LIVE TELECAST AND REMOTE NEWS GATHERING OF A SATELLITE TELEVISION STATION

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An Internship Report Submitted to the Daffodil International University in Partial Fulfillment of the Requirements for the Degree of Bachelor of Science in Electronics and Telecommunication Engineering

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APPROVAL

This Internship report entitled "Live Telecast and Remote News Gathering of a Satellite Television Station" by Syed Afiat Rahman has been submitted to the Dept. of Electronics and Telecommunication Engineering, Daffodil International University in the partial fulfillment of the requirements for the degree of Bachelor of Science in Electronics and Telecommunication Engineering. This internship report has been accepted as satisfactory by the honorable members of the board examiners of the following after its presentation that was held on 19 July, 2011.

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I, hereby declare that, this internship report has been done by me under the supervision of **Mr. Md. Taslim Arefin, Assistant Professor Dept. of ETE** Daffodil International University. I also declare that neither this internship report nor any part of this paper has been submitted elsewhere for award of any degree or diploma.

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ABSTRACT

Now-a-days Satellite TV is being considered with utmost significance as it has been contributing to every sector of our society. Certain differences have been brought to our life with a wide array of program ensuring several advantages to our day to day life. Now TV programs, broadcasted both in analog and digital format possessing higher quality of sound and picture, can entertain anyone from anywhere based on the availability of Satellite TV connection. It has been a great opportunity for me to gather a complete hand on experience on all the sections of Satellite TV channel during my internship in RTV and this report has been prepared based on the knowledge that I achieved during my working period. The complete illustration of Earth Station and Live Transmission process of RTV channel has been signified here as the core parts of my internship paper.

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Chapter 1

Introduction

1.1 Introduction

Satellite television is television delivered by the means of communications satellites, as compared to conventional terrestrial television which broadcasts over radio waves originating from several independent, ground-based television stations. Cable television is distributed by underground coaxial cables. In many areas of the world, satellite television services supplement older terrestrial signals, providing a wider range of channels and services, including subscription-only services. It is very popular although normally to receive satellite television one must purchase a receptor such as Sky dish and dig box and Free sat.[1]

1.2 Objective

In my internship I have to study on :

1. TV Studio with Equipment
2. Studio Production Control Room (PCR)
3. Ingest Room
4. Master Control Room (MCR)
5. Lighting System
6. ENG, EFP & Live
7. Play out Automation
8. News room Automation
9. Local & International Feeds (COAB, UCS, CNN, APTN etc.)
10. Online & Offline Graphics Animation
11. Archiving System
12. IT Network
13. Digital Satellite News Gathering (DSNG) Van

14. Live Telecast Technology by Back Pack

1.3 Formation

In the chapter two I have discuss about the Technology of satellite Television, Phase Alternating Line (PAL) Technology of satellite Television, Number of frames per seconds, Interlacing, Aspect ratio, Key element of satellite TV engineering and Major division of satellite TV station.

In the Chapter three I have discuss about the total working in Production Control Room (PCR), this room controls the studio equipment & other equipment which is related with audio & video. So many equipment is using inside the room. The final output of the control room is prepared for transmission or it can record by VTR.

In the chapter four I have discuss about Studio. A studio is the heart of a TV station. It can produce audio & video signal by microphone & Camera. The studio can be both indoor & outdoor and both the studio consists with camera, microphone & lighting. The indoor studio must have a lighting system.

In the chapter five I have discuss about Master control is the technical hub of a broadcast operation. It is common among most over-the-air television stations and networks. It is distinct from production control rooms in television studios where the activities such as switching from camera to camera are coordinated.

In the chapter six I have discuss about “Earth Station”. An earth station, ground station, or earth terminal is a terrestrial terminal station designed for extra planetary telecommunication with spacecraft, and/or reception of radio waves from an astronomical radio source. Earth stations are located either on the surface of the Earth, or within Earth's atmosphere. Earth stations communicate with spacecraft by transmitting and receiving radio waves in the super high frequency or extremely high frequency bands (e.g., microwaves). When an earth station successfully transmits radio waves to a spacecraft (or vice versa), it establishes a telecommunications link.

In the chapter seven I have discuss about different types of live broadcasting technology : “Electronic news gathering (ENG), Electronic field Production (EFP), Digital satellite news gathering (DSNG) and Back Pack live Broadcasting”.

Chapter 2

Introduction to Satellite Television Station

2.1 History of Satellite Television

The first satellite television signal was relayed from Europe to the Telstar satellite over North America in 1962. The first geosynchronous communication satellite, Syncom 2 was launched in 1963. The world's first commercial communication satellite, called Intelsat I, was launched into synchronous orbit on April 6, 1965. The first national network of satellite television, called Orbital, was created in Soviet Union in 1967, and was based on the principle of using the highly elliptical Molniya satellite for re-broadcasting and delivering of TV signal to ground downlink stations. The first domestic North American satellite to carry television was Canada's geostationary Anik 1, which was launched in 1972. ATS-6, the world's first experimental educational and Direct Broadcast Satellite, was launched in 1974. The first Soviet geostationary satellite to carry Direct-To-Home television, called Ekran, was launched in 1976.[1]

2.2Definition of satellite television

Satellite television is television delivered by the means of communications satellites, as compared to conventional terrestrial television which broadcasts over radio waves originating from several independent, ground-based television stations. Cable television is distributed by underground coaxial cables. In many areas of the world, satellite television services supplement older terrestrial signals, providing a wider range of channels and services, including subscription-only services. It is very popular although normally to receive satellite television one must purchase a receptor such as Sky dish and dig box and Free sat.[1]

2.3 Technology of satellite Television

Satellites used for television signals are generally in either naturally highly elliptical (with inclination of +/-63.4 degrees and orbital period of about 12 hours) or geostationary orbit 37,000 km (22,300 miles) above the earth's equator.

Satellite television, like other communications relayed by satellite, starts with a transmitting antenna located at an uplink facility. Uplink satellite dishes are very large, as much as 1 to 12 meters in diameter. The increased diameter results in more accurate aiming and increased signal strength at the satellite. The uplink dish is pointed toward a specific satellite and the uplinked signals are transmitted within a specific frequency range, so as to be received by one of the

transponders tuned to that frequency range aboard that satellite. The transponder 'retransmits' the signals back to Earth but at a different frequency band (a process known as translation, used to avoid interference with the uplink signal), typically in the C-band (4-8 GHz) or Ku-band (12-18 GHz) or both. The leg of the signal path from the satellite to the receiving Earth station is called the downlink.

A typical satellite has up to 32 transponders for Ku-band and up to 24 for a C-band only satellite, or more for hybrid satellites. Typical transponders each have a bandwidth between 27 MHz and 50 MHz Each geo-stationary C-band satellite needs to be spaced 2 degrees from the next satellite (to avoid interference). For Ku the spacing can be 1 degree. This means that there is an upper limit of 360/2 = 180 geostationary C-band satellites and 360/1 = 360 geostationary Ku-band satellites. C-band transmission is susceptible to terrestrial interference while Ku-band transmission is affected by rain (as water is an excellent absorber of microwaves at this particular frequency).

The down linked satellite signal, quite weak after traveling the great distance (see inverse-square law), is collected by a parabolic receiving dish, which reflects the weak signal to the dish’s focal point. Mounted on brackets at the dish's focal point is a device called a feed horn. This feed horn is essentially the flared front-end of a section of waveguide that gathers the signals at or near the focal point and 'conducts' them to a probe or pickup connected to a low-noise block down converter or LNB. The LNB amplifies the relatively weak signals, filters the block of frequencies in which the satellite TV signals are transmitted, and converts the block of frequencies to a lower frequency range in the L-band range. The evolution of LNBs was one of necessity and invention.

The original C-Band satellite TV systems used a Low Noise Amplifier connected to the feed horn at the focal point of the dish. The amplified signal was then fed via very expensive 50 Ohm impedance coaxial cable to an indoor receiver or in other designs fed to a down converter (a mixer and a voltage tuned oscillator with some filter circuitry) for down conversion to an intermediate frequency. The channel selection was controlled, typically by a voltage tuned oscillator with the tuning voltage being fed via a separate cable to the head end. But this simple design evolved.

Designs for micro strip based converters for Amateur Radio frequencies were adapted for the 4 GHz C-Band. Central to these designs was concept of block down conversion of a range of frequencies to a lower, and technologically more easily handled block of frequencies (intermediate frequency).

The advantages of using an LNB are that cheaper cable could be used to connect the indoor receiver with the satellite TV dish and LNB, and that the technology for handling the signal at L-Band and UHF was far cheaper than that for handling the signal at C-Band frequencies. The shift to cheaper technology from the 50 Ohm impedance cable and N-Connectors of the early C-Band systems to the cheaper 75 Ohm technology and F-Connectors allowed the early satellite TV receivers to use, what were in reality, modified UHF TV tuners which selected the satellite television channel for down conversion to another lower intermediate frequency centered on 70 MHz where it was demodulated. This shift allowed the satellite television DTH industry to change from being a largely hobbyist one where receivers were built in low numbers and complete systems were expensive (costing thousands of Dollars) to a far more commercial one of mass production.

Direct broadcast satellite dishes are fitted with an LNBF, which integrates the feed horn with the LNB.

The satellite receiver demodulates and converts the signals to the desired form (outputs for television, audio, data, etc.). Sometimes, the receiver includes the capability to unscramble or decrypt; the receiver is then called an integrated receiver/decoder or IRD. The cable connecting the receiver to the LNBF or LNB must be of the low loss type RG-6, quad shield RG-6 or RG11, etc. It cannot be standard RG-59.[1]

2.4 Phase Alternating Line (PAL)

PAL, short for Phase Alternating Line, is an analogue television encoding system used in broadcast television systems in many countries. Other common analogue television systems are SECAM and NTSC. The basics of PAL and the NTSC system are very similar; a quadrature amplitude modulated subcarrier carrying the chrominance information is added to the luminance video signal to form a composite video baseband signal. The frequency of this subcarrier is 4.43361875 MHz for PAL, compared to 3.579545 MHz for NTSC. The SECAM system, on the other hand, uses a frequency modulation scheme on its two line alternate color sub carriers 4.25000 and 4.40625 MHz[3]

2.5 Number of frames per seconds

Frame rate, the number of still pictures per unit of time of video, ranges from six or eight frames per second (frame/s) for old mechanical cameras to 120 or more frames per second for new professional cameras. PAL (Europe, Asia, Australia, etc.) and SECAM (France, Russia, parts of Africa etc.) standards specify 25 frame/s, while NTSC (USA, Canada, Japan, etc.) specifies 29.97 frame/s. Film is shot at the slower frame rate of 24photograms/s, which complicates slightly the process of transferring a cinematic motion picture to video. The minimum frame rate to achieve the illusion of a moving image is about fifteen frames per second.[3]

2.6 Interlacing

Video can be interlaced or progressive. Interlacing was invented as a way to achieve good visual quality within the limitations of a narrow bandwidth. NTSC, PAL and SECAM are interlaced formats. Abbreviated video resolution specifications often include an i to indicate interlacing. For example, PAL video format is often specified as 576i50, where the number 576 indicates the vertical line resolution, i indicate interlacing, and the number 50 indicates 50 fields (half-frames) per second.[3]

2.7 Display resolution

The size of a video image is measured in pixels for digital video, or horizontal scan lines and vertical lines of resolution for analog video. In the digital domain (e.g. DVD) standard-definition television (SDTV) is specified as 720/704/640×480i60 for NTSC and 768/720×576i50 for PAL or SECAM resolution. However in the analog domain, the number of visible scan lines remains constant (486 NTSC/576 PAL) while the horizontal measurement varies with the quality of the signal: approximately 320 pixels per scan line for VCR quality, 400 pixels for TV broadcasts, and 720 pixels for DVD sources. Aspect ratio is preserved because of non-square "pixels".[3]

2.8 Aspect ratio

Aspect ratio describes the dimensions of video screens and video picture elements. All popular video formats are rectilinear, and so can be described by a ratio between width and height. The screen aspect ratio of a traditional television screen is 4:3, or about 1.33:1. High definition televisions use an aspect ratio of 16:9, or about 1.78:1. The aspect ratio of a full 35 mm film frame with soundtrack (also known as the Academy ratio) is 1.375:1.[4]

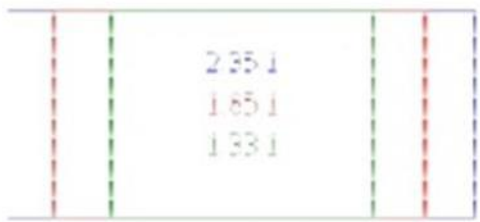

Figure 1.1 Aspect Ratios

Different Aspect Ratios (PAL)

Video Format Resolution	Resolution	Equivalent Square-pixel Resolution
PAL 4:3	704×576	768X576
PAL 4:3	720×576	768X576
PAL 16:9	704×576	1024X576
PAL 16:9	720×576	1048X576

2.9 Video compression method (digital only)

A wide variety of methods are used to compress video streams. Video data contains spatial and temporal redundancy, making uncompressed video streams extremely inefficient. Broadly speaking, spatial redundancy is reduced by registering differences between parts of a single frame; this task is known as intra frame compression and is closely related to image compression. Likewise, temporal redundancy can be reduced by registering differences between frames; this task is known as inter frame compression, including motion compensation and other techniques. The most common modern standards are MPEG-2 used for DVD and satellite television, and MPEG-4, used for home video.[3]

2.10 Key element of satellite TV engineering

1. TV Studio with Equipment
2. Studio Production Control Room (PCR)
3. Ingest Room
4. Central Apparatus Room (CAR)
5. Master Control Room (MCR)
6. Edit Suite for News/Program
7. Electrical Power Generation (AVR, UPS)
8. Lighting System
9. ENG, EFP & Live
10. Play out Automation
11. News room Automation
12. Local & International Feeds (COAB, UCS, CNN, APTN etc.)
13. Online & Offline Graphics Animation
14. Archiving System
15. IT Network
16. Digital Satellite News Gathering (DSNG) Van
17. Earth Station

2.11 Major division of satellite TV station

1. Broadcast Operation & Engineering
2. News & Current Affairs
3. Programmers & Events

2.12 Block diagram of a satellite TV station

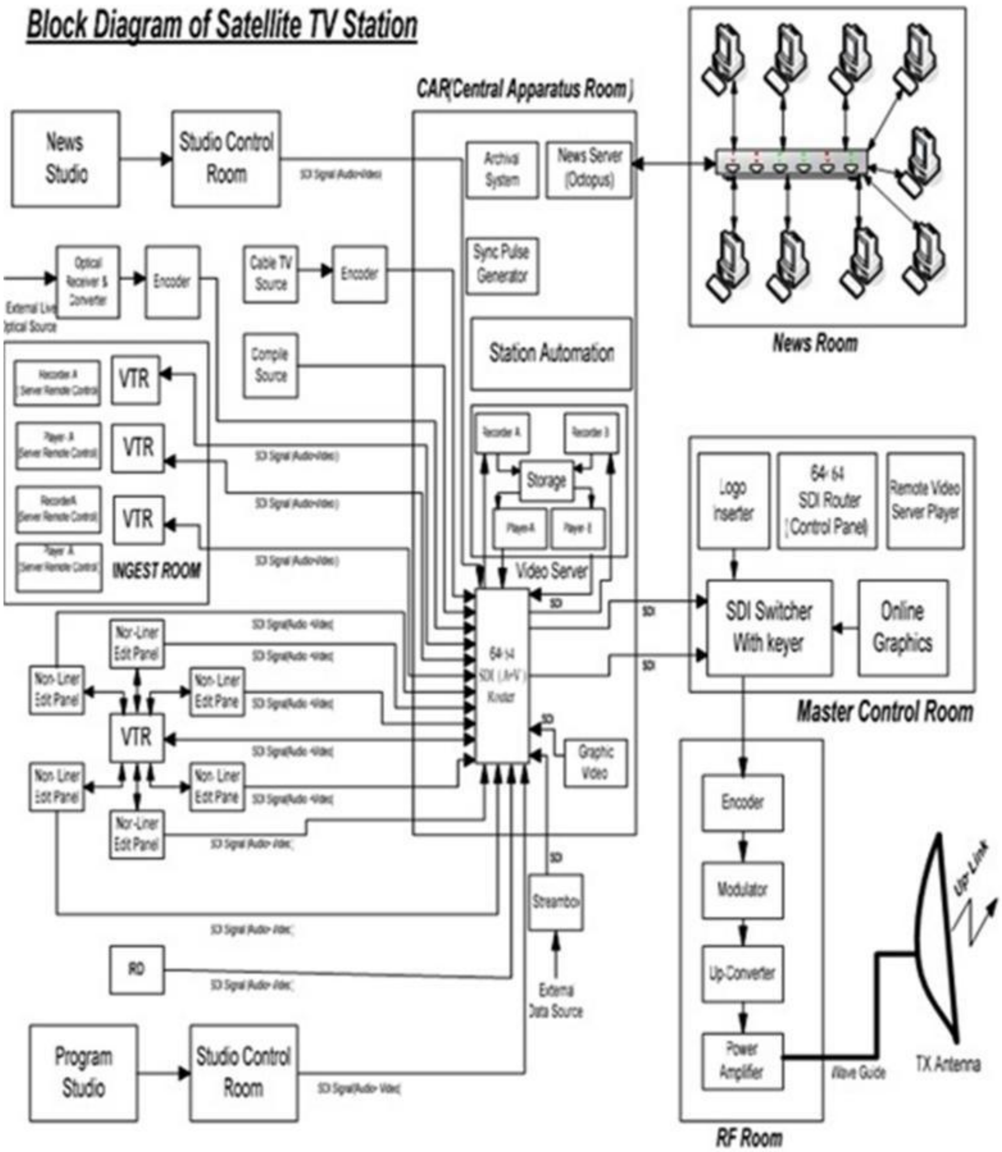

Figure 2.2 Satellite TV Station [1]

Figure 2.2 show every step of satellite TV station where news or video are captured in studio or outdoor, then the news or videos are recorded in Ingest room and send to Central Apparatus room for storage .After loaded in video server the news or video send to Master Control Room for SDI format and add online graphics . In the End the video is prepared for Broadcasting in RF room and encode the video signal.

2.13 Broadcast flow chart

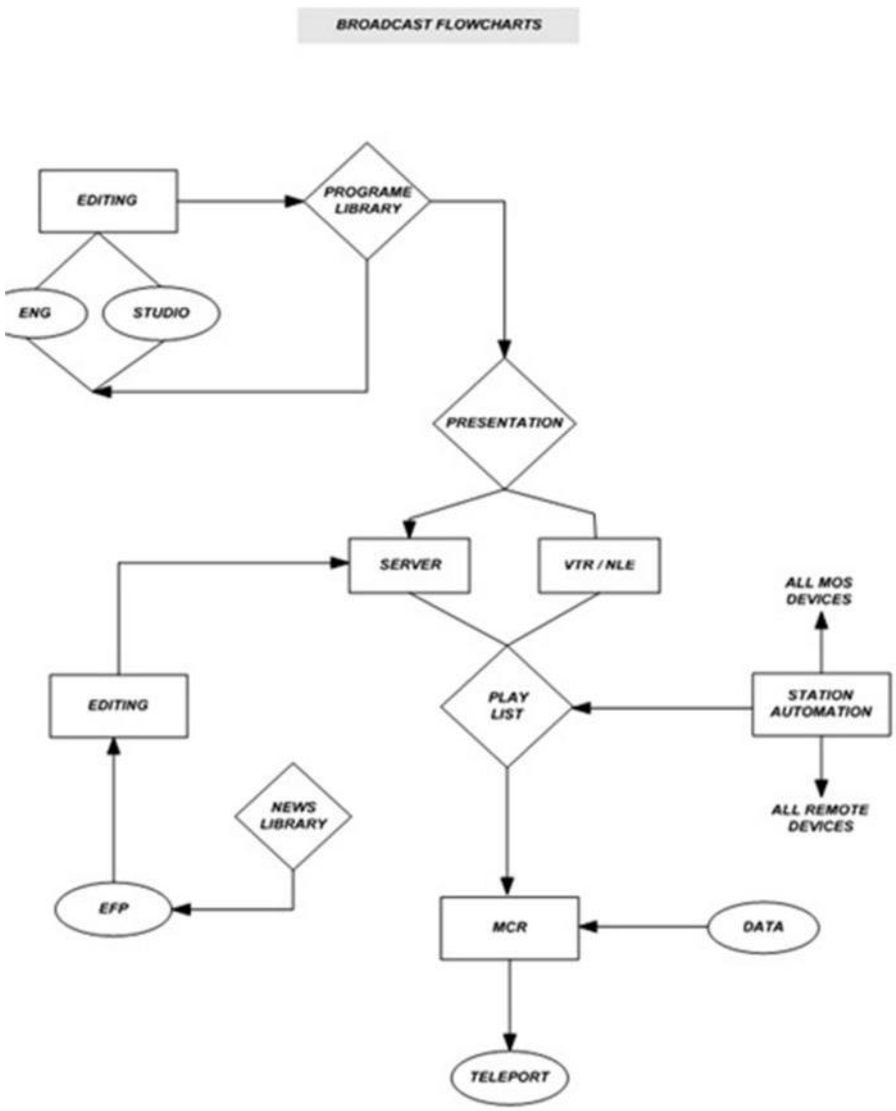

Figure 2.3 Broadcast Flow Chart [1]

Figure 2.3 show the total Broadcast system flow Chart that start from news collection and prepared for On Air.

2.14 RTV

RTV Media Lid. is a Private sector effort, dedicated to the creative presentation of television technology for Bangla speaking people all over the world. The company has established round the clock satellite television channel aimed at the a worldwide audience with programs depicting Bangla culture, history, geography, people, language and faiths responding to both national and international needs and demands. The name of the channel is "RTV".

RTV has a very experienced team of programmer makers, technical and management consultants with intimate knowledge and experience of running a television station. RTV has its own digital facilities with a large scale studio, a dedicated news studio, news room, computerized editing facility and in house transmission/broadcast facility based in Dhaka, Bangladesh.

RTV is committed to maintain a high-level of quality, technical efficiency and reliability while keeping up to date with state of the art technology.

It can be safely said that "RTV" as a global and Bangla speaking channel will be available to 210 million Bengali people worldwide.

Technical Information of RTV

1. Satellite: Apaster IIR

2. Orbit location: 76.5˚E

3. Modulation: QPSK

4. Up link frequency: 6234 MHz

5. Down link frequency: 4009 MHz

6. Symbol rate: 4300 Kbps

7. Forward error correction: 3/4

8. Polarization: Horizontal

9. Type of carrier: MPEG-2/DVB-S

10. SDI video bit rate: 270 Mbit/s

11. Video compression format: MPEG-2

12. Audio level: (-20dB to -12dB)

13. Display resolution: 720X576

14. Video format: PAL

15. Aspect ratio: 4:3

17. Chrominance format: 4:2:2

18. Scanning line per second: 625

19. Number of frames per second: 25

Chapter 3

Production Control Room (PCR)

3.1 Definition of PCR

This room controls the studio equipment & other equipment which is related with audio & video. So many equipment is using inside the room. The final output of the control room is prepared for transmission or it can record by VTR.

The production control room (PCR), also known as the "gallery" or Studio Control Room (SCR), is the place in a television studio in which the composition of the outgoing program takes place.[1]

The basic block diagram of a studio control room is shown below.

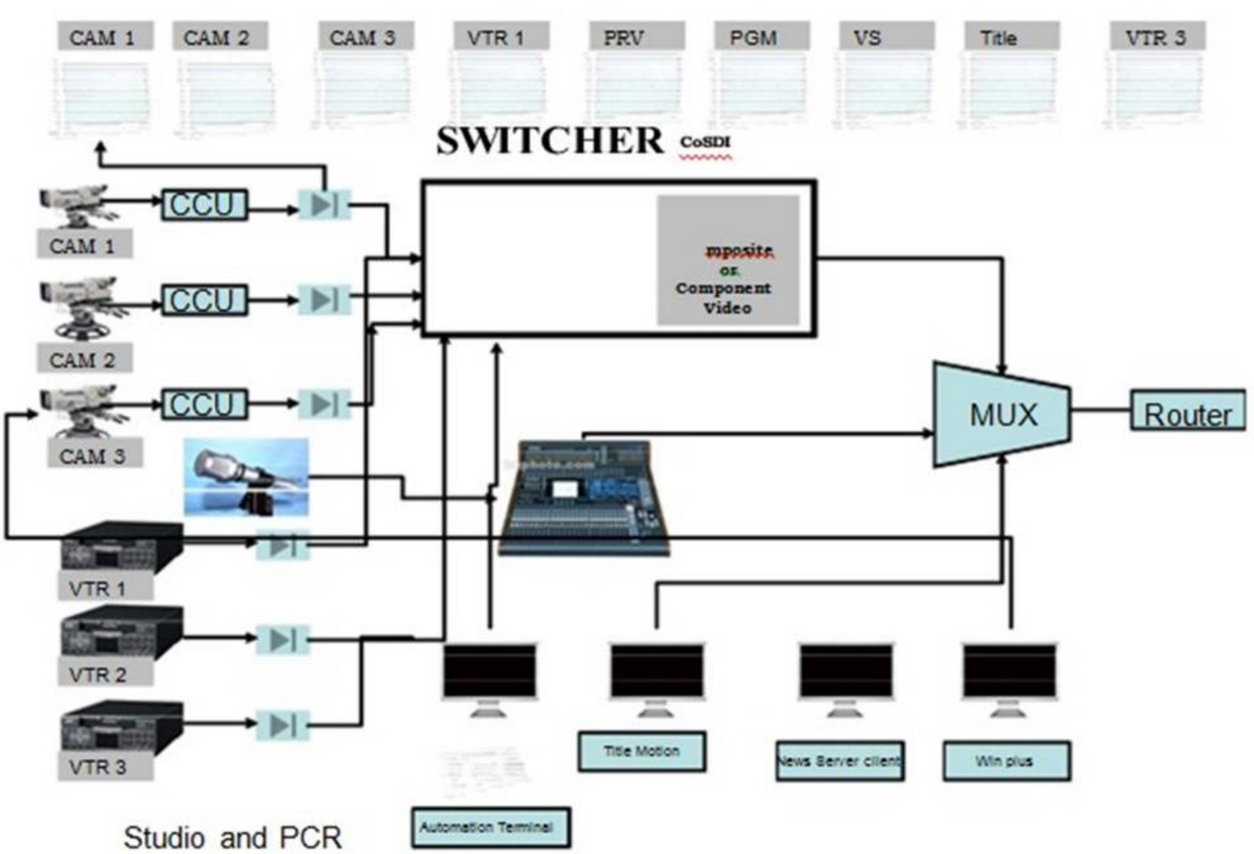

Figure 3.1 Block Diagram of Production Control Room (PCR)

Figure 3.2 inside the Production Control Room (PCR)[1]

3.2 Camera control unit

The camera control unit (CCU) is installed in the production control room (PCR), and allows various aspects of the video camera on the studio floor to be controlled remotely. The most commonly made adjustments are for white balance and aperture, although almost all technical adjustments are made from controls on the CCU rather than on the camera. This frees the camera operator to concentrate on composition and focus, and also allows the technical director of the studio to ensure uniformity between all the cameras.

As well as acting as a remote control, the CCU usually provides the external interfaces for the camera to other studio equipment, such as the vision mixer and intercom system, and contains the camera's power supply.

This unit is also providing the remote panel, by this panel all parameter can be controlled remotely.

Figure 2.3 Cameras Control Unit.

3.3 Vision mixer

Basically the unit is use to mixing the video with various types of effects such as wipe, mix, DPM etc. It can take a number of video inputs and produce the single mixed (with keyer) video output. This unit can operate DSK (Down sting key) also.

Figure 3.4 Vision Mixers.

3.4 Audio mixer

In professional audio, a mixing console, or audio mixer, also called a sound board or soundboard, is an electronic device for combining (also called "mixing"), routing, and changing the level, timbre and/or dynamics of audio signals. A mixer can mix analog or digital signals, depending on the type of mixer. The modified signals (voltages or digital samples) are summed to produce the combined output signals.

Mixing consoles are used in many applications, including recording studios, public address systems, sound reinforcement systems, broadcasting, television, and film post-production. An example of a simple application would be to enable the signals that originated from two separate microphones (each being used by vocalists singing a duet, perhaps) to be heard through one set of speakers simultaneously. When used for live performances, the signal produced by the mixer will usually be sent directly to an amplifier, unless that particular mixer is "powered" or it is being connected to powered speakers.

Figure 3.5 Audio Mixers.

3.5 Audio loudness meter

Loudness monitoring of programmed levels is needed in radio and television broadcasting, as well as in audio post production. Traditional methods of measuring signal levels such as the Peak programmed meter, and VU meter do not give the subjectively valid measure of loudness which many would argue is needed to optimize the listening experience when changing channels or swapping disks. The meter is showing the dB or VU scale which can be selected by user.

Figure 3.6 Audio Level Meters.

3.6 VTR (Video tape recorder)

This device can simultaneously record the audio & video signal with different format e.g. (SDI, Composite, Component, and S-Video). This device is used to record the final output of PCR the device can also be used for Ingest & MCR. All VTR are capable to play the recorded cassette also.[1]

Figure 3.7 Video Tape Recorders (VTR).

3.7 Play out video server

A video server is a computer based device (also called a 'host') dedicated for delivering video. Unlike personal computers, being multi-application a device, a video server is designed for one purpose; provisioning video, often for broadcasters. A professional grade video server records, stores, and plays back multiple streams of video without any degradation in the video signal. Broadcast quality video servers often store hundreds of hours of compressed audio and video (in different codec’s), play out multiple and synchronized simultaneous streams of video, and offer quality interfaces such as SDI for digital video and XLR for balanced analog audio or AES/EBU digital audio and also Time Code. A unlock input is usually provided to provide a means of synchronizing with the house reference clock, thereby avoiding the need for time base correction and frame synchronization. Video servers usually offer some type of control interface allowing them to be driven by more sophisticated scheduling or play-listing applications. Popular protocols include VDCP and 9-Pin Protocol.[1]

3.8 Audio player (CD/DVD)

A cassette deck is a type of tape recorder for playing or recording audio compact cassettes. A deck was formerly distinguished from a recorder as being part of a stereo component system, while a recorder had a self-contained power amplifier (and often speakers). While the two terms are often now used interchangeably, a recorder is typically thought of as a small low-fidelity portable device, while a deck is a sophisticated high fidelity component.[1]

Figure 3.8 Audio Player.

3.9 Video monitor

A video monitor also called a broadcast monitor, broadcast reference monitor or just reference monitor, is a device similar to a television, used to monitor the output of a video-generating device, such as a media play out server, IRD, video camera, VCR, or DVD player. It may or may not have audio monitoring capability. Unlike a television, a video monitor has no tuner and, as such, is unable independently to tune into an over-the-air broadcast. One common use of video monitors is in Television stations and in outside broadcast vehicles, where broadcast engineers use them for confidence checking of signals throughout the system. Video monitors are used extensively in the security industry with Closed-circuit television cameras and recording devices.

3.10 Audio monitor

A loudspeaker (or "speaker") is an electro acoustic transducer that converts an electrical signal into sound. The speaker moves in accordance with the variations of an electrical signal and causes sound waves to propagate through a medium such as air or water. Loudspeakers (and other electro acoustic transducers) are the most variable elements in a modern audio system and are usually responsible for most distortion and audible differences when comparing sound systems.

3.11 Online graphics

During LIVE telecasting or recording period the PCR people need to super impose the DSK (Down sting key) such as anchor name, program type and scroll or Roll text with graphics. Basically in our country the most television channel are using the inscriber for PCR online graphics.

Chapter 4

Studio

4.1 Studio definition

A studio is the heart of a TV station. It can produce audio & video signal by microphone & Camera. The studio can be both indoor & outdoor and both the studio consists with camera, microphone & lighting. The indoor studio must have a lighting system.

The studio needs to have enough space-horizontally for access and camera shots, and vertically to have the lighting in a suitable place. Technically it should have wall boxes where equipment can be plugged in and connection for other services, such as mains power and computer networks. There are two type of Television Studio.[1]

1. Normal Studio
2. Virtual Studio

Figure 4.1 inside the Studio

4.2 Camera

Camera is an electronic device that convert light signal to electric signal Cameras may work with the light of the visible spectrum or with other portions of the electromagnetic spectrum. A camera generally consists of an enclosed hollow with an opening (aperture) at one end for light to enter, and a recording or viewing surface for capturing the light at the other end. A majority of cameras have a lens positioned in front of the camera's opening to gather the incoming light and focus all or part of the image on the recording surface. Most 20th century cameras use

Figure 4.2 Camera

photographic film as a recording surface, while modern ones use an electronic camera sensor. The diameter of the aperture is often controlled by a diaphragm mechanism, but some cameras have a fixed-size aperture.

A typical still camera takes one photo each time the user presses the shutter button. A typical movie camera continuously takes 25 film frames per second as long as the user holds down the shutter button, or until the shutter button is pressed a second time.

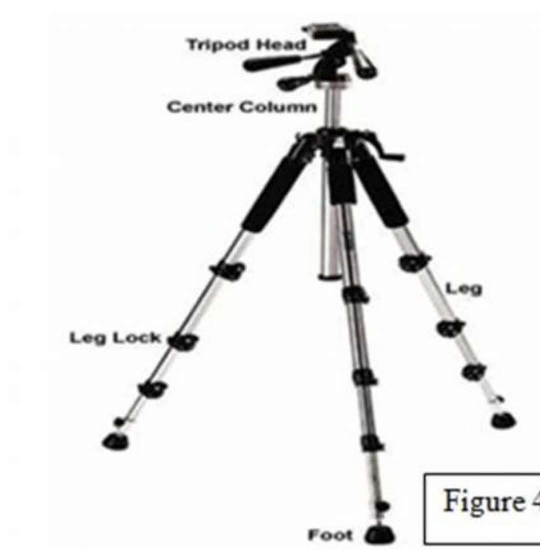

Figure 4.2 Camera Tripod

4.3 Tripod

Tripod is a word generally used to refer to a three-legged object; generally one used as a platform of some sort, and comes from the Greek tripods, meaning "three feet". A tripod provides stability along the side-to-side and up-and-down Coordinate axis of motion and

provides a large amount of leverage.

There are eight characteristics common to all tripods: Collapsed size, extended size, load capacity, head type, feet, leg locks, and common material.[1]

4.4 Lighting

Lighting or illumination is the deliberate application of light to achieve some aesthetic or practical effect. Lighting includes use of both artificial light sources such as lamps and natural illumination of interiors from daylight. Day lighting (through windows, skylights, etc.) is often used as the main source of light during daytime in buildings given its low cost. Artificial lighting represents a major component of energy consumption, accounting for a significant part of all energy consumed worldwide. Artificial lighting is most commonly provided today by electric lights, but gas lighting, candles, or oil lamps were used in the past, and still are used in certain situations. Proper lighting can enhance task performance or aesthetics, while there can be energy wastage and adverse health effects of poorly designed lighting. Indoor lighting is a form of fixture or furnishing, and a key part of interior design. Lighting can also be an intrinsic component of landscaping.

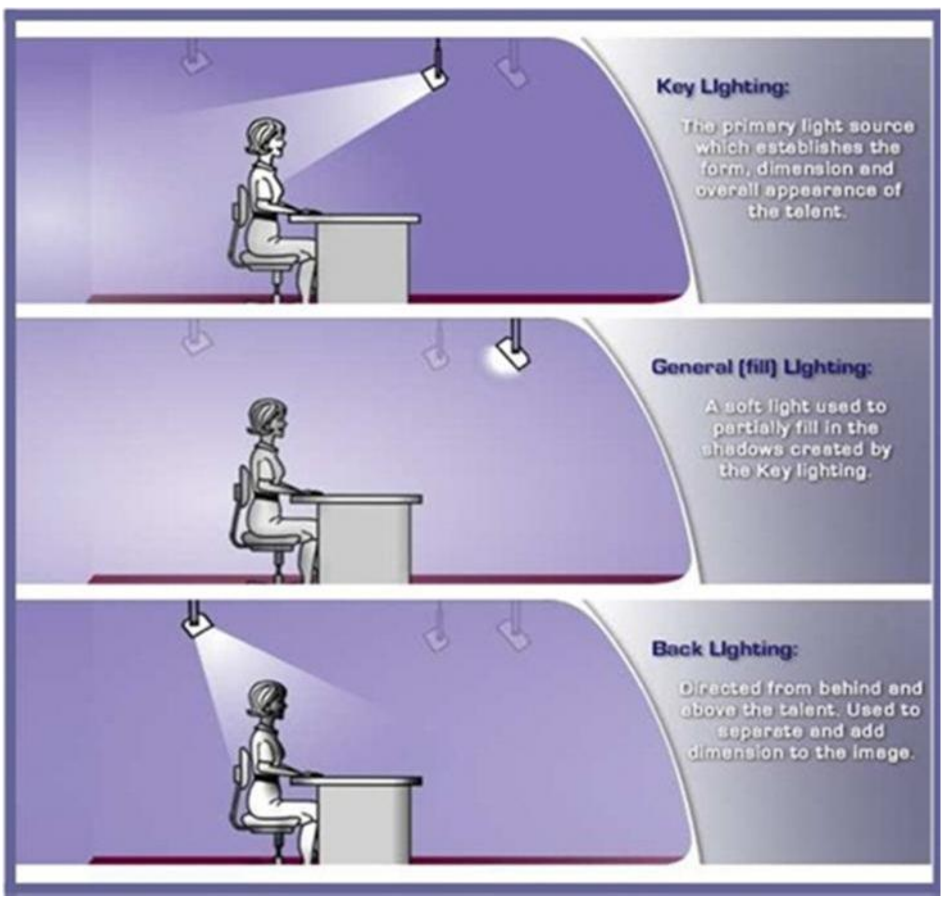

Figure 4.3 Basic Lighting Techniques

4.5 Light dimmer

Dimmers are devices used to vary the brightness of a light. By decreasing or increasing the RMS voltage and hence the mean power to the lamp it is possible to vary the intensity of the light output. Although variable-voltage devices are used for various purposes, the term dimmer is generally reserved for those intended to control resistive incandescent, halogen and more recently compact fluorescent (CFL) lighting. More specialized pulse-width modulation equipment is needed to dim fluorescent, vapor, solid and other arc lighting.

Dimmers range in size from small units the size of a normal light switch used for domestic lighting to high power units used in large theatre or architectural lighting installations. Small domestic dimmers are generally directly controlled, although remote control systems (such as X10) are available. Modern professional dimmers are generally controlled by a digital control system like DMX or DALI. In newer systems these protocols are often used in conjunction with Ethernet.[1]

Figure 4.4 Light Dimmer Control Panel

4.6 Microphone

A microphone is an acoustic-to-electric transducer or sensor that converts sound into an electrical signal. In 1876, Emile Berliner invented the first microphone used as a telephone voice transmitter. Microphones are used in many applications such as telephones, tape recorders, karaoke systems, hearing aids, motion picture production, live and recorded audio engineering, FRS radios, megaphones, in radio and television broadcasting and in computers for recording voice, speech recognition, VoIP, and for non-acoustic purposes such as ultrasonic checking or knock sensors.

Most microphones today use electromagnetic induction (dynamic microphone), capacitance change (condenser microphone, pictured right), piezoelectric generation, or light modulation to produce an electrical voltage signal from mechanical vibration.[1]

Figure 4.5 Microphone

4.7 Teleprompt monitor

Teleprompter is an electronic prompting system. Actually it's a monitor which is sated front of camera and inside the monitor text can be rolling vertically that's why anchor can see the all text with control.

A teleprompter (also known as an autocue) is a display device that prompts the person speaking with an electronic visual text of a speech or script. Using a teleprompter is similar to the practice of using cue cards. The screen is in front of the lens of the camera, and the words on the screen are reflected to the eyes of the speaker using a two-way mirror.

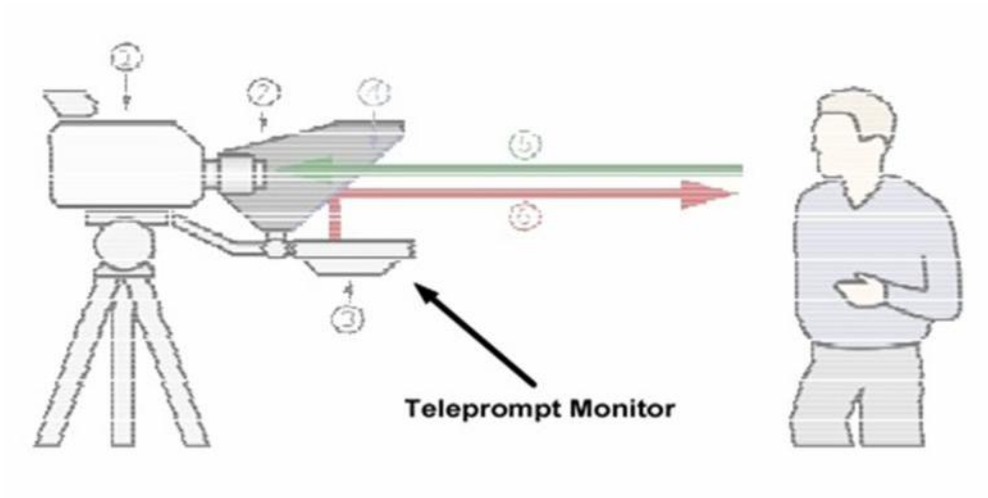

Figure 4.6 Studio Teleprompt

Chapter 5

Master Control Room (MCR)

5.1 Definition of MCR

Master control is the technical hub of a broadcast operation. It is common among most over-the-air television stations and networks. It is distinct from production control rooms in television studios where the activities such as switching from camera to camera are coordinated.

Master control is the final point before a signal is transmitted over-the-air or sent on to a cable television operator or satellite provider for broadcast. Television master control rooms include banks of video monitors, satellite receivers, videotape machines, transmission equipment, and, more recently, computer broadcast automation equipment for recording and playback of on-air programming.

Master control is generally staffed with one or two operators around-the-clock, every day to ensure continuous operation. Master control operators are responsible for monitoring the quality and accuracy of the on-air product, ensuring the transmission meets government regulations, troubleshooting equipment malfunctions, and preparing programming for future playback. Regulations include both technical ones (such as those against over-modulation and dead air), as well as content ones (such as indecency and station ID).

Figure 5.1 inside the Master Control Room (MCR)

5.2 AV switcher

This is a basic audio video switcher which has multiple input and single output. The operator can select any source from multiple inputs which is selected for on air. The AV switcher is connected with Graphics system also for that the operator can select the DSK function.

Figure 5.2 AV Switcher

5.3 Audio controller

The MCR taken the different AV source from different place, that's why the audio level is not similar with each other source, for that the operator need to control the audio level.

Figure 5.3 Audio Controller

5.4 Server plays out terminal

This is the remote client for main Video Server.

The operator can make the play list in this terminal. During the broadcasting period the operator can also edit the play list at the same time.

5.5 Video router control panel

This is a serial video router control panel which is connected with main router. The main video router is installed in CAR. By the control panel operator can select any source for On-Air.

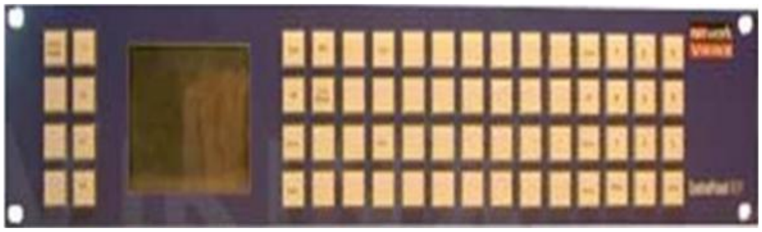

Figure 5.4 Video Router Control Panel

5.6 Online DSK

This is workstation computer where the DSK software and hardware is installed. The hardware gives the Key and Fill and the key and Fill is connected to the MCR switcher. The operator can insert all type of graphics to the On-Air such as News ticker, graphical commercial etc.

5.7 Audio & Video monitoring

In MCR so many incoming source are come from different place. The operator needs to monitor the all video and audio source, that’s why number of video and audio monitor is connected in MCR.

5.8 Intercom system

The Intercom is installed to the MCR for internal Communicate with each other. During LIVE transmission the MCR operator can communicate with all concern people such as Ingest, PCR and Editing by intercom.

Figure 5.5 Wireless Intercom

Chapter 6

Earth Station

6.1 Definition of earth station

An earth station, ground station, or earth terminal is a terrestrial terminal station designed for extra planetary telecommunication with spacecraft, and/or reception of radio waves from an astronomical radio source. Earth stations are located either on the surface of the Earth, or within Earth's atmosphere. Earth stations communicate with spacecraft by transmitting and receiving radio waves in the super high frequency or extremely high frequency bands (e.g., microwaves). When an earth station successfully transmits radio waves to a spacecraft (or vice versa), it establishes a telecommunications link.

Specialized satellite earth stations are used to telecommunicate with satellites chiefly communications satellites.

When a satellite is within an earth station's line of sight, the earth station is said to have a view of the satellite. It is possible for a satellite to communicate with more than one earth station at a time. A pair of earth stations are said to have a satellite in mutual view when the stations share simultaneous, unobstructed, line-of-sight contact with the satellite. [4]

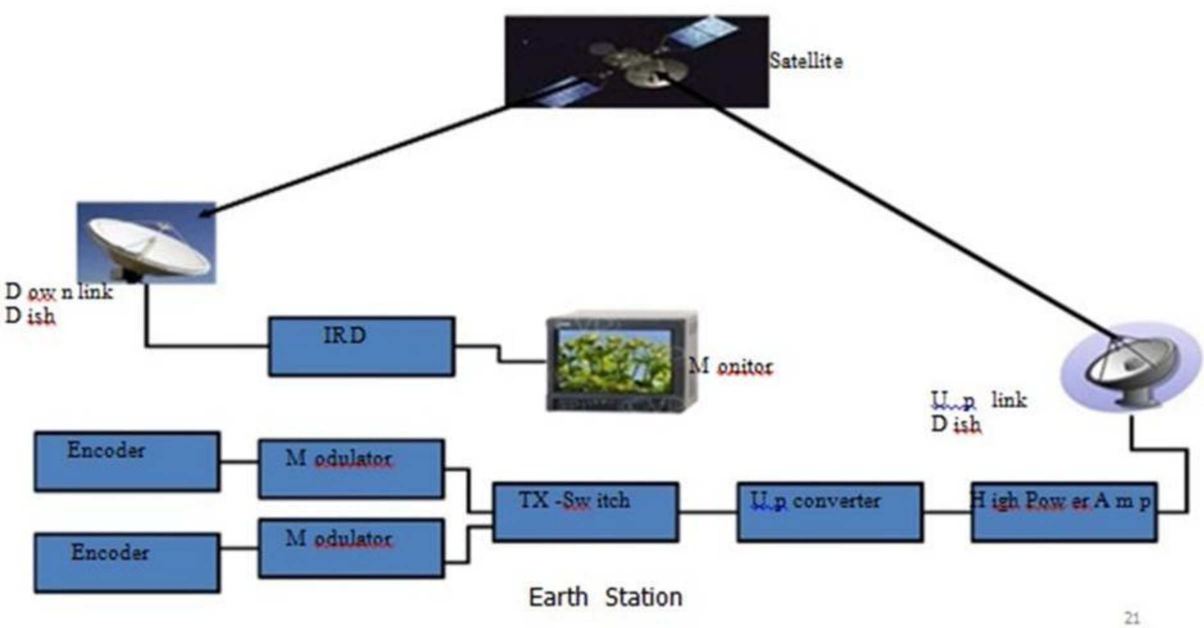

Figure 6.1 Block Diagram of Earth Station

6.2 Types of earth station

1. Transmit & Receive: Earth station can transmit signal for satellite and can receive signal from satellite.

2. Receive only: Earth station can only receive signal, mostly used for CATV system.

3. Transmit only: Earth station can only transmit signal towards satellite.

6.3 Encoder

An encoder is a device, circuit, transducer, software program, algorithm or person that converts information from one format or code to another, for the purposes of standardization, speed, secrecy, security, or saving space by shrinking size.

In TV station basically its taken SDI video with embedded audio and given ASI output to de modulator.

Figure 6.2 Encoder

6.4 Asynchronous signal

In general, asynchronous is an adjective describing objects or events that are not coordinated in time. In information technology, the term has several different usages.

In telecommunication signaling within a network or between networks, an asynchronous signal is one that is transmitted at a different clock rate than another signal. Signals are almost but not quite in synchronization - and a method is used to adjust them - and synchronous signals are those that run at the same clock rate.

6.5 Multiplexer

In electronics, a multiplexer is a device that selects one of several analog or digital input signals and forwards the selected input into a single line. A multiplexer of 2n inputs has n select lines, which are used to select which input line to send to the output. Multiplexers are mainly used to increase the amount of data that can be sent over the network within a certain amount of time and bandwidth.

In Digital Logic a "Multiplexer" converts multiple inputs to a single output.

An electronic multiplexer makes it possible for several signals to share one device or resource, for example one A/D converter or one communication line, instead of having one device per input signal.

An electronic multiplexer can be considered as a multiple-input, single-output switch, and a demultiplexer as a single-input, multiple-output switch. The schematic symbol for a multiplexer is an isosceles trapezoid with the longer parallel side containing the input pins and the short parallel side containing the output pin. The schematic on the right shows a 2-to-1 multiplexer on the left and an equivalent switch on the right.

6.5.1 Single channel per carrier (SCPC)

SCPC stands for Single Channel per Carrier.

SCPC is a form of satellite transmission where each channel is transmitted on a dedicated single carrier.

The alternative to SCPC is MCPC (Multiple Channel per Carrier).

MCPC is more efficient than SCPC, but SCPC is still utilized for some satellite feeds. By using SCPC, satellite users are able to uplink to the same transponder from multiple locations.

6.5.2 Multiple channels per carrier (MCPC)

MCPC stands for Multiple Channel per Carrier.

MCPC is a form of satellite transmission where each carrier is utilized to transmit multiple channels.

MCPC transmits multiple video or audio channels on one carrier by utilizing Time Division Multiplexing (TDM).The alternative to MCPC is SCPC (Single Channel per Carrier).

MCPC is used much more than SCPC because it makes much more efficient use of expensive satellite bandwidth.

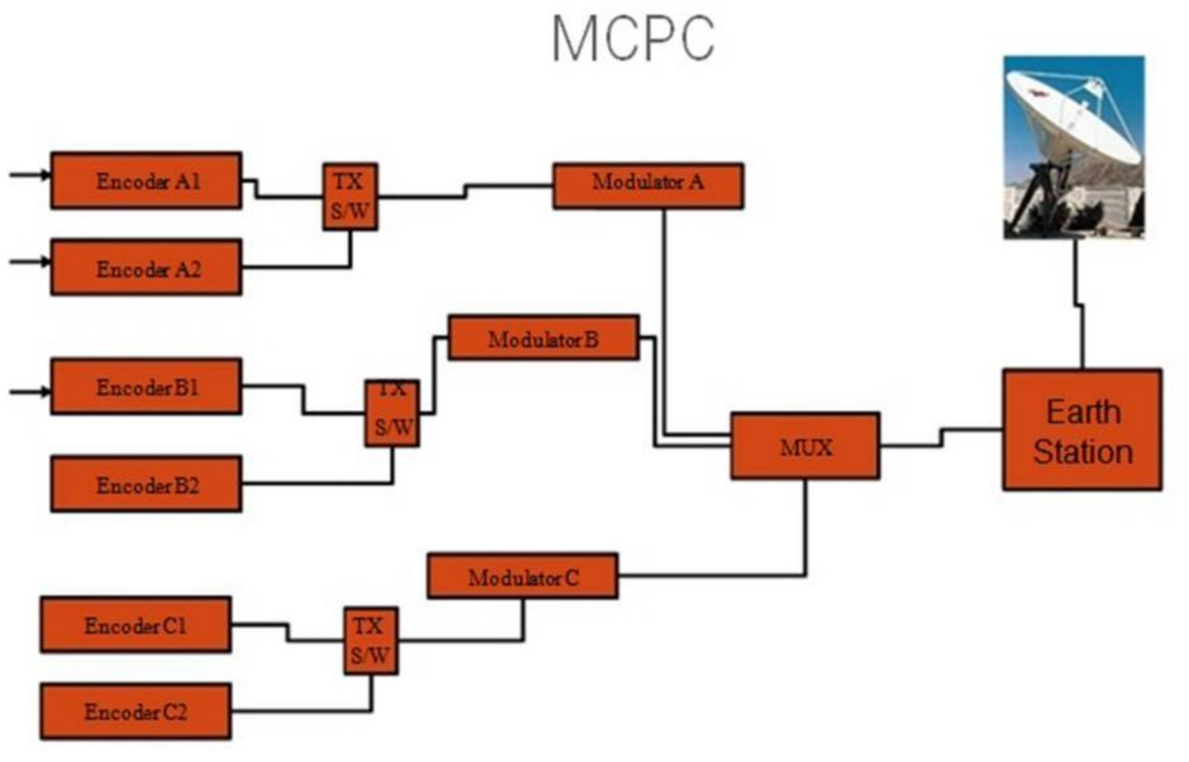

Figure 6.3 Multiple Channels per Carrier

6.6 Modulator

In electronics, modulation is the process of varying one or more properties of high frequency periodic waveform, called the carrier signal, with respect to a modulating signal. This is done in a similar fashion as a musician may modulate a tone (a periodic waveform) from a musical instrument by varying its volume, timing and pitch. The three key parameters of a periodic waveform are its amplitude ("volume"), its phase ("timing") and its frequency ("pitch"), all of which can be modified in accordance with a low frequency signal to obtain the modulated signal. Typically a high-frequency sinusoid waveform is used as carrier signal, but a square wave pulse train may also occur.

In telecommunications, modulation is the process of conveying a message signal, for example a digital bit stream or an analog audio signal, inside another signal that can be physically transmitted. Modulation of a sine waveform is used in view to transform a base band message signal to a pass band signal, for example a radio-frequency signal (RF signal). In radio communications, cable TV systems or the public switched telephone network for instance, electrical signals can only be transferred over a limited pass band frequency spectrum, with specific (non-zero) lower and upper cutoff frequencies. Modulating a sine wave carrier makes it possible to keep the frequency content of the transferred signal as close as possible to the centre frequency (typically the carrier frequency) of the pass band.

Figure 6.4 Modulator

6.6.1 Quadrature phase shift keying (QPSK)

QPSK (Quadrature Phase Shift Keying) is a phase modulation algorithm.

Phase modulation is a version of frequency modulation where the phase of the carrier wave is modulated to encode bits of digital information in each phase change.

The "PSK" in QPSK refers to the use of Phased Shift Keying. Phased Shift Keying is a form of phase modulation which is accomplished by the use of a discrete number of states. QPSK refers to PSK with 4 states. With half that number of states, you will have BPSK (Binary Phased Shift Keying). With twice the number of states as QPSK, you will have 8PSK.

The "Quad" in QPSK refers to four phases in which a carrier is sent in QPSK: 45, 135, 225, and 315 degrees. QPSK Encoding, Because QPSK has 4 possible states; QPSK is able to encode two bits per symbol.

Phase	Data
45 degrees	Binary 00
135 degrees	Binary 01
225 degrees	Binary 11
315 degrees	Binary 10

QPSK is more tolerant of link degradation than 8PSK, but does not provide as much data capacity.[4]

6.7 Intermediate Frequency

In communications and electronic engineering, an intermediate frequency (IF) is a frequency to which a carrier frequency is shifted as an intermediate step in transmission or reception. The intermediate frequency is created by mixing the carrier signal with a local oscillator signal in a process called heterodyning, resulting in a signal at the difference or beat frequency. Intermediate frequencies are used in super heterodyne radio receivers, in which an incoming signal is shifted to an IF for amplification before final detection is done. There may be several such stages of intermediate frequency in a super heterodyne, which is called double (or triple) conversion. There are some values for intermediate frequencies.

Ex:

Audio signal/am:	455 KHz
FM:	10MHz
TV/Video:	26-45MHz
Satellite:	30-60MHz

6.8 Up converter

A block up converter (BUC) is used in the transmission (uplink) of satellite signals. It converts a band (or "block") of frequencies from a lower frequency to a higher frequency. Modern BUCs convert from the L band to K_u band, C band and K_a band. Older BUCs convert from a 70 MHz intermediate frequency (IF) to K_u band or C band.

Most BUCs use phase-locked loop local oscillators and require an external 10 MHz frequency reference to maintain the correct transmit frequency.

BUCs used in remote locations are often 2 or 4 W in the K_u band and 5 W in the C band. The 10 MHz reference frequency is usually sent on the same feed line as the main carrier. Many smaller BUCs also get their DC current over the feed line, using an internal DC block.

BUCs are generally used in conjunction with low-noise block converters (LNB). The BUC, being an up-converting device, makes up the "transmit" side of the system, while the LNB is the down-converting device and makes up the "receive" side. An example of a system utilizing both a BUC and an LNB is a VSAT system, used for bidirectional internet access via satellite.

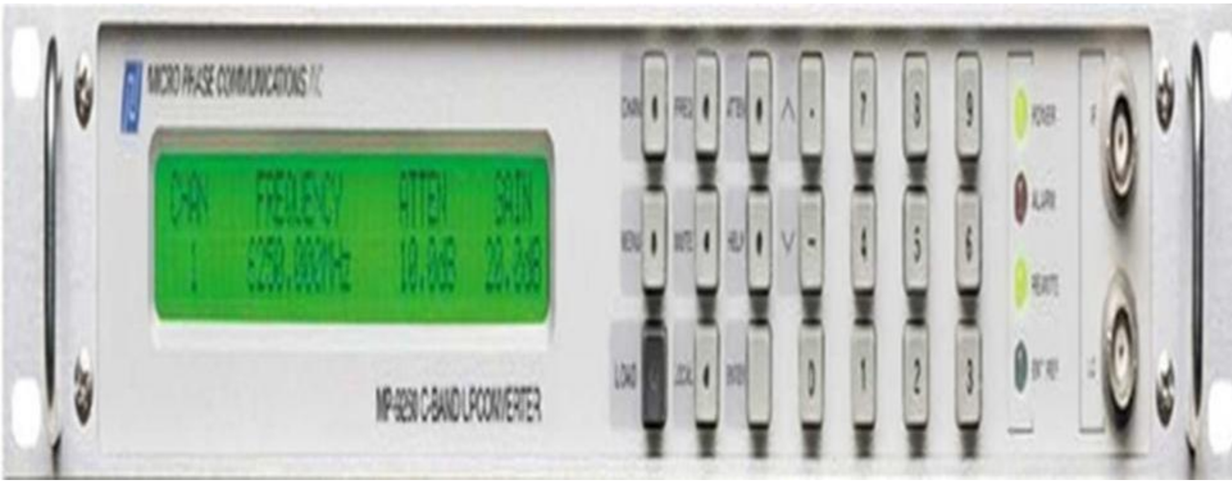

Figure 6.5 Up-Converters

6.9 Radio Frequency

Radio frequency (RF) is a rate of oscillation in the range of about 3 kHz to 300 GHz, which corresponds to the frequency of radio waves, and the alternating currents which carry radio signals. RF usually refers to electrical rather than mechanical oscillations, although mechanical RF systems do exist.

Electric currents that oscillate at radio frequencies have special properties not shared by direct current or alternating current of lower frequencies. The energy in an RF current can radiate off a conductor into space as electromagnetic waves (radio waves); this is the basis of radio technology.

In order to receive radio signals an antenna must be used. However, since the antenna will pick up thousands of radio signals at a time, a radio tuner is necessary to tune in to a particular frequency (or frequency range). This is typically done via a resonator - in its simplest form, a circuit with a capacitor and an inductor forming a tuned circuit. The resonator amplifies oscillations within a particular frequency band, while reducing oscillations at other frequencies outside the band.

Chart of Radio Frequency

Frequency	Designation	Abbreviation
300-3000Hz	Voice frequency	VF
3-30KHz	Very low frequency	VLF
30-300KHz	Low frequency	LF
300KHz-3MHz	Medium Frequency	MF
3-30MHz	High frequency	HF
30-300MHz	Very high frequency	VHF
300MHz-3GHz	Ultra high frequency	UHF
3GHz-30GHz	Super high frequency	SHF
30-300GHz	Extra high frequency	EHF

[4]

6.10 High Power Amplifier

An RF power amplifier is a type of electronic amplifier used to convert a low-power radio-frequency signal into a larger signal of significant power, typically for driving the antenna of a transmitter. It is usually optimized to have high efficiency, high output Power (P1dB) compression, good return loss on the input and output, good gain, and optimum heat dissipation.

Figure 6.6 High Power Amplifiers (HPA)

6.11 Auto change over switch

In earth station all equipment are redundant, so if one is failure another will make backup by auto change over switch. The all equipment are connected with the change over switch.

In data communications, an automatic switching system is a switching system in which all the operations required to execute the three phases of information-transfer transactions are automatically executed in response to signals from a user end-instrument.

In an automatic switching system, the information-transfer transaction is performed without human intervention, except for initiation of the access phase and the disengagement phase by a user.

6.12 Wave Guide

A waveguide is a structure which guides waves, such as electromagnetic waves or sound waves. There are different types of waveguide for each type of wave. The original and most common meaning is a hollow metal pipe used for this purpose.

Waveguides differ in their geometry which can confine energy in one dimension such as in slab waveguides or two dimensions as in fiber or channel waveguides. In addition, different waveguides are needed to guide different frequencies: an optical fiber guiding light (high frequency) will not guide microwaves (which have a much lower frequency). As a rule of thumb, the width of a waveguide needs to be of the same order of magnitude as the wavelength of the guided wave.

Figure 6.7 Wave Guide

6.13 Feed Horn

The feed horn is the part of a satellite dish system which gathers the reflected signal from the dish and focuses it towards the LNB.

It is a type of horn antenna that is deployed to convey radio signals between the transceiver and the reflector antenna. Horn antennas basically effect a transition between waves propagating through a transmission line like a waveguide and the waves propagating in free space. The shapes could be various, based on the final purpose of regulating some of the fundamental properties of gain, radiation pattern and impedance.

The feed horn also does the job of attenuating unwanted signals from sources like adjacent channels. This is done by selection of the polarity of the waves that are to be received. As an accessory located at the focal point of a satellite dish system or a parabolic antenna, it gathers the reflected signal from the dish and focuses it towards the Low Noise Block (LNB), which is usually affixed in or on the dish.

Figure 6.8 Feed Horns

6.14 Antenna

Satellite TV station are using the C band parabolic Dish antenna for both transmitting and receiving. Basically the TV station are using 4.5 to 5.0 diameter antenna for transmitting.

A parabolic antenna is a high-gain reflector antenna used for radio, television and data communications, and also for radiolocation (radar), on the UHF and SHF parts of the electromagnetic spectrum. The relatively short wavelength of electromagnetic radiation at these frequencies allows reasonably sized reflectors to exhibit the desired highly directional response for both receiving and transmitting.

Figure 6.9 Parabolic Dish Antenna

6.14.1 Azimuth

Azimuth is fancy name for direction.

Azimuth is an angular measurement made in the horizontal plane.

A correct azimuth setting is critical pointing a satellite antenna.

Magnetic compass North will vary from the true azimuth North by the value of declination.[4]

6.14.2 Polarization

Polarization is the orientation of the electric field vector of the electromagnetic wave produced by the antenna. For most antennas, the orientation of the antenna conductor determines the polarization. Polarization may be vertical, horizontal or elliptical.

The diagram above shows vertical and horizontal polarization. If the radio wave's electric field vector points in some other direction, it is said to be obliquely polarized.

If the electric field rotates in space, such that its tip follows an elliptical path, it is elliptically polarized.

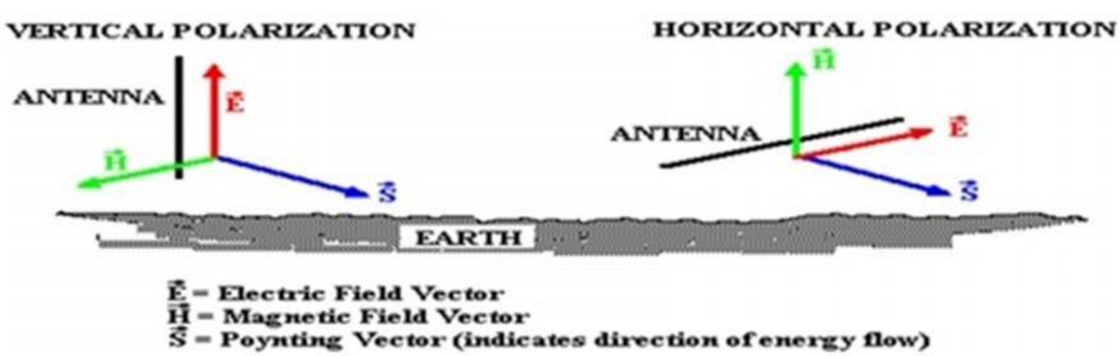

Figure 6.10 Different Polarization

6.14.3 Elevation

Elevation is the angular measurement of a satellite above the horizon.

Elevation is measured in degrees. A satellite which is higher in the sky will have a greater elevation than one which is close to the horizon.

A satellite exactly level with the horizon would have an elevation of 0 degrees. A satellite with an elevation of 90 degrees would be directly overhead.

Knowing the elevation of a satellite from your location is critical to being able to successfully point a satellite antenna to it.

6.14.4 Low Noise Block

An LNB - Low Noise Block (also called an LNC- Low Noise Converter), is used for communications (broadcast) satellite reception. The LNB is usually affixed either in or on the satellite dish.

The purpose of the LNB is to utilize the super heterodyne effect; and amplify and convert a wide block (band) of frequencies. This helps compensate the signal loss associated with typical coaxial cable at relatively high frequencies.

The term 'low noise' relates to the quality of the 1st stage input amplifier transistor, measured in either called Noise Temperature units, Noise Figure units or Noise Factor units.

The "low-noise" part also indicates that amplification and mixing takes place prior to cable attenuation, in a circuit that requires no power supply or receiver.
With the high frequencies that satellites operate at, it is critical that the noise is controlled prior to signal processing.

An LNB helps keep the overall sound and picture of satellite TV from becoming greatly degraded, without the need of introducing a much larger dish reflector.
For wide-band satellite television carrier reception (generally 27 MHz wide band), the tolerance (accuracy) of the LNB local oscillator frequency needs to be in the range of ±500kHz, This makes low cost DRO's (dielectric oscillators) feasible.

Figure 6.11 LNB

6.14.5 Integrated Radio Decoder

An integrated receiver/decoder (IRD) is an electronic device used to pick-up a radio-frequency signal and convert to audio video signal.

Figure 6.12 IRD

6.15 Base band System

In telecommunications and signal processing, baseband is an adjective that describes signals and systems whose range of frequencies is measured from close to 0 hertz to a cut-off frequency, a maximum bandwidth or highest signal frequency; it is sometimes used as a noun for a band of frequencies starting close to zero. Baseband can often be considered as a synonym to low pass or non-modulated, and antonym to pass band, band pass, carrier-modulated or radio frequency (RF) signals.

Chapter 7

ENG, EFP & Live

7.1 Electronic news gathering (ENG)

Electronic News Gathering is an independent single camera operation normally for news event coverage.

ENG is a broadcasting (usually television) industry acronym which stands for electronic news gathering. It can mean anything from a lone broadcast journalist reporter taking a single camcorder out to get a story, to an entire television crew taking a production truck or satellite truck on location to do a live television news report for a newscast.

7.2 Electronic field Production (EFP)

Electronic Field Production is a wider setup i.e. more than 1 cam and normally it comes together with a switcher, several monitors and sets of cables. It can be a live or recording coverage e.g. concert, football match and seminars.

7.3 Digital satellite news gathering (DSNG)

DENG is a broadcasting (usually television) industry acronym which stands for digital electronic news gathering.

Satellite News Gathering is a mini transmitter to send footages via satellite or micro link depend on the mode of transmission. Those days, it takes a big lorry to carry such equipment used to be called OB van.

Satellite offers the unique possibility to transmit images and sound from almost anywhere on the planet. From a fully equipped uplink truck or from a light flyaway travel case, DSNG makes it possible to bring live news and sport to millions of viewers.

Our modulation products are based on the DVB-DSNG and DVB-S2 standard. Their very high bandwidth efficiency enables mobile TV contribution even in High Definition.[4]

7.3.1 DSNG E5740 Voyager

MPEG-2 Standard Definition DSNG

The E5740 is a future-proof DSNG system allowing deployment in a variety of applications from low data rate fly-away to high bandwidth, multi-channel SNG trucks.

Broadcasters and satellite news gathering organizations are covering more live events, sports and news spots than ever before and need reliable technology that will make it easier and more efficient to deliver video from the field.

Application

The E5740 can be deployed within Digital Satellite News Gathering (DSNG) systems requiring either L-Band or IF modulation output capability in an upgradeable 2RU chassis. The encoder platform has the flexibility and performance to meet the needs of a wide variety of outside broadcast (OB) applications.

Inputs

Video

Analog composite video (PAL/NTSC) 10bit sampling SNR >60dB SDI serial digital video 625 and 525 line standard supported with EDH error detection and health monitoring HSYNC support for 625 and 525 line.

Audio

2 stereo pairs input via analog, AES-EBU or SDI Analog audio balanced 600Ω/20kΩ Input levels: 12, 15, 18, 21, 22 and 24dB Up to 4 stereo pairs can be de-embedded from SDI.

Outputs

Note: Base unit will have either 70MHz IF output or L-Band output. IF

Output Option

IF Frequency: 50 to 180 MHz (1 kHz steps)
Output Power: -20 to +5dBm (0.1 dB steps)
Monitor Output: -20dB relative to main IF output

L-Band Output Option

Frequency: 950 to 1750 MHz (1 kHz steps)

Output Power: -20 to +5dBm (0.1 dB steps)

Monitor Output: -30dB relative to main output

Switchable up-converter Power: +24Vdc, 500mA max

Switchable 10MHz reference

Signal Conditioning**:** EN 300 421 (DVB-S) and EN 301 210 (DVB-DSNG)

Modulation: QPSK, 8-PSK (option) and 16-QAM (option)

Symbol rate: 1 to 48 MSym/s variables in 1 Sym/s increments

Transport Stream: 3 x ASI Copper Single Program Transport Stream [6]

Figure 7.1 DSNG Van

7.3.2 G. I. G. A. S. A. T. -The FA-180 Antenna

The FA-180 is intended primarily for Satellite News Gathering in C, Ku or K-band, but is equally well suited to any other application requiring a compact rugged antenna which is rapidly deployable with no tools. It includes a multi segmented carbon fiber honeycomb reflector,
ensuring light weight and maximum strength with no deformation, even after being reassembled hundreds of times.

Transmit

Transmit Bands: FA-180/60 5.85 to 6.65 GHz

3dB Beam width: <2.0˚ at 5.85GHz

Transmit Power: 1.5KW max

Off Axis Transmit Gain: <29-25 log dBi

VSWR: 1.3:1

Transmit Gain: FA-180/60 39.5dBi mid band[5]

7.4 Live Broadcast by Back Pack

Back Pack is the perfect solution for organizations looking to capture live news and events from remote locations, crowded venues or even moving vehicles. With its lightweight, portable design, Back Pack is ready to broadcast live whenever news breaks.

Fig: Back Pack

Back Pack offers the highest quality, most stable HD picture available in an ultra-mobile 3G/4G/LTE uplink solution. Back Pack uses several proprietary technologies to ensure optimal picture quality regardless of network conditions:

a. Inverse StatMux+ – 3G/4G/LTE wireless networks suffer from unstable network conditions and limited bandwidth. Back Pack is able to overcome these network limitations and provide a strong signal through its proprietary Inverse StatMux+ technology. Inverse StatMux+ dynamically segments a live video signal and transmits the segments through multiple independent connections, and then uses intelligent monitoring and control to adjust the signal in real-time to ensure that each 3G/4G/LTE wireless connection is fully utilized. As a result, Back Pack can deliver a stable, professional-broadcast quality picture.

b. Superior Variable Bit Rate Encoding Technology – Back Pack utilizes a proprietary advanced low

c. delay H.264 Variable Bit Rate encoder, which ensures that broadcasters can deliver quality live from thousands of miles away, yet maintain less than four second end-to-end delay.

d. Back Pack FEC – Back Pack uses a powerful patent-pending forward error correction algorithm to auto-correct packet errors and ensure a stable, broadcast-quality picture.

7.4.1 Positive site :

1. Simple to Use

   Operating Back Pack is simple. Plug in the camera via SDI or composite connections, turn on the power, and the pack will begin broadcasting live in less than a minute. No field configuration is required, allowing the camera operator to focus on collecting compelling live footage without worry.

2. Significant Cost Savings

   Back Pack provides broadcasters with a cost-effective alternative to traditional satellite and microwave trucks. Back Pack costs a fraction of the price of traditional OB vans. Back Pack customers are able to further lower operating costs by lessening the dependence on expensive satellite links and eliminating the need for additional engineers.

Live Telecast at Jatrabari Flyover

Live Telecast at Kamlapur Station

7.5 Different Live connections

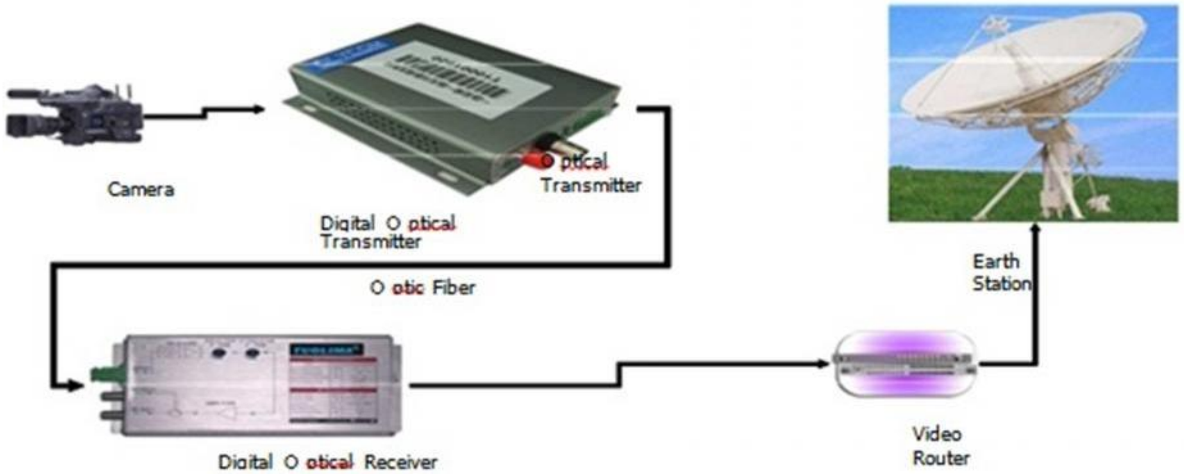

Figure 7.2 Live Transmissions by Optical Fiber

Figure 7.2 show the live Transmission by Optical Fiber system which is setup in under ground Optical Fiber that is connected with digital Optical receiver in TV station. Receiver send it to Video Router that is connected with Earth Station.

Figure 7.3 Live Transmissions by DSNG

Figure 7.3 show the live Transmission by DSNG .ENG captured video and send it to satellite directly. DSNG is a mini transmitter to send footages via satellite or micro link depend on the mode of transmission. Those days, it takes a big lorry to carry such equipment used to be called OB van.

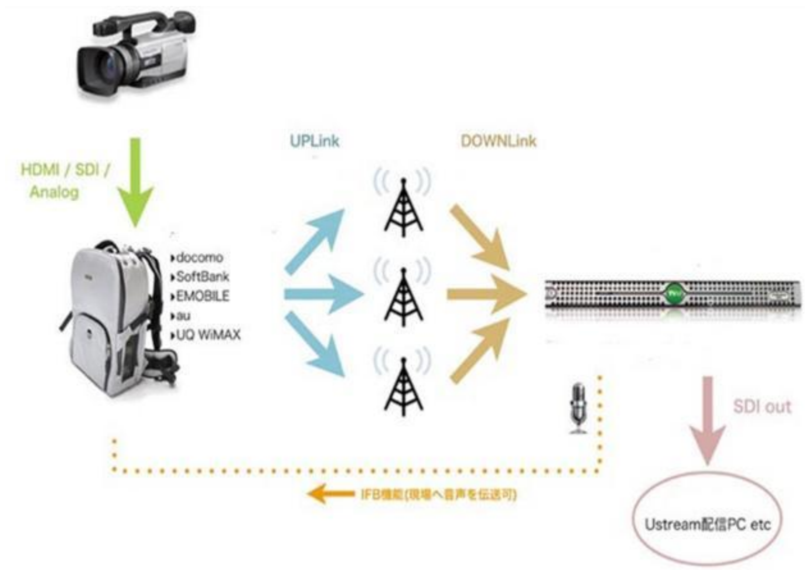

Fig7.4 : Live Transmission By Back Pack

Figure 7.4 show the Update technology of live transmission that is Back Pack . Back Pack is the perfect solution for organizations looking to capture live news and events from remote locations, crowded venues or even moving vehicles. With its lightweight, portable design, Back Pack is ready to broadcast live whenever news breaks

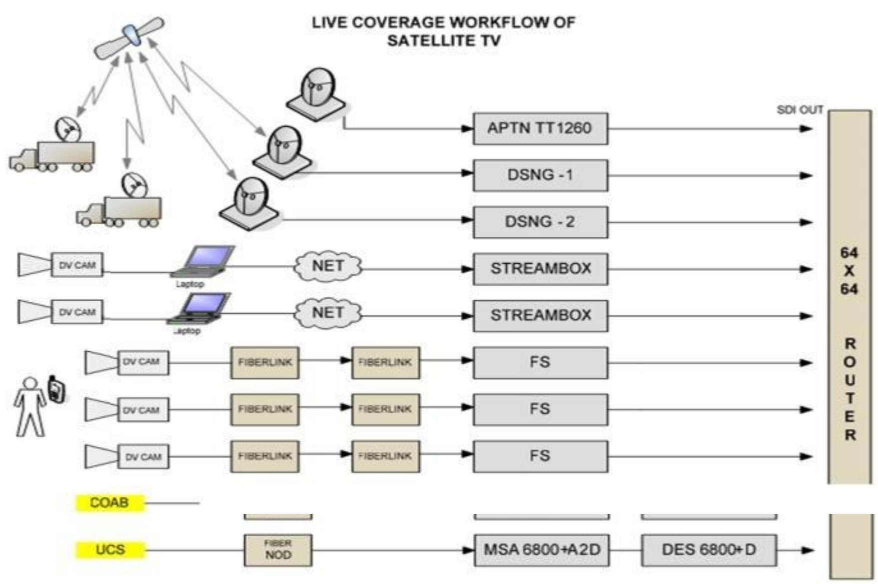

Figure 7.4.1 Block Diagram of Live Connection

Figure 7.4.1 show the block diagram of live transmission systems in a satellite TV station. Different system are working here.

Chapter 8

Conclusion

8.1 Conclusion

The rapid growth of digital technology revolutionized the media broadcasting industry. The number of television and radio broadcasting stations has immensely increased, media delivery expanded from satellite, cable and terrestrial to include mobile devices (mobile phones, pocket computers and PDA) and the internet. This growth created a need for qualified professionals with core competencies in HDTV and digital broadcast technologies, electronics, communications, digital multi-media, digital broadcast/film production, computer networking and internet technologies in addition to project management and organizational skills. This work is mainly focused on the total setup of a Satellite TV channel.

In my report I have discussed the main parts of the Satellite Television which covers the Earth Station and Live Transmission and Satellite TV Communication. I have also discussed how a signal is transmitted accurately with the help of diagram. Most of all TV channels in our country transmit the SD (Aspect Ratio 4:3) signal, but recently the ‘Maasaranga’ and the ‘Channel 71’ transmits the HD (Aspect Ratio 16:9) signal. Our Television Channels use single channel per carrier and they use 6 MHz BW. But if we can use multi channels per carrier, we can use more channels in the same BW.

Finally I can say, if we use MCPC, then we can save our cost. On the other hand, if we transmit the HD signal then we can get better quality of sound and picture.

Technology has made our dreams into reality. Satellite Television Channel is based on technology and we hope that it will advance with the increasing development of technology day by day.

8.2 Future Scope

I have a plan to study on the following topics in future:

- Compression Technique
- Automation System

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List of Abbreviations

A

ADC-Analog to Digital Converter

APTN-Aboriginal Peoples Television Network

B

BPP-Bits Per pixel

BEC-Backward Error Correction

BUC-Block up Converter

BPF-Band Pass Filter

BUD-Big Ugly Dish

C

CAR-Central Apparatus Room

CATV-Community Antenna Television

CD-Compact Disc

CRT-Cathode Ray Tube

COAB-Cable Operator Associations of Bangladesh

CCU-Camera Control Unit

CRC-Cyclic Redundancy Check

D

DVB-Digital Video Broadcasting

DVB-S-Digital Video Broadcasting -Satellite

DAC-Digital to Analog Converter

DVD-Digital Video Disc

DSNG-Digital Satellite News Gathering

E

EDTV-Enhanced Definition Television

ENG-Electronic news gathering

EFP-Electronic field Production

EIRP- Effective Isotropic Radiated Power

F

FEC-Forward Error Correction

FCC-Federal Communication Commission

G

GOP-Group Of pictures

GPS-Global Positioning Systems

GEO-Geostationary Earth Orbit

H

HD-High Definition

HDTV-High Definition Television

HPA-High Power Amplifier

HEO-High Earth Station

I

IF-Intermediate Frequency

IRD-Integrated Radio Decoder

L

LCD-Liquid Cristal Display

LEO-Low Earth Orbit

LNC-Low Noise Converter

LNBF-Low Noise Block Frequency

M

MCR-Master Control Room

MPEG-Moving Pictures Experts Group

MCPC- Multiple channels per carrier

MEO-Medium Earth Orbit

N

NTSC-National Television Systems Committee

O

OB-Outside Broadcast

P

PCR-Production Control Room

PAL-Phase Alternating Line

PQM-Phase Quadrate Mixing

Q

QEF-Quasi Error Free

S

SECAM-Sequential Color with Memory

SDTV-Standard Definition Television

SCPC-Single Channel PER Carrier

U

UCS-United Cable Service

UPS- Uninterruptible power supply

V

VCR-Video Cassette Recorder

VTR-Video Tape Recorder