

# Principle of Working Radio and Television Broadcasting Theory and Facility

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## ABSTRACT

Technological developments relating to Broadcasting have been progressing very rapidly. That is the workings, systems, and devices in the broadcasting system contained in radio stations and television stations, as well as the receiver's development can also receive from the broadcasting station broadcasters. The workings of systems and devices that are commonly used systems of radio and television broadcasting stations are commonly operated by operators in order to broadcast to listeners or spectator viewers broadcasting stations.

Keywords: Broadcasting system, radio station, television station

## ABSTRAK

Perkembangan teknologi yang berhubungan dengan *Broadcasting* telah mengalami perkembangan yang sangat pesat. Yaitu cara kerja, sistem, dan perangkat pada *sistem broadcasting* yang terdapat pada *stasiun radio* dan *stasiun televisi*, juga perkembangan penerima juga dapat menerima dari pemancar stasiun broadcasting tersebut. Cara kerja dari Sistem dan perangkat yang biasanya digunakan pada system stasiun broadcasting radio dan televisi yang dapat dioperasikan operator agar dapat menyiarkan berita berupa gambar dan teks kepada pendengar ataupun penonton stasiun broadcasting.

Kata kunci :Sistem broadcasting, stasiun radio, stasiuntelevisi

## I. Introduction

### A. Understanding Broadcasting System

Broadcasting is the dissemination of audio and video content to a scattered audience through radio, television, or other media. The recipient can be a large public or some large public group (See Wikipedia on the definition of broadcasting). The origin of the term broadcasting refers to the phenomenon in agricultural land on the activity of spreading the seeds in vast land. The term was first adapted by past radio engineers in the Midwestern region of America. They refers to the spread of analog radio broadcasting signals, with the shape resembling the spreading of seeds on the

farm. At that time broadcasting is a mass media segment that is very large Broadcasting aimed at a very narrow range of audience called narrow casting. In line with the technological developments of electronic components of broadcasting systems exist

3 systems are used, there is :

- broadcasting radio
- broadcasting tv (tv broadcasting)
- internet broadcasting (Streaming Radio and TelevisionStreaming)

The discovery of a television system is transmissions by sound (audio) and image (video) signals. There are three interrelated parts, namely TV studios, TV transmitters and TV receivers. The principle block

diagram of a television broadcast system can be described in block diagram as in the following images 1.1 and 1.2 :

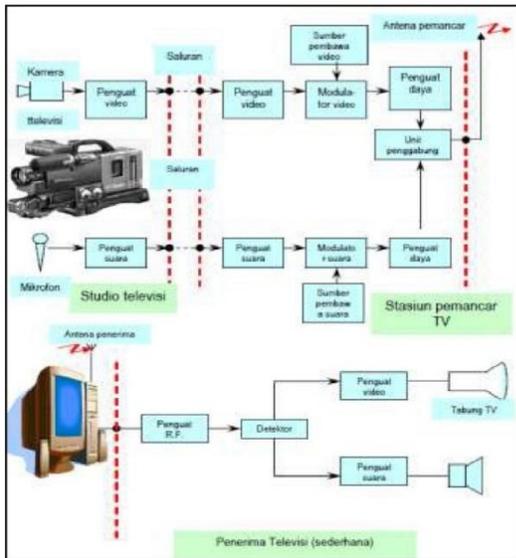


Image 1.1 Simple Principles of a Television Broadcasting System and Television Receiver

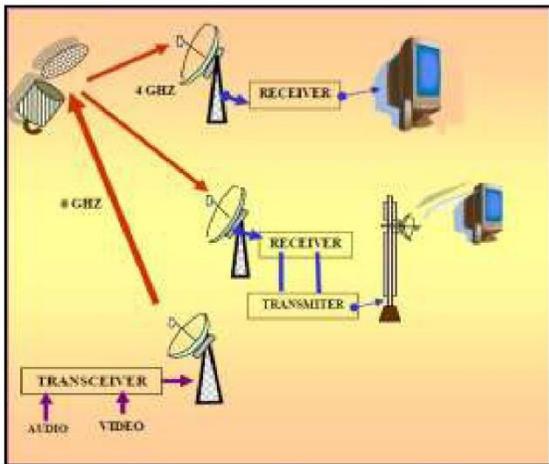


Image 1.2. Communication Broadcasting TV Broadcasting System

The types of production that can be transmitted is the result of field production and studio production that is processed by using equipment:

1. Field Production

ENG (Electronic News Gathering) - Electronic News Production The process of video recording of news types using portable devices such as portable VCR cameras and 1 microphone, with a cameraman crew accompanied by a director who also doubles as a reporter. EFP (Electronic Field Production) - Electronic Field Production Same as ENG, only types of programs produced are documentary, *sinetron* (film style). MCR (Multi Camera Remote) Field Production using more camera and 1 microphone, with switchers, multiple monitors, sound system audio. Production recorded is *sinetron*, music, sport, etc.

2. Studio Production

Live - The program is broadcast live, the stage of production is the final stage in the process. Most news programs, sports, state ceremonies are broadcast live. Video Taping - (recorded in video tape) Live on Tape Production goes on without stopping, until the end of the program, editing only in special cases (insert editing). Recorded segment

**B. How the Aircraft Television Receiver**

Works In order to work and display images from your favorite TV stations, the television consists of parts that support each other to work. Broadly speaking the television parts are Antenna, Power supply (power), Tunner, Rangkain video detector, Video amplifier suite, and Audio Series. The following outline the way television works (see image 1.3)

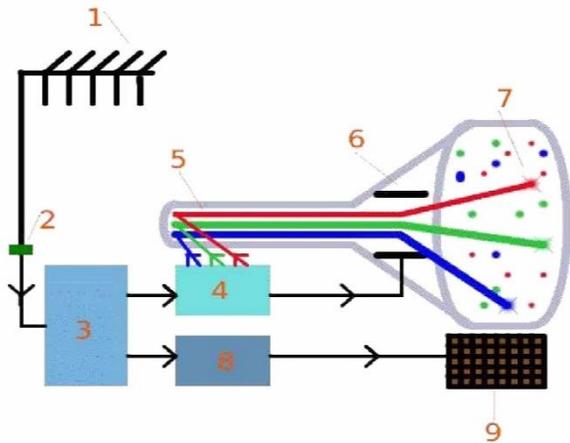


Image 1.3. How Television works

#### 4. Working Principle In Image

Viewer Tool The development stage of the drawing tool used today is actually divided into two phases. The first phase in 1855 was marked by the discovery of cathode ray tubes by German scientist Heinrich Geißler. He is the father of the tube monitor. Then, 33 years later, Austrian chemist Friedrich Reinitzer laid the foundation for developing LCD technology by discovering liquid crystals. The tube technology since the beginning was developed for realizing monitors. However, liquid crystals are still a chemical phenomenon for the next 80 years. At that time, the display frame rate or even thought. During this time, many consider that Karl Ferdinand Braun as the inventor of the cathode ray tube. In fact, he was the first application maker for the tube, the oscilloscope in 1897. It was this device that became the basis for the development of other devices, such as televisions or radar screens. That same year, Joseph John Thomson invented the electrons, which accelerated the development of the tube technique.

##### a. CRT

In 1897 Karl Ferdinand Braun, a German scientist who made a television (TV) tube (cathode ray tube / CRT). The image tube in the receiver converts the video signal back into visual information. The electron file

pays all the image elements from the left right in a horizontal line and all in order from top to bottom.

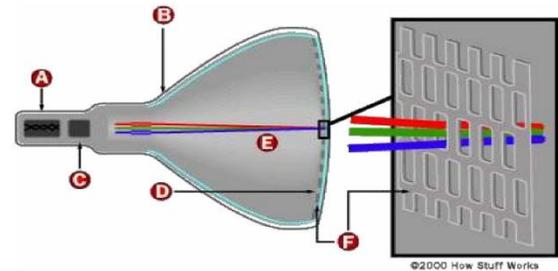


Image 1.4. CRT Tubes

##### b. LCD

LCD technology is not really a new thing. The LCD was first tested in RCA's electronic lab laboratory in the United States, by George Heilmeyer in 1968. He tested LCD-based dynamic scattering mode (DSM). A year later, Optel's Heilmeyer company then produced the LCD. LCD commonly used to display audio visual. This LCD performs electrical control on the light by polarizing the existing liquid crystals on the media cells that apply the LCD.

Polarization is done after there is electrical contact on the fluids that exist on the cells on the TV. The three LCD system also has better image processing capabilities, resulting in better images as well.

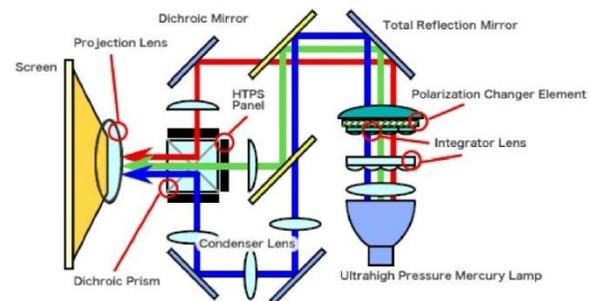


Image 1.5. How LCD works

### c.OLED

Color TV OLED information is produced using an organic carbon-based mixture, which emits red, blue and green light in response to electric currents. OLED The ultimate difference from LCDs in the absence of backlight and no "to crooked" crystals. No additional light source is needed to energize organic mixtures, so they use very little power and can be produced with a thin profile. OLED TV panels come with either two or three layers that are organically mixed; lies a great thin layer of "glass". The panel is supported by a plexiglass material that also protects sensitive inside materials.

In addition to images, the television transmitter also carries the sound signals transmitted along with the image signal. Television broadcasting actually resembles the sound of a radio system but includes images and sound. The sound signal is transmitted by frequency modulation (FM) to a separate wave in one transmitter channel equal to the image signal. The modulated image signal is similar to a previously known radio transmitting system. In both cases, the amplitude of a radio frequency carrier wave (RF) is made variable to voltage modulator. Modulation is a signal of base frequency field (base band). Frequency modulation (FM) is used in voice signals to minimize or avoid noise and interference. The FM voice signal in television is basically the same as in FM radio broadcasting but the maximum frequency swing is not 75 KHz but 25 kHz.

## C. PRODUCTION BROADCASTING (BROADCASTING)

### A. Statistics Broadcasting Radio

On the radio station required some hardware and software equipment. This system includes input, process and output equipment. Equipment inputs include microphone, PC, CD / cassette player,

telephone network, and SMS network. While the process is an audio mixer, audio processor, and FM transmitter. For internal output there are headphones, left and right speaker monitors to control the sound output from inside the radio. While the external output there is an antenna mounted on the pole BTS on top of the broadcast building ready to emit FM signal from Radio station. On the radio COSMO one of the stations radio in the city of Bandung put the pole BTS placed  $\pm 50$  km. Equipment and installation in stations radio can be described as in Figure 1.6 below:

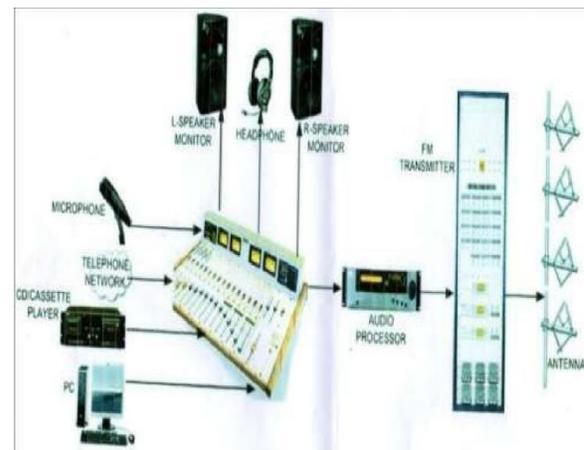


Image 1.6. Broadcasting System on Radio

#### 1. Microphone

Microphone (microphone) is a device that can convert the vibration of sound into electrical vibration. Microphone is one of the main sources and is a recording studio input (production studio). Being very sensitive to receiving sound vibrations, microphone laying requires special settings to prevent unnecessary sound from coming in to vibrate the microphone membrane. The vibratory conductor media travels through the wires.

#### 2. PC

PC in the broadcast room serves as a control tool either from the announcer or from the

recipient phone, sms, or technicians. Control tool on PC i using a software. Software used can be designed in local software that is made by as needed station radio it self or used software circulating in the market like named matrix. This software works to take and organize songs on playlists, organize advertisements on radio (using traffic theory), connect between broadcasters with technicians and telephone recipients, also connect broadcasters to be able to see incoming SMS from telephone and SMS network that is often used on radio stations when requested by radio listeners.



Image 1.7. PC and Matrix Software used

## 2. CD / Cassette Player

The function of CD/Cassette Player is almost the same as PC but this is more specific, that is used only to play a song or music.

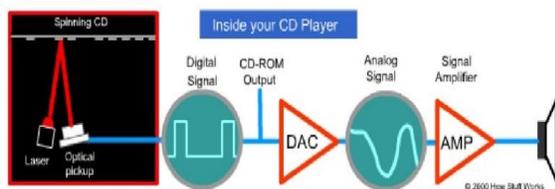


Image 1.8. CD Player Working Scheme

## 4. Telephone Network

Telephone network on cosmo radio serves to receive and accommodate the song requests on radio stations coming from listeners who call to the radio. Of course this network

phone is governed by the operator that serves to set the traffic on phone calls and receive calls from the listeners.

## 5. SMS Network

SMS network on Cosmo Radio Bandung station is not much different function with the phone network. However, there is only difference from the source only. On SMS network serves to receive and accommodate the song requests on radio stations coming from listeners who send SMS to the radio.

## 6. Broadcast Mixer

Mixer is a tool for managing electrical signals from studio microphones, tape recorders, and processor signals. The operator moves this gesture with the knob / button, then redirects the signal to the tape recorder, the processor signal, and the power amplifier monitor. There are now many audio mixer outs that not only serve as a mixer but also as an audio processor called consul or many who call the consul mixer.

Operating this one tool is a bit difficult, but if you are determined you can master it. You should be able to memorize the mixer chanel you use that is chanel microphone, computer, hybrid phone, VCD / DVD, relay device, etc . Then you will automatically know the position of the fader (the button is moved from bottom to top). Do not forget to pay attention to the light / display level indicator in your mixer, so you can match the volume intensity of your songs and microphone.



Image 1.9. Mixer used

## 7. Audio Processor

Audio processor is a digital voice signal processor. With the help of this processor then all audio signals either music, vocals, or synthesizer that was not clear or not heard at all will sound clear and transparent. To support this then provided some setting buttons and LCD screen to know the desired parameters. Audio processor used in Radio Cosmo Bandung also features 3 simulation surround effects of BBE eala, VIVA HD3D sound and simulated surround. BBE eala (surround buata NJRC) is a sound signal reproduction process that produces surround effects with vocal clarity orientation. Shadow sound will be highlighted the original sound equivalent so that the sound will become richer, detailed, wailing and shouting but the vocals are not defective. VIVA HD3D sound is a signal reproduction process similar to eala but added 3 dimensional effect, so the room feels wider. While simulated surround is simulate mono signal into stereo shadow. Using this series of low tones will sound full blast, middle tones like vocals and so on will sound very open, and high notes will jangle smoothly. Nice to hear and not painful ears, also more festive by the variety of surround effects. Suitable for home and field audio. Key functions on the processor audio:

- a. Volume up button, serves to strengthen the input signal.
- b. Volume down button, serves to weaken the input signal.
- c. Mute button, serves to create a temporary silence.
- d. Menu button, serves to select the facilities contained inside series, among others: Balance, Bass, Sub Bass, Treble, Sub Treble, BBE Contour, BBE Process, Surround Effect.
- e. Up / down menu button, function to set or select sub menu option. By pressing the menu button,

With the menu press the button, then press the up / down menu button

then the facilities will be lowered as follows:

- A. Balance, serves to set the balance of left and right signals.
- b. Bass, serves to strengthen low tones up to + 15dB or weaken to -15dB
- c. Sub bass, serves to strengthen the tone of 100Hz to + 3dB or weaken up to -3dB
- d. Treble, serves to strengthen the tone of 10KHz to + 3dB or weaken up to -3dB
- e. Sub treble, serves to strengthen the tone of 10 KHz to + 3dB or weaken to -3dB
- f. Contour BBE, serves to amplify the tones at a frequency of about 50Hz of 15dB.
- g. The BBE process, serves to amplify the frequency tones around 10KHz of 15dB.
- h. Surround effect, contains some surround effect varization such as: BBE eala, VIVA HD3D and simulated surround.
- i. Gain, serves to set the level of amplification of the whole system, among others: 150, 300, 400, 540mVrms.



Image 1.10. The Audio processor used

## 8. Left and Right Speaker Monitor

Left and right speaker monitor is a speaker mounted on the radio station building to

control the sound output coming from the broadcast room. When you listen to sound from a sound card, digital sound data in the form of waveform .wav or .mp3 is sent to the sound card. This digital data is processed by DSP (Digital Signal Processing) working with DAC (Digital Analog Converter). Converts a digital signal into an analog signal, which then amplifies the analog signal and is ejected through the speakers.

### 9. Handphone

Handphone are used by broadcasters to control their own voice and various audio inputs from the broadcast room. Headphones are very effective sound output for use by broadcasters because it can focus to listen to the voice directly to the ear announcer.

### 10. FM Transmitter

At present, FM radio stations can be said to be more popular than radio broadcast stations using AM waves. In big cities, almost all popular radio stations use FM radio waves to transmit their broadcasts. The simplest reason behind the choice of using fm transmitter is the better transmission quality. FM radio waves using frequency modulation can transmit audio signals with two channels or stereo which became the standard for popular record production. This makes the song played by an FM radio station to be transmitted to a radio receiver of a quality that is not much different from the original and still uses two voice signal channels.

In addition to sound quality with better clarity than AM radio and the ability to send two-channel audio signals, radio waves with frequency modulation technology also still has another advantage that FM radio waves are also more resistant to weather conditions that greatly affect the quality of radio broadcast broadcast of a transmitter. These reasons form the basis of the choice of most modern commercial radio stations that choose to use FM radio transmitters in transmitting their broadcast signals. At

present, to obtain any equipment, components or spare parts of transmitters, receivers or other means related to radio broadcasting activities is not difficult. The availability of affordable and affordable equipment suppliers provides everyone with the opportunity to start radio broadcasting activities.

### 11. Antenna FM

Antenna is a device to emit electromagnetic signals. Transmitters present as transmitters only (AM / FM transmitter radio antennas, television transmitting antennas, etc.); receiver only (AM / FM receiver radio antenna, home television antenna, etc.); or transmitter and receiver (HP antenna, tower antenna / BTS, radar antenna, etc.)

## D. Television Broadcasting System

### 1. Broadcasting System

Video is a *latin* word which means I see and the audio means I hear. The term is similar to video for light and audio for sound. For audio systems, microphones generally convert sound waves into electrical changes in audio signals. The camera tube device functions to convert light input into appropriate changes for mapped and visible signals (video) on what image tubes are visible and captured by the camera tube. A simple flow of usage for audio and video signals in the broadcast system can be seen as shown below:

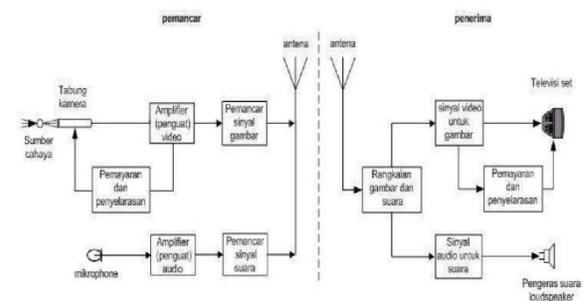


Figure 1.11. A simple flow of audio video signals on the broadcast system

The function of television is to re-display a form of audio-visual information in the exact same replica as when we directly watch it. So by means of a television receiver, can see pictures and hear sounds that are actually produced elsewhere using telecommunication systems.

## 2. Statistics Broadcasting

At this time many television stations that use advanced technology to improve its broadcasting system. Automation broadcasting is one way to improve performance and save costs and human resources used. The broadcast automation system consists of interlocking hardware and software in a unity, controlled by hardware and software to form a broadcast automation system. Broadcasting system operations as an example used on STV television statements are as follows:

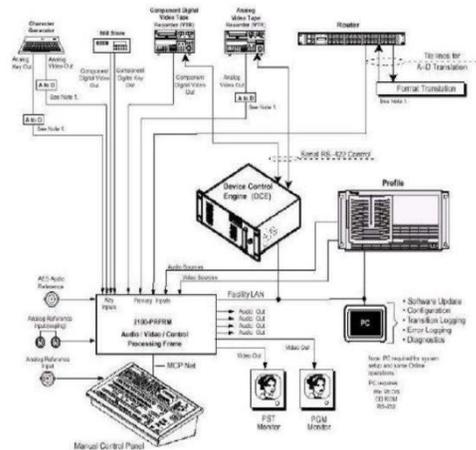


Image 1.12. Broadcast Automation System

From the picture above can be seen overview of broadcasting system automatically. The above system consists of several image and sound generating devices, such as from studios, VTRs, video servers, video routers and character generators as well as a master control switcher. Computer controller / controller of voice and image generator, interface between controller computer with image and sound generating device and master control switcher, serial

communication (RS-232, RS-422) and reference of picture and sound signal.

Then the output from the master control switcher will be forwarded to the sound and image output device (monitor preview and monitor program) to broadcast to the home audience. The working principle is as follows, on the computer controller that uses the software there is a list of programming arrangements that will work sequentially / sequentially. The controller computer will work according to the list, when the program will show the controller computer has detected The device that will run the program. For example, if the program that will appear the material comes from the VTR then the computer will detect the readiness of the VTR, and will move the VTR from the initial time code until the final time code has been entered by the operator. Controller computers that have acquired programming files (movies, ads / commercials, fillers and so on) that are about to go live will prepare the video server as the source image and sound according to the list on the controller's computer. When seconds of material from the video server will be displayed (about 3 seconds) then the controller computer instructs the master switcher to move the video server in standby mode, monitored material will be in preview position. After 3 seconds where the material must be aired, the master switcher will move the preview position to the program position on the monitor to start the material.

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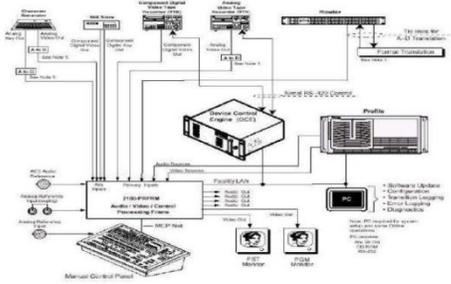


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## E. Production Devices

### a. Producer

The producer is responsible for all programming activities. For a particular need, there is a computer with an on-line system like New Q Pro that connects directly to the teleprompter so that producer or scrip writer can make changes or add scripts that appear and will be read by anchors. The system also online can calculate the duration per material so that producer gets accurate information when drop (drop) or add material in the segment to match the duration and production needs of TV program requires serious thinking from a

producer, because producer is the most responsible person responsible for program production. There are several things that a producer must think or plan for the production of TV programs: production materials, equipment, production costs (financial), production organizations, and production implementation stages. Production material is anything that can arouse ideas such as events, events, experiences, creation, animals, forest and so on. A producer will be touched his mind and will stimulate to be ride to create something TV programs. The idea is changed to the theme of a documentary program or soap operas or other programs. From the theme came the concept of the program is manifested into a synopsis that narrates the incident briefly but thoroughly. From the synopsis made treatment which contains steps of implementing the realization of ideas into a program. From treatment created / written script / script or directly produced. Actually, the treatment has shown whether the program will be made of quality / weight or not. Therefore it is necessary to refine the concept of the program so as to produce a good program script. The good program criteria according to NHK are: Unity between idea and truth, Unity between ability of creativity and technical ability, relevant for every time, has clear and noble purpose, learning and knowing, reducing desire and violence, authenticity, presenting universal values, presenting a new one in form and content ideas, and having the power to encourage positive change. The program to be produced is grouped into two, namely adlib program that is produced without / no need to use the script because it is impossible to write and production of block system program that is production program that use script / script. Examples of non-scripting prologues such as interviews, live talk shows and perhaps a comedian are impossible / difficult to memorize.

### **b. Audio Visual Library**

Program Library. The program libraries are various production programs themselves or from the purchase in the form of cassettes, tapes, cds, films and so on that have been or will be broadcast need to be administrated and stored well in the audio-visual library space. Usually the production of the program (master) duplicated some copy of the form in accordance with the player device. The library gets a copy with complete information such as title, airing day of the year and its duration, including artist and work relative to be an informative medium. The data is recorded and numbered and listed in the catalog, so it will be easier to search if at any time needed. Here is an example of the various programs stored in the library.

### **c. Audio music**



Image 1.13. Music Library

### **d. Music Library and Sound Effects.**

In addition to the production, for production purposes required material support various music for back sound and sound effects. Therefore the library needs to complete the library of various types of music such as traditional music, classical, jazz, pop and so on. Or music of his own creation (sound designer) and the music that has been used to support the program's production needs to be well-preserved and administered. Usually the type of music used in production is the

type of instrumental. Similarly, various types of sound effects such as the sound of wind, rain, lightning, various animal sounds, the sounds of people walking, open the door, applause and so on, the library needs to have a collection that makes it easier if at any time producer requires.

**e. Bank Image.**

What is meant by image banks is a collection of production materials shooting results. After the production is complete then the pictures shooting results are collected and given the identity and complete information. These images are useful for revision production or can be used to produce new programs with different reviews and themes. Besides being kept for archival purposes / documents that may be required at any time.

**f. Reference books.**

Reference books are also indispensable especially producers and scriptwriters to plan a program. Therefore the library needs to have a complete collection of reference books, to facilitate the producer and script writer in getting a reference book on the manuscript he made.

**g. Program Director (PD)**

The program director is responsible for the technical implementation and the selection of images and sound according to rundown.

**h. Switcher Operation (Switcherman)**

Switcherman is responsible for operating the switcher machine.

**i. Character Generic (CG) Stylists**

The scriptkeeper is in charge of displaying text of information such as names presenter, resource person and other information.

**j. Sound Organizer (Audioman)**

The Voice Maker is in charge of selecting the sound source to be displayed. Sound or audio comes from various sources, such as: microphone in the studio used talent, musical equipment, VTR, music player to audio stored in the computer.

**k. VTR Operation (VTRman)**

The VTR operation is in charge of playing the videocassette according to rundown and performing recording.

**l. Virtual Set Operation**

The virtual set operation is in charge of bringing up the virtual background that was previously created by the virtual set designer and setting its position to fit the camera locking.

**m. Lighting Operation**

Lighting or also called Lighting or Lighting done in the production process of Film and / or Television events. Light arrangement is done to add value

Artistic in image is more dimensionless and has a depth of space. Light and Lighting done in shooting known as shooting is painted with light. This element of light is very important in making movies and television shows. By simple there are two types of lighting sources, namely:

1. Original Light (natural lighting)

- The sun

- Moon

2. Artificial Light (artificial / artificial lighting)

Light is an electromagnetic wave received by the sense of vision (eye) which is then transmitted to the brain that will respond, responding to the light Simply, without light, things will not be seen. On the basis of that, the production of film and video requires light so that the subject can be seen. Elements Lighting that must be considered there are three aspects of the element Engineering, art elements, **and elements of philosophy (pragmatic)**. Illuminating the object means giving the image so that the object or subject can be seen clearly according to the concept of the film itself. Not all shadows are needed and not all shadows are needed. With certain lighting the shadow can be removed, reduced, or even added. Whether or not shadow or

shadow, again depends on the concept of shooting itself. There are three light points (**Three Points of Light**) in the shooting that has become the formula or basic formula of a lighting in the production of video, movies, and photos. Three important points that consist of: Key Light, Fill Light, Back Light.

**Key Light** is the main irradiation that falls on a subject, producing a strong shadow. **Fill Light** is the irradiation to soften the shadow that the key light produces. The intensity of the fill light is usually half of the key light. **Back Light** irradiation from behind the subject of the head and shoulders, forming the rim / rim of the subject serves to give dimension so that the subject does not "blend in" with the background.

which is generated from key light, fill light, and backlight can be measured by a tool that is Lightmeters. There are two types of this tool is Incident and Reflectant. Incident is dedicated to measuring the intensity of light that "falls" on the subject. While Reflectant is used to measure the intensity of light reflected by the subject.

The types of lighting can be categorized, among others:

1. Hard Light, for KeyLight, BackLight

- Spot Light
- Gun / follow spit
- Spot effect profile

2. Soft Light, for Fill Light

- Small Board
- Large Board
- Sky Pan

**Lighting Director** Persons who are responsible for lighting implementation and design all lighting against set and player to create atmosphere and Aesthetics and Artistic according to Script / Directed.

**Lighting Direction** is the laying of lights and setting the direction of lighting to the object to be shot by the camera. The usual lighting method

used is three-point lighting. Type of type Directing of Light:

- Above or below light: Light coming from the top or bottom of the object.
- Overhead light that is: Light that comes right from the top of the head.
- In front of or behind is: Light direction coming from front or back.

Both have different artistic values, such as the direction of a very strong back light, light can produce silhouette images.

- Left or right is: Light direction coming from left or right side.

Lighting technique is often used during outdoor shooting during the day. Because the change of direction of light or shift of the location of the sun causes an influence on the continuity shot.

- Even lighting: Parallel light direction illuminates objects without a light source surely. For example, during a cloudy outdoor shoot, a cloud-covered sun, or an indoor shoot that's already very bright because of the high-intensity light bounce.

- Sidelight: The direction of light created to enhance the aesthetics of the image. For example, shooting for a particular object that has been illuminated by key, fill and back lights, but less beautiful, can be added sidelight by using floodlight.

**Lighting Techniques** are light rearrangement Technique, this technique has two goals First: attain sufficient lighting and highlight the main subject in a scene. Lighting is often simulated in the form of a lighting diagram on paper before it is actually installed Second to anticipate the appearance of unwanted shadows. The simplest type of lighting is when one camera takes a picture of a subject. Subjects are placed in settings that are slightly away from the wall or backdrop to avoid shadowing the subject on the wall.

**Lighting Color** is the color of the light source, which can be manipulated with filters or gels.

**Lighting Instrument** is a type of lamp type commonly used at the time shooting, there are at least four types of lights that are commonly used at the time Film / Television production are: - Spot Light: spot light types have a range of light spreading narrow, giving rise to a strong shadow. - Broad: Broad-shaped square light with wide reach and shadow soft. - Flood: Flood lights also cover large areas, but are circular with blurry shadows n Soft Light: Soft lights (also called bathtubs) are a set of lights reflected in a box, used for background lighting. The strength of the light source (lamp) or the intensity of light can be measured with a Light meter device with a Kelvin (k) unit. Light used for shooting there are two types: **Accent Light** is a unit of light that is enabled to reinforce the subject. Can be a key light, kicker, or backlight and **Ambient Light** Natural light or lights that are in the vicinity of the location shooting.

## **F. Facilities and Equipment Production Devices Production**

### **a. Studio**

Studio is a place to produce and supply television programs. The production process in the studio must be connected with the Master Control Room. When an event program is produced in the studio, the Master Control Room becomes essential to regulate the course of production. Video and audio will be sent to Master Control Room. Production programs in the studio can be live (directly broadcasted to the audience) such as music programs, sports, and news or recording (program recorded in advance or known by taping). Inside the studio there are several integrated systems namely audio (system mixer), video (camera system), lighting (lighting system) and art (art design).

### **b. Lighting Department.**

**Lighting (lighting)** is the harmonious irradiation of a subject in order to create a good image. Part of the production team responsible for lighting and electricity during the shooting process, controlling the intensity of the lighting also includes ensuring alignment for shot continuity, on-screen effects, moving light control, and arranging collaboration with other departments related Special effects and Visual effects .is at the Lighting Department. The people in the lighting department include: Gaffer, lighting board operators, Lamp operators, Rigging gaffer, Riggers, Genny operators, Lighting Technician and Crew lighting. **Purpose of light arrangement:**

1. Getting the desired atmosphere to show the impression
2. Obtain an image appropriate to the production plan script
3. Influence audience emotion
4. Get images that match the original color.

**Television lighting has the following functions:**

1. Meet the needs of technical equipment systems
2. Provide perspective
3. Give attention to the important elements of the scene
4. Setting the scene/ set the time of the incident
5. To support the beauty in the overall scene.

### **c. Camera**

Image information (light) can not or can not be stored, transferred or transmitted and reproduced directly due to the limitations of materials (materials) that can process light. In the process of converting light into electrical signals is processed by using some properties of materials that can bridge between light signals to electrical signals which are the basics of light-signal-altering systems or television camera basics.

**Camera Video / Film** Is a mechanical or electronic device used to record moving

images / Audio visual with cassette ribbon or film recording media. There are various types of Camera like: Consumer Camera (handycam), Presume(*semi professional*) and Professional Camera commonly used by Television and Production House in making TV / Movie Program.

**Camera Crew** it called for a group of people who are directly involved in camera operation during the process of production / filming. They include: Director of Photography DOP, Camera Operator, Assistant camera, focus puller, grip, key grip, dolly grip, etc.

**Camera Angle.** The placement of a camera and what can be seen through the camera to produce the desired image composition, Angle examples such as High angle is shooting from the upper viewpoint, Low angle is the opposite of High angle, while Eye level is shooting parallel to the eye.

**Camera Blocking.** Is positioning camera to get Angle and Composition desired image according to Script / scenario needs.

**Camera Movement.** It is camera movement to get appropriate images based on perspective and camera angles.

Types of camera movement types are Tracking that is the movement of the camera fore / rear, Sliding movement of the camera to the left / right side, Swing movements like float (usually this movement using JimmJip).

**Camera Roll** is the name when recording camera in every shot made by a camera operator, and each will be numbered in the order of shooting. Usually marked with the abbreviation 'CR' followed by the number, this is done to facilitate the editing process.

**Camera Loader / Clapper** is the person in charge of holding and functioning clapboard on every initial shot this is done to facilitate the recording scene.

**Camera Boom** is a mobile camera that can be moved, usually large; where the camera

can be projected out of set and or raised above it, usually used for the purposes of Film making.

**Camera Cap** is a cover / protector mounted on the front of the camera to protect the camera from light or dust when the lens is not installed.

**Multi Cam System** Continuing the article on Multicam System (Part1) Multicam fixtures the following are used:



Image 1.14. Camera Control

**CCU / Camera Control Unit** This is a tool that can control some functions in camera can be controlled or replaced its function through this tool such as lighting settings (brightness contrast), color temperature (color temperature), speed (shutter speed), white balance , as well as hue color (red, green, blue). The number of CCUs used exactly matches the number of cameras used because each camera is controlled by a CCU.

**One camera that is MiniDV**For small television stations can use MiniDV digital Handy Camtype 3CCD (Charge Couple Device). This type of camera although only standard home appliance quality, but the resolution is quite good especially if the lens quality. For most studios it does not take 2 cameras.



Image. 1.15 Camera used

This type of camera is specially designed for high production requirements with a high usage level, high quality of all components aspects

including lenses. Has features:

- Users of most major industry broadcasters in the world television and PH

- The features available can be spelled out full manual because almost most use manual settings even if it has auto feature, but if you want to produce good image and visual using setting manual

Price is relatively expensive even very expensive

- High standard of functionality, HDV resolution with stable color no defects or distortions.

- Very stable and reliable.

- To get maximum results other equipment must be balanced,

eg at the time of postproduction. The editing machine used must be completely compatible.

- Strong enough and withstand any conditions such as vibration, bumps, shocks, dust, heat, and rain) when used in very demanding conditions.

#### **d. Microphone**

There are various types of microphones that can be used, namely a cable microphone, wireless and clip (clip on). In addition, it can also be distinguished from the way the sensor works, namely condenser (very sensitive, using batteries) and dynamic

(relatively insensitive, without batteries). Microphone needs in studio at least 3 pieces, the addition of object / resource will increase the number of microphones



Image 1.16. Microphone clip on

#### **e. Audio Mixer**

Audio mixer is used to mix and select audio signals from multiple input outputs. For miniature TV station required 8 channel mixer.



Image 5.18. Audio mixer used

#### **f. Clearcom**

Clearcom is a tool for communication between producer, cameraman, switcher operator and master control speaker for source communication with viewers (live broadcast). Property production support needs include: stage / level (stage), backdrop, accessories, dll.

Figure 1.19. Clearcom is used

#### **g. Video Monitor**

At least a 21 "video monitor is required for presenters and cameraman. The editing

computer comes with video editing applications, graphics cards and video capture cards sufficient for post-production processes.



Image 5.21. Video monitor

#### **h. VTR (Video Tape Recorder)**

This section is where the provision of broadcast program materials in the form of tapes or tapes are ready to run like a soap opera, non-drama program. Video Tape Recorder functions recording and viewing recordings in the production process, can also be used to capture (convert recording from tape to digital tape). the format used, among others VHS, S-VHS, and MiniDV. The tapes are barcode or computerized so there is a segment division for an event program. Then after it is shared, in the input to Flexicart or the player's programming material. For example a *sinetron* program will air on November 7th at 7 pm, with a duration of 64 minutes and will be divided into five segments for Running File of the program. In addition to segmenting the program, the Video Tape Recorder section also supplies the creative requirements. If there is a creative that does not comply with the format in the Video Tape Recorder room, then the cassette meter will be converted into ready-to-run material. The feasibility of the current television station, has asked the advertising company who wants to enter the ad, to enter the appropriate ad format.



Image 1.21. Video tape recorder

#### **i. Controlling Device (Master Control)**

**Master Control Room (MCR)** or also called the television broadcasting control room is a room that contains the main technical device of broadcasting in control of all the broadcast process of television stations. Master Control Room becomes the center of all broadcast production activities that exist in television broadcasting stations. Master Control Room is very important because all live event or live studio recording material, or event directly from a location outside the studio via OB Van or broadcast car, must be through Master Control Room first, before it is finally transmitted to satellite. Broadcasting materials in the form of advertisements, television station logos, event programs, running text and so on, have all been prepared in the Master Control Room to be aired.



Image 1.22. Master Control Room

#### **5. Server Computer**

Server computer serves to play the recording, displaying logo, template, running text and super impose



Image 1.23. The server computer used

### 6. Digital Video Mixer / Switcher

Digital video mixer / switcher is used to mix 2 video signals or select one of the video signal to send to the transmitter. For a small TV station, just need a switcher only.



Image 1.24. Digital video mixer

### 7. DVD Recorder

DVD recorders are used to record the broadcast program, because the KPI requires that all broadcast programs be recorded and stored for at least 1 year. While 1 DVD can record up to 1 hour (XP quality), 2 hours (SP quality), 4 hours (LP quality), 8 hours (ELP quality).



Image 1.25. DVD recorder

### 8. Monitor

The monitor is used to monitor the output of the video signal of each used device

(camera, VTR, etc.) and monitor the television signal received from the transmitter.



Image 1.26. Monitor used

### 9. Transmission Tool

TV transmission station is a TV transmitter station that aims to transmit radio frequency signals that carry information signals in the form of images (video) and sound (audio), so as to be received by TV receivers in areas covered by TV transmitters the.

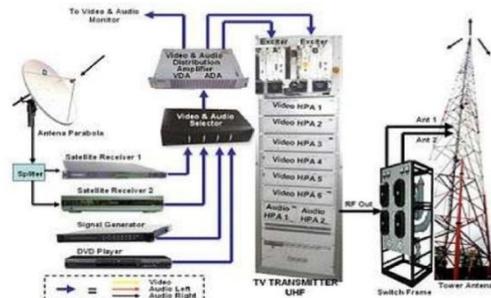


Image 1.27. TV Transmission Station Configuration

### 10. Editing Tool

IMovie is one of the software that can be used to edit video that has been recorded and can then be edited. Steps to perform the appropriate editing of the movie on a computer that can then be done editing process like the following steps:

- a. Show all movie projects on the computer
- b. The field where the clip will be edited
- c. Monitor window, to see the results of clips that have been edited.

- d.** Play Project, to play a clip either in the viewer screen or full
- e.** New Project (click), to start a new movie project
- f.** Frame adjustment, to view thumbnails of clips with the number of thumbnail frames (same for video source)
- g.** Import, to import recordings from webcam or video camera
- h.** Flip Switch, Swap video source and iMovie Project from top to bottom
- i.** Adjust, the thumbnail size used in iMovie
- j.** Event Library, to display all clips in computer
- k.** Add Selection, to add a clip to your project
- l.** Favorite Tab, to select a favorite clip, or part of a clip, or just delete the clip all together
- m.** Option Tab, works on voiceovers, crops images, to customize audio or adjust video.,
- n.** Turn off / on Audio skimmer
- o.** Edit Browser, for editing like adding music, photos, text, narration, and animations
- p.** Source Video, Shows all events from specific sources that can be used for editing

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