAD OF STAGE SPEAKERS)

PURPOSE-BUILT CINEMA SET-UPS CAN BE BOUGHT AND INSTALLED AS A PACKAGE WITH ALL OR MOST OF THE REQUIRED ELEMENTS INCLUDED. SELECT INSTALLATION COMPANIES ARE AUTHORISED BY THE MAIN CINEMA MANUFACTURERS TO INSTALL AND ALSO SERVICE THEIR EQUIPMENT IF REQUIRED. THE EQUIPMENT IN THESE SET-UPS WILL BE DCI (DIGITAL CINEMA INITIATIVE) COMPLIANT AND WILL REQUIRE PARTICULAR STANDARDS AND SPECIFICATIONS. EXAMPLES OF COMPANIES THAT OFFER INTEGRATOR SERVICES ARE SOUND ASSOCIATES, OMNEX, BELL THEATRE SERVICES AND CINEMA NEXT (FOR LINKS, SEE APPENDIX 1). FOR TEMPORARY OR EVENT SET-UPS, MUCH DEPENDS ON BUDGET – SOME OF THE ABOVE INTEGRATORS OFFER SERVICES, BUT PICTURE AND SOUND EQUIPMENT CAN ALSO BE HIRED FROM SMALLER, LESS SPECIALIST AUDIOVISUAL COMPANIES ACROSS THE COUNTRY. IT'S IMPORTANT TO CHECK WHICH FORMATS YOU WILL BE SCREENING FROM SO YOU CAN ENSURE YOUR EQUIPMENT IS SUITABLE FOR PLAYBACK.

FILM PROJECTOR (DIGITAL & FILM)

DIGITAL CINEMA INITIATIVE (DCI) DIGITAL CINEMA PROJECTORS DO NOT HANDLE AUDIO DIRECTLY THEMSELVES BUT ARE LINKED VERY CLOSELY VIA THE SERVER/IMB/IMS. THE PROJECTOR MUST BE 'MARRIED' TO THE SERVER/IMB/IMS WHERE THE DCP IS LOADED BEFORE SOUND AND IMAGE CAN BE PLAYED BACK. MOST OTHER STANDARD COMMERCIAL PROJECTORS ALSO ONLY HANDLE IMAGE, THOUGH SOME CHEAPER PORTABLE NON-DCI PROJECTORS THAT CAN BE BOUGHT OR HIRED MAY HAVE INTEGRATED SPEAKERS. HOWEVER, THESE ARE NOT RECOMMENDED FOR RUNNING A SHOW. 35MM PROJECTORS HAVE FILM READERS BUILT INTO THEM THAT READ AND TRANSMIT SOUND INFORMATION TO THE CINEMA PROCESSOR. THERE ARE DIFFERENT TYPES OF READERS FOR DIFFERENT FILM TRACKS – FURTHER INFORMATION IS DETAILED IN THE CELLULOID AUDIO SOURCES SECTION STARTING ON PAGE 41.



LM SERVER / THEATRE MANAGEMENT SYSTEM (TMS)

FILM SERVERS ARE UTILISED IN DIGITAL DCI COMPLIANT CINEMA SET-UPS. FILMS IN DCP FORMAT CAN BE LOADED ONTO THE SERVER VIA HARD DRIVES OR DELIVERED VIA NETWORK OR SATELLITE. THE VAST MAJORITY OF COMMERCIAL CINEMAS ACROSS THE WORLD OPERATE IN THIS MANNER. THE MOST COMMON PLAYBACK SERVERS ARE MADE BY DOLBY, DOREMI, GDC, QUBE, CHRISTIE, BARCO AND SONY. ON TOP OF THIS THERE ARE MANY THEATRE MANAGEMENT SYSTEMS (TMS) THAT CAN CONTROL MULTIPLE SERVERS SIMULTANEOUSLY AND EFFICIENTLY. THEY OFTEN HAVE A DIFFERENT INTERFACE THAN THE MAIN SERVER BUT SIMILAR FUNCTIONALITY WITH THE ABILITY TO CONTROL REMOTELY.

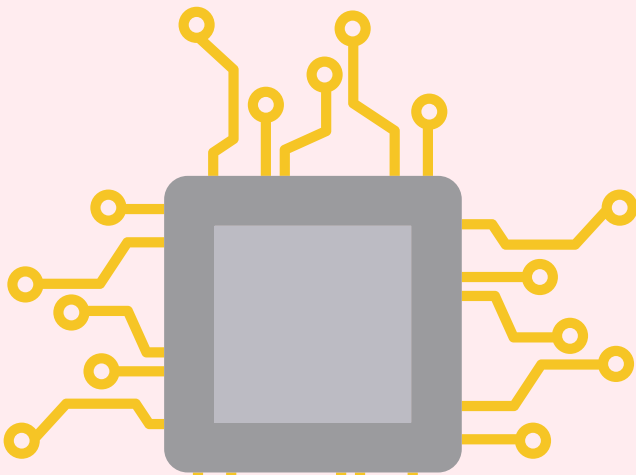
CINEMA SOUND PROCESSOR

SOUND PROCESSORS TAKE THE AUDIO COMING INTO THEM FROM DIFFERENT AND OFTEN MULTIPLE SOURCES (INCLUDING DIGITAL FILM SERVERS), DECODE IT (IF REQUIRED) AND OUTPUT IT TO THE MONITOR AND AMPLIFIERS BEFORE

IT FINALLY GOES TO THE SPEAKERS. THERE WILL BE SEVERAL OPTIONS FOR SWITCHING SOUND BETWEEN PLAYBACK SOURCE(S) AND NON-SYNC MUSIC (SEE PAGE 30) AND MICROPHONES. PROCESSORS OFTEN HAVE A CONTROL KNOB TO SET GLOBAL VOLUME – THIS IS THE ONLY CONTROL AVAILABLE TO PROJECTIONISTS OR TECHNICIANS AS IT IS EXPECTED THAT ALL CALIBRATIONS

OF SOUND (ON INDIVIDUAL CHANNELS) HAVE FOLLOWED A STANDARDISATION PROCESS FROM PRODUCTION THROUGH TO THE AUDITORIUM SET-UP. CRUCIALLY, THERE WILL ALSO BE A MUTE BUTTON WHICH CAN SLOWLY FADE AND MUTE THE SOURCE IN A GENTLE MANNER. REGARDLESS OF THE MAKE, MOST CINEMA SOUND PROCESSORS WORK TO THE DOLBY SCALE OF REFERENCE VOLUME. THIS IS EXPRESSED IN NUMBERS 0-9, WITH 7 KNOWN AS 'REFERENCE' – THE LEVEL FEATURE FILMS SHOULD BE MASTERED TO LEVEL 7 OR REFERENCE TRANSLATES TO 85 DECIBELS PER CHANNEL WHEN PLAYING PINK NOISE AT -20DBFS. THE EQUIVALENT OF THIS IS THE DB SCALE WHERE LEVEL 7 OR REFERENCE IS SET AT 0DB. IN AN IDEAL WORLD, ALL FILMS WOULD BE PLAYED AT REFERENCE LEVEL AND THE SOUND VOLUME AND CLARITY WOULD BE PERFECT. IN REALITY, THIS IS NOT ALWAYS THE CASE, AND INCREASINGLY AUDIENCES FEEL THAT FILMS ARE GETTING LOUDER. IT'S IMPORTANT TO LISTEN TO THE FILM IN THE SPACE YOU ARE PROJECTING IN; BOTH BEFORE THE SHOW (TO GET AN IDEA OF THE RIGHT VOLUME LEVEL) AND AT THE START, SO YOU CAN ADJUST TO THE NUMBER OF PEOPLE IN ATTENDANCE (PEOPLE SOAK UP SOUND, SO YOU MAY NEED TO ADJUST THE AUDIO UPWARDS).

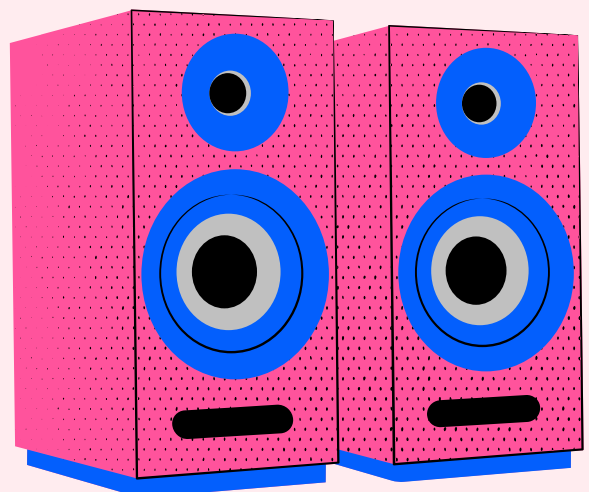


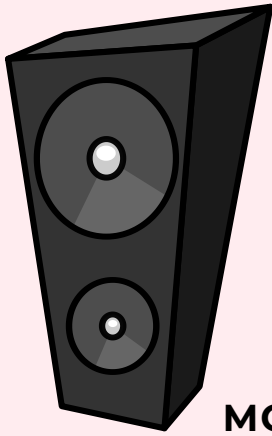


THE NEWEST SOUND PROCESSOR MODELS ARE MAINLY DESIGNED FOR DIGITAL CINEMA AUDIO, SO TO BE ABLE TO RUN CELLULOID, A SOUND PROCESSOR THAT CAN HANDLE ANALOGUE SOLAR CELL INPUTS WILL BE REQUIRED. IF YOU ARE UNABLE TO FIND A MODERN PROCESSOR FOR THIS TASK, OLDER ONES CAN STILL BE UTILISED. THESE CAN BE FOUND FOR SALE ON EBAY AND OTHER AUCTION SITES AND SOME CINEMA SUPPORT COMPANIES WILL ALSO HAVE A FEW REFURBISHED UNITS IN STOCK. THE DOLBY CP650 OR PANASTEREO ARE OFTEN THE MOST SOUGHT-AFTER PROCESSORS FOR 35MM SET-UPS. FOR ALTERNATIVE MEDIA FLEXIBILITY, UNITS SUCH AS THE DOLBY DMA 8+ CAN OFFER AUDIO HANDLING FOR ANCILLARY INPUTS SUCH AS BLU-RAY, VIDEO FILE OR OTHER INPUT SOURCES. ALTHOUGH THIS UNIT IS TECHNICALLY SUPERSEDED (AS THE NEWEST DIGITAL PROCESSORS HAVE THIS AS INBUILT FUNCTIONALITY WITH SOFTWARE CONTROL), MANY CINEMAS THAT UTILISE MULTIPLE FORMATS PREFER THE PHYSICAL SWITCHING ABILITY THIS UNIT PROVIDES – IT ALSO WORKS WITH THE OLDER PROCESSORS NEEDED FOR 35MM TO ALLOW FOR DIGITAL CINEMA AUDIO. THERE IS ALSO THE OPTION OF PLAYING A DOWN-MIXED STEREO TRACK BACK IN DOLBY PRO LOGIC OR PRO LOGIC II, WHICH WILL DECODE THE TWO CHANNELS BACK INTO L, C, R AND DOLBY SURROUND, AND IN THE CASE OF PRO LOGIC II, DOLBY 5.1 SURROUND SOUND. FOR MORE INFORMATION, SEE PAGES 38 & 39.

PROCESSORS AND CINEMA SERVERS UTILISE THE AES 3 (AES/EBU) PROFESSIONAL STANDARD FOR EXCHANGE OF DIGITAL AUDIO. AES3 SIGNALS CAN CARRY TWO CHANNELS OF PCM AUDIO EACH AND THE AES PAIRS ARE ROUTED AS STANDARD IN THE BOX BELOW. PCM STANDS FOR 'PULSE CODE MODULATION' AND OFFERS UNCOMPRESSED AUDIO DATA FROM THE PLAYBACK SOURCE.

MOST PERMANENT CINEMA SET-UPS WILL HAVE DOLBY PROCESSORS; THESE HAVE DOMINATED THE MARKET FOR SOME TIME.





MONITORS / MONITORING SOUND

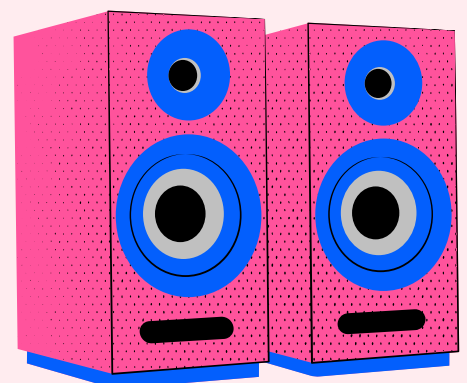
MONITORS SIMPLY ALLOW THE PROJECTIONIST TO HEAR THE FILM IN THE PROJECTION ROOM AND CHECK ALL IS WELL. MOST MONITORS HAVE THE ABILITY TO SWITCH BETWEEN PROCESSOR OR AMPLIFIERS. MANY MAKES OF MONITOR DISPLAY THE DECIBEL LEVEL, SO YOU CAN MONITOR THE ROUGH VOLUME BEING PLAYED IN THE AUDITORIUM. HOWEVER, IT IS HIGHLY RECOMMENDED YOU USE THE MONITOR AS A ROUGH GUIDE ONLY; IT IS VERY IMPORTANT THAT ALL SHOWS ARE CHECKED BY EAR IN THE AUDITORIUM. THIS SHOULD BE DONE ON TESTING THE FILM AND LATER AGAIN AT THE START OF THE SHOW TO ADJUST TO THE AMOUNT OF PEOPLE IN THE SPACE. THE PROCESSOR SETTING TAKES AUDIO DIRECTLY FROM THE SOUND PROCESSOR, WHICH IS CLOSER TO THE SOURCE, FOR MONITORING. THE AMPLIFIER SETTING TAKES AUDIO FROM THE AMPLIFIER END, WHICH IS A BETTER INDICATION OF WHAT IS HAPPENING IN THE AUDITORIUM. IT IS POSSIBLE TO HAVE THE MONITOR ON THE PROCESSOR SETTING BUT THE AMPLIFIERS TURNED OFF, SO ALTHOUGH YOU HEAR SOUND, IT IS NOT ACTUALLY TRAVELLING TO THE SPEAKERS IN THE AUDITORIUM – DO NOT BE CAUGHT OUT BY THIS.

IN A TEMPORARY SET-UP, YOU MAY BE SITUATED IN THE SAME ROOM YOU ARE PROJECTING IN. IF SO, A PAIR OF HEADPHONES (IF THERE IS FACILITY FOR A JACK, WHICH WILL BE THE CASE WITH A SOUND DESK) MAY BE USEFUL SO YOU CAN CLEARLY HEAR THE SOUND BEFORE IT REACHES THE SPEAKERS.

AMPLIFIERS

AMPLIFIERS FIT BETWEEN THE PROCESSOR AND SPEAKERS. AMPLIFIERS SIMPLY TAKE THE INCOMING LOW VOLTAGE SIGNAL FROM THE PROCESSOR

AND ADD POWER TO THE SIGNAL SO IT IS STRONG ENOUGH TO DRIVE THE SPEAKERS. AMPLIFIERS ARE GENERALLY INSTALLED IN THE PROJECTION ROOM BUT FOR LARGE SCREENS, WITH MULTIPLE SPEAKERS AND WHERE SPACE IS AT A PREMIUM, THEY CAN ALSO BE INSTALLED BEHIND THE SCREEN OR IN AN ADJOINING ROOM. MOST SPEAKER ARRAYS HAVE AN AMPLIFIER EACH, LEADING TO 'BANKS' OF AMPLIFIERS IN RACKS BUT MANY AMPLIFIERS CAN POWER UP TO TWO SETS OF SPEAKERS. AS SPEAKERS CAN BE AFFECTED BY SUDDEN HARSH OR LOUD SOUNDS BANGING THROUGH THE SOUND SYSTEM, AND AS LARGE POWER DRAINS CAN OCCUR WHEN TURNING ON A STACK OF AMPLIFIERS ALL AT ONCE, IT IS RECOMMENDED THAT YOU POWER THEM ON AND OFF INDIVIDUALLY.



NIGHTSPOT CINEMA

SPEAKERS / CROSSOVERS / LIMITERS

SPEAKERS ARE DEVICES THAT TRANSLATE ELECTRICAL SIGNALS BACK INTO SOUND THROUGH VIBRATION. THEY ARE GENERALLY MADE UP OF A CABINET AND THE DRIVER (CONSISTING OF A MAGNET, VOICE COIL, FRAME AND CONE DIAPHRAGM) AND, AS ABOVE, ARE DISTINGUISHED BETWEEN POWERED AND PASSIVE (NON POWERED). POWERED SPEAKERS HAVE A BUILT-IN AMPLIFIER AND ARE NOT COMPATIBLE WITH AMPLIFIED SIGNALS. PASSIVE SPEAKERS REQUIRE AN EXTERNAL AMPLIFIER. GENERALLY, PASSIVE SPEAKERS ARE FOUND IN PERMANENT CINEMA INSTALLATIONS AND CAN OFTEN BE INSTALLED IN HARD TO REACH OR TIGHT AREAS. THESE SPEAKERS ARE CONNECTED WITH CABLES MADE FROM CONDUCTIVE METALS (USUALLY COPPER) AND OFTEN A LOT OF CABLING IS REQUIRED.

SOME VERY NEW INSTALLATIONS ARE STARTING TO USE CAT 6 (ETHERNET) TO HANDLE AUDIO INFORMATION FOR PART OF THE SOUND TRANSPORT. ETHERNET PROTOCOLS AND SYSTEMS SUCH AS COBRANET, ETHERSOUND AND THE NEWER DANTE ARE MAKING GROUND IN THIS AREA.

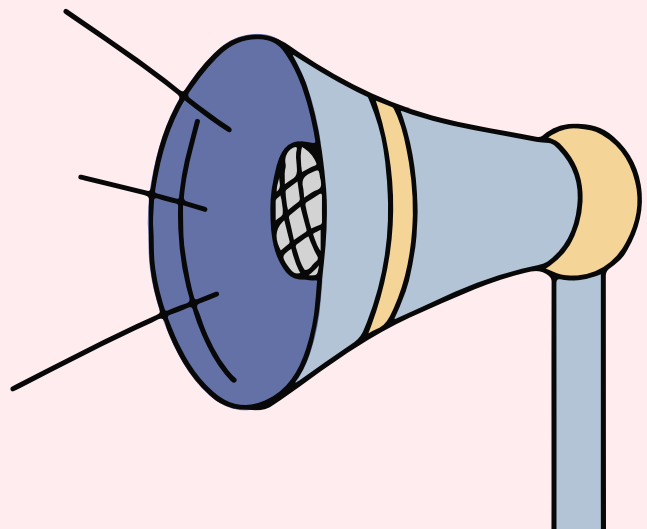
STAGE SPEAKERS ARE LARGE CABINETS WHICH ACTUALLY HOUSE MULTIPLE SPEAKERS/DRIVERS COVERING DIFFERENT FREQUENCIES.

MOST LOUDSPEAKERS HAVE MULTIPLE DRIVERS IN DIFFERING COMBINATIONS IN THE SAME UNIT. IN THESE SET-UPS, THE HIGHER FREQUENCIES OFTEN UTILISE A 'HORN' AT THE TOP OF THE STACK TO AID IN TRANSPORT OF THE HIGHER FREQUENCIES.

2-WAY SPEAKERS: A UNIT MADE UP OF TWO LOUDSPEAKERS WITH DIFFERING FREQUENCY RANGES; USUALLY HIGH (TWEETER) AND LOW (WOOFER).

3-WAY SPEAKERS: 3-WAY SPEAKERS CONTAIN THREE SPEAKERS; OFTEN HIGH (TWEETER), MID-RANGE AND LOW (WOOFER).

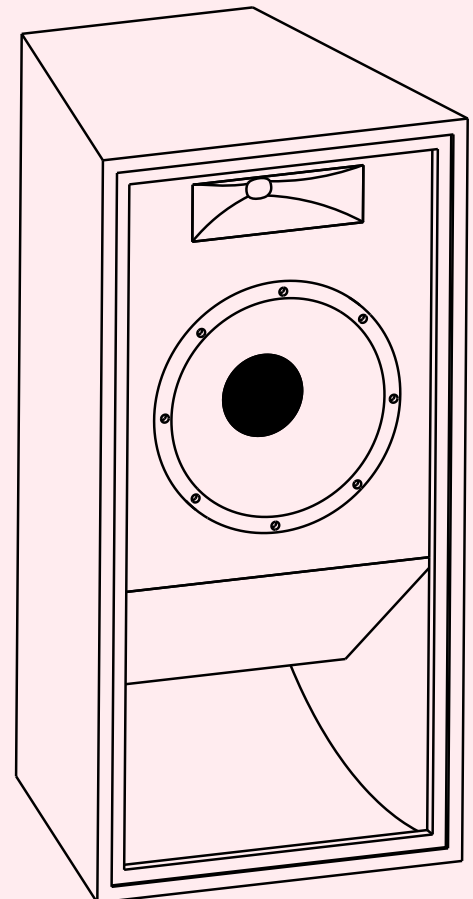
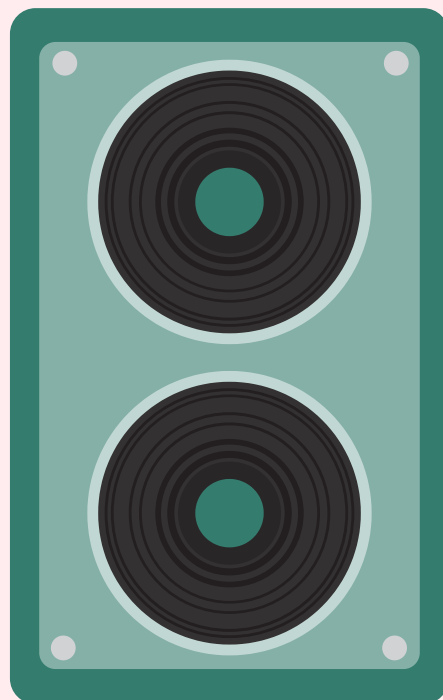
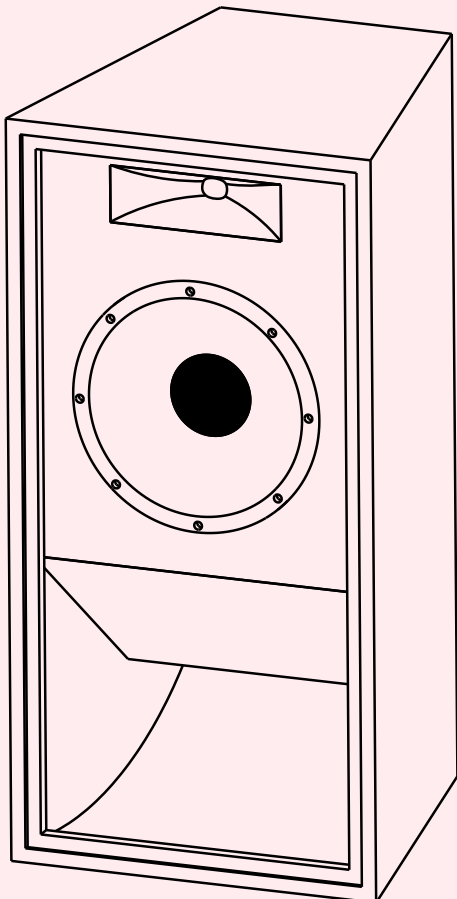
4-WAY SPEAKERS: CONSIST OF TWEETER AND HIGH MID, MID-RANGE AND LOW (WOOFER).

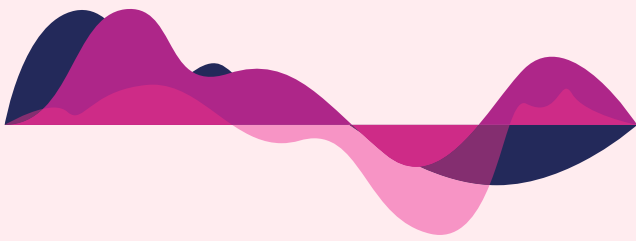


LINE ARRAY SPEAKERS ARE NOW ALSO BECOMING MORE COMMON IN CINEMA ENVIRONMENTS. THESE ARE MULTIPLE LOUDSPEAKER SYSTEMS WITH HIGH AND/OR MID AND LOW FREQUENCY DRIVERS STACKED IN LINE VERTICALLY AT SLIGHTLY DIFFERING ANGLES. AS THE DRIVERS ARE QUITE CLOSE TOGETHER BY DESIGN, THE SOUND COMING OUT OF THEM INTERFERES WITH THAT OF ITS NEIGHBOUR (SOME PHASE CANCELLATION AND SOME ADDITION) WHICH ALLOWS THE SOUND WAVE TO BE CONTROLLED AND DIRECTED AND THUS MORE EFFICIENT AS A WHOLE. ALTHOUGH HORNS AND OTHER SPEAKER CABINET DESIGNS DO SHAPE THE SOUND WAVES VIA PHYSICAL DESIGN, LINE ARRAYS ARE PARTICULARLY ADEPT AT CONTROLLING AND DIRECTING THE WAVE VIA THEIR SHAPE AND PLACEMENT, ALLOWING THE SOUND TO CLEARLY REACH ALL SEATS AND THE BACK OF THE AUDITORIUM.

STAGE SPEAKERS ARE PLACED BEHIND THE SCREEN (USUALLY ENCOMPASSING LEFT, CENTRE, RIGHT) AND WILL USUALLY BE RAISED OFF OF THE GROUND WITH THE DIFFERENT FREQUENCY DRIVERS STACKED UP. THEY CAN BE PLACED ON SCAFFOLDING BUILT UP BEHIND THE SCREEN FRAME; PERHAPS STACKED ON TOP OF EACH OTHER OR EVEN SUSPENDED BEHIND THE SCREEN FRAME.

SURROUND SPEAKERS ARE MUCH SMALLER UNITS THAT ARE PLACED IN THE LAST TWO THIRDS OF THE AUDITORIUM AWAY FROM THE SCREEN. THEY SHOULD BE EVENLY SPACED AROUND THE SIDES AND BACK OF THE AUDITORIUM. THEY TEND TO BE FULL RANGE SPEAKERS WHICH RELY ON INTERNAL CIRCUITRY TO SEPARATE LOW AND HIGH FREQUENCIES. ON SET-UP AND CALIBRATION, THEY REQUIRE A 20-MILLISECOND DELAY WITH AN ADDED MILLISECOND PER FOOT FOR THE LENGTH OF THE AUDITORIUM.





IN MODERN FILM SOUNDTRACKS, LOW-FREQUENCY SOUND EFFECTS ARE MIXED TO A SEPARATE LOW-FREQUENCY EFFECTS (LFE) CHANNEL. IN MOST SET-UPS, A SEPARATE SUB-WOOFER SPEAKER WILL BE NEEDED TO REPRODUCE THE LOWEST FREQUENCIES, REINFORCING THE DEEP BASS SOUNDS AND LOW-FREQUENCY EFFECTS. MOST PEOPLE CAN HEAR DOWN TO 20 HZ BUT LOW-FREQUENCY EFFECTS BEYOND THAT CAN BE PHYSICALLY FELT; THIS CAN TRULY AUGMENT THE CINEMA EXPERIENCE WHEN USED CORRECTLY. SUBWOOFER SPEAKERS WILL BE PLACED ON THE GROUND BEHIND THE CINEMA SCREEN AND BELOW THE STAGE SPEAKERS, SLIGHTLY OFF CENTRE.

OUTSIDE THE TRADITIONAL CINEMA ENVIRONMENT, SUBWOOFERS MAY HAVE A BASS MANAGER THAT STEERS ALL FREQUENCIES BELOW A SET CROSSOVER POINT (TYPICALLY 80 HZ) TO THE SUBWOOFER. THIS CAN REMOVE SOME OF THE HEAVY LIFTING FROM YOUR OTHER MAIN SPEAKERS, ALLOWING THEM TO COVER THE DETAIL WITHIN THE MID AND HIGH RANGE.

AN IDEA OF FREQUENCY RESPONSE CAN BE SEEN IN THE CHART

BELOW:

LOWER LIMIT (HZ)

10,000

6,000

3,500

2,000

1,000

500

250

100

16

UPPER LIMIT (HZ)

20,000

10,000

6,000

3,500

2,000

1,000

500

250

40

DESCRIPTION

TOP OCTAVE

UPPER TREBLE

MIDDLE TREBLE

LOWER TREBLE

UPPER MIDRANGE

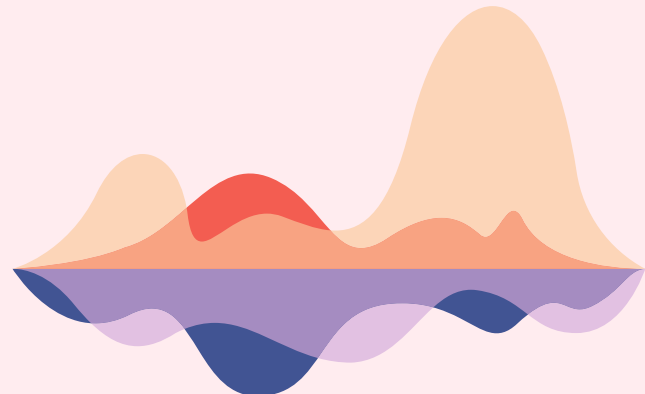
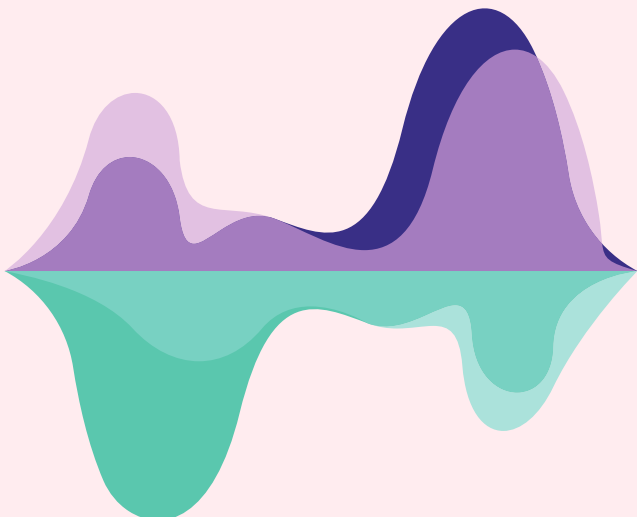
MIDRANGE

LOW MIDRANGE

UPPER BASS

DEEP BASS

15



IN ORDER TO SPLIT DIFFERENT FREQUENCY RANGES TO THE CORRECT SPEAKER DRIVERS IN ANY SET-UP, 'CROSSOVERS' ARE REQUIRED. CROSSOVERS ARE A TYPE OF FILTER THAT TAKE THE SIGNAL AND SPLIT IT INTO THE CORRECT FREQUENCY RANGES REQUIRED BY THE RELEVANT SPEAKER DRIVER. CROSSOVERS ARE NEEDED AS CERTAIN SPEAKER/DRIVERS CAN ONLY REPRODUCE THE FREQUENCIES THEY ARE DESIGNED FOR. MUCH LIKE SPEAKERS, CROSSOVERS COME IN ACTIVE AND PASSIVE VARIETIES. PASSIVE CROSSOVERS DO NOT REQUIRE ELECTRICAL POWER. MOST PERMANENT CINEMA SYSTEMS UTILISE THE 'COMPONENT' VARIETY OF PASSIVE CROSSOVER WHICH ARE SITUATED AT THE SPEAKER END IN THE CHAIN, AFTER THE AMPLIFIERS HAVE AMPLIFIED THE AUDIO SIGNAL. 'INLINE' CROSSOVERS ARE THE OTHER PASSIVE TYPE OF CROSSOVER; THESE CAN BE FOUND SITUATED BEFORE THE AMPLIFIER IN THE CHAIN. ACTIVE CROSSOVERS SPLIT THE AUDIO SIGNAL UP BEFORE IT GETS TO THE AMPLIFIERS AND SIT AFTER THE CINEMA PROCESSOR, SO ARE OFTEN FOUND IN THE SOUND RACK. SOME SYSTEMS MAY MAKE USE OF 'LIMITERS' TO PROTECT THE SPEAKERS BY KEEPING THE LEVEL OF SIGNAL BELOW A CERTAIN SET THRESHOLD. IN AN AUDIO SET-UP THEY CAN BE UTILISED AT THE SPEAKER END TO PREVENT DAMAGE TO THE SPEAKER CONE FROM CERTAIN PEAKS OR HARSH NOISES. LIMITERS ARE ALSO BUILT INTO CERTAIN SOFTWARE AND CAN BE FOUND IN SOME VIDEO PLAYBACK PROGRAMMES OR AS SEPARATE PLUG-INS.

FREQUENCY RESPONSE

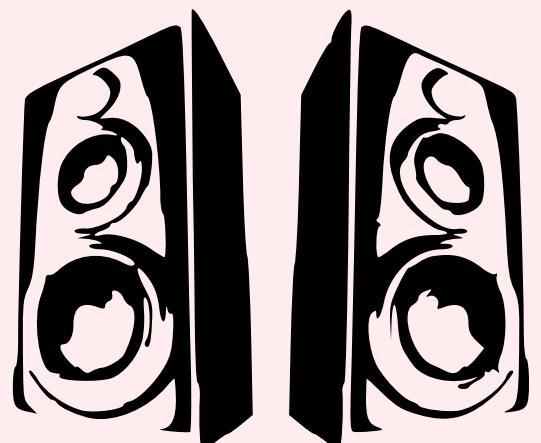
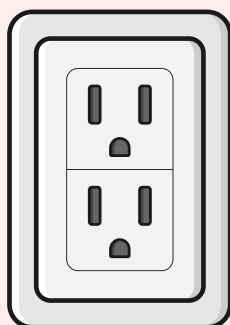
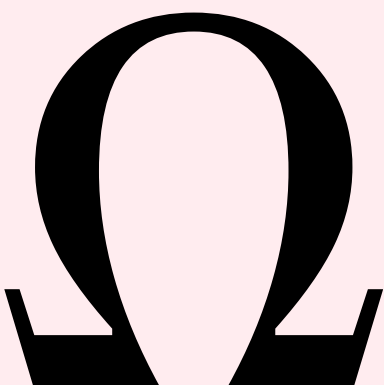
A SPEAKER'S FREQUENCY RESPONSE, MEASURED IN HERTZ (HZ), INDICATES THE RANGE OF TONES THAT IT CAN PRODUCE. THE LOWER FIGURE INDICATES HOW DEEP ITS BASS GOES; THE SECOND FIGURE INDICATES THE HIGHER FREQUENCIES. THE WIDER THE FREQUENCY RESPONSE RANGE, THE FULLER THE SOUND A GIVEN SPEAKER CAN REPRODUCE.

SENSITIVITY AND POWER HANDLING

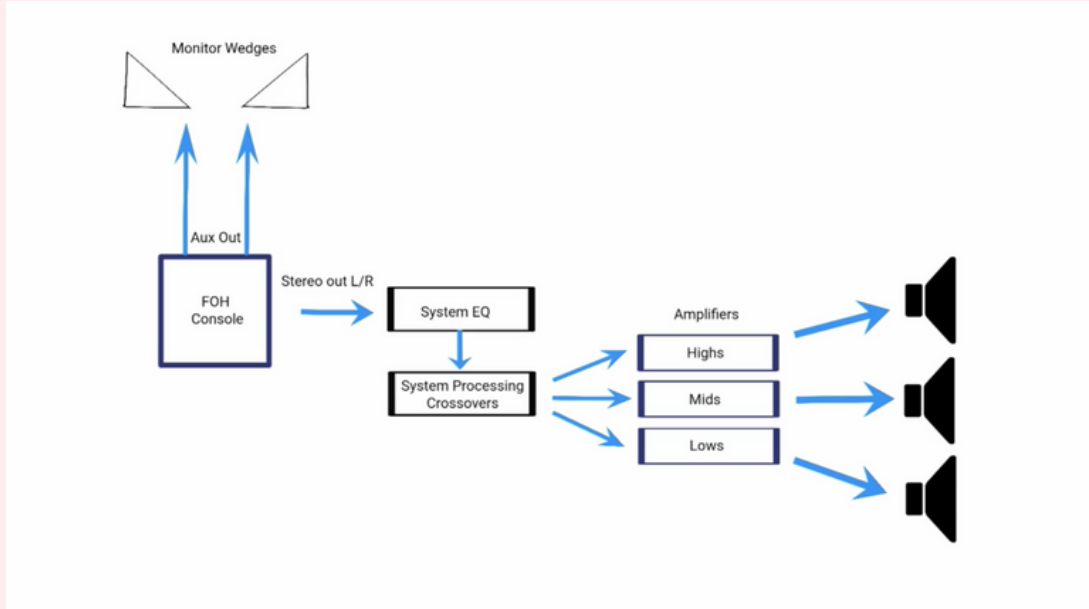
THE SENSITIVITY RATING TELLS YOU HOW EFFECTIVE A SPEAKER IS AT CONVERTING POWER INTO VOLUME. THE HIGHER THE RATING, THE MORE EFFICIENT FOR A GIVEN INPUT YOUR SPEAKERS WILL BE.

IMPEDANCE (OHMS)

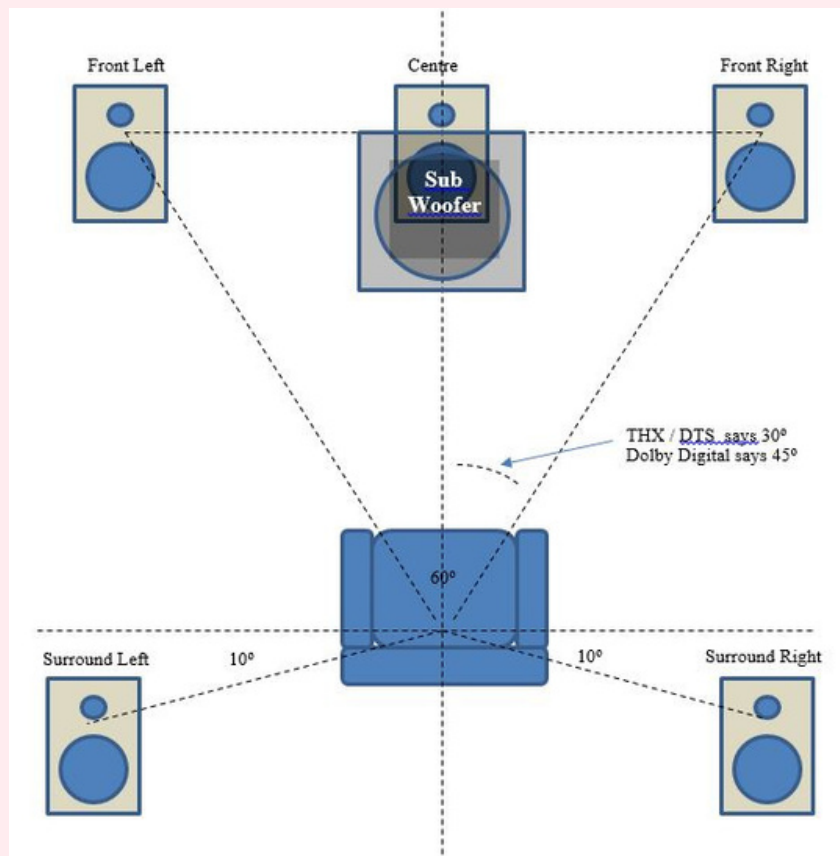
A SPEAKER'S IMPEDANCE, MEASURED IN OHMS, INDICATES THE AMOUNT OF ELECTRICAL RESISTANCE THAT IT PRESENTS TO AN AMPLIFIER. THIS ISN'T ENTIRELY ACCURATE, BECAUSE WHEN PLAYING A DYNAMIC RANGE OF SOUNDS, A SPEAKER'S ACTUAL IMPEDANCE CONSTANTLY FLUCTUATES; BUT TO MAKE THINGS SIMPLER, SPEAKERS ARE USUALLY GIVEN A SINGLE OHM RATING BETWEEN 4-8 OHMS. CHECK YOUR AMPLIFIER'S SPECS TO MAKE SURE IT'S COMPATIBLE WITH THE SPEAKERS YOU ARE CONSIDERING.



A SOUND CHAIN DIAGRAM:



IF YOU HAVE AN IDEA OF THE EQUIPMENT SPECIFICATION FOR YOUR INTENDED EXHIBITION VENUE, IT CAN BE USEFUL TO DRAW UP A SOUND / SIGNAL 'PATH', 'CHAIN' OR 'FLOW' DIAGRAM (THE INSTALLER MIGHT BE ABLE TO PROVIDE THIS). THIS DIAGRAM WILL AID IN VISUALISING HOW THE SOUND WILL GET FROM THE PLAYBACK MEDIA TO THE SPEAKERS AND WHICH EQUIPMENT IS REQUIRED ON THE WAY. IT IS USEFUL TO KEEP THESE DIAGRAMS FOR PROJECTIONISTS AND OPERATORS TO AID IN TROUBLESHOOTING WHEN UP AND RUNNING. EXAMPLE SOUND PATH DIAGRAM FOR A STANDARD PERMANENT 5.1 CINEMA INSTALLATION:



3D

NIGHTSPOT CINEMA

3D AUDIO IS THE USE OF BINAURAL SOUND SYSTEMS TO CAPTURE, PROCESS AND PLAY BACK AUDIO WAVES. THE GOAL OF 3D AUDIO IS TO PROVIDE THE LISTENER WITH AN AUDIO EXPERIENCE THAT MIMICS REAL LIFE. 3D AUDIO RECORDINGS ARE MADE WITH TWO MICROPHONES MOUNTED INSIDE A HUMAN-LIKE HEAD AND PLACE WHERE THE HUMAN'S EARS WOULD BE

3D OBJECT BASED SOUND SET-UPS ARE NEW OBJECT-BASED 3D IMMERSIVE SOUND TECHNOLOGIES IN THE CINEMA ENVIRONMENT, SUCH AS DOLBY ATMOS, REQUIRE A SPECIALISED SOUND PROCESSOR (SUCH AS CP850 OR CP950+ ADAPTER), A CUSTOM SPEAKER INSTALL (INCLUDING OVERHEAD SPEAKERS), AN INDIVIDUALISED MAPPING SET-UP FOR THE AUDITORIUM AND SPECIFIC ATMOS-RENDERED DCP FILES FOR PLAYBACK. IN A CINEMA ENVIRONMENT, THIS CAN BE UP TO 128 SIMULTANEOUS AUDIO CHANNELS THROUGH UP TO 64 SPEAKERS PLACED AROUND THE AUDITORIUM. AUROMAX (BARCO) VIA THE APX PROCESSOR UTILISES A HEIGHT 'LAYERING' CONCEPT WHERE THREE DIFFERENT HEIGHTS ARE UTILISED IN THE AUDITORIUM (AURO-3D), WITH SPEAKERS THEN ZONED TO CREATE OBJECT-BASED AUDIO. DTS:X ALSO UTILISES A NON-PROPRIETY HEIGHT LAYERED AND OBJECT-BASED AUDIO SET-UP VIA ITS MDA PROCESSOR. ALL OF THESE SET-UPS ALLOW FOR A MORE REALISTIC FIELD OF SOUND THAT RECREATES HOW OUR EARS HEAR SOUND IN A MULTI-DIMENSIONAL MANNER.



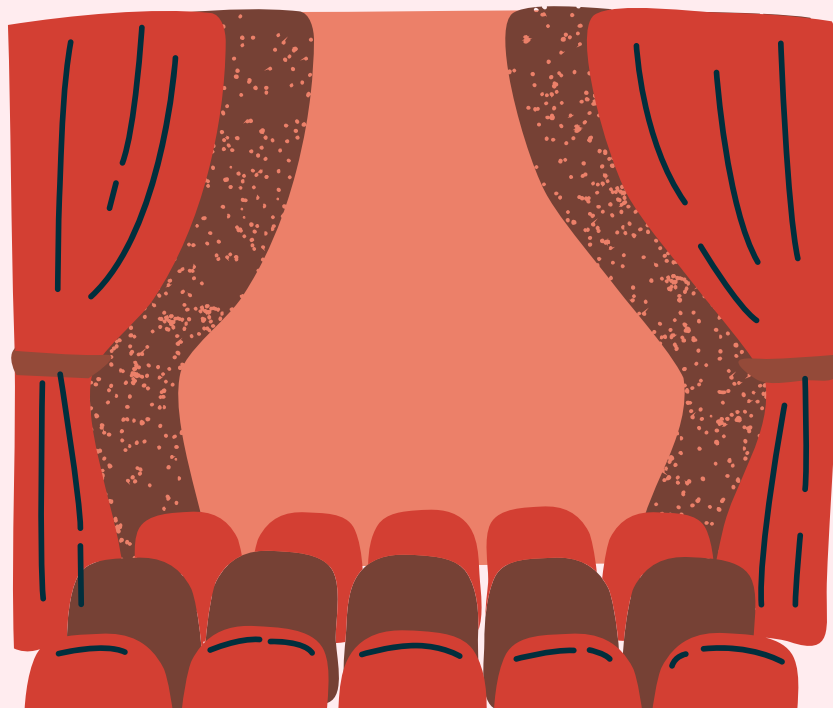


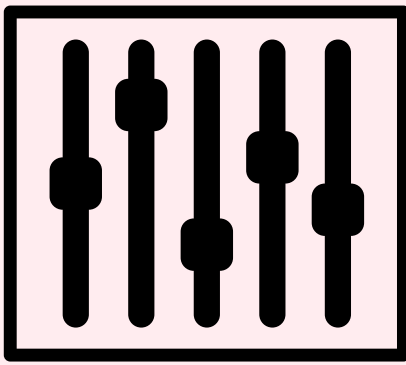
CINEMA SCREEN

MANY PEOPLE THINK CINEMA SCREENS EXIST PURELY TO DISPLAY THE FILM IMAGE, BUT THEY ARE ALSO KEY TO ENSURING HIGH QUALITY SOUND. BECAUSE THE STAGE SPEAKERS IN CINEMAS ARE PLACED BEHIND THE SCREEN, IT IS IMPORTANT THAT SOUND CAN STILL TRAVEL TO THE AUDIENCE WITH AS MUCH VOLUME, PRESSURE AND CLARITY INTACT AS POSSIBLE – PARTICULARLY SOUNDS IN THE HIGHER FREQUENCY RANGE.

TO ALLOW FOR THIS, TRADITIONAL CINEMA SCREENS HAVE TENS OF THOUSANDS OF TINY PERFORATIONS (WELL UNDER 1MM IN SIZE). A SINGLE SQUARE FOOT OF CINEMA SCREEN CAN HAVE WELL OVER 5,000 PERFORATED HOLES WHICH ALLOW THE SCREEN TO BE TERMED 'ACOUSTICALLY TRANSPARENT'. THE PERFORATIONS ARE VERY SMALL AND GENERALLY NOT VISIBLE FROM SEATS IN THE AUDITORIUM, SO DON'T USUALLY AFFECT THE PICTURE. HOWEVER, ADVANCEMENTS IN 4K DIGITAL PROJECTION AND LASER LIGHT PROJECTION HAVE MADE INTERFERENCE BETWEEN PROJECTED PIXELS AND SCREEN PERFORATIONS MORE OF AN ISSUE, WITH MOIRÉ AND SPECKLE BEING TWO OF THE UNWANTED TYPES OF INTERFERENCE WHICH CAN APPEAR. IF IN DOUBT, ENQUIRE WITH YOUR LOCAL SCREEN PROVIDER AND INSTALLER. PERFORATED SCREENS ARE BY FAR THE MOST COMMONLY USED, BUT DUE TO THE ABOVE, ANOTHER TYPE OF ACOUSTICALLY TRANSPARENT SCREEN GAINING TRACTION IS THE WOVEN SCREEN. WITH WOVEN SCREENS THERE ARE NO PERFORATIONS, INSTEAD THEIR COARSE WEAVE ALLOWS SOUND TO TRAVEL THROUGH TO THE AUDIENCE.

MASKING (THE BLACKOUT/LIGHT ABSORBING MATERIAL WHICH MOVES TO CREATE A FRAME FOR EACH RATIO) SHOULD ALSO BE CONSIDERED IN RELATION TO SPEAKER PLACEMENT. IT SHOULD BE MADE OF ACOUSTICALLY TRANSPARENT MATERIAL, AND IT IS VERY IMPORTANT THAT THE SCREEN FRAME OR SCAFFOLD DOES NOT BLOCK ANY OF THE SPEAKER DRIVERS.





MIXING DESKS

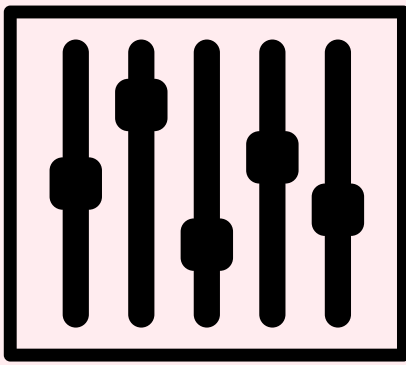
ALTHOUGH SOME CINEMAS WILL USE THE CINEMA PROCESSOR AND STAGE SPEAKERS FOR MICROPHONES RELATING TO HIRES AND EVENTS, MANY VENUES DECIDE THAT FOR INCREASED FLEXIBILITY AND PROTECTION OF

THE CINEMA SPEAKERS THEY WILL OPT FOR A SEPARATE MIXER AND PA (PUBLIC ADDRESS SYSTEM).

IN SMALL OR TEMPORARY EVENT SET-UPS IT IS POSSIBLE FOR MIXING DESKS, ALONG WITH PA SPEAKERS TO SERVE INSTEAD OF A CINEMA SOUND PROCESSOR. MIXING DESKS CAN BE DIGITAL OR ANALOGUE AND WILL HAVE VARYING AMOUNTS OF CHANNELS. THE SIZE OF THE DESK YOU REQUIRE WILL BE DEPENDENT ON HOW MANY CHANNEL INPUTS AND OUTPUTS YOU NEED FOR THE SET-UP YOU WANT TO ACHIEVE. IF YOU ARE UNCERTAIN OF YOUR NEEDS, HIRE EQUIPMENT OR INSTALL COMPANIES WILL BE HAPPY TO ASSIST AND GUIDE YOU IN YOUR CHOICES.

BLU-RAY/DVD PLAYERS, COMPUTERS AND EVEN CINEMA SERVERS CAN BE SET-UP TO WORK WITH MIXING DESKS. IT IS IMPORTANT THAT YOU HAVE THE RIGHT CABLES TO 'BREAK OUT' OF YOUR SOURCE DEVICE AND INTO THE MIXING DESK. CINEMA SERVERS CAN BE SET UP WITH DIGITAL SOUND DESKS AND WILL REQUIRE A SPECIALIST 'BREAK OUT' LOOM OF CABLES THAT CAN SEND THE AUDIO CHANNEL INFORMATION TO THE RELEVANT AES/EBU 110 OHM BALANCED XLR LINES IN THE MIXER WHERE THEY CAN THEN BE OUTPUTTED TO THE AMPLIFIERS. IF YOU ARE UTILISING A SERVER, DOLBY REFERENCE 7 WILL NEED TO BE TRANSLATED TO THE DB SCALE AT FADER POINT 0. IT IS POSSIBLE TO DO THIS BY RUNNING PINK NOISE FROM THE CINEMA SERVER OR SOURCE AT -20 DBFS AS EXPLAINED ON PAGE 51. IT CAN BE CONFUSING, AS THE SAME XLR CONNECTORS FOR INPUTS AND OUTPUTS ON A MIXING DESK ACTUALLY HAVE DIFFERENT FUNCTIONS. WHAT ARE KNOWN AS 'LINE LEVEL' INPUTS WILL GENERALLY SUFFICE FOR DVD, COMPUTER, DIGIBETA AUDIO INPUTS ETC. AND CAN BE PHONO, XLR OR JACK CONNECTORS INTO THE DESK. PROFESSIONAL EQUIPMENT TENDS TO BE +4 DBU AND CONSUMER EQUIPMENT -10 DBV, WHICH DESCRIBES THE STRENGTH OF THE SIGNAL. THE DIFFERENT INPUTS WILL USUALLY BE MARKED UP ON THE MIXER AS A GUIDE.

MICROPHONE LEVEL INPUTS ARE GENERALLY ALSO XLR CONNECTIONS, BUT THESE LINES ARE VERY LOW VOLTAGE FOR MICROPHONES. THESE INPUTS SHOULD BE LABELLED 'MIC' OR 'MIC IN' – BEAR THIS IN MIND, AS CONNECTING EQUIPMENT WITH MORE POWERFUL SIGNALS INTO LOWER LINE VOLTAGE LEVELS AT BEST DISTORT THE SOUND, AND AT WORST OVERLOAD AND DAMAGE EQUIPMENT. THE GENERAL GOAL IS TO MATCH THE EQUIPMENT TO THE RIGHT VOLTAGE LINES ACROSS ALL THE CHAIN SO THE CORRECT VOLTAGE IS ALWAYS USED. HOWEVER, CERTAIN SCENARIOS CAN OCCUR WHERE THIS IS NOT POSSIBLE. TO BRING A MIC LEVEL (MILLIVOLTS) UP TO LINE LEVEL (AROUND A VOLT) A PRE-AMPLIFIER IS NEEDED.



MIXING DESKS

IF FOR SOME REASON YOU NEED TO PLUG LINE LEVEL EQUIPMENT INTO THE MIC INPUTS, A DI BOX WILL BE NEEDED TO ATTENUATE OR 'REDUCE' THE SIGNAL SO IT IS NOT OVERLOADED.

SPEAKER LEVEL IS THE STRONGEST OF THE SIGNALS (AROUND 10 VOLTS), POST AMPLIFICATION AND AT A LEVEL NEEDED FOR POWERING PASSIVE SPEAKERS. THIS LEVEL NEEDS SPECIALIST SPEAKER CABLES AND IF OUTPUTTED INTO THE WRONG LINE OR EQUIPMENT, IT CAN CAUSE VERY SERIOUS PROBLEMS (BANG!). IF YOU NEED TO WORK WITH POST AMPLIFIED SPEAKER LEVEL AUDIO AND YOU ARE NOT WELL VERSED IN THIS AREA, IT'S HIGHLY RECOMMENDED THAT YOU CONSULT A FULLY TRAINED AUDIO TECHNICIAN.

MIXING DESKS HAVE TOO MANY ABILITIES AND FUNCTIONS TO FULLY COVER HERE, BUT BELOW ARE A FEW OF THEIR MAIN FUNCTIONS AS A START.

- › ONCE AN INPUT HAS BEEN PLUGGED INTO A CHANNEL, THE CONTROLS FOR THAT CHANNEL WILL FOLLOW THE SOUND DOWNWARDS IN A 'STRIP'.
- › THE GAIN 'POT' OR CONTROL IS WHAT SETS THE SENSITIVITY OF THE SIGNAL AND CONTROLS HOW MUCH POWER IT HAS BEFORE IT GOES THROUGH PROCESSING.
- › A RECTANGULAR BUTTON KNOWN AS A PAD WILL BE SITUATED NEARBY – THIS IS AN ATTENUATOR. THESE PROVIDE A SPECIFIC FIXED REDUCTION IN THE INCOMING SIGNAL IF IT IS TOO POWERFUL (USUALLY AROUND 20 DB).
- › EQUALISATION POTS THEN ALLOW FINE TUNING OF THE SIGNAL ACROSS HIGH, MID AND LOW FREQUENCY BANDS. IT IS HERE PROBLEM FREQUENCIES CAN BE MINIMISED, AS SHOWN ON PAGES 56 & 57.
- › THE PAN CONTROL ALLOWS YOU TO CONTROL WHERE AUDIO WILL BE LOCATED IN THE STEREO AREA. SET NEUTRALLY, SOUND WILL COME OUT OF BOTH
- THE LEFT AND RIGHT SPEAKERS; SET TO EXTREME LEFT, SOUND WILL ONLY TRANSMIT FROM THE LEFT SPEAKER AND SET TO EXTREME RIGHT, ONLY OUT OF THE RIGHT SPEAKER.
- › AUXILIARIES ALLOW FOR EQUIPMENT SUCH AS MONITORS TO BE SENT A SIGNAL. THIS CAN BE PRE-FADE, MEANING THE FADER WILL NOT AFFECT SIGNAL OR POST-FADE, MEANING IT WILL. PRE-FADE LISTEN ALLOWS YOU TO PLUG HEADPHONES IN AND MONITOR THE SIGNAL FOR SELECTED CHANNELS BEFORE THE EQUALISATION SETTINGS WERE APPLIED.
- › THE MUTE BUTTON MUTES THE CHANNEL AND THE CHANNEL FADER ADJUSTS THE OUTPUT VOLUME OF THE SIGNAL FOR THAT CHANNEL. THE MASTER FADER (AT THE FAR RIGHT OF THE DESK) DOES THIS FOR ALL CHANNELS.
- › THE MASTER OUTPUTS ARE WHERE SOUND THEN GOES ON TO THE NEXT PART OF THE CHAIN: USUALLY AMPLIFIERS, SPEAKERS OR PA SYSTEMS, ETC.



PA SYSTEMS (PUBLIC ADDRESS SYSTEMS)

MANY PERMANENT VENUES HAVE AN ADDITIONAL PA SYSTEM FOR MICROPHONES AND OTHER ANCILLARY EQUIPMENT. HOWEVER, SOME SMALL OR TEMPORARY CINEMA SET-UPS ALSO UTILISE PA SYSTEMS TO SCREEN FILMS, AS IT IS OFTEN MORE PRACTICAL AND COST-EFFECTIVE.

SOME PA SYSTEMS COME WITH A BUILT-IN MIXER AND AMPLIFIER ALLOWING YOU TO EXCHANGE INPUTS AND OUTPUTS AND MAKE ADJUSTMENTS TO THE AUDIO. EACH MIXER CHANNEL HAS VOLUME AND TONE CONTROLS, ALLOWING YOU TO MANIPULATE THE MIX.

IT'S WORTH FAMILIARISING YOURSELF WITH THE DIFFERENT SETTINGS AND EXPERIMENTING TO UNDERSTAND WHAT EFFECT YOU CAN HAVE ON THE OVERALL SOUND.

IF YOUR MIXER IS NOT POWERED, YOU WILL NEED TO CONNECT IT TO AN AMPLIFIER(S) BEFORE CONNECTING TO ANY PASSIVE SPEAKER SYSTEM. PASSIVE PA SPEAKERS ARE GENERALLY LIGHTER THAN POWERED MODELS

BUT REQUIRE SEPARATE AMPLIFICATION AND MORE CABLING. IT IS WORTH NOTING THE SIZE, DIMENSIONS AND OVERALL WEIGHT OF THE SPEAKER CONES AND CABINETS IF YOU HAVE A MOBILE OR TEMPORARY SET-UP; AS ROOM SIZE, PLACEMENT, TRANSPORTATION AND LIFTING ALL NEED TO BE TAKEN

INTO ACCOUNT. IF YOU ARE USING EQUIPMENT ALREADY INSTALLED IN A MULTIPURPOSE VENUE, YOU ARE MORE LIKELY TO BE USING A CONFIGURATION OF A TRADITIONAL PA SYSTEM. TYPICALLY, A MORE POWERFUL AMPLIFIER

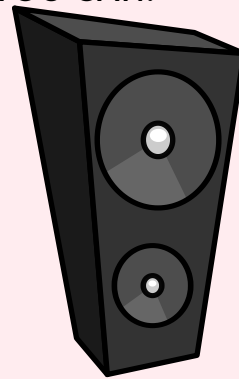
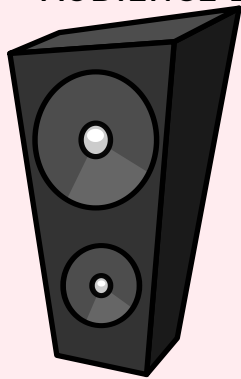
WILL BE REQUIRED THAN WHAT CAN BE ACHIEVED WITH A MULTI-CHANNEL HOME THEATRE RECEIVER.

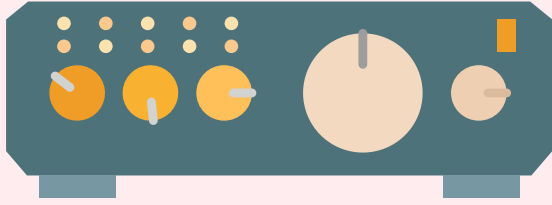
WHEN IT COMES TO MAKING AN INFORMED DECISION, THE FIRST STEP IS FINDING A REPUTABLE SUPPLIER WHO HAS A LARGE RANGE OF EQUIPMENT AND CAN RECOMMEND APPROPRIATELY FOR YOUR NEEDS. IDEALLY, THEY WILL BE WILLING TO DEMONSTRATE OR TEST THE EQUIPMENT FOR YOU IN THE SPACE YOU WILL USE IT IN.

WHETHER YOU ARE SETTING UP SPEAKERS ON STANDS OR WORKING WITH A PRE-EXISTING INSTALLED SYSTEM, IT'S IMPORTANT TO CONSIDER THE POSITIONING OF YOUR MAIN AUDIO SOURCE AND HOW IT MIGHT AFFECT THE OVERALL SOUND. WHEN

WORKING WITH A PA SYSTEM WHERE YOU CAN POSITION THE SPEAKERS ON STANDS, CONSIDER THE PLACEMENT AND ANGLE OF THE SPEAKERS. IF THEY ARE TOO HIGH, YOU MAY WASTE THE POTENTIAL BENEFIT OF YOUR SPEAKERS BY FIRING THE SOUND STRAIGHT OVER THE HEADS OF YOUR AUDIENCE. IF THEY ARE ANGLED TOWARDS A HARD SURFACE, YOU MAY END UP LARGELY HEARING REFLECTIONS WHICH MUDDY THE DIALOGUE AND DECREASE OVERALL SOUND CLARITY. IF YOU ARE UNABLE TO

ADJUST SPEAKER HEIGHT, WORK WITH THE ANGLE TO INCREASE THE COVERAGE OF YOUR SEATING AREA AS MUCH AS YOU CAN. IT CAN HELP TO VISUALISE A CONE, REPRESENTING THE SOUND ENERGY GENERATED BY THE SPEAKER, AND DIRECT IT TOWARDS AUDIENCE EAR LEVEL AS BEST YOU CAN.





AV RECEIVERS

(ALSO KNOWN AS HOME CINEMA AMPLIFIERS)

AN AV RECEIVER IS EFFECTIVELY A PROCESSOR AND AMPLIFIER BUILT INTO ONE. THE TERM 'RECEIVER' REFERS TO THE FACT THAT THEY HAVE A BUILT-

IN RADIO TUNER, BUT THEY CAN DO MUCH MORE THAN THAT. CAPABLE OF RECEIVING SIGNALS FROM A VARIETY OF SOURCES SUCH AS BLU-RAY PLAYERS OR OVER-THE-AIR TV BOXES, RECEIVERS DECODE THE SURROUND SOUND INFORMATION AND AMPLIFIES IT TO THE SPEAKERS. THEY CAN ALSO PASS THE VIDEO SIGNAL ON TO THE TELEVISION; THIS MEANS THEY CAN ACT AS A COMPLETE SWITCHING HUB FOR YOUR AUDIO AND VISUAL SHOWS. THEY ALSO ALLOW FOR HDMI SWITCHING AND CAN BE USEFUL WHEN DEALING WITH MULTIPLE VIDEO SIGNALS, AND MOST SUPPORT HIGH-END AUDIO FORMATS SUCH AS DOLBY ATMOS AND DTS: X. YOU CAN ALSO CONNECT AUDIO SOURCES, SUCH AS CD PLAYERS AND TURNTABLES FOR NON-SYNC. MANY NOW OFFER WIRELESS MUSIC STREAMING TOO.

A 5.1 OR 7.1 SET-UP CAN BE A GREAT OPTION WHEN TRYING TO RECREATE THE CINEMA EXPERIENCE OUTSIDE OF A TRADITIONAL VENUE. MOST RECEIVERS HAVE A USEFUL FUNCTION THAT ALLOWS YOU TO PROGRAMME CUSTOM FORMATS, A VARIATION OF THE COMMON 5.1 SETTING SUCH AS 3.1 OR 2.2, DEPENDING ON THE SPEAKERS CONNECTED AND YOUR PREFERRED ARRANGEMENT.

THEY ARE ALSO USEFUL FOR TESTING THE FUNCTION AND INDIVIDUAL LEVELS AND ADJUSTING THE SIZE SETTINGS FOR EACH SPEAKER. HIGHER END RECEIVERS ARE PACKAGED WITH A MICROPHONE THAT ALLOWS FOR AUTOMATIC ROOM ADJUSTMENT, WHICH CAN BE A USEFUL START IN CALIBRATING YOUR EQUIPMENT APPROPRIATELY TO YOUR SPACE. THIS IS WORTH DOING ON A REGULAR BASIS TO IDENTIFY ISSUES, SUCH AS A LOOSE CABLE, OR FOR MAKING SMALL ADJUSTMENTS TO FREQUENCY AND VOLUME SETTINGS.

THE RATING OF THE SPEAKERS YOU CHOOSE MUST BE CAPABLE OF HANDLING THE OUTPUT WATTAGE OF YOUR AV RECEIVER OTHERWISE THEY WILL BLOW – SO MAKE SURE TO RESEARCH THIS AREA CAREFULLY!

MICROPHONES

MICROPHONES ARE USEFUL FOR FILM INTRODUCTIONS, Q&AS OR PRIVATE HIRE EVENTS IN YOUR AUDITORIUM. IN TEMPORARY SET-UPS THEY CAN ALSO SERVE AS USEFUL TOOLS FOR INFORMATION UPDATES, ADVERTISING OFFERS OR EVEN CROWD CONTROL. CINEMA PROCESSORS ALLOW FOR A MIC CHANNEL THROUGH THE CINEMA SYSTEM, BUT USING A SEPARATE PA (IF YOU HAVE ONE) WILL GIVE YOU MORE CONTROL OVER THE SIGNAL.

THE TYPE OF MIC YOU UTILISE WILL BE DEPENDENT ON YOUR NEEDS. IN MOST CASES, A HANDHELD MIC WILL SUFFICE BUT IF YOU ARE RUNNING A SIT-DOWN Q&A OR A PRESENTER/PERFORMER NEEDS THEIR HANDS FREE, YOU MAY NEED TO CONSIDER OTHER TYPES OF MIC AND THINK ABOUT THE SOUND YOU ARE PICKING UP (MICROPHONES HAVE DIFFERENT WAYS OF PICKING UP SOUND/SENSITIVITIES TO IT).

OMNI DIRECTIONAL MICS

OMNI DIRECTIONAL MICS ARE SENSITIVE TO SOUND FROM ALL ANGLES AND ARE GOOD FOR APPLICATIONS WHERE THERE IS LOW BACKGROUND NOISE AND GOOD ACOUSTICS (SUCH AS RECORDING STUDIOS). IF YOU HAVE MULTIPLE PEOPLE USING ONE MICROPHONE, THIS WILL PICK UP ALL THEIR VOICES; HOWEVER, IT MAY ALSO PICK UP A LOT OF OTHER, UNWANTED SOUNDS IN A CINEMA ENVIRONMENT.

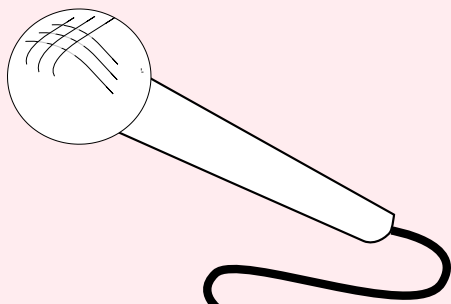
BIDIRECTIONAL MICS

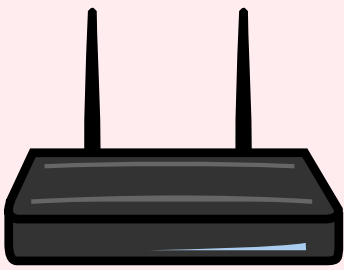
BIDIRECTIONAL MICS PICK UP SOUND FROM EITHER SIDE BUT NOT THE FRONT OR BACK. THESE TYPICALLY WON'T BE USED IN A SIMPLE INTRODUCTION OR Q&A SET-UP BEFORE A FILM BUT ARE USEFUL TO KNOW ABOUT. THEY CAN ALSO BE REFERRED TO AS A FIGURE OF EIGHT DUE TO THE SHAPE OF THE PICK-UP AREA. THEY ARE GOOD FOR RECORDING STEREO SOURCES.

UNIDIRECTIONAL MICS

UNIDIRECTIONAL MICS ARE SENSITIVE TO SOUND ARRIVING DIRECTLY IN FRONT OF THE MIC, BUT DEPENDING ON THE ANGLES, WON'T PICK UP SOUNDS TO THE SIDES OR BACK OF PLACEMENT.

THE TERMS 'CARDIOID', 'SUPER CARDIOID' AND 'HYPER CARDIOID' FALL UNDER THIS CATEGORY. CARDIOID IS THE MOST COMMONLY FOUND TYPE OF MICROPHONE AND IS LIKELY THE TYPE YOU WILL UTILISE FOR A HANDHELD INTRODUCTION OR Q&A. IN A SITUATION WHERE A MUCH NARROWER PICK-UP IS REQUIRED, WITH LESS AMBIENT NOISE COLLECTED, SUPER OR HYPER CARDIOID MICS MAY BE BEST. IF YOU ARE RUNNING AN EVENT WHERE YOU NEED TO RECORD A PERSON FROM A STAND ONSTAGE, AND THEY ARE SAT BACK FROM THE MICROPHONE, A 'SHOT-GUN' STYLE MIC WOULD BE BEST. THESE ARE AN EXTENSION OF THE SUPER AND HYPER CARDIOID MICS AND HAVE AN EVEN NARROWER DIRECTIONAL LOBAR POLAR PATTERN OF PICK-UP.





WIRELESS HANDHELD RADIO MICROPHONES WIRELESS MICROPHONE RECEIVER

WHEN YOU KNOW WHAT TYPE OF MICROPHONE YOU NEED FOR YOUR APPLICATION, IT'S IMPORTANT TO THINK ABOUT WHETHER YOU REQUIRE WIRED OR RADIO MICS.

WIRED MICS REQUIRE A 'WIRE' OR CABLE CONNECTION AND ARE POWERED BY THE MIXING DESKS THEY ARE PLUGGED INTO. A SETTING CALLED 'PHANTOM POWER' MUST BE ON FOR THEM TO WORK; THIS EFFECTIVELY MEANS THAT THE MIXING DESK ITSELF IS POWERING THE MICROPHONES. WIRED MICS DO NOT NEED ANY LICENCES AND DON'T REQUIRE BATTERIES.

WIRELESS MICS OR RADIO MICS ARE POWERED BY BATTERIES OR A BATTERY PACK AND OPERATE WITHOUT WIRES OVER RADIO FREQUENCY. THEY CAN COME IN 'STICK' OR 'HAND MIC' VARIETIES OR AS A PACK WORN ON THE BODY WITH A SMALLER MIC THAT CAN BE CLIPPED ONTO CLOTHES (LAVALIER MIC) OR WORN AS A HEADSET. THEY ARE MUCH MORE FLEXIBLE AND PORTABLE BUT REQUIRE AWARENESS OF THE LAW AROUND RADIO FREQUENCIES.

THERE ARE A FEW FREQUENCIES AVAILABLE IN THE UK WHICH DO NOT REQUIRE A LICENCE. HOWEVER, YOU WILL STILL NEED TO CHECK THAT THERE

IS NO USE OF THESE SAME FREQUENCIES BY OTHERS, NEARBY, OR YOU WILL COME ACROSS A PROBLEM KNOWN AS INTERMODULATION WHICH OCCURS WHERE EQUIPMENT USING THE SAME OR CLOSE FREQUENCIES IN NEAR PROXIMITY CAN INTERFERE WITH EACH OTHER. THIS CAN BE DISASTROUS TO A CAREFULLY PLANNED SHOW, SO CHECK WITH YOUR OWN AND OTHER NEARBY VENUES WHAT FREQUENCIES THEY USE.

GUIDE TO CINEMA AUDIO

UHF (ULTRA HIGH FREQUENCY) VHF (VERY HIGH FREQUENCY) VHF LICENCE EXEMPT CHANNELS: 173.700-175.10 MHZ

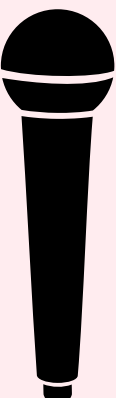
UHF LICENCE EXEMPT CHANNELS: 863.100-864.900 (CHANNEL 70) RADIO MICS UNDER 10 MW AND 50MW FOR BODY WORN TRANSMITTERS.

PMSE LICENSES ARE REQUIRED FOR ANYTHING ELSE:

- › A UK SHARED UHF LICENSE CAN GRANT ACCESS TO CHANNEL 38 – 606.500 TO 613.500 OR VHF SHARED LICENCE TO THE RANGE 175.250-209.800 MHZ. THESE ARE SHARED UK WIRELESS MICROPHONE LICENSES THAT CAN BE GRANTED TO ANYONE WHO APPLIES AND PAYS SO YOU WILL STILL NEED TO CHECK WHAT FREQUENCIES YOUR NEIGHBOURS USE TO AVOID INTERFERENCE. THESE ARE VALID FOR A YEAR, THEN WILL NEED TO BE RENEWED.
- › A STANDARD CHANNEL LICENCE CAN BE PURCHASED FROM OFCOM FOR EVENTS OPERATING IN SPECIFIC AREAS AT SPECIFIC TIMES. THE FREQUENCIES AWARDED BY THESE LICENCES ARE SPECIFICALLY COORDINATED SO THEY DON'T INTERFERE WITH OTHER RADIO FREQUENCIES IN USE NEARBY. THE FREE OR SHARE LICENCE CHANNELS SHOULD BE SUFFICIENT FOR MOST CINEMA SET-UPS BUT IN UNIQUE SITUATIONS, A STANDARD LICENCE WILL BE NEEDED. IF YOU ARE BASED OUTSIDE THE UK, PLEASE REFER TO YOUR NATIONAL AND LOCAL LAWS.

DISCLAIMER:

THE ABOVE IS STATED FOR GUIDANCE ONLY AND THE RESPONSIBILITY LIES WITH EACH USER TO ENSURE THEY HAVE THE CORRECT LICENCE FOR OPERATING THEIR EQUIPMENT ON RADIO FREQUENCY BANDS AND HAVE CHECKED THE MOST UP-TO-DATE INFORMATION THEMSELVES. THE WRITERS ARE NOT LIABLE FOR ANY PROBLEMS THAT ARISE ON THE BASIS OF THE ABOVE INFORMATION. FOR MORE INFORMATION, PLEASE REFER TO OFCOM.





WIRELESS/BLUETOOTH/RF AUDIO TRANSMISSION FOR EVENT CINEMA

WIRELESS SYSTEMS CAN BE A USEFUL AND CONVENIENT METHOD IN SOME SITUATIONS. FOR MANY DECADES, DRIVE-IN CINEMAS HAVE UTILISED FM RADIO TRANSMISSION SIGNALS TO BROADCAST FILM AUDIO SO IT CAN BE PICKED UP VIA CAR RADIO. THIS REQUIRES PROFESSIONAL RADIO BROADCASTING EQUIPMENT WHICH IS THEN CONNECTED TO THE SOUNDTRACK SOURCE. A RADIO BROADCAST LICENCE IS ALSO REQUIRED.

SILENT DISCOS HAVE GAINED MORE TRACTION IN RECENT YEARS AND THIS TECHNOLOGY (INDIVIDUAL HEADPHONES) CAN ALSO BE USED FOR POP-UP SCREENINGS OR EVENT CINEMA. YOU CAN HIRE FULL PACKAGES OF HEADSETS AND BROADCAST UNITS, BUT REMEMBER ALL HEADSETS MUST BE RETURNED OR YOU WILL FACE A BILL FOR LOSSES. YOU CAN ALSO NOW HIRE WIFI SPEAKERS WHICH UTILISE A DEDICATED NETWORK TO BROADCAST FILM AUDIO.

IN ALL OF THE ABOVE EXAMPLES, THE SOUND IS TRANSMITTED TO MULTIPLE DEVICES THAT ARE 'TUNED' IN TO BROADCAST A SIGNAL, WHETHER VIA RADIO, WIFI OR BLUETOOTH FREQUENCIES.

THERE ARE MANY COMPATIBLE BLUETOOTH DEVICES FOR SHORT RANGE CONNECTIONS, INCLUDING SPEAKERS AND AV RECEIVERS, AS WELL AS BLUETOOTH TRANSMITTERS WHICH CAN ALLOW MANY DEVICES TO TRANSMIT OR RECEIVE A BLUETOOTH SIGNAL.

HOWEVER, IT IS NOT RECOMMENDED TO USE THIS AS YOUR PRIMARY AUDIO SOURCE. DROP-OUTS AND INTERRUPTIONS ARE COMMON, LATENCY AND SYNC CAN ALSO BE TIRESOME ISSUES. RE-ENABLING AND PAIRING DEVICES CAN ALSO CAUSE LENGTHY DISRUPTION TO A SHOW. IF YOU ARE CONSIDERING USING BLUETOOTH, IT IS RECOMMENDED THAT YOU HAVE A WIRED CONNECTION YOU CAN QUICKLY SWITCH TO SHOULD ANY ISSUES ARISE.

REMEMBER THAT RF, BLUETOOTH AND WIFI ARE ALL HEAVILY REGULATED

- FROM BANDWIDTH TO THE TYPES OF DEVICES BEING USED. IF YOU DON'T FOLLOW THE LAW, YOUR SET-UP MAY CAUSE PROBLEMS FOR BOTH YOURSELF AND OTHERS. FOR MORE INFORMATION, CONTACT OFCOM.

REMEMBER TO STAY FULLY WITHIN THE LAW AT ALL TIMES AND ENSURE YOU ARE FULLY LICENSED FOR ANY RADIO FREQUENCY / WIRELESS SIGNALS YOU ARE PLANNING TO BROADCAST OR UTILISE.





NON-SYNC

(DOLBY CODES 60, 61, 62) (SHORT FOR NON-SYNCHRONISED SOUND) IS A TERM UTILISED FOR 'WALK-IN' MUSIC AND REFERS TO NON-FILM AUDIO UTILISED BY THE PROJECTIONIST TO SET THE MOOD FOR OF THE FILM. IT WILL OFTEN BE INDICATED ON SOUND PROCESSORS AS 'NS'. TO PLAY MUSIC IN A VENUE, YOU NEED A PRS (PERFORMING RIGHTS LICENCE) AND MUSIC TRACKS SHOULD BE UTILISED FROM THE PRS TRACK REGISTER.

SPOTIFY AND OTHER MUSIC STREAMING SERVICES ARE GREAT TOOLS FOR SOURCING MUSIC, BUT CANNOT BE USED IN THIS INSTANCE AS THEY DO NOT LICENCE THE APPLICATION FOR COMMERCIAL USE. HOWEVER, SOUNDTRACK YOUR BRAND IS A SIMILAR SERVICE THAT IS AVAILABLE FOR COMMERCIAL USE AT A FEE.

FOR TEMPORARY VENUES THE ABOVE STILL APPLIES. DO ALSO CHECK WITH YOUR LOCAL AUTHORITY REGARDING EVENT LICENSING.

IT IS BEST PRACTICE TO FIND MUSIC THAT REFLECTS THE ERA, CULTURAL, GEOGRAPHICAL REGION AND/OR MOOD OF THE FILM THAT IS BEING SHOWN. DO YOUR RESEARCH AND BE SENSITIVE TO THE ORIGINS, POLITICAL OR RELIGIOUS LEANINGS AND CONTENT OF SONG LYRICS. FOR INSTANCE, SONGS WITH ADULT CONTENT OR PROFANITY ARE NOT IDEAL WHEN RUNNING A U CERTIFIED FILM FOR FAMILY AUDIENCES. SOME PROJECTIONISTS WILL PLAY THE OFFICIAL SOUNDTRACK OF A FILM BEFORE IT PLAYS BUT THIS IS GENERALLY NOT RECOMMENDED, AS HEARING THE SAME MUSIC BEFOREHAND CAN LESSEN ITS IMPACT WITHIN THE FILM ITSELF. GOOD PRESENTATION IS IMPORTANT, AND IDEALLY YOU WILL TIME YOUR MUSIC TO END JUST AS THE FILM IS ABOUT TO START. IF THIS ISN'T POSSIBLE, MOST CINEMA AUDIO PROCESSORS HAVE A MUTE BUTTON PROGRAMMED TO HAVE A FIVE SECOND FADE IN AS THE FILM STARTS. THE SAME CAN BE ACHIEVED ON A MIXING DESK WITH A SLOW FADER PULL DOWN. THE MOST IMPORTANT THING IS TO NOT ABRUPTLY STOP THE MUSIC MID-TRACK AND THEN START THE FILM, AS IT CREATES A PREGNANT PAUSE THAT CAN SEEM LIKE A TECHNICAL PROBLEM TO THE AUDIENCE. A REMOTE PROCESSOR CONTROL PANEL FOR NON-SYNC SELECTION



SOURCING PRINTS FILM PROJECTION

THE DOMINATION OF DIGITAL CINEMA OVER ANALOGUE FILM PROJECTION

IS ALMOST COMPLETE AND FEWER FILM PRINTS ARE STRUCK YEAR ON YEAR. THEREFORE, THE LARGE MAJORITY OF AVAILABLE PRINTS MUST BE SOURCED FROM FILM ARCHIVES, STUDIOS, AND PRINT REPOSITORIES. THERE ARE GOOD SOURCES OF 35MM PRINTS—THE BRITISH FILM INSTITUTE'S DISTRIBUTION ARM HAS A LARGE SELECTION OF PRINTS AND CAN OFFER ADVICE ABOUT WHERE TO FIND PRINTS THEY DON'T HAVE AVAILABLE IN THEIR CATALOGUE. PARK CIRCUS ALSO HAS A VERY LARGE CATALOGUE OF 35MM AND RECENTLY AN INCREASING CATALOGUE OF 70MM. FTS BONDED SERVICES KEEP A LARGE SELECTION OF FILM PRINTS AND IT ALSO WORTHWHILE CONTACTING INTERNATIONAL SALES AGENTS SUCH MK2, THE MATCH FACTORY OR PLAYTIME.

MANY ARCHIVES AND SOME STUDIOS WILL ONLY LOAN PRINTS TO MEMBERS

OF INTERNATIONAL FEDERATION OF FILM ARCHIVES (FIAF) AND CINEMAS THAT THEY HAVE DEALT WITH BEFORE. FILM ARCHIVES TEND TO REQUIRE A HIGH DEGREE OF ASSURANCES ABOUT LOANING PRINTS, ALL WILL EXPECT THEIR PRINTS TO BE SHOWN ON DUAL PROJECTOR SYSTEMS AND CHANGEOVERS AND DETAILED PRINT CONDITION REPORTS FILLED OUT PRIOR AND POST SCREENINGS. IF THESE STANDARDS CAN BE MET THEN IT WILL BE POSSIBLE TO BOOK ARCHIVE FILM PRINTS AND THERE ARE MANY NATIONAL AND INTERNATIONAL ARCHIVES WITH LARGE CATALOGUES. IN THE UK, THE BFI NATIONAL FILM AND TV ARCHIVE HAS THE LARGEST COLLECTION AND INTERNATIONALLY THERE ARE MANY OTHERS SUCH AS THE LIBRARY OF CONGRESS OR GEORGE EASTMAN HOUSE. FIAF IS A GOOD SOURCE OF INFORMATION ON INTERNATIONAL ARCHIVES.

IN THE CONTEMPORARY FILM LANDSCAPE, ALL PRINTS, IRRESPECTIVE OF WHERE THEY HAVE BEEN SOURCED, SHOULD BE REGARDED AS PRECIOUS AND IRREPLACEABLE AND AS SUCH, TREATED WITH GREAT CARE DURING PROJECTION.

PRINT INSPECTION AND MAKEUP
CAREFUL PRINT MAKEUP AND INSPECTION IS A VITAL PART OF THE
PROCESS

OF SCREENING FROM FILM. WHETHER IT IS 16MM, 35MM OR 70MM, A PRINT MUST BE THOROUGHLY INSPECTED TO ENSURE THAT THERE WILL BE NO ISSUES WITH PROJECTING IT. AN AVERAGE LENGTH 35MM FEATURE FILM WILL ARRIVE ON FIVE TO SEVEN REELS, EACH 35MM REEL USUALLY HOLDS UP TO 20 MINUTES OF SCREEN TIME. IT IS THE RESPONSIBILITY OF THE PROJECTIONIST

TO "MAKEUP" THE REELS ONTO SPOOLS IN ORDER TO PROJECT THE FILM. DEPENDING ON THE SOURCE OF THE PRINT, THIS CAN BE ONE 2000-FOOT SPOOL PER REEL FOR ARCHIVE FILM, UP TO THREE REELS PER 6000-FOOT SPOOL FOR NON-ARCHIVE OR 'RELEASE' PRINTS PROJECTED USING CHANGEOVERS, OR ALL REELS ON TO ONE LARGE PLATE FOR LONG PLAY SYSTEMS. TODAY'S PRINTS WILL MOST LIKELY NOT BE BRAND-NEW DIRECT FROM THE LABORATORY AND WILL HAVE BEEN SCREENED BEFORE, POTENTIALLY MANY TIMES.

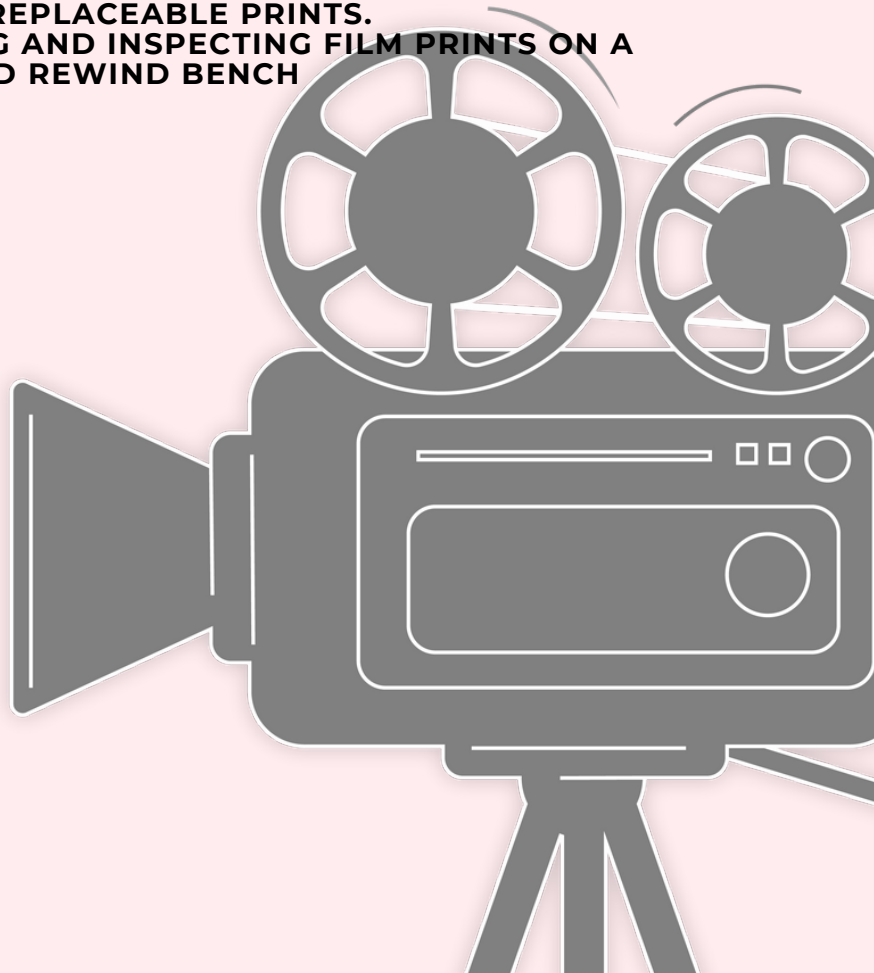
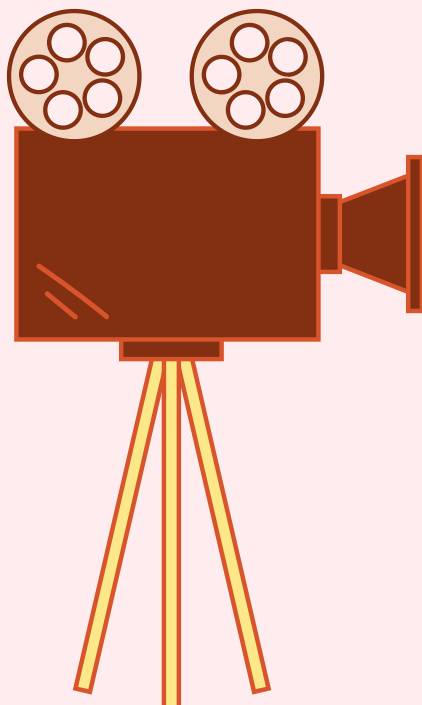


NIGHTSPOT CINEMA

MAKE UP CAN BE A LONG AND INVOLVED PROCESS WHICH WE'LL TOUCH ON HERE ONLY BRIEFLY.

INITIALLY, THE PROJECTIONIST MUST CHECK ALL THE REELS HAVE ARRIVED AND THEY ARE ALL FROM THE CORRECT FILM. THIS CAN BE DONE BY LOOKING AT THE FILM CANS, BUT REALLY SHOULD BE CONFIRMED BY LOOKING AT THE PRINT ITSELF, THE LEADERS AND TAILS IN PARTICULAR. THE PROJECTIONIST MUST ALSO ASCERTAIN THE ASPECT RATIO AND THE SOUND FORMAT. ANY FILM SPLICES OR JOINS MUST BE CHECKED TO ENSURE THEY ARE SOUND AND HAVE THE CORRECT NUMBER OF PERFORATIONS ON THE FRAMES EITHER SIDE OF THE JOIN. ALL THE PERFORATIONS MUST BE SOUND AND NOT TORN AND IF THE FILM IS RUNNING ON CHANGEOVERS THEN CUE DOTS MUST BE CHECKED TO ENSURE THEY ARE VISIBLE AND IN THE RIGHT PLACE-A MISSED CHANGEOVER IS EMBARRASSING FOR THE PROJECTIONIST AND ANNOYING FOR THE AUDIENCE. ANY ISSUES NOT PICKED UP DURING THE INSPECTION CAUSE PROBLEMS DURING SCREENING-BAD JOINS AND TORN PERFORATION ARE THE PRINCIPAL CAUSE OF STOPPAGES DURING A SCREENING.

AT ALL TIMES DURING MAKEUP GREAT CARE MUST BE TAKEN TO AVOID ANY UNNECESSARY DAMAGE TO THE PRINT. MAKEUP AREAS SHOULD BE KEPT CLEAN AND FREE FROM COFFEE CUPS. WHEN LIFTING REELS OUT OF CANS, CARE SHOULD BE TAKEN NOT TO ALLOW CENTRES TO DROP OUT OF THE REEL. REWINDING SHOULD ALWAYS BE DONE WITHOUT LOSING CONTROL AND GLOVES SHOULD BE WORN ON AT LEAST ONE HAND TO AVOID ANY ADDITIONAL DIRT BUILD UP. IF A PROJECTIONIST IS CONSCIENTIOUS, A PRINT CAN OFTEN LEAVE THE PROJECTION BOX IN A BETTER CONDITION THAN WHEN IT ARRIVED, SLAP DASH MAKE UP AND PRINT HANDLING WILL DAMAGE IRREPLACEABLE PRINTS. PROJECTIONISTS HANDLING AND INSPECTING FILM PRINTS ON A FLATBED REWIND BENCH





OPERATION

THE EFFICIENT AUTOMATED PLAYLIST OF THE CONTEMPORARY MULTIPLEX HAS MEANT THE LOSS OF SOME OF THE PERFORMATIVE ELEMENTS OF A NIGHT AT THE CINEMA. AN ANALOGUE FILM SCREENING SHOULD BE VIEWED AS A PERFORMANCE AND THE PROJECTIONIST'S ROLE IS TO EASE THE AUDIENCE INTO THE FILM WITH AS LITTLE FRICTION AS POSSIBLE. THIS HUMAN INVOLVEMENT ALSO ALLOWS EXTRA DETAILS TO BE CONSIDERED, SUCH AS CAREFULLY SELECTING PLAY-IN MUSIC AHEAD OF THE SCREENING AND THE ADDITION OF THEATRICAL ELEMENTS SUCH AS CURTAINS AND SPECIFIC LIGHTING TO ADD SHOWMANSHIP TO A SCREENING.

PRE-SHOW CHECKS

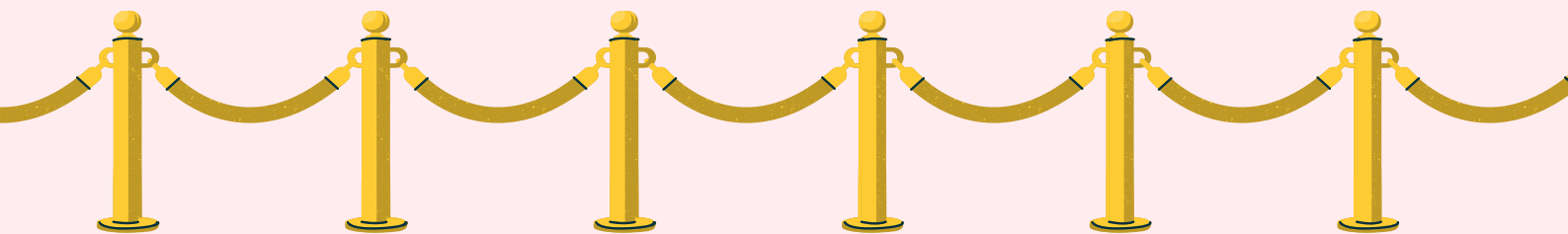
DURING OPERATION THE PROJECTIONIST IS RESPONSIBLE FOR EVERYTHING THAT HITS THE SCREEN OR TAKES PLACE IN THE AUDITORIUM. AHEAD OF THE HOUSE OPENING TO THE AUDIENCE EVERYTHING SHOULD BE DOUBLE CHECKED TO ENSURE THERE WILL BE NO ERRORS. ALL EQUIPMENT NEEDS TO BE SWITCHED ON, THE PROJECTOR AND PORTHOLES FULLY CLEANED, THE SPOOLS (OF THE CORRECT FILM!) PLACED ON THE PROJECTOR, THE CORRECT LENS AND APERTURE PLATE SHOULD BE IN PLACE AND THE MASKING SET FOR THE CORRECT ASPECT RATIO. THE LAMP SHOULD BE ON AND RUNNING AT THE CORRECT BRIGHTNESS. BEFORE A SCREENING, IF THERE IS TIME, IT IS WISE TO PUT A REEL ON SCREEN TO CHECK THAT THE FOCUS IS CORRECT.

FOR MOST CINEMAS RUNNING 35MM, LINING UP A SHOW WILL ALSO INCLUDE RUNNING DIGITAL ADVERTS AND TRAILERS, SO THIS SHOULD ALSO TAKE PLACE IN ADVANCE. IT'S USEFUL TO REHEARSE THE TRANSITION FROM DIGITAL TO ANALOGUE PRESENTATION TO MAKE SURE IT'S AS SMOOTH AS POSSIBLE.

THE SHOW

THERE IS A REPEATABLE CHAIN OF ACTIONS AT THE START OF A FILM SCREENING AND THIS IS THE POINT WHERE THE PROJECTIONIST NEEDS TO BE FULLY FOCUSED ON WHAT NEEDS TO HAPPEN. MUSIC MUST BE FADED, HOUSE LIGHTS DROPPED, CURTAINS OPENED, THE PROJECTOR STARTED, SOUND FORMAT SELECTED, PROJECTOR DOUSER OPENED AND SOUND UNMUTED, ALL IN A FLUID SEQUENCE. ONCE THE FILM IS ON SCREEN, THE GATE TENSION, FRAMING AND FOCUS SHOULD BE CHECKED, FOLLOWED BY A QUICK TRIP TO THE AUDITORIUM TO MAKE SURE THE VOLUME IS CORRECT FOR THE AUDIENCE. IT'S ALWAYS BEST TO CHECK THE VOLUME IS CORRECT ON A SCENE OF DIALOGUE. VOLUME IS VERY SUBJECTIVE AND IS ONE OF THE MOST COMPLAINED ABOUT ASPECTS

OF FILM PROJECTION. THERE'S A BALANCE TO BE FOUND BETWEEN ENSURING A FILM SOUNDTRACK HAS IMPACT BUT DOES NOT OVERWHELM OR BECOME PAINFUL FOR AUDIENCES WITH A WIDE RANGE OF AUDITORY SENSITIVITY, AND THIS IS NOT ALWAYS EASY TO GET RIGHT.





APART FROM THE VOLUME CHECK, IF POSSIBLE A PROJECTIONIST SHOULD REMAIN IN THE PROJECTION BOX FOR THE DURATION OF THE FILM, THIS CAN SEEM LESS ESSENTIAL WHEN RUNNING A LONG PLAY SYSTEM, BUT WITH PRINTS BECOMING MORE PRECIOUS, PROJECTIONISTS NEED TO KEEP AN EYE OUT FOR ANY ISSUES. FOCUS, OR FRAMING CAN CHANGE OVER THE COURSE OF A FILM AND EQUIPMENT CAN FAIL, SO SOMEONE ON HAND TO KEEP THE IMAGE LOOKING GOOD ON SCREEN OR PREVENT EXCESS DAMAGE IS IMPORTANT. IF TWO PROJECTORS ARE USED, CHANGEOVERS WILL NEED TO BE UNDERTAKEN. A CHANGEOVER SHOULD ALLOW A SEAMLESS TRANSITION FROM ONE REEL.

TO THE NEXT AND EXCELLENT TIMING AND CONCENTRATION IS NEEDED TO MAKE IT A SMOOTH ONE. WHILST THE OUTGOING REEL IS RUNNING, THE INCOMING REEL SHOULD BE LACED AND READY TO GO. TIMINGS CAN VARY FROM PROJECTOR TO PROJECTOR BUT THE INCOMING REEL CAN OFTEN BE LACED WITH EIGHT FEET OF LEADER AHEAD OF THE START OF THE ACTUAL PICTURE.

WITH A MINUTE OR SO TO GO BEFORE THE END OF THE OUTGOING REEL THE PROJECTIONIST SHOULD READY THEMSELVES AT THE PORTHOLE NEXT TO THE INACTIVE PROJECTOR AND LOOK AT THE TOP RIGHT CORNER OF THE SCREEN. WHEN THEY SPOT THE FIRST SET OF FOUR CUE DOTS—THESE ARE ON SCREEN FOR A SIXTH OF A SECOND—THE START BUTTON IS PRESSED ON THE PROJECTOR AND A SHORT PAUSE THE LAMPHOUSE DOUSER IS OPENED AND THE SECOND CUE DOTS ARE AWAITED. JUST OVER SEVEN SECONDS AFTER THE FIRST SET OF DOTS THE SECOND SET OF FOUR WILL APPEAR. AT THIS POINT THE PROJECTIONIST WILL PRESS TWO BUTTONS, ONE TO SHUT THE CHANGEOVER SHUTTER ON THE OUTGOING PROJECTOR AND OPEN THE SHUTTER ON THE INCOMING PROJECTOR, THE OTHER BUTTON CHANGES OVER THE SOUND. AFTER SEVEN SECONDS, THE LEADER WILL HAVE RUN THROUGH THE PROJECTOR AND THE SHUTTER AND SOUND WILL OPEN ON THE PICTURE SECTION OF THE INCOMING REEL. REPEAT UNTIL ALL THE REELS HAVE FINISHED.

THE FINAL ACT OF A FILM SCREENING IS TO BRING THE LIGHTS UP AND CLOSE THE CURTAINS AT THE END OF THE FILM, AS THE DOUSER IS CLOSED AND THE SOUND IS MUTED.

FOR BOTH AUDIENCE AND PROJECTIONIST, THERE IS MUCH PLEASURE TO BE HAD FROM AN INCIDENT FREE SHOW AND THE LESS THE FORMER RECOGNISES THE HARD WORK OF THE LATTER DURING THE SCREENING, THE BETTER.





APPENDIX 1 -

**CINEMA ENGINEERS AND SYSTEMS INTEGRATORS
PROJECTION EQUIPMENT SALES AND INSTALLATION
BELL THEATRE SERVICES
UNIT 9B CHESTER ROAD BOREHAMWOOD HERTFORDSHIRE
WD6 1LT
020 8238 6000 ADMIN@BELL-THEATRE.COM SALES@BELL-
THEATRE.COM
CINEMANEXT UK
AN YMAGIS GROUP COMPANY ESKDALE ROAD, RIVERSIDE HOUSE
MIDDLESEX
UB8 2RT-UXBRIDGE
UNITED KINGDOM
0203 6958473 CONTACT.UK@CINEMANEXT.COM
SOUND ASSOCIATES LTD
KEEBLE HOUSE,
81 ISLAND FARM ROAD WEST MOLESEY, SURREY KT8 2SA
020 8939 5900 INFO@SOUNDASSOCIATES.CO.UK**

**ONLINE GUIDE
A GUIDE TO FILM PROJECTION
ROSBEEKTECHNIEK
SIR WINSTON CHURCHILLLAAN 309 2287 AA RIJSWIJK ZH
NETHERLANDS
TEL: +31 70 319 40 71 MOB: +31 653 334 165
INFO@ROSBEEKTECHNIEK.NL
MASKING, CURTAINS AND SCREEN INSTALLATION ENGINEERS**

**POWELL CINEMA ENGINEERS
UNIT 8 & 9, LEIGHTON INDUSTRIAL PARK, BILLINGTON ROAD,
LEIGHTON BUZZARD,
BEDS, LU7 4AJ
01525 383054 INFO@POWELLLED.COM**

**CAMSTAGE
BATFORD MILL INDUSTRIAL ESTATE, LOWER LUTON RD,
HARPENDEN AL5 5BZ
01727 830151 CAMSTAGE.COM/CONTACT-US**

BELL THEATRE

CINEMANEXT UK

**SOUND ASSOCIATES LTD
OMNEX PRO FILM
MISSION HALL,
9-11 NORTH END RD, LONDON W14 8ST, UK
0161 477 7633 INFO@OMNEX.CO.UK**

**INDEPENDENT CINEMA OFFICE
OMNEX PRO FILM**



APPENDIX 2:

RESOURCES

**HTTP://WWW.FILM-TECH.COM/VBB/–GREAT FORUM FOR USEFUL
ADVICE AND EQUIPMENT INFORMATION, EQUIPMENT SALES AND
REQUESTS**
**HTTPS://IN70MM.COM/–FOCUS ON 70MM BUT USEFUL FOR ALL FILM
INFORMATION AND OCCASIONAL EQUIPMENT SALES**
**HTTP://WWW.WIDESCREENMUSEUM.COM/–GOOD INFORMATION ON
ASPECT RATIOS AND FILM HISTORY**
**HTTPS://WWW.FIAFNET.ORG/–HOME PAGE OF INTERNATIONAL
FEDERATION OF FILM ARCHIVES**

ROSBEEKTECHNIEK

POWELL CINEMA ENGINEERS

CAMSTAGE

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**A GUIDE TO FILM PROJECTION
RESOURCES**

**THE ART OF FILM PROJECTION: A BEGINNER'S GUIDE
ROCHESTER, NY: GEORGE EASTMAN MUSEUM, 2019 ISBN
9780935398311**

GREAT ACCESSIBLE BOOK ON ALL THINGS FILM PROJECTION.

**THE ADVANCED PROJECTION MANUAL
TORKELL SÆTERVADET, FIAF/NORSK FILMINSTITUTT, 2005, ISBN:
9782960029611**

**THOROUGH AND AUTHORITATIVE BOOK ON FILM PROJECTION.
BKSTS CTC PROJECTIONISTS' HANDBOOK**

NIGHTSPOT CINEMA

@Nightspotcinema