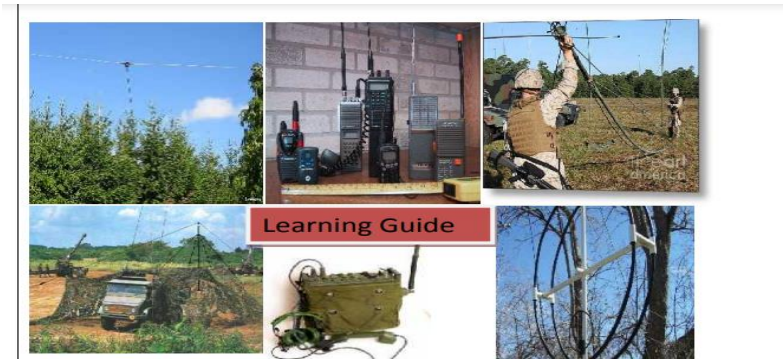
ELECTRICAL/ELECTRONICS EQUIPMENT SERVICING

LEVEL – III

Based on April, 1023 curriculum Version- 1



Module Title: Assembling and Erecting Antenna Signal

Prepared by: Ministry of Labor and Skill

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Acknowledgment

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Acronyms

AF ..... Audio Frequencies

CAD ..... Computer Aided Design

EMF .....Electromotive Force

LC .....Inductive Capacitiv

LED ..... Light Emitting Diode

OHS ..... occupational health and safety

PC .....Personal Computer

PPE .....personal petro tactic equipment

PRM..... Pulse Rate Modulation

PWM .....Pulse width modulation

RF ..... Radio Frequencies

SHF.....Super High Frequency

SMART .....Specific, Measurable, Achievable, Realistic, Time

SOP..... standard operating procedures

UHF .....Ultra High Frequency

VHF ..... Very High Frequency

VT..... Visual Testing VT

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Introduction to Module

In electrical/electronic equipment servicing filed; Assembling and Erecting Antenna Signal project helps to know the Assembling and Erecting Antenna Signal) mechanically supports and electrically connects electronic Antenna Signal using conductive tracks, pads and other features etched from copper sheets laminated onto a non-conductive substrate**.** Assembling and Erecting Antenna Signal Terminology having a basic understanding of Assembling and Erecting Antenna Signal terminology can make working with a DESHI LNB concept company much faster and easier. This glossary of circuit board terms will help you understand some of the most common words in the industry. While this isn't an all-inclusive list, it is an excellent resource for your reference. This term refers to a type of component that is dependent on the flow direction of an, this is a type of technology used to build multi- layer Assembling and Erecting Antenna Signal. often replaces traditional visa and is a useful production method for creating high-density Assembling and Erecting Antenna Signal: It refers to Assembling and Erecting Antenna Signal (continuous and variable signal). The outputs are non-binary that is suitable for Assembling and Erecting Antenna Signal

This module covers the units:

- unit and workstation
- Repair satellite receiver/decoder
- Install satellite/ antenna system
- Install reception signal distribution systems
- Install reception antennae and signal distribution systems
- Set-up reception antennae and signal distribution systems and report.

Learning Objective of the Module

- uniting and workstation
- Repairing satellite receiver/decoder
- Installing satellite/ antenna system
- Installing reception signal distribution systems
- Installing reception antennae and signal distribution systems
- Set-up reception antennae and signal distribution systems and report

Module Instruction

For effective use this modules trainees are expected to follow the following module instruction:

1. Read the information written in each unit
2. Accomplish the Self-checks at the end of each unit
3. Perform Operation Sheets which were provided at the end of units
4. Do the “LAP test” giver at the end of each unit and
5. Read the identified reference book for Examples and exercise

Unit one: Uniting and workstation

Instruction sheet

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Identifying workplace
- Applying OHS procedures
- Basic concept of satellite antenna as imply and TV system
- PPT and necessary tools, test instruments
- Service manuals and service information

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Identify workplace
- Apply OHS procedures
- Basic concept of satellite antenna as imply and TV system
- PPT and necessary tools, test instruments
- Service manuals and service information

1.1 Identifying workplace

Definition workplace is a location where someone works, for their employer or themselves, a place of employment. Such a place can range from a home office to a large office building or factory.

When you are stepping into your first job, you need to be prepared for the workplace. Here are five tips you can follow:

A Be Organized When you are taking on a new job with plenty of new responsibilities, it can become overwhelming. That is why you need to plan ahead. You can do this by:

I. Creating a work calendar
II. Listing your tasks
III. Keeping a daily journal

IV. Setting up a filing system for yourself

B Manage Your Time In order to get all your tasks done, plan how much time you want to spend on them beforehand. To predict how much time you will need will get easier over time as you learn from each day's work.

Planning your time can be done on your daily journal or calendar. Make sure to set up your time schedule a few days before, so that you are ready for each day. It is also important to make space for unexpected situations, such as load shedding or having technical difficulties.

C Build Professional Relationships Having good relationships with your colleagues is a crucial part of your development in the workplace. The people you work with on a daily basis will have a huge influence on how well you do your job.

Communication is the glue that keeps an office together. It is important to keep your colleagues informed about how you are keeping up with the work and what you need from them

1.2 Basic concept of satellite antenna and TV system

Antenna is an electrical device which converts electrical power into wave. It used with a radio transmitting or radio receiving. In transmitting radio it supplies an electric current oscillating at radio frequency. I.e. high frequency to the antennas terminal and antenna radiates the energy from current as electromagnetic wave. It is also the ability to match the transmission line and the load impedance. It act like a resonant circuit, i.e. it transfer energy from electrostatic to electromagnetic energy.

Antenna is essential component of all equipment such as

- Radio broadcast
- Television broadcast
- Two way radio
- Radar
- Cell phone
- Satellite communication and etc.

Antenna consists of an arrangement of metallic conductors, i.e it connected often through transmission line to receiving or from receiving to transmitting line. It can be designed to

transmitting and receiving radio wave in all horizontal direction equal (Omni-directional). The most important element of TV is antenna and the second is signal distribution

1.2.1 Concepts of Satellite Communication

Satellite is communications relayed by satellite, starts with a transmitting antenna located at an uplink facility. Uplink facilities transmit the signal to the satellite over a narrow beam of microwaves, typically in the C-band frequency range due to its resistance to rain fade.
communication satelliteis an orbiting artificial earth satellite that receives a communications signal from a transmitting ground station, amplifies and possibly processes it, then transmits it back to the earth for reception by one or more receiving ground stations
. In the earlier days, there used to be a single telephone for Learning Instructions: Read the specific objectives of this learning guide¬ Read the information written

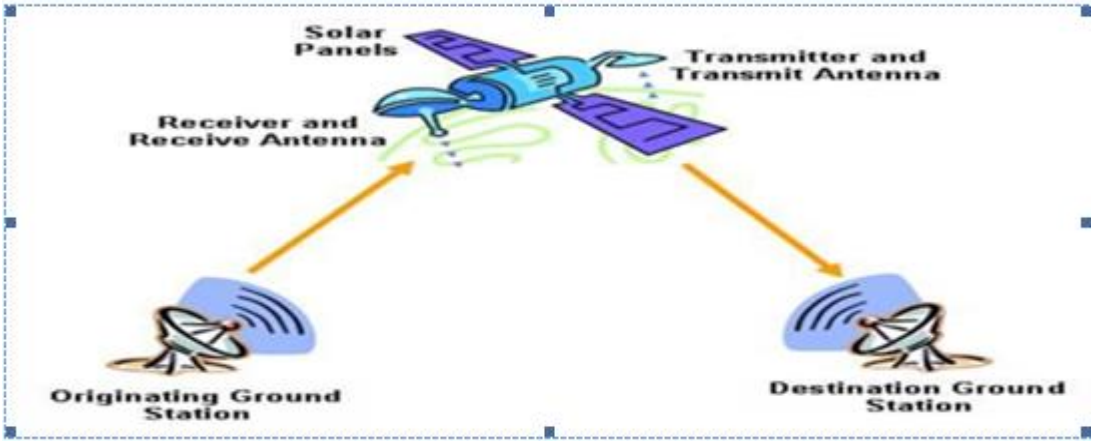


Figure 1

These satellites are maintained by earth stations which govern the sub-systems. They get their power from the sun by the help of solar panels connected to them. A lot of efforts are required to maintain the satellite in its particular orbit as their position changes due to the external forces that may act upon them. They have a wide range of applications like navigation, radio, crop monitoring, military, atmospheric conditions etc. Hence, satellites are an integral part of our daily life. They are flexible, cover vast areas and has control over their own network.

1.2.2 Classification and of antenna

Types of antenna

A. Satellite antenna

- Wire Antennas Short Dipole Antenna
  - I. Long wire antenna
  - II. Whip antenna
  - III. Wideband antenna
  - IV. Dipole Antenna
  - V. Half-wave dipole
  - VI. Broadband dipole
  - VII. Loop antenna
- Travelling wave Antenna Helical antenna
  - I. Yagi-uda antenna
  - II. Spiral antenna
- Reflector Antenna Parabolic reflectors (dish antenna)⎦
- Micro strip antennas Rectangular micro strip (patch) antennas⎦
  - Planar inverted antenna
  - Aperture antenna Slot antenna
  - Inverted antenna
  - Horn antenna
  - Short Dipole Antenna

A Wire Antenna: is a metallic devices (as a rod or wire) used for radiating or receiving radio waves

B. Long Wire Antenna: A random wire antenna is a radio antenna consisting of a long wire suspended above the ground; whose length does not bear a relation to the wavelength of the radio waves used, but is typically chosen more for convenience

Directional antenna: it radiates or receives greater power in specific direction allowing for increased performance and reduce interface from unwanted source. It is the ratio of the radiation intensity in a specific direction to the average power.

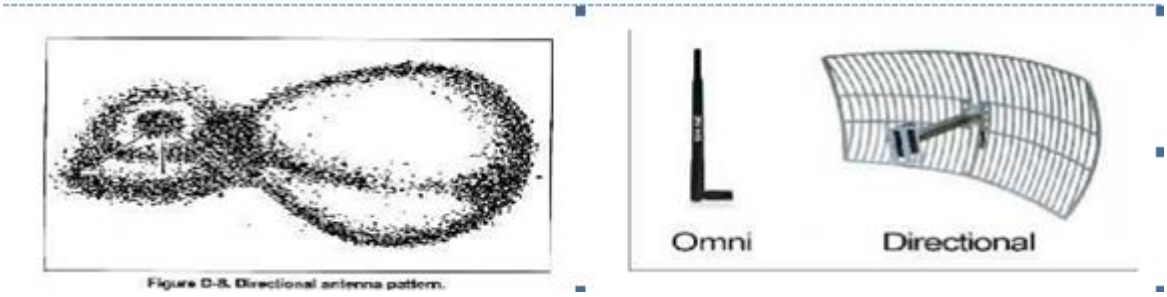


Figure D-8. Directional antenna pattern.

Figure 2

C. A dipole antenna is a straight electrical conductor measuring 1/2 wavelength from end to end and connected at the center to a radio-frequency (RF) feed line

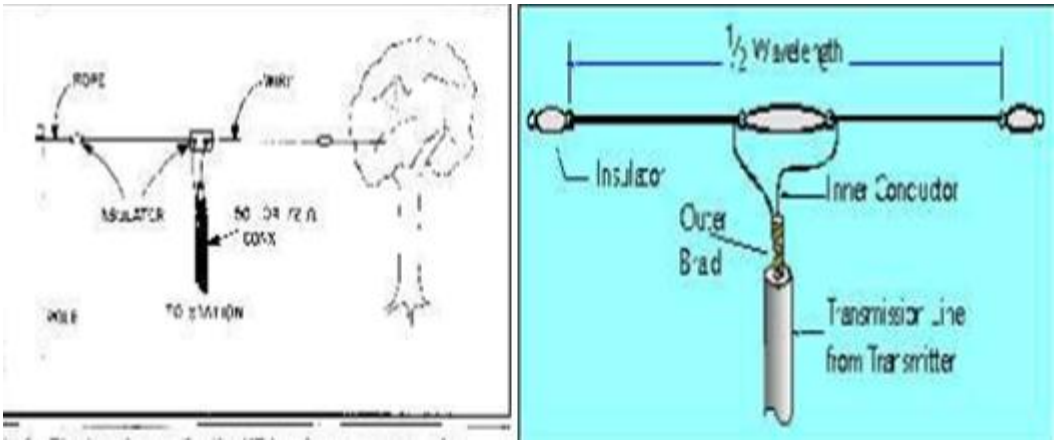


Figure 3

D. Short Dipole Antenna: is the simplest of all antennas. It is simply an open circuited wire, fed at its center as shown



Figure 4

It is simply an open-circuited wire, fed. The words "short" or "small" in antenna engineering always imply "relative to a wavelength". So the absolute size of the above dipole antenna does not matter, only the size of the wire relative to the wavelength of the frequency of operation. Typically, a dipole is short if its length is less than a tenth of a wavelength: Half wave Dipole Antenna The half wave dipole antenna is just a special case of the dipole antenna, but it's important enough that it will have its own section. Note that the half wave term means that the length of this dipole antenna is equal to a half wavelength at the frequency of operation

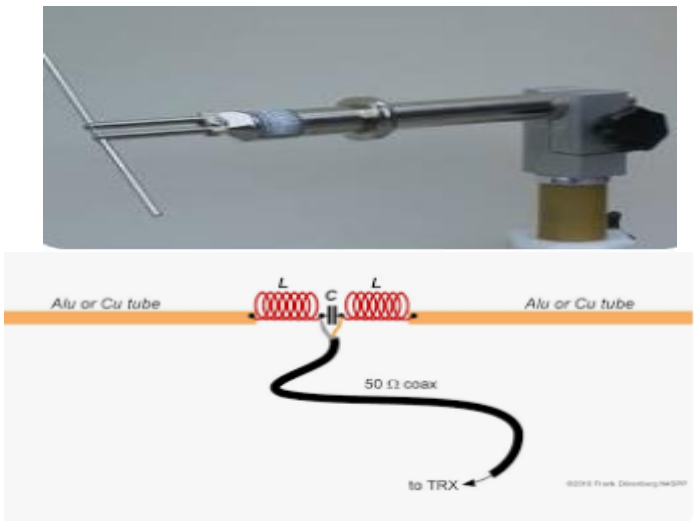


Figure 5

E. A half-wave dipole antenna receiving energy from a radio wave. The antenna consists of two metal rods connected to a receiver. The electric field (E, green arrows) of the incoming wave pushes the electrons in the rods back and forth, charging the ends alternately positive (+) and negative (−). Since the length of the antenna is one half the wavelength of the wave, the oscillating field induces standing waves of voltage (V, represented by red band) and current in the rods.

- 



Figure 6

F. Wideband Antenna: A wideband antenna is one with approximately or exactly the same operating characteristics over a very wide pass band. It is distinguished from broadband antennas, where the pass band is large, but the antenna gain and/or radiation pattern need not stay the same over the pass band.



Figure 7

G. Broadband dipole Antenna: an antenna whose main parameters and characteristics do not vary substantially over a rather wide frequency band. Broadband antennas are used to transmit, receive, or transmit and receive radio signals with a wide frequency spectrum, for example, in television, radar, or radio astronomy. An antenna with wide bandwidth is referred to as a broadband antenna. The term



Figure 8

H. A monopole antenna is a class of radio antenna consisting of a straight rod-shaped conductor, often mounted perpendicularly over some type of conductive surface, called a ground plane. Monopole antenna is one half of a dipole antenna, almost always mounted above some sort of ground plane



Figure 9

I Folded Dipole Antenna: A folded dipole is a half-wave dipole with an additional wire connecting its two ends. If the additional wire has the same diameter and cross-section as the dipole, two nearly identical radiating currents are generated.. This is because for a fixed amount of power, the total radiating current I 0 is equal to twice the current in each wire and thus equal to twice the current at the feed point. Equating the average radiated power to the average power delivered at the feed point

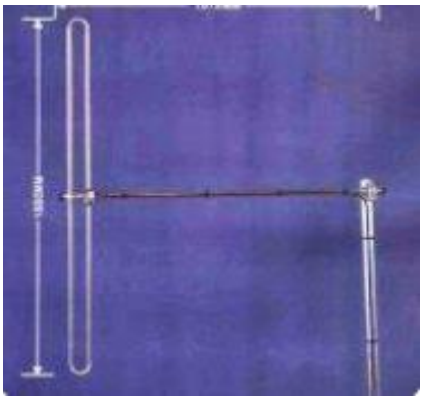



Figure 10

J. A loop antenna is a radio antenna consisting of a loop or coil of wire, tubing, or other electrical conductor with its ends connected to a balanced transmission line (or possibly a balun




Figure 11

K. Half loop antenna: Half Loop Antenna System provides rapid, fully automatic and highly reliable voice and data HF radio communications suitable for mobile land and marine applications-short, medium and long range. Complying with military standards, the system can withstand severe shock and vibration as well as extreme weather conditions and is designed to operate with all icon HF-SSB radios. The Half Loop system provides advanced tuning solution to replace existing large vertical and bent whip antennas.



Figure 12

Travelling wave antenna Helical Antenna: A helical antenna is an antenna consisting of a conducting wire wound in the form of a helix. In most cases, helical antennas are mounted over a ground plane. The feed line is connected between the bottom of the helix and the ground plane



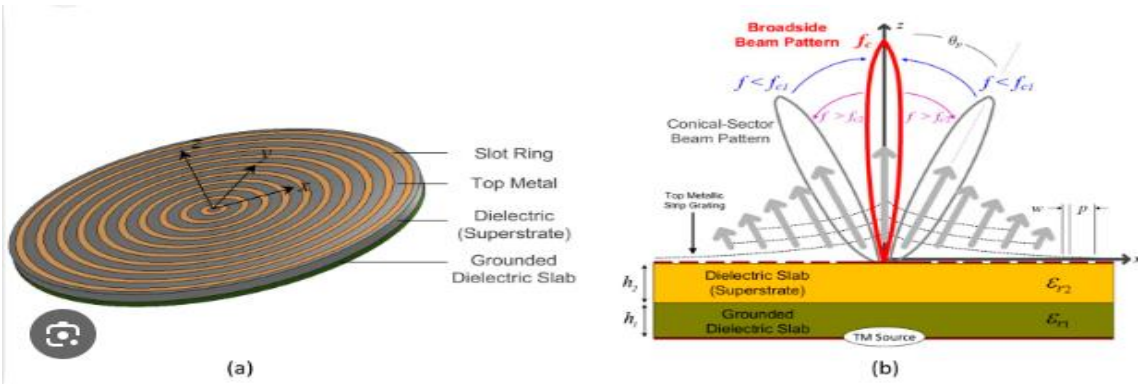


Figure 13

The most popular helical antenna (helix) is a travelling wave antenna in the shape of a corkscrew that produces radiation along the axis of the helix antenna. These h The benefits of this helix antenna are it has a wide bandwidth, is easily constructed, has real input impedance, and can produce circularly polarized fields.

Yagi-Uda Antenna: The Yogi Antenna is one of the most brilliant antenna designs. It is simple to construct and has a high gain, typically greater than 10 db. The Yagi-Ud a antennas typically operate in the HF to UHF bands (about 3 MHz to 3 GHz), although their bandwidth is typically small, on the order of a few percent of the center frequency. You are probably familiar with this antenna, as they sit on top of roofs everywhere

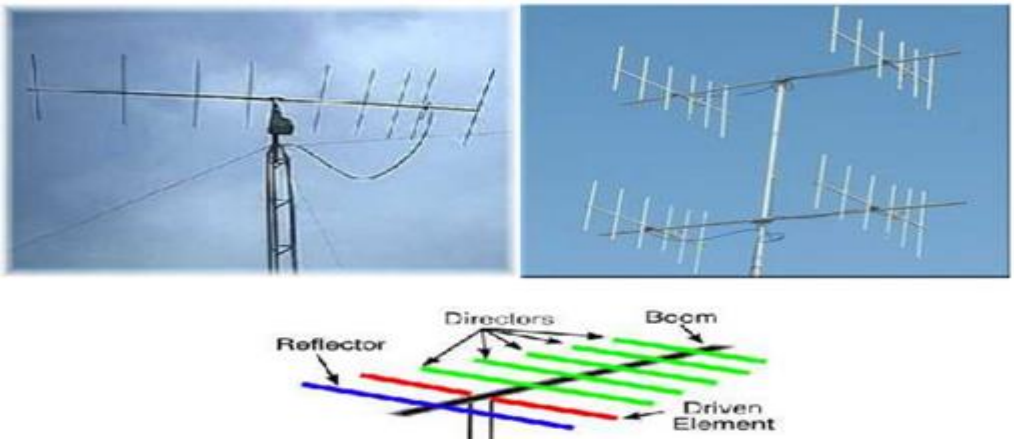
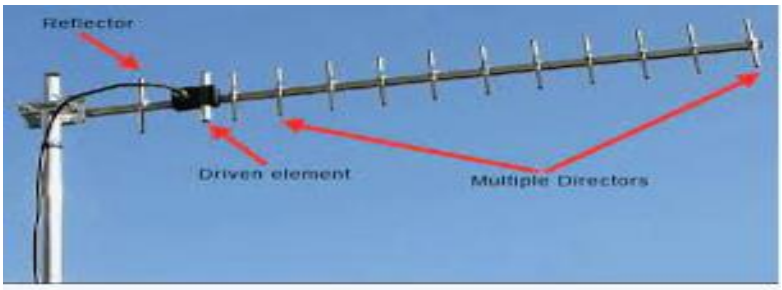


Figure 14



Spiral Antenna: Spiral antennas belong to the class of "frequency independent" antennas; these antennas are characterized as having a very large bandwidth. The fractional Bandwidth can be as high as 30:1. This means that if the lower frequency is 1 GHz, the antenna would still be efficient at 30 GHz, and every frequency in between.

Spiral antennas are usually circularly polarized. The spiral antenna's radiation pattern typically has a peak radiation direction perpendicular to the plane of the spiral (broadside radiation).







Reflector Antenna: To increase the directivity of an antenna, a fairly intuitive solution is to use a reflector. For example, if we start with a wire antenna (let's say a half-wave dipole antenna), we could place a conductive sheet behind it to direct radiation in the forward direction. To further increase the directivity, a corner reflector may be used; the angle between the plates will

be 90 degrees..

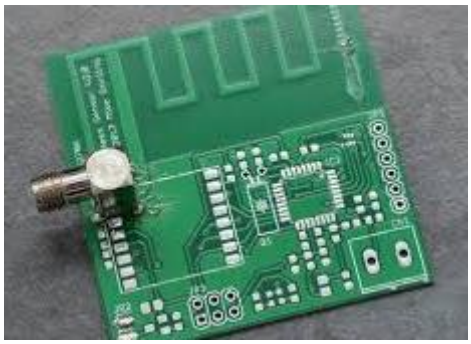
Parabolic Reflector Antenna: The most well-known reflector antenna is the parabolic reflector antenna, commonly known as a satellite dish antenna.




Parabolic reflectors typically have a very high gain (30-40 dB is common) and low cross polarization. They also have a reasonable bandwidth, with the fractional bandwidth being at least 5% on commercially available models, and can be very wideband in the case of huge dishes (like the Stanford "big dish" above, which can operate from 150 MHz to 1.5 GHz). The smaller dish antennas typically operate somewhere between 2 and 28 GHz. The large dishes can operate in the VHF region (30-300 MHz), but typically need to be extremely large at this operating band.

Micro strip Antenna: Micro strip or patch antennas are becoming increasingly useful because they can be printed directly onto a circuit board. Micro strip antennas are becoming very widespread within the mobile phone market. Patch antennas are low cost, have a low profile and are easily fabricated.



In terms of making a real antenna, we can take the simple approach and just clip it after some distance and seeing what happens. The result is the bow-tie antenna (also known as a butterfly antenna, or a bucolical antenna):

Log-Periodic antennas- antennas are designed for the specific purpose of having a very wide bandwidth. The achievable bandwidth is theoretically infinite; the actual bandwidth achieved is dependent on how large the structure is (to determine the lower frequency limit) and how precise the finer (smaller) features are on the antenna (which determines the upper frequency limit). On this page, we will expand on the ideas related to wideband antennas presented on the Bow Tie Antennas) page. Then we will explain why Log-Periodicity in antennas will produce wide bandwidth.



Figure 15

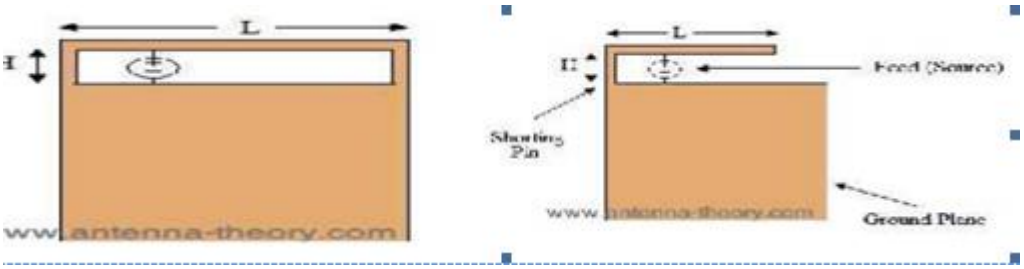


Slot antennas: are used typically at frequencies between 300 MHz and 24 GHz. The slot antenna is popular because they can be cut out of whatever surface they are to be mounted on, and have radiation patterns that are roughly Omni- directional (similar to a linear wire antenna). The



Figure 16

The inverted-F antenna is appears to be a wire antenna, after some analysis of how this antenna radiates, it is more accurately classified as an aperture antenna



The feed is placed from the ground plane to the upper arm of the IFA. The upper arm of the IFA has a length that is roughly a quarter of a wavelength. The feed is closer to the shorting pin than to the open end of the upper arm. The polarization of this antenna is vertical, and the radiation pattern is roughly donut shaped, with the axis of the donut in the vertical direction

Slotted Waveguide Antennas Slotted antenna arrays used with waveguides are a popular antenna in navigation, radar and other high-frequency systems. They are simple to fabricate, have lowloss (high antenna efficiency) and radiate linear polarization with low cross-polarization. These antennas are often used in aircraft applications because they can be made to conform to the surface on which they are mounted. The slots are typically thin (less than 0.1 of a wavelength) and 0.5 wavelengths long (at the center frequency of operation).



Figure 17

Horn antennas are very popular at UHF (300 MHz-3 GHz) and higher frequencies (I've heard of horn antennas operating as high as 140 GHz). Horn antennas often have a directional radiation pattern with a high antenna gain, which can range up to 25 dB in some cases, with 10-20 dB being typical. Horn antennas have a wide impedance bandwidth, implying that the input impedance is slowly varying over a wide frequency range. The bandwidth for practical horn antennas can be on the order of 20:1 (for instance, operating from 1 GHz-20 GHz), with a 10:1

bandwidth not being uncommon.



Figure 18

1.3 Applying OHS procedures

Apply occupational health and safety procedures element, an element is a fundamental item that can't be easily broken into smaller pieces. In chemistry and physics, an element is a substance that can't be broken down by non-nuclear reactions. In computing and mathematics, an element is a distinct piece of a larger system or set

1.3.1 Occupational health procedures

Determine occupational health and safety (ohms) issues relating to immediate work environment. Expected learning outcome at the end of this element allow health, safety and security procedures correctly in accordance with enterprise policy, relevant regulations and insurance requirements.

A Principles The principle of Occupational Health and Safety is that employers must provide a safe and healthy environment for their employees .Some of the ways in which they ensure that this done is to provide: Fire Extinguishers Fire Alarms Smoke detectors on-Skid mats on slippery surfaces Appropriate Safety signs Door Chains Electronic locks Health Safety and

Security procedures

B Responsibilities the responsibility for OH&S rests both with the employer, the employee and also with visitors and clients. Employers: The primary responsibility for the promotion, maintenance and dissemination of OH&S information rest with management of the organization. Employees: know their rights and ensure that they are protected at work. All organization should have a health and safety monitor from among their employees.

C **Responsibilities** (cont'd)All employees should know Designated first aid and safety monitors and how to contact them .Location of the first aid kit Location of the fire extinguisher Location of accident report boo KHz own to raise an alarm Person(s) to whom hazards are reported Visitors and Clients - Visitors and clients also have the responsibility of complying with the organization's OH&S policies, procedures and programs and to observe safety directions on health and safety from designated officers.

D Legislation the Jamaican workplace health and safety act 1995 requires workplaces to have a written health and safety policy for some of the following reasons: State clearly what the employer plans to do by declaring support for sound occupational health and safety programs. To assist the organization in preventing accidents. To ensure that adequate human and financial resources are available.

1.4 PPE and necessary tools, test instruments

PPE is equipment that will protect the user against health or safety risks at work. It can include items such as safety helmets, gloves, eye protection, high-visibility clothing, safety footwear and safety harnesses. It also includes respiratory protective equipment (RPE).

- Necessary PPT includes the those what we use for dish installation
  - Eye goggle
  - Head mask
  - Glove
  - Safety shoe
  - Over all (Gowon)

It's important to ensure that you're safe when working on electronic circuits. Here are some personal safety precautions to keep in mind:

- Always keep your work area dry.
- Do not wear flapping or loose clothing when working.
- Do not work with metallic jewelry on your hands like watches, rings and bracelets.
- Do not use bare hands to remove hot parts.
- Always wear non-conductive shoes.

- Always wear insulator gloves in your hands when carrying out repairs.
- When removing high-voltage charges on capacitors, always use a shorting stick.
- Do not hold the test prods when measuring voltage over 300V.
- Always remove power to a circuit before connecting alligator clips.
- Always wear safety goggles.
- When it is necessary to handle equipment that is plunge in, be sure hands are dry and, when
- Possible, wear nonconductive gloves, protective clothes and shoes with insulated soles.
- Remembers: gloves, clothes and shoes.
- **Purpose:** identify tools & equipment disassemble/assemble of Satellite dish.

Familiarize the small& big parts of the Satellite dish.

Equipment, Tools, & Materials: Low noises block (LNB), DISH, table, well practical work area, satellite finder, cable, adjustable wrench, hammer…

Condition or Situation for the operation: Given the period of 1 hours you are required to disassemble & assemble Satellite dish Check the require materials, select the appropriate tools &equipment, ensures the occupational health & safety,



Figure 1.1.17: - Gloves, Safety clothes and shoes

Procedures personal protective equipment

- Identify personal protective equipment.
- Identify the proper materials.
- Identify equipment
- Clean working area.

- Use all the above procedures

1.4.2 Important Tool needed for satellite installation

Tool is an object used to extend the ability of an individual to modify features of the surrounding environment. Although many animals use simple tools, only human beings, whose use of stone tools dates back hundreds of millennia, use tools to make other tools

Personal Protective Equipment

Appropriate PPE should always be wear whilst working in and around the generator set. Wear a hard hat, protective glasses, gloves and other protective equipment, as required by generator set location.

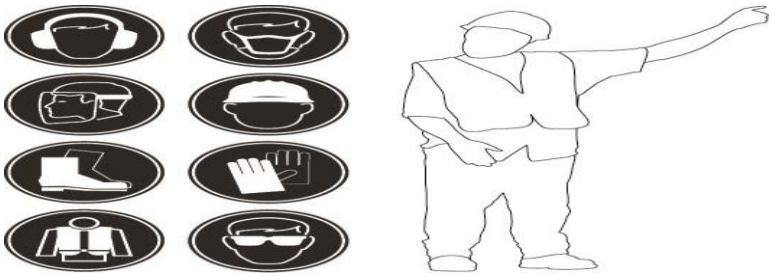


Figure 19

Types of tool

1 **Measuring** Electronic Instruments is the instruments used to measure any quantity known as measuring instruments.

If the instruments can measure the basic electrical quantities, such as voltage and current are known as basic measuring instruments.

A multi-meter is a device, which is use to measure several electrical quantities such as current, voltage, resistance, inductance, capacitance, circuits, and electrical frequency.





a. analogy satellite finder b. Digital satellite finder

Figure 20

Satellite Dish A satellite dish is a dish-shaped type of parabolic antenna designed to receive or transmit information by radio waves to or from a communication satellite. The term most commonly means a dish used by consumers to receive direct-broadcast satellite television from a direct broadcast satellite in geostationary orbit

2 **Hand tool** Open-end wrench, or open-ended spanner: used for loosing and tightening bolts and nuts during dish installation.

The open-end wrench has a long, smooth shank providing the user with a better gripping surface

box end wrench surrounds the nut, bolt head, or stud on all sides. Box wrench openings are offset from the shank by 15 degrees to give more room for your knuckles or to give clearance over obstructions.



a. box end wrenchb.split-box wrench

Figure1.1.2 Wrench

Combination Wrench: The combination wrench has a box wrench and an open-end wrench on opposite sides of the same tool. The two ends are usually the same size.



Figure1.1.3: - Combination wrench

Socket wrench consists of a round metal sleeve with a square opening in one end for insertion of a handle, and a 6- or 12-point wrench opening in the other.



Figure1.1.4a: - four way socket wrench



Figure1.1.4b: - 90-degree off set handle socket wrench

Pocket Knife Pocket knife are used for light cutting, removing insulation of coaxial cable, cutting string, and whittling



Figure1.1.5: -pocket knife

The flat nose pliers have flat serrated jaws, a fixed pivot, and curved handles that may have insulated sleeves. These pliers are used to pull coaxial cable for in narrow place



Figure1.1.6: - Long nose (needle nose) pliers. **di**

agonal cutting pliers The diagonal cutting pliers have a fixed pivot. The jaws are offset by about 15 degrees and are shaped to give enough knuckle clearance while making flush cuts. The diagonal cutting pliers are used for cutting small, light materials, such as wire, cotter pins, and similar materials.



Figure1.1.7: - Diagonal cutting pliers.

Screwdriver Sorted screw driver means different size and type in one set. A screwdriver is a device used to insert and tighten screws or to loosen and remove screws.



Figure1.1.8: - Sorted screw driver

Soldering Irons: - soldering irons are device that convert electrical energy to heat energy through systematically designed high resistive wire as heating elements. They are used to solder electronic circuits or connecting wires and other materials using soldering leads



Figure1.1.9: - soldering iron

drill is a tool primarily used for making round holes or driving fasteners. It is fitted with a bit, either a drill or driver, depending on application, secured by a chuck. Some powered drills also include a hammer function.



Figure1.1.10: - drill

Blower An air blower is a machine used for generating flow of air at substantial pressure. It's used to remove dusts from satellite receiver



Figure1.1.11: - blower

Pump/sucker The disordering pump is otherwise called the "solder sucker," it is designed with a spring-loaded plunger. Therefore, the disordering pump is a device used in achieving the removal of solder from a printed circuit board.



1.5 Service manuals and service information

Service manuals are put together by either the manufacturer or a 3rd party and contain information about maintenance and repair. Typically a workshop manual will contain general maintenance information and a factory service manual is more in-depth On this site you can find repair and service manuals to download totally free of charge in PDF format.

Service Manuals (also called repair manuals or service guides) are technical documents intended to perform maintenance and repairs .Information contained in the **s**ervice **manual typically includes:**

Service manuals will guide through the process if you need to test, maintain, fix, disassemble or repair a device

Training Manual A training manual is a comprehensive document or guide designed to facilitate the process of teaching and learning a specific skill, procedure, or set of instructions. It serves as a structured resource that provides step-by-step guidance and relevant information to individuals undergoing training or on boarding processes.

The objectives of the maintenance programmed are (in decreasing order of priority):

1) To preserve adequate safety

2) To enhance plant availability

3) To minimize plant costs due to failures in plant systems and components

4) To make the most effective use of available resources.

1. Orientation manual An orientation manual is designed to introduce new employees to an organization and its culture. It provides essential information about the company, its history,

mission, vision, values, and the overall work environment. Orientation manuals also cover practical matters such as policies, procedures, safety guidelines, and employee benefits.

2. Procedure manual A procedure manual, often referred to as a standard operating procedures (SOP), outlines step-by-step instructions for specific tasks, processes, or operations within an organization.

. Product or service manual A product or service manual provides detailed information about the products or services offered by a company. These manuals include specifications, features, usage instructions, maintenance guidelines, troubleshooting procedures, and customer support information..

4. Compliance or policy manual Compliance or policy manuals outline the rules, regulations, and guidelines that employees must adhere to in the workplace.. These manuals are essential for ensuring that employees understand their responsibilities and obligations, as well as for maintaining a compliant and ethical working environment.

6 Steps to Create a Training Manual

Instead of throwing together current documentation or a quick how-to guide, take a step back and be thoughtful about the content you need for your training manual. Here are six steps to help you create an effective training manual.

1. Establish your goal and audience Setting training objectives will help create a clear training manual with all the information users need to know—nothing more and nothing less. Too much information can leave a user feeling overwhelmed, but not enough will cause slower product adoption.

2. Define the manual's structure Next, you'll want to clearly define how the manual is going to be structured. Determine how you'll divide the content into sections or chapters. Create a table of contents to provide an overview of the topics covered.

3. **Create a plan and delegate tasks** planning training manual with your goals in mind is key to its success and usage.

Identify the problem this manual needs to solve and ask why it's an issue. If customers are not using a valuable feature, you can survey them or talk to customer success for feedback. It will

also be helpful to talk to those in your organization who are currently working with your audience. If it's an external training manual, then the customer success team. Ask them what to include in your manual to save time and create a more knowledgeable team member or customer..

4. Develop training content With your training manual planned and a team to help out, it's time to start creating. The type of training manual you're creating will determine what type of software tool you'll need to use..

For training manuals targeting software developers (such as API manuals and documentation), use **a software documentation tool**.

For an internal employee handbook, use a knowledge base software.

For in-app training, use a digital adoption platform. This decreases time-to-value for your customers and creates a more effective on boarding process for new hires.

Include interactive content that makes it easier for users to learn, such as:

Info graphics or diagrams

- Videos
- Checklists
- Quizzes
- Screenshots for context
- In-app guidance

5. Publish and distribute By designating a central place for training tools, you can ensure your training manuals are utilized and easily accessible. This central spot could be a Google Drive,

Is resource with new employees and customers during on boarding

6. Monitor effectiveness Many applications with training manual capabilities have easy-to-use analytics tools. These data points are a great way to understand how users engage with your training program. For example, with what fix Analytics, organizations can see engagements, content completion rate, and weak points in the content.

Another way to evaluate the effectiveness of your training manual is by asking for user feedback. Use post-training survey questions to identify learning barriers and pay attention to areas for improvement

Self-Check 1.1

WRITE thru or floes

_____1 Workplace is a location someone works, for their employer or themselves, a place of employment. Such a place can range from a home office to a large office building or factory

_____2, element is a fundamental item that can't be easily broken into smaller pieces.

_____3 Satellite is communications relayed by satellite, starts

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____1 is radiation pattern typically has a peak radiation direction

A) Micro strip antennas B Hand Gloves C Eye Glass D) All

_____2 Patch antennas are low cost, have a low profile and are easily fabricated

A) Wire Antenna B) The spiral antenna's C) Eye Glass D) All

_____3 is a metallic devices used for radiating or receiving radio waves

A) The spiral antenna's B) Hand Gloves C) Wire Antenna D) All

Unit Two: Repair satellite receiver/decoder

This learning guide is developed to provide you the necessary information regarding the following conten coverage and topics:

- Reading and interpreting drawings of circuit
- Inspecting and checking units
- Using service manuals and service information
- Identifying repair hardware and upload software

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upor completion of this learning guide, you will be able to:

- Read and interpret drawings of circuit
- Inspect and check units
- Use service manuals and service information
- Identify repair hardware and upload software

2.1 Reading and interpreting drawings of circuit

Read and interpret plans and specifications Commonwealth of Australia, used under Creative Commons Attribution-No Derivative Works

These images are protected by copyright law and are not to be reproduced or re-used in other materials without permission from the owner of Think stock.

Current in the circuit. It is then easy for a user to understand when there is a change in the course of the circuit A Electrical schematics the electrical schematics are read from left to right or from top to bottom.

- Satellites are manmade objects placed in orbit above the Earth for a variety of civil, scientific, and military applications, such as communications, environmental monitoring, navigation, and reconnaissance. A satellite is any object that orbits...

Learn More

- 

Telemetry Receivers and Telemetry Transmitters - (361 companies)

...receiver and telemetry transmitter components are soldered on to a printed circuit board; or by using through-hole technology, where the components are secured on to a printed circuit board by inserting component leads into holes in the board...

Search by Specification | Learn More

- 

Radio Receiver ics - (30 companies)

Radio receiver ic support worldwide radio band requirements, including frequency modulation (FM), FM radio data system (RDS), amplitude modulation (AM), long wave (LW), short wave (SW), and weather bands. These integrated circuits (ics...

Search by Specification | Learn More

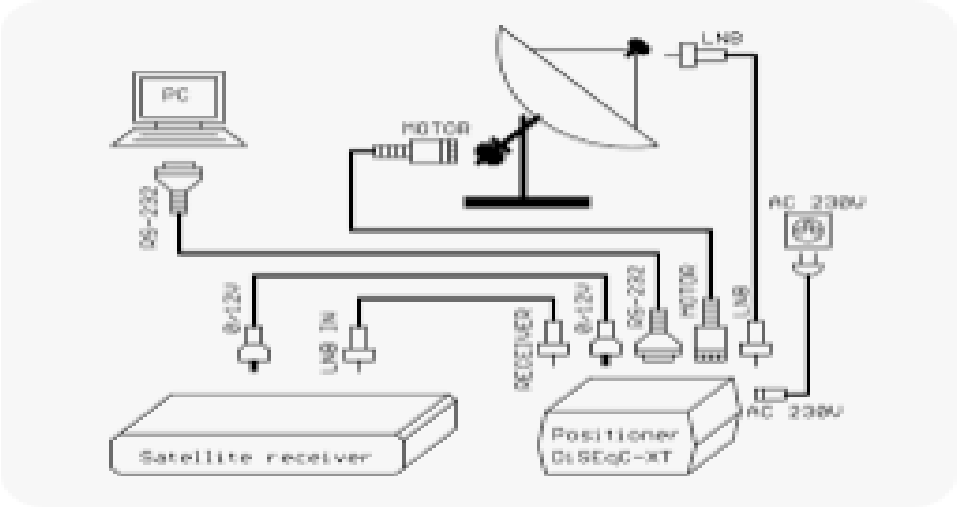
- 

Figure 21 **Complete HD Satellte**

A Complete HD Satellte TV System, Forget the discount supermarkets, we are offering a recession busting **£99 complete HD Satellite TV System**. The Cheapest HD Satellite TV

package on sale in the UK to date.

You will receive;

A BORC HD PVR 1080p HD Satellite Receiver

A Raven 60cm Black Mesh Zone 2 Satellite Dish ,inc Single LNB + wall bracket

25m of RG6 Black Satellite cable

2 f-connectors.

4 Wall plugs and Bolts

Perfect for Astra2D or Astra 1 or even Hotbird at 13 east

This is a high quality Free to Air HD satellite Tv system, not one of those cheap supermarket specials that come and go, even in high winds the supplied dish once correctly installed is rock solid and stable in all wind conditions. The dish is a Raven Zone 2 and it is highly respected, the satellite receiver is Ireland designed and very well built giving you years of trouble free service, the cable is RG6 and it comes with 2 f-connectors.

Buy your **Complete Freesat HD Satellite TV System** from Satellite TV Shop, your UK free delivery store.

Electrical knowledge A number of varieties of schematic symbols exist for representing real devices or wires in a circuit. The expertise to understand these electrical diagrams and be able to read them is key, as a wrong reading of these details results in wrong interpretation. Straight lines represent wires, the wires are used to connect different peripherals in a circuit. This may include bulbs, switches, etc.

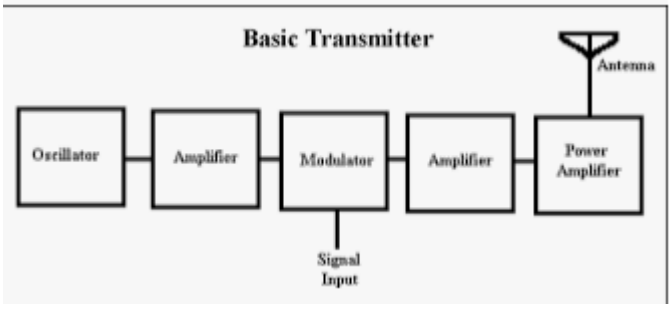


Figure 22

Electrical “grids” are interconnected regional systems. An event in one location, affects other locations. To ensure reliable operation the system must be in balance at all times. • Planning is performed in collaborative forums, to ensure that the system will operate reliably in accordance with technical standards-- NERC • these forums include: – WECC, west connect, isos – Sub regional forums – Participants in combined ownership facilities

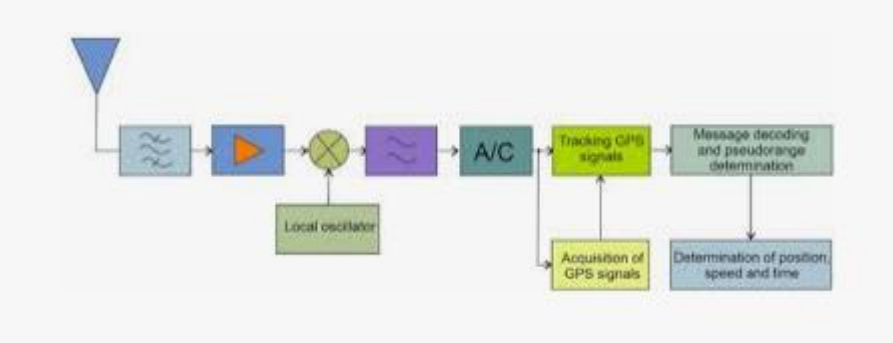


Figure 23 GNSS Receivers

GNSS Receivers are the core product for satellite positioning. They convert signals from visible satellites into a position on earth. The amount of visible satellites is dependent on the number of constellations the receiver is compatible with, such as GPS, Glonass, Galileo and Beidou.

Major quality factors are:

• Consistently precise production quality, accuracy of shape and dimension, surface finish

• Used materials: aluminum, steel

• Size: depends on sating possibilities, rain fade compensation, single or shared use, wind exposure Interesting fact: A 85 cm dish (0.567 m²) has twice the surface area of a 60 cm dish (0.283 m²), which results in a (logarithmic) gain at the LNB of 3dB

Different colors: white, charcoal grey, red

• Robust reflector edge; separate mounting of reflector is possible from the front

• Robust, fold open LNB arm with cable runs

• Solid mast clamps for two-point mounting, easy to use with wing bolts

• LNB holder (aluminum/plastic) available also as multiple LNB holder

2.2. Inspecting and checking units

Visual inspection is a process of verifying the attributes of parts such as Device condition, part markings and evidence of the device, Ports conditions, dimensions and surface quality. Visual inspection can be use for internal and external surface inspection of a variety of equipment types, including satellite receiver, coaxial cable, LNB, dish and other equipment.

Visual Inspection, or Visual Testing (VT), is the oldest and most basic method of inspection. It is the process of looking over a piece of equipment using the naked eye to look for flaws. It requires no equipment except the naked eye of a trained inspector.

- Inspect visually Physical parts
- Broken parts of the device
- Deformed of the device
- Cover of the device



Figure2.2.1: - Inspection using different methods

Figure 24 **Visual inspection**

As a key component of a maintenance program, inspections include tasks that check the condition of equipment and determine what tools, materials, and labor are required to service them.

- **A maintenance inspection** is the process of evaluation the condition of equipment or machines..
- The best maintenance inspection programs include the following best practices:
- Condition-monitoring routes cover all needed inspections

- Simple inspection tools including a stroboscope, bright flashlight, infrared thermometer, vibration pen, mirrors, and industrial stethoscope are readily available
- Guards or other protective gear can be removed in order to check belts, couplings, and chains in action
- Oil containers and other clear gauges and base bolts are clean and facilitate accurate inspections
- Maintenance staff is educated and trained in basic inspection processes
- 8 types of maintenance inspections

Safety inspections

- Safety inspections can include everything from checking and restocking first aid kids to inspecting fall protection and harness equipment. It can also include checking those components of machinery and equipment that are critical for safe operation.

Failure finding inspections

- These inspections check the operation of back-up or protective devices that cannot be readily checked unless a primary system fails. Failure instances must be simulated to test these components of equipment or machinery.

Lighting inspections

- Bulbs should be checked regularly and replaced in a group when they begin to fail for efficiency. In addition, a technician should examine controls, filters, and baffles on transformer systems as well as cables, hardware, and gaskets on exterior lights.

Electrical inspections

Begin with simple battery replacement in smoke and carbon monoxide detectors as well as flashlights and testing equipment. Timers and photocells should be inspected and exhaust fans should be cleaned regularly.

HVAC Inspections

- Air intake, filers, motors, and ductwork should be inspected and cleaned regularly.

Building interior inspections

- Check walls, ceilings, and floors for damage, leaks, or other deterioration. Be sure to remove hazards and ensure proper operation of doors and locks. Restroom areas should

be inspected for problems, and alarms should be tested.

Building exterior inspections

- Check paint, walls, windows, and doors for damage regularly as well as any foliage that may damage the walls or foundation. Inspect the roof, drains, and gutters.

Plumbing inspection

- This system should be checked at least once a year for leaks, noises, and damage.. Sewage and sump pumps should be inspected regularly and replaced as needed.

Example of a maintenance inspection

- During the warmest months of the year, cooling systems must work overtime. Before the mercury rises, technicians conduct a thorough inspection of a facility's cooling system.

2.3. Using service manuals and service information

Manual refers to a document that contains all the necessary details on the upkeep of equipment and property. The operating and maintenance manual contains information that serves as detailed guidance for maintenance personnel on keeping workers safe, minimizing the chances of unplanned shutdowns, extending the life cycles of assets, and reducing maintenance costs.

Therefore, the target audience for the O&M manuals is usually third-party contractors, maintenance technicians, and organizational managers. Any organization that wants to optimize asset management needs an O&M manual. .

2.3.1. Maintenance manuals and procedures

Equipment maintenance manuals and procedures are essential documents that guide the safe and efficient operation, inspection, and repair of your equipment. They also help you comply with relevant standards and regulations, and improve your maintenance performance and reliability. But how do you create and update them effectively? Here are some tips and best practices to follow.

Assess your needs

Distribute and train your manuals and procedures

Once your manuals and procedures are ready, you need to distribute and train them to your maintenance staff.

. You should also evaluate the effectiveness of

- your training and solicit feedback from your staff
- Review and update your manuals and procedures.

2.3.2. Types of Operation and Maintenance Manuals

Manuals for product installation and maintenance: This manual contains details on installing and maintaining various products and assets within a facility.

- **Backup and recovery protocols:** When there's a shutdown and a need to get things back on track as fast as possible, the backup and recovery protocols manual is a perfect tool.
- **Manuals for information and software administration:** You can't rule out the importance of information and software administration in the organization as this manual serves as a source of guidance through this process.
- **Human resources manuals:** Human resources is an important aspect of every organization. This manual guides interaction between employees and management, and ensures that everyone knows what to do in every unique situation.
  - **Emergency and safety user guide:** You can't rule out the chances of emergencies within the facility. However, this safety user guide contains instructions on the protocol to take in the event of an emergency.
  - **Industrial aid manuals:** An industrial setting is a home to lots of heavy machinery that requires handling by experts. Industrial aid manuals provide the right level of guidance for handling this equipment, including details on maintenance and repairs.
  - **Quick reference manuals:** This manual usually contains up-to-date outlines for quick references on everything employees need to know about the facility.

2.3. 3. Components operation and maintenance manual

The machine operating procedures involve information on both proactive and reactive maintenance programs that help make sure that all important company assets are in great working condition..

Equipment Specification information

These are specific, detailed information on the equipment and facility, including the types of

building materials, floor plans, building specification information, site surveys, and other necessary information to be provided by both contractors and subcontractors.

Machinery Engineering Drawing

. These include information on the location of access points, emergency shut-off valves, utility connections, and major pieces of equipment. Therefore, this SOP documentation is an outline of the specific tasks to be handled, how often they should be done, and the procedures for doing them safely. This will ensure that regular maintenance checks are done periodically to keep all assets in optimal working condition.

Emergency protocols and safety guidelines

The emergency protocols and safety guidelines are a list of the necessary steps to take during emergencies, especially how to handle crisis communication and the right people and agencies to inform about the situation.

2.4 Identifying repair hardware and upload software

Hardware issues are problems that affect the physical components of a computer, such as the motherboard, the CPU, the RAM, the hard drive, the power supply, the keyboard, the mouse, the monitor, and so on. Hardware issues can cause symptoms such as no power, no display, no sound, overheating, random shutdowns, blue screens, beeping noises, or error messages. **Software issues** are problems that affect the programs and applications that run on a computer, such as the operating system, the drivers, the antivirus, the browser, the office suite, the games, and so on. Software issues can cause symptoms such as slow performance, freezing, crashing, pop-ups, error messages, missing files, corrupted data, or security breaches. To diagnose software issues, you need to use various tools and techniques, such as checking the system settings, updating the software, scanning for viruses and malware, using troubleshooting wizards, restoring the system, or reinstalling the software.

Basic steps To differentiate between hardware and software issues, you need to observe the symptoms and note when and how they occur, check the error messages and codes, and look for clues or solutions online. Additionally, restart the computer and boot it in safe mode to see if the problem persists or changes. Further, run a hardware diagnostic test and a software

diagnostic test to detect any errors. Best practices ensure your computer operates optimally and securely, you should take some best practices into consideration. This includes using a surge protector or UPS to protect your computer from power fluctuations, keeping it clean and dust-free, and ensuring adequate ventilation and cooling. Additionally, handle your computer with care and update your hardware and software regularly. Install reputable antivirus and malware protection software, scan your computer frequently, and backup your data and files. Furthermore, follow instructions and guidelines for installing and configuring your hardware and software. If you encounter a problem that you cannot fix or understand, seek professional help or advice.



Figure 25 **Hardware& Software issues**

Wireless communication is an incredibly useful technology .The idea of using space as medium for information transmission yields flexible and cost-effective problem solutions . **MATERIALS** The flowchart, shown in Fig.1, depicts the design approach for the proposed communication system. We use modeling for both antenna and baseband design. Once these models have been tested the system is implemented and verified. The two subsequent sections introduce antenna and baseband models respectively.

Implementation The implementation process includes the physical creation of the antenna and the configuration of the software radio. As such, these process steps are quite different, because configuring the SDR involves setting up the software and the configurable hardware components. The learning curve is steep, but errors are largely inconsequential

Fabrication process Fabrication turns the model into a physical problem solution. The RF-4 substrate has a thickness 1.6mm, copper conductor of thickness 0.035mm and tangential loss of

0.0019. During the first fabrication stage, the antenna is exported from CST into Gerber, a file format that is recognized by the PCB milling machine.

Self-Check 1.1

WRITE thru or floes

_____1 Workplace is a location someone works, for their employer or themselves, a place of employment. Such a place can range from a home office to a large office building or factory

_____2, element is a fundamental item that can't be easily broken into smaller pieces.

_____3 Satellite is communications relayed by satellite, starts

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____1 is radiation pattern typically has a peak radiation direction

A) Micro strip antennas B Hand Gloves C Eye Glass D) All

_____-2 Patch antennas are low cost, have a low profile and are easily fabricated

A) Wire Antenna B) The spiral antenna's C) Eye Glass D) All

_____3 is a metallic devices used for radiating or receiving radio waves

A) The spiral antenna's B) Hand Gloves C) Wire Antenna D) All

	Unit Three: Install satellite/ antenna system

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

- Determining location of satellite / antenna
- Assembling petals/arms of the dish and LNB unit
- Tightening dish/antenna
- Connecting and disconnecting signal finder
- Performing operational check
- Determining azimuth and Television

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

- Determine location of satellite / antenna
- Assemble petals/arms of the dish and LNB unit
- Tighten dish/antenna
- Connect and disconnecting signal finder
- Perform operational check
- Determine azimuth and Television

3.1 Determining location of satellite / antenna

A **location** is the place where something happens or is situate. **Location** is a place away from a studio where a signal or part of a signal is mad.

The location is 4 to 6 feet away from your house, with the satellite dish pointing towards the southern sky. You will need to adjust the dish for both vertical and horizontal alignment.

Satellite antenna means any antenna, typically in the shape of a shallow dish, and appurtenant

equipment, used for the reception of communications (television or otherwise) from orbiting satellites or ground transmitters.

Satellite antenna means apparatus designed for transmitting microwave radio energy to satellites or receiving it from them, and includes any mountings or brackets attached to such apparatus;

Satellite antenna directivity whose main lobe encompasses significantly less than the earth's surface that is within line-of-sight view of the satellite.

Related to Satellite and antenna

Satellite means any satellite owned by the Issuer or any of its Restricted Subsidiaries and any satellite purchased by the Issuer or any of its Restricted Subsidiaries pursuant to the terms of a Satellite Purchase Agreement, whether such satellite is in the process of manufacture, has been delivered for launch or is in orbit (whether or not in operational service).

Antenna means communications equipment that transmits or receives electromagnetic radio frequency signals used in the provision of wireless services.

Satellite Manufacturer means, with respect to any Satellite, the prime contractor and manufacturer of such Satellite.

Satellite services means communications capabilities that utilize an on-orbit satellite for transmitting the signal from one location to another.

Antenna coating means a coating labelled and formulated exclusively for application to equipment and associated structural appurtenances that are used to receive or transmit electromagnetic signals.

3.1.1. Types location and satellite / antenna

The two primary considerations when pointing a satellite dish are the angle of

I Elevation The angle of elevation is the angle where your satellite dish is pointed into the sky at a (typically) 90° angle to the signal from the satellite. 0° angle of elevation is considered parallel with the earth and 90°

angle of elevation is considered pointing straight up into the sky. This means that your angle of elevation will be somewhere between those two. This is most easily accomplished with a tilt sensor or inclinometer, which is where our products come into play



Figure 26**Antenna means**

II Azimuth is essentially a compass heading; the satellite dish needs to be pointed in the direction of the satellite. For example, if a satellite is over the equator, and I'm in the northern hemisphere, the satellite dish will need to be pointed in a southern direction..



Note that Fredericks tilt sensors require signal conditioning electronics to give an angle position output.

Equipment tool& material

*Soldering iron -knife *Tools for assemble/disassemble/wrenches

* Screw driver *satellite dish *F-connector

* DMM/AMM *Pliers * satellite dish finder

*Divider *coaxial cable *AV jack

*Nastro (Plaster) *Receiver

In the practical work area prepare and place the required materials, tools & equipment, and ensures the safety requirements and select the required consumer electronics products & systems according to the task requirements.

1. Check & list all materials needed for the task requirement and ask the shop assistant if it is available, if not ask for the alternative materials.
2. Select the appropriate tools & equipments use according to the task requirements and place in the practical work area, make sure the 5s are properly followed.
3. Make sure that the workstation is in good condition and safety rules or occupational health and safety must be present.
4. To assemble the disassemble equipment & search the signal
5. Insert the signal

We are going to align a satellite dish using a satellite finder analog or digital type

Test signal quality

. The first and most important consideration when choosing a prospective site is whether the site can provide an acceptable LOS to the satellite. Choose a site where the antenna will be able to receive the strongest signal available. When orienting a TV satellite dish, it's very useful to know in advance the required azimuth and elevation, since the operation is not easy. A misalignment of one degree is enough to completely loos the signal.

Location calculator: -There are many different types of tools to calculate antenna's location. Example**:-**

Dish Alignment Calculator using Google Maps: **-** It is the most practical and compact than competitors and you do not need a fast internet connection to use it. Tracking Sat detects the city where you are and shows latitude, longitude and magnetic declination of the dish site. You can calculate at once the azimuth, azimuth magnetic, elevation and LNB skew from your city

Inclinometer: is an instrument used for measuring angles of slope (or tilt), elevation, or depression of an object with respect to gravity's direction. It is also known as a tilt indicator or tilt sensor



Fig2.1.1. a) magnetic compass Fig2.1.1 b) analog inclinometer integrated device Fig2.1.1 c) digital inclinometer

Figure 27

3.2 Assembling petals/arms of the dish and LNB unit



Steps of assembling or installing antenna system

Step 1: Use a Provider Comparison Chart

To get the most entertainment and value out of your satellite service, use a package comparison chart to compare pricing and specials offered by the country's top satellite providers.

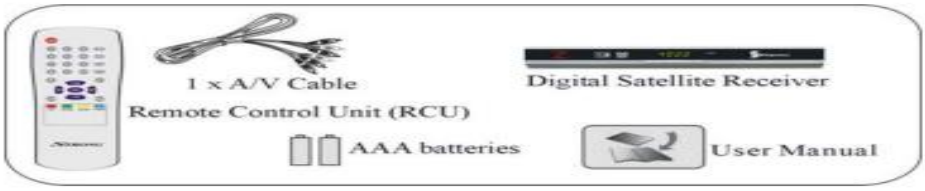
Step 2: Check Local Regulations Find out if your homeowners association or city code restricts where you can install your dish. For example, some hoas may not allow the dish to be mount to a balcony or the front of a home. If you are renting, get written permission from your property owner before installing your dish.

Step 3: Find a Helper Installing your satellite dish will be much easier, and safer, if you have a helper to hand you tools, hold the ladder, and read you the instructions.

Step 4: Check the Weather Forecast Don't install the dish when the weather is bad. Elements such as rain, snow, and wind not only make it difficult to position your dish properly, they also make climbing a ladder dangerous.

Step 5: Inspect Your Satellite TV Kit Generally, satellite kits include the satellite dish, mast, receiver, cables, and all necessary mounting hardware. Before you being installation, check the instructions that come with your satellite kit to be sure you have all the components you need.

Step 6: Gather Tools and Supplies



We hope you enjoy using your digital satellite receiver!

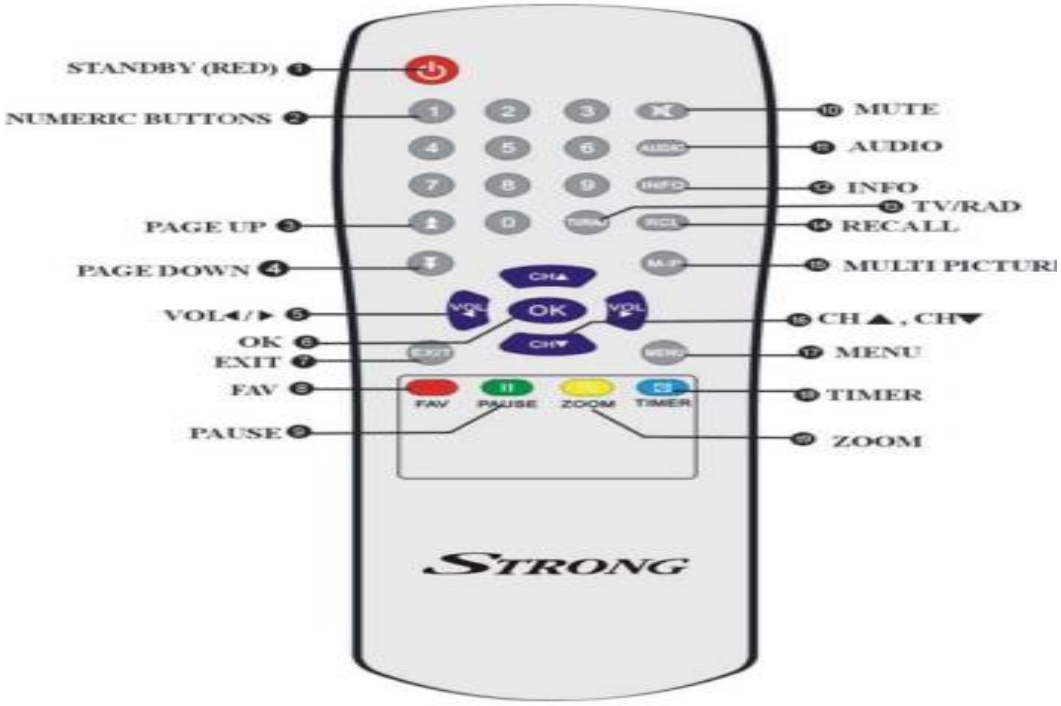


Figure 28

Table 1 Remote Control Unit

1	STANDBY	Switches between Operation and Standby modes.
2	0–9	Changes channels or selects the menu options.
3	PAGE UP	Press to jump one page up.
4	PAGE DOWN	Press to jump one page down
5	VOL(◄/►)	Turns up/down volume. Changes the page of channel list.
6	OK	Displays the channel list and selects the item on the menu.
7	EXIT	To close the current menu and return to normal viewing
8	FAV	Selects favorite channel list or current channel list in the view mode. In Edit Channel mode's"Add favorite"menu it changes the right window's channel list
9	PAUSE	To freeze the screen
10	MUTE	Sounds On/ Off
11	AUDIO	To choose speakers(left, right or stereo),audio format and audio language
12	NFO	To show information about the current program
13	TV/RADIO	Switches between TV and Radio modes.
14	RCL	To return to the previous channel or station
15	M-P	Display 9 channels preview window.
16	CH (▲/▼)	Changes channels or items from top to bottom on the menu.
17	MENU	To display the main menu, or return to a previous menu
18	TIMER	To display the wakeup timer
19	ZOOM	Press to Zoom-in and Zoom-out picture.

1.2 Edit Satellite Press OK on the remote control to enter this menu. You can press ◄/► to change the icon and press ▲/▼ to select. Press MENU to exit the current menu and press OK to rename the satellite. Choose the edited satellite as you want and setting, then go to "OK" to

save the setting.

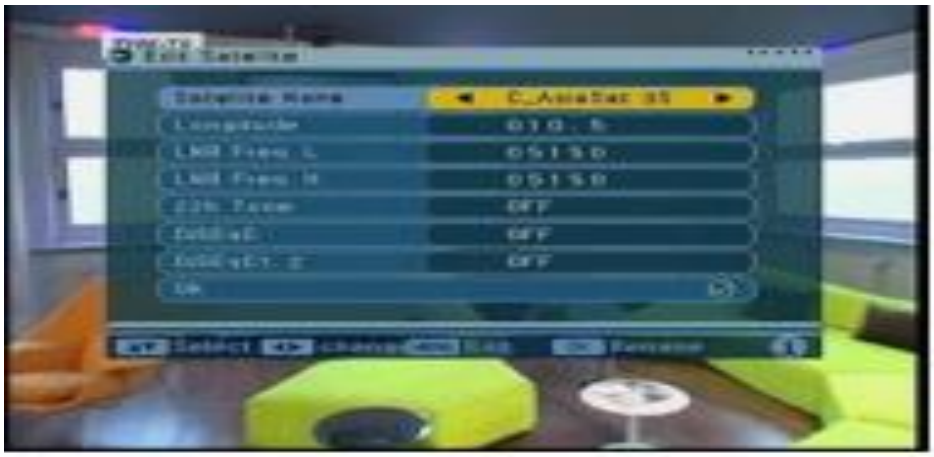


Figure 29

1.3 Delete Satellite Move the cursor to the “Delete satellite” menu and press “OK” on the remote control to enter in. Press ▲/▼ to select the satellite you want to delete. Press ◄/► to page up and down Press OK to delete the highlighted satellite Press “Menu” to exit and it will disappear:” Do you want to save?” Press OK to save or cancel to exit.



Figure 30

1.4 Blind Scan Move the cursor to the “Blind Scan” menu and press “OK” on the remote control to enter in. then you will see the picture as below:



Figure 31

Operation Press ◄/► to page up and down Press OK to delete the highlighted satellite Press "Menu" to exit and it will disappear:" Do you want to save?" Press OK to save or cancel to exit. If the satellite you want to scan is not saved in software. It is necessary to add a new satellite in **Satellite manager menu, before blind scan.**

Auto Scan Press ▼ move the cursor to "Auto Scan" and press OK on the remote control to enter into the sub-menu. Choose the satellite you want to scan, and press ok to start. If there are no new channels found, it will not store on the STB. It states:" Can't find new program!"

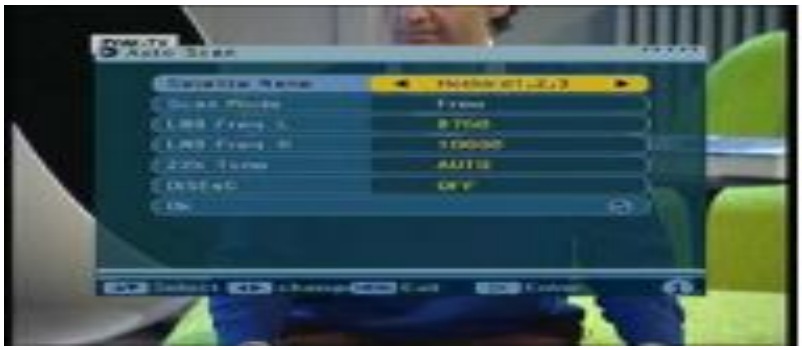


Figure 32

2 Prog List Under the Program list menu, you can choose the TV and Radio channels as you wish.



Figure 33

2.1 TV List Press ▲/▼ to select the channels Press ◄/► to page up and down Press OK to enter into the full screen to play Press "Menu" to show the existing satellites under channels.

Operation 2.2 Radio List Press OK button on the remote control, the radio list will be displayed, there are total 10 programs as well as brief information of channel in one page, and press "CH" buttons and "Vol" buttons to move in the list, and press "OK" button to select current program,

press “OK” button again, to exit Radio List Menu to enjoy. 2.3 Tv Favorite List The easy to use functions of Set Favorite enhance the flexibility of operating huge amount of TV and Radio Channels in your STB. Personalize it with your own way of interests can increase the joy of Digital Entertainment. There are total 7 groups of Favorite Sorting.



Figure 34

2.4 Radio Favorite List The same procedure of the Tv Favorite List, and there are 7 groups of favorites sorting as well. 3.Prog Edit To edit the programs, favorite, move, delete, edit, and lock. .



Figure 35

Operation correct Polarization, Horizontal or Vertical, then save it. 4.2 Edit Transponder Input the frequency value and symbol rate value by numeric key, choose the correct Polarization, Horizontal or Vertical, and then save it. 4.3 Delete Transponder Delete the transponder from the list, and press 0 to select all on the list. Press EXIT button to save it. 4.4 Manu Scan Pressing 0 on remote control you can scan the current TP. The scan mode is the same as satellite, Free; ALL; Free+NIT; ALL+NIT



Figure 36

1. System With system menu, you can set whatever you want the features and specifications of your STB to be most suitable for your watching programs. 5.1 TV Standard To set TV standard by choosing AUTO; PAL and NTSC; strongly suggested to set always AUTO. 5.2 Language To select the preferred language by using ▲/▼ buttons. 5.3 Factory default To default the factory settings, 5.4 System Update To updated the software by modes of ALL, Code, Code & List, and LOGO.
   Operation Choose the one you want and press START to update. 5.5 OSD Setting Select the preferred OSD style and OSD transparency. 5.6 Picture Setting Setting the picture light, red and blue color as you wish. 5.7 Version You can check the current firmware and software version 5.8 Parental Lock To prevent the unauthorized Accessing of your STB, you can set the Parental control password to you receiver. (Default password: 00000)

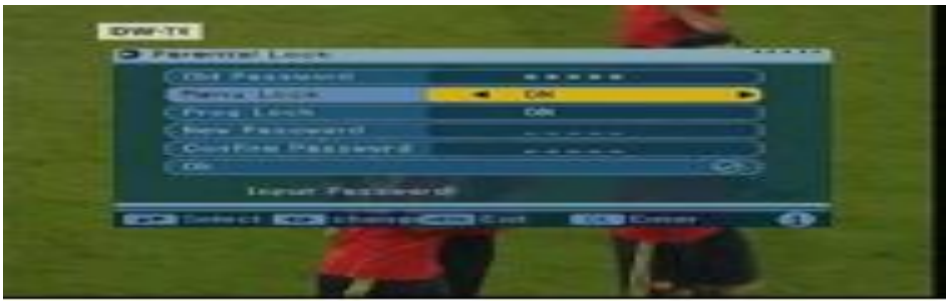


Figure 37

6. Tools 6.1 Calendar You can get the date information from the calendar, and press “CH”

buttons to change the month, press “VOL” buttons to change the year.



Figure 38

Operation 6.2 Russion The classic game of all time, Russion is a highly playable game. 6.3 Snake The classic game of modern times, do not get your snake too long.



Figure 39

Software Update 1. Requested Devices: (1) Computer: Offer new software for the digital satellite receiver. (2) Digital Satellite Receiver: The receiver which is going to be upgraded. (short as “receiver”). (3) Upgrading cable for PC to Unit: A special RS-232 cable supplied by the manufacturer. 2. Operation: (1) Connect the RS-232 ports of the receiver and the PC with the upgrading cable. (2) Copy the upgrading software into your computer. Open the “Update.exe” file, then the window appears as follows: NOTE: Please keep the update.exe file and Lib file on the same position. (3)Select the Preferences Requirement which you need, click “open file” button choose update file what you need ,then click “update” button . (4)Turn on the STB, the Update is in progress, some data will be showed in the small window. When the small window showed “update finished”, the receiver will boot automatically. NOTE: Please do not turn power off until the receiver has restarted completely

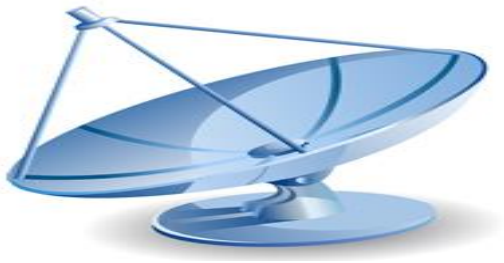


Figure 40

Table 2

Fault Phenomenon probably reasons Resolve	Fault Phenomenon probably reasons Resolve	Fault Phenomenon probably reasons Resolve
Power on	but no display on screen Please carefully check the power plug	to see if it is plugged in to the power outlet. Has power been interrupted? Ensure the power plug is inserted into the power outlet correctly
Power on this STB, then that screen displays ”No signa	s the aerial installed correctly? Reinstall the aerial and calibrate it LNB input is not connect the LNB The transmission has been interrupted. Attempt again until the signal returns The sky wave disturbs the device Attempt again later Power on this STB	then that screen displays ”No signal” The program setup is incorrect Set the proper parameters of received program in the system settings menu
STB plays a strange sound Due to the channel containing more audio tracks or audio languages User can use the “Audio” button on the RCU to select the correct audio track or audio languages	STB plays a strange sound Due to the channel containing more audio tracks or audio languages User can use the “Audio” button on the RCU to select the correct audio track or audio languages	STB plays a strange sound Due to the channel containing more audio tracks or audio languages User can use the “Audio” button on the RCU to select the correct audio track or audio languages

Tips: If you referred to this troubleshooting guide, but it did not resolve the problem you encountered. Please contact the local dealer or technical support, do not open the machine, because that is very dangerous to you or to the machine.



Introduction This manual, as its name suggests, is a simple guide on the installation of geonetcast Americas ground stations. Geneticist Americas is a public service to provide earth sciencedataandderivativeproductsverasatellitebroadcast.



Figure 41

Pictured here from left-to-right, mere minutes after successfully receiving the GNC-A broadcast on our temporary station setup, is Paul Seymour (Broadcast Manager for GNC-A), Kelly Sponberg (me), and Martin Steinson. Rosario Alfaro, who also helped with the test installation, is behind the camera.

3.1.1 Extremely Brief Summary of Installation Steps for a GNC-A Ground Station

1. Identify location to place dish antenna.
2. Install mount / foundation for antenna at installation site.
3. Assemble and mount dish.
4. Run cable from dish indoors to location of computer workstation.
5. Install and configure DVB-S / S2 receiver card.
6. Attach cable.
7. Install Ken cast Fazzt client.

8. Start up Fazzt client and receiver card.

9. Receive broadcast. 10. Smil

3 Station Components Geneticist is currently designed to work with standard DVB-S; that is Digital Video Broadcasting over Satellite. This means that there are numerous off the shelf components and solutions, thereby making it easy to find equipment Often the components associated with the dish antenna are heavy, large, and sometimes awkward to move. To avoid damaging the station, and more importantly causing injury to yourself or others, please read the installation and setup instructions carefully. The following provides a high level overview of all the components necessary to install a Geneticist Americas DVB-S receive ground station

3.1.2 Dish Antenna

The dish antenna is comprised of a few different sub-components or assembles. Every model of dish antenna will have an equivalent set of assembles, although the installation and look may differ slightly. It is a parabolic surface that reflects radio frequency (RF) signals to a focal point. At the collected focal point, the RF is 'fed' to an LNB and other receive equipment. For the dish antenna to work properly, the reflector must be put together well.

he LNB attaches to the feed horn. In the picture below, there are two mounting locations for different lnbs..



Installed GEONETCast Americas station at Bowie State University in Bowie, Maryland, USA.
Profile shows reflector dish and focal point.

Figure 42

LNB The LNB, low-noise block down-converter, is used to do a couple tasks. It amplifies the received signal, and then down-converts frequencies to frequencies that are more manageable via common coaxial cable and electronics in the receiver. An LNB is generally powered by the receiver via the connected coaxial cable. While rare you can damage an LNB if the power output from a receiver is incorrect, multiple and incomplete connections, etc. temperature or other changes. PLL lnbs do cost more than say a dielectric resonator oscillator (DRO) LNB. Issues of low-bitrate are not generally a problem with DVB-S services and that of geonetcast, but for the added stability, at only a marginally greater cost, a PLL LNB is highly recommended.



Photo of Norsat LNB just opened from box. With the LNB is a gasket to help with seal to feed horn.



Photo of GNC-A dish installed at Bowie State University of Maryland, United States. The LNB shown attached to feed horn and properly mounted to reflector.

Figure 43

DVB-S / S2 Receiver The DVB-S / S2 receiver converts the signal from the LNB to data that can be managed by a computer. The receiver also generally allows you to tune to specific content streams on the satellite, through a software interface. There are numerous internal (PCI) card receivers, that can be installed in a standard desktop computer. DVB-S receivers can also be purchased as external box units. Typically these connect via a USB or serial connection, although there are some that utilize an Ethernet port. **Computer** A computer is required to receive data and files broadcast over geonetcast Americas. Requirements are quite minimal. Earlier tests and specifications for the ground stations called for the following requirements: o 2.0 ghz Pentium IV; o 1Gb RAM o 36Gb internal disk; o USB port; o MS Internet Explorer 5.5+

Client Software geonetcast Americas currently uses the Kencast Fazzt family of software to manage the satellite uplink, as well as the de-encapsulation of data at the client end. What does that mean? On the up link side of the broadcast, there is a content management server.

This server places content on the proper sub-channels, and it performs a number of administrative tasks as logging, error checks, and bandwidth / bitrate management.

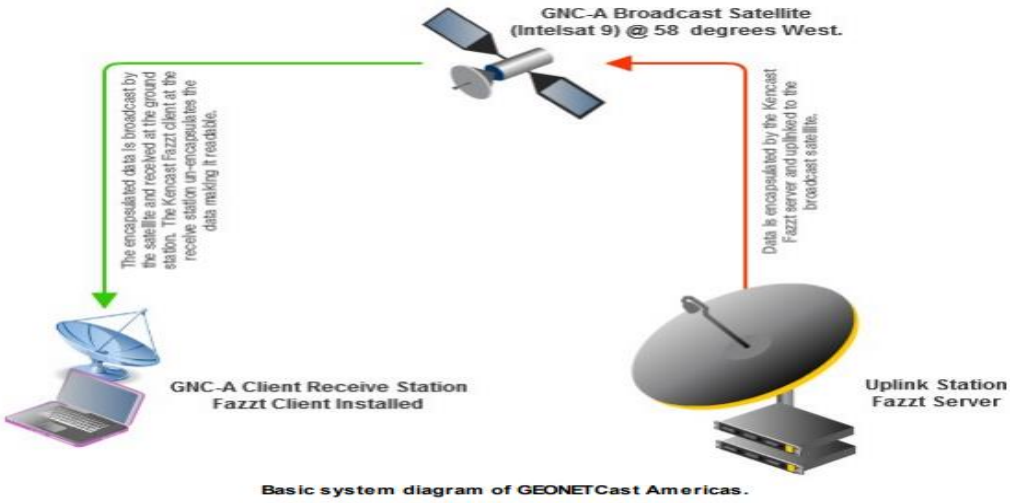


Figure 44

3.1.3 Dish Antenna Pre-Installation Preparation

The dish antenna in the geonetcast receive station is the largest component, and therefore the most difficult piece of equipment to deploy. Its large size means that accuracy and precision in setup, placement, and pointing is critical; in comparison to a smaller dish antenna.. High wind

effectively treats mesh dishes as a solid surface. Some mesh dishes, due to an emphasis on light weight design and easy deployment, may actually have a lower wind survivability rating that a solid construction dish. If cyclones and high wind storms are of concern in your area, look up the specification sheet for your dish. Generally there are two ratings. Operation and survival. Operation means the dish should reliably operate at wind speeds up to that listed. Otherwise it is likely to be put out of alignment and similar

Hand and Eye Protection

Throughout the installation you will be working with heavy objects; some with sharp edges or unfinished metal edges. A pair of gloves per person is recommended. Similarly, you may need to use a portable drill or drill press. In this case be sure to have shop

Glasses to protect everyone's eyes.



- Safety Glasses / Eye Protection

You can most likely install the dish with a simple set of spanner wrenches and pliers, however, we found at times we were using more that two tools at once; particularly on the feed horn. Therefore, extra wrenches and pliers of the required size are recommended. For our installation several wrench / socket sizes were required: SAE 5/16", 7/16", 9/16", 3/4", 15/16", 1-1/8". Similarly, assembly will go considerably faster if you have a ratchet set and locking pliers handy. - Open

Wrench / Spanner Wren



- Pliers

- Ratchet (w/ appropriately sized sockets for your dish)



- Locking Pliers



Lubrication and Cleaning We found that often the nuts and bolts provided with the dishes were poorly milled, such that there were burs of metal in the thread. A steel brush helps to clean these off, and a bit of oil ensures everything goes on smoothly. I also recommend a bit of silicon grease be used on the rubber gasket sealing the LNB to the feed horn. This is simply added protection against the elements. And finally, you might need some paper towels or rags to help wipe up extra lubricant

- Wire Brush



- Light Weight Oil



Measurement and Alignment To help with proper pointing of the dish and assembly, you will need some measuring tools. You will also need some basic string.

- Bubble or Other Level



- Plumb Bob



- Protractor



Support and Reach The dish antenna is 2.4 meters. When tightening the components and mounting the dish, it will help to have saw horses (or equivalent) on which to steady the dish, as well as a ladder, to help you reach up to the dish in comfort. - Saw Horse or



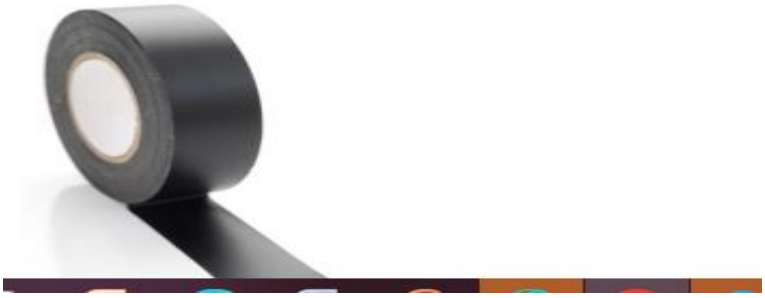
- Ladder (8')

Equivalent 

Cabling You will also need (likely) some extra coaxial cable and connectors. Of course you should also get some electrical tape and preferably heat shrink tubing. You will also want cable ties to secure the coaxial cable to the dish antenna, mount, and other structures as it makes its **Tubing, but rather should be held in proximity. Run a few tests if you have not used shrink tubing before. - Coaxial Cable**



- Electrical Tape



Site Check List (Days Prior to Installation) Check installation site location for above ground obstructions. Using a site like dishpointer.com, enter the coordinates of the proposed installation location. Check to ensure that

Check installation site for below ground obstructions. Assuming you are building a foundation to mount your dish, be sure that you have checked for buried cable, water or gas pipes, and similar obstructions.

Check for building and other codes. Depending upon your location there may be building and other zoning codes that affect if and how you can place a dish antenna. Some of these regulations may be for safety. Others codes may be for aesthetic reasons.

Prepare the dish mounting / foundation. Be sure to read the instructions that came with your dish antenna before attempting to mount it either on the ground or on the roof of a building. For ground mounts generally a hole is dug and cement placed at the bottom to anchor a pole on which the antenna assembly is placed.

Sort and ensure you have all component pieces. Each dish, receiver, and other equipment will come with a packing slip. Read through the instructions and the packing slips to

Site Check List (Day of Installation) Start early. A dish installation, if everything has been prepared properly, need only take a few hours, but you should expect minor problems. Be sure to have a plan to pick up or leave equipment out, in case you can not finish

Dish Antenna Installation Before preceding with the installation instructions, I will assume that you have already installed a mount for the dish antenna, either as a pole in the ground or a rack structure on a rooftop.

Steps 1. Slide petals of dish together, using flange and other alignment guides. Do so on a solid flat surface.

2. Move petals so that holes along ribs are aligned. There are five (5) holes for each joining edge of the petals.

3. Oil bolts and nuts. Push bolts through holes in ribs of petals, except in the middle hole (third hole) (referred to as the c position in the dish manual).

4. Hand tighten nuts on bolts working from bottom holes (those on the outside of the dish) to top / center of the dish.

5. If dish appears properly aligned grease bolts and nuts with lithium or similar grease. Tighten fully using ratchet. Again start from bottom / outside of dish and work towards the top / center.

6. In preparation for the next phase of assembly, lift the dish up onto three or more saw horses (or equivalent support). This is best done with 3-4 people.

7. Install feed support assembly bolts into reflector in preparation of feed support assembly.

Tool Requirements and Suggestions Ratchet 24 geneticist Americas: Standard C-Band DVB-S Receive Station Setup © 2016 UCAR JOSS IEPAS Pliers Light Oil Lithium Grease (or equivalent) Three or More Saw Horses (or equivalent supports

Installation Instructions The reflector in our dish is solid and made of three petals. Pictured here is a single peta



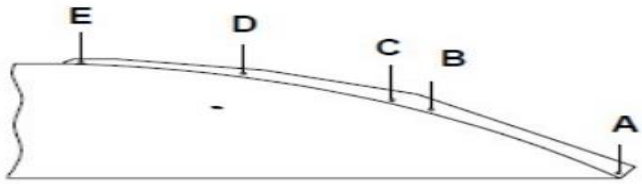
Reflector petal of C-Band satellite receive dish.

F you are using a different model dish, you could have many more petals, and your dish might be mesh. If it is a mesh dish, read the instructions to be sure, but generally the mount and support assembly for the reflector is constructed first, before the reflector is put in place



A close up of two petals place side-by-side, with the alignment tabs of each petal.

With the dish petals aligned, next, insert the bolts (with washers) into each hole that connects the edges of one petal to another. As noted in the original instructions, insert bolts into only holes A,B,D, and E. Do not insert bolts yet into C, as this is where the angle braces from the center hub will be attached.



The graphic shows side view / cross section of a single reflector petal. The bolt holes are labeled A through E. Hole C should not be used when initally attaching petals together, as it will be used to secure the angle braces.



Photo of dish with bolts holding two petals together. The outside of the dish ('A' position) should be tightened first, then the 'B' position, and so forth to the 'E' position. NOTE: Unlike the picture, you should not insert and tighten bolts into the 'C' position. Yes. We didn't read our instructions carefully!

Hand tighten the bolts starting at A (the outside holes) and work towards the center / top of the dish. Add a little lithium grease or similar grease to the nut and bolts, before the nuts are fully tightened. Most oils will wash off and loose any protective property outside in the heat and rain.

A high temperature and 'all weather' grease like lithium grease will provide some assurance that the nuts can be unfastened in the future without stressing or cracking the reflector of the dish.



Completed reflector. Did we fail to follow instructions and insert a bolt into the third hole / 'C' position? Why yes. Yes we did.

Figure 45

With all three petals firmly connected and the bolts well tightened, lift the dish up onto three or more saw horses, or a similar set brace. Lifted up the 'face' of the dish should point to the ground while the convex portion ('back') points upward.



Completed reflector is lifted onto saw horses to help with installaiton of center hub and center plate. Three saw horses (or similar support) is necessary.

Figure 46

. Three to hold the dish while a fourth person positions the saw horses. While two individuals can lift the dish, it can be a bit awkward. With the reflector elevated, install the feed support bolts. You will need to locate the three holes. There is one per petal and located roughly in the middle at the cross section of two spines. From the face of the petal / reflector insert the threads. Note assembly with bolt and washer order. Tighten the feed support bolts by hand only at this point. These will need to be adjusted at a future point in time.



Photo of feed support bolt.
Note that attachment hole is on the face side of the reflector.

Side Notes If you are using the same model that is utilized in this manual, and if you read the manufacturers instructions, you will note that the first step is to put two petals together and then attach the center plate and center hub, before bolting on the third petal.

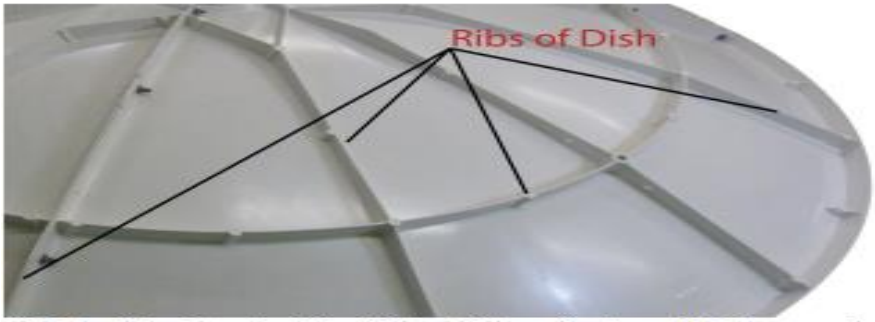


Photo of center hub and center plate attached to reflector with one petal removed. The center hub is attached to the center plate with bolts. The two, when bolted together 'pinch' the lip of the petals.

Figure 47

At this point we attached the angle braces to the center hub. The center hub was then positioned on the back of the reflector -- the convex part of the dish that is facing up, while resting on the saw horses. Next we attached the angle braces to the reflector ribs, and then someone held center plate up while the center hub was bolted down.

Helpful Hints Inspect and if necessary scrub the threads of the bolts with a wire brush before inserting into holes. Do so to remove metal burrs or other dirt. Be careful not to damage threads. Wipe bolt threads after inserting into the holes before screwing on nuts. Pieces of plastic may stick to the threads.



'Ribs' of the back side of the dish reflector. While you should avoid putting any weight on the reflector, if you need to do so during assembly, brace your weight on a rib.

Figure 48

Support Assembly

Steps 1. Attach angle braces to center hub.

2. Place center hub with angle braces on back / convex side of dish. This is best done with the dish face down and elevated on saw horses or other support.

3. Bolt angle braces to dish in hole left open during reflector assembly.

4. Hold center plate on face of dish covering the opposite side of the hole from the center hub. You will need a friend or two to crawl under the reflector and to hold the plate up. Be sure that the dish is safely elevated and secured so that it does not fall on anyone.

5. Bolt center hub to center plate. Put a small amount of lithium or similar grease on all bolts.



Photo of center hub. The bottom part will be set on top of the back side of the reflector, once angle braces are attached.





Image taken from General Dynamics Satcom Technologies 2.4 Meter Series 1252 Assembly Manual, 4096-356, July 14, 2009. The graphic shows an angle brace being attached to the center hub.

As with all pieces, you will want to potentially brush off and lightly oil all bolts and nuts. As the bolts and nuts get closer to their final position, a quick spray or lithium grease or similar is recommended. Do not tighten the angle braces completely at this point.

Earlier in the Reflector Assembly instructions the bolt in the 'C' position was left out. Now you will use a bolt to attach the angle braces to the reflector. Hand tighten the braces to both center hub and reflector until everything is well positioned and aligned. The angle braces should be slightly offset from, but as straight as and parallel to, the ribs of the reflector. When aligned add grease and tighten.



Photo of center hub with angle braces attached to the back of the reflector dish.



Photo of center plate. The plate will be placed on the face of the reflector over the center hole. The center hub, placed on the back of the reflector, will be bolted onto the plate.



Photo of center plate bolted to center hub. The center hub sits on the back of the dish. Bolted together these two pieces 'pinch' the reflector and are part of the main support structure.

Figure 49

Align holes of the center plate and center hub together. Grease and bolt the two pieces together. A ratchet is extremely helpful in this task, as the bolts are difficult to reach and the threads between the plate and hub offer a lot of resistance.



Tightening without a ratchet will be long and tedious.

Figure 50

Helpful Hints If you or a friend do not have long enough arms to reach the center of the reflector, get an old cardboard box and fill it with loose packing material. Get two friends to help you raise the dish vertical with the reflector edge resting on this support. Similar soft support will suffice. While two people hold the dish, you and another can bolt on the center plate

Steps 1. Position canister on pole mounts. Insert square head bolts. Tighten bolts enough to prevent canister from moving while attaching the dish via the support assembly.

2. Put together the elevation rod by screwing on one nut. Place it about 6" up the thread. Attach the elevation block to the rod. It will move freely. Now attach the next nut.

3. Attach the elevation rod to the canister via the elevation bloc

Installation Instructions The canister assembly will connect to the support assembly, thereby attaching the reflector and entire dish to a pole. The canister sits as a cap on top of the pole, and as it is rotated, you can adjust your dishes azimuth (pointing in a N, S, E, W direction). The elevation rod and assembly is connected to both the canister and support assembly. It pretty well describes its purpose. It helps you adjust the elevation (up and down) of the dish.



Canister. Elevation block held in place by plastic tie.

Now insert the six square bolts into the holes of the canister. Hand tighten, but not to the point where the canister cannot turn. Now adjust / rotate the canister to its final position. The protruding bars should be on the opposite side of the pole from where the antenna will be placed.



Figure 51

Next assembly the elevation rod. Begin by screwing on one nut. Place it about 6" up the thread. Attach the elevation block to the rod. It will move freely. Now attach the next nut. Finally, attach the elevation rod to the canister assembly with the two bolts. The threaded end of the elevation rod should point to the ground, while the hole which will attach to the support assembly (see above image) should point upward. It is okay if the elevation rod hangs loose

Attachment of Reflector to Mount

Steps 1. Position dish close to mount.

2. With help lift reflector up, such that the top of the center hub is between the brackets of the canister.

3. Position and mount antenna to the pole by attaching the support assembly to the canister and elevation assembly. Connect with the 1" bolt.

4 Attach elevation rod to the support assembly.

5. Have fun changing the elevation (raise and lower) of the dish, as well as its azimuth (rotate). Actually, now is a good time to check everything moves, bolts are tightened, etc. Do a general inspection. 5.4.2 Tool Requirements and

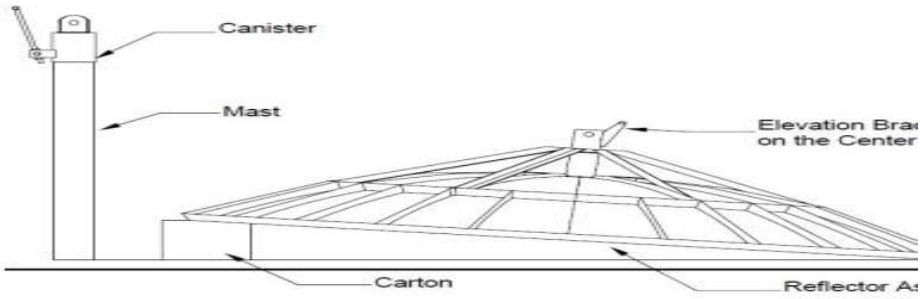


Image taken from General Dynamics Satcom Technologies 2.4 Meter
1252 Assembly Manual, 4096-356, July 14, 2009. The graphic shows pos
of the canister assembly and dish before mounting.

The top of the support assembly (the rectangular portion) should point away from the pole. When attached it should be pointing upward. Again view the following image to see how the assembly will look when complete

Feed Assembly

Steps 1. Examine feedhorn to determine if there are two or one positions for an LNB. In dual-pole scenarios more than one position may exist. If more than one exists, attach cover plate to side position.

2. Attach LNB to open position on feedhorn. Before attaching, place gasket in groove. Place small amount of silicone grease over and around gasket (using a cloth, finger, or similar). Do not spray lubricant or sealant into hole of feedhorn. Generally be sure to avoid dirt and other particles from getting inside feedhorn.

3. Attach the feed horn assembly, with LNB securely attached, to the three feed support rods. Each feed rod will have one end with an 'L' bend. The other will be straight. Attach the 'L' bent end to the feed horn

Installation Instructions The feed assembly will hold your LNB in the proper position relative to the dish reflector. In short, it's the part that actually captures and converts the broadca



Inside of LNB. The protruding piece of metal (brass color) points to the polarity direction. Currently this is shown pointing horizontal. If the LNB were turned 90 degrees, it would be pointing vertical.

Figure 52

Begin making the assembly by attaching the plate to the side position. The feedhorns we had were designed for dual polarity, which in essence allows two lnbs to be attached at once. In our

case we only need one position / LNB. Use the plate to cover the open position. Be sure to use a gasket and silicon grease to ensure the position is properly sealed.



Shown here is a feedhorn with two LNB positions. A plate is place over the side position.



Plate being attached to side position of feedhorn. Note that the instructions show the bolts facing inward. However, we think reversing the bolt direction (different than that shown in the picture) will make it easier to attach the plate.

Figure 53

After the plate is attached, attach the LNB to the top position. See side notes regarding potential problems attaching the LNB. Once the feedhorn is complete, attach the three feed support rods. Each feed rod will have one end with an 'L' bend. The other will be straight. Attach the 'L' bent end to the feed horn. Attach these somewhat less than hand tight, as there will need some room for adjustment when attaching to the reflec



Photo of feed supports attached to feed horn with LNB in place.

Figure 54

Side Notes I am not quite sure why, but in our installation we had 3 lnbs of one model, 1 LNB of another make, and then three feedhorns. While supposedly compatible, we could not get any combination of LNB or feedhorn to align correctly, such that all the bolts could be inserted

Before drilling, apply a piece of tape over the hole. This will prevent metal shavings from getting inside the feedhorn. Also be sure to lightly oil the drill bit. Finally do not drill into the LNB, as this is made of harder metal and precision made. Altering it could damage the LNB and its performance.

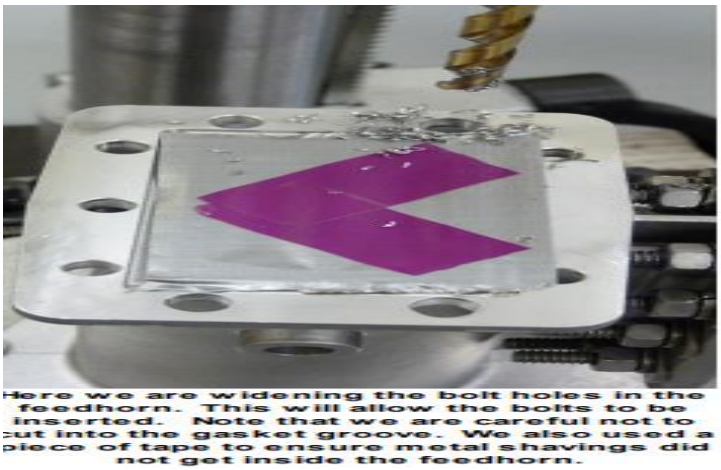


Figure 55

Steps 1. Lower dish so reflector is perpendicular to the ground. You will need easy access to the feed support bolts on the reflector. A ladder or other support will likely be necessary.

2. Attach the feed support assembly rods to the reflector via the feed support bolts. Tighten the bolts holding the feed support rods to the feed horn.

3. Adjust the feed support bolts until the feed horn is centered on the reflector and distance from the feedhorn to center plate is 35.8". This distance is the focal length and should be as accurate as possible. The focal length on other dishes may be differen

Dish Pointing Pointing the dish at the satellite is actually easy to do, however, it does require some patience and attention to detail. Here we assume you have a satellite signal meter or finder, like the Birdog pictured here.



Photo of the Birdog, which is a satellite finder and signal meter we used as part of a test installation. While not strictly necessary for deployments, it is certainly a lot handier than attempting to find a signal with the dish attached to your DVB-S receiver using the receiver software on your computer to test for a lock.

Figure 56

Azimuth, Elevation, and Polarization Angle Before you try to adjust the antenna you need to know three separate range of motion the antenna can make. If you did the installation of the dish antenna, you likely already know these and know how to adjust them on the dish. In case you did not do the installation, we will review the angles.



Phone compass application showing by a white bar the azimuth corresponding to 112 degrees.

Figure 57

Elevation is the 'up down' tilt or vertical position of the reflector. If pointed at zero degree elevation, the reflector face is perpendicular to the ground. A 90 degree elevation is pointing straight up with the back of the reflector parallel to the ground. Elevation is adjusted with the elevation rod connected to the support assembly and canister



Cartoon showing the concept of dish elevation.

Figure 58



The magnetic protractor here is a handy tool. It attaches to the dish mount and a gauge shows the angle as you move the dish up or down.

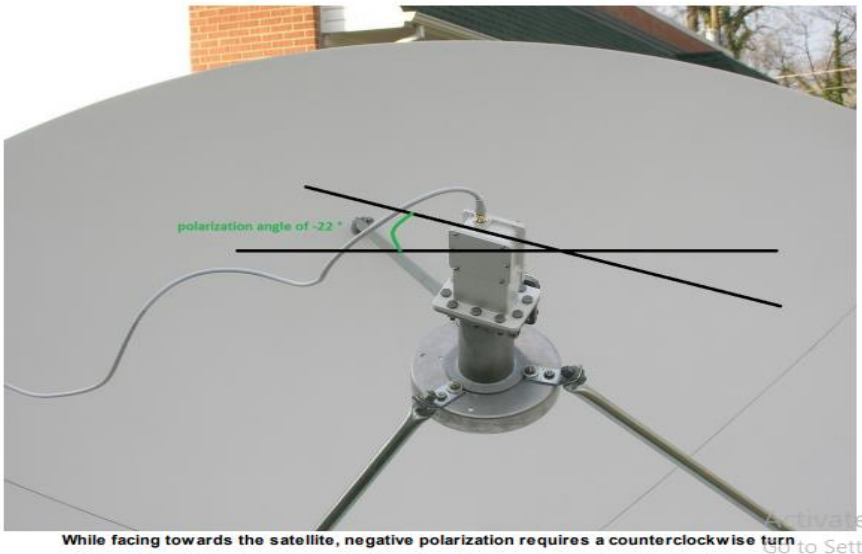
Figure 59

Finally there is the polarization angle. Sometimes this is referred to as tilt. It is the angle of the LNB. In the image below, when our LNB is flat side towards the ground, it has a vertical polarization angle of 0 degrees. Of course your LNB will be attached to the feedhorn, in which case you simple offset it a certain number of degrees for your installation



Image of LNB showing it positioned at a vertical polarization of zero degrees.

Figure 60



While facing towards the satellite, negative polarization requires a counterclockwise turn

Figure 61

To adjust the polarization angle of your LNB, simply loosen the screws feedhorn. Do not remove these altogether. Just loosen the screws enough to allow the horn and LNB to rotate. Using a protractor as shown helps with accuracy.


Martin Steinson adjusts the polarization angle of the LNB using a protractor.

Figure 62

The use of the wrong polarization can cause the reception of the wrong signal or no signal at all. The horizontal polarization of the 7C transponder of the IS-21 satellite (3840 mhz) corresponds to "intelsat atlanta" instead of "intelsat ellenwood" which corresponds to the vertical polarization of the GNC-A broadcast. Additional information about the polarization angle can be found in Appendix II.

Finding the Angles

Satsig.com will provide more complete information, but dishpointer.com is a little easier to use and provides some nice map integration. To use these sites, however, you will need the latitude and longitude of your dish, as well as the name / location of the broadcast satellite.

Locking the Signal Once you have your pointing angles, you should adjust the azimuth, elevation, and polarization as best possible. In our experience it is easier to adjust the azimuth, therefore spend a little more time getting the elevation and polarization as correct as possible

Final Installation Items of the Dish Antenna Once your dish is installed and correctly pointed, you will need to run cable from the LNB to the location of your receiver. Your cable should be shielded, and if a run of over 100 feet will be needed, then you should consult a supplier about thicker, higher grade cabling. Based on expert technical advice, it is advisable to install the receiver as close as possible to the antenna

Antenna Care and Maintenance All too often dish antenna are installed with great effort, only to fail at some later date because minimal maintenance was not performed. Maintenance and inspection is easy and should be performed every two to four weeks. More inspections are certainly not harmful.

Installing the Kencast Fazzt Professional Client The Kencast Fazzt Professional Client is used to un-encapsulate the geonetcast Americas broadcast. The client also serves to manage incoming data files. There is a lot of functionally contained within Fazzt. In this manual, however, we only provide the basics overview necessary for installation and to have it interface with your receiver card.

Preparing the Installation First ensure that the computer or server you will use has enough capacity. The requirements for a geonetcast station are: o 2.0 ghz Pentium IV; o 1Gb RAM o 36Gb internal disk; o USB port; o MS Internet Explorer 5.5+

9.2 **Installation of Fazzt Professional** Client The installation executable (fazztprofessionalclient.exe) for the Fazzt Professional Client is located on the DVD in Fazzt -> Windows. Double click it and you will be prompted with a standard installation dialog. After reading and accepting the terms of service, the installation will ask for the license file mentioned earlier.

3.3 Tightening dish/antenna

The antennas that Scan (Space Communications and Navigation) mainly includes a particular antenna with bowl-shaped that focuses signals at a particular end known as a parabolic antenna. This kind of antenna allows both transmitting and capturing electromagnetic signals which can move vertically and horizontally to transmit and capture the signal

Some of the characteristics of an antenna include the following.

- Radiation Pattern of Antenna
- Polarization of Antenna
- Intensity of Radiation
- Effective Aperture
- Gain & Directivity
- Bandwidth
- Power Gain & Radiation Efficiency
- Effective Length
- Input Impedance

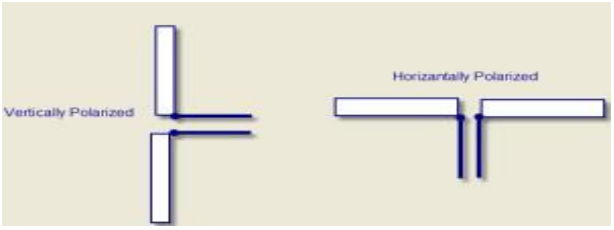


Figure 63

Polar Diagram: The most significant property of an antenna is its radiation pattern or polar diagram. In the case of a transmitting antenna, this is a plot that discusses about the strength of the power field radiated by the antenna in various angular directions as shown in the plot below



Figure 64



Figure 65

Types of Antennas

1) Log periodic antennas 2) Bow tie antennas 3) Log-periodic dipole array

4)Wire antennas 5)Short dipole antenna 6)Dipole antenna 7)Monopole antenna

8)oop antenna 9)Travelling wave antennas 10) Helical antennas 11) Yagi-uda antennas

)Microwave antennas 13)Rectangular microstrip antennas 14)Planar inverted-f antennas

)Reflector antennas 16) Corner reflector 17)Parabolic reflector 18)Log-Periodic 19)Antennas

A log-periodic antenna is also named a log-periodic array. It is a multi-element, directional narrow beam antenna that works on a wide range of frequencies

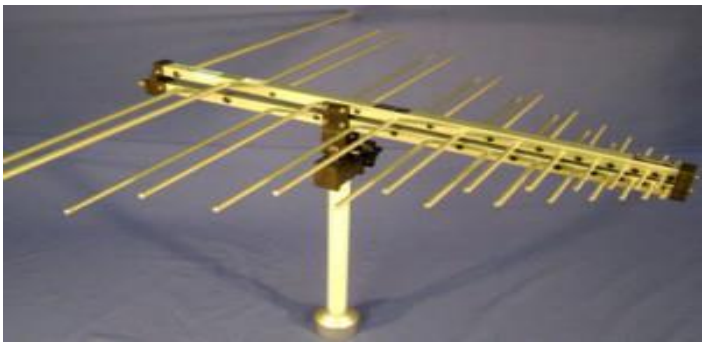


Figure 66

Bow-tie antennas A bow-tie antenna is also known as a Biconical antenna or Butterfly antenna. Biconical antenna is an unidirectional wide-band antenna

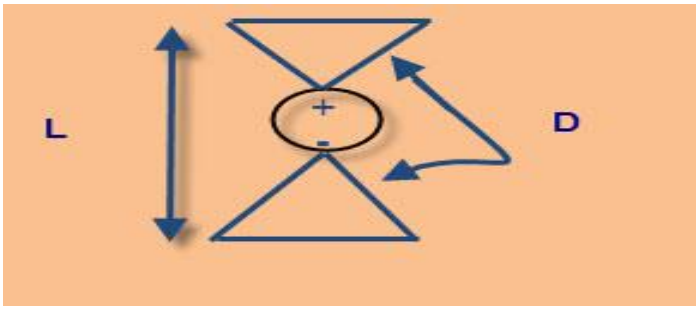


Figure 67

Log-Periodic Dipole Array

The most common type of antenna used in wireless communication technology is a log-periodic dipole array that fundamentally comprises a number of dipole elements.

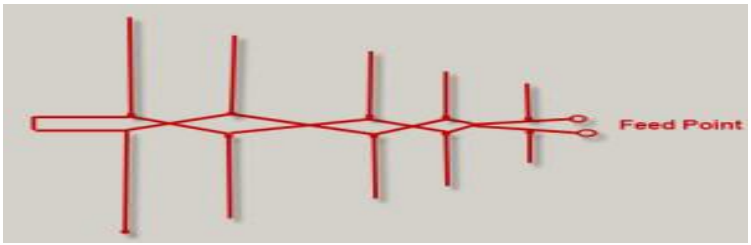


Figure 68

step satellite finder:

Step 1: Connect the dish to your satellite finder. Do this by connecting a coaxial cable from the LNB (low noise block down converter) to your satellite finder.

Step 2: Connect a coaxial cable from the satellite receiver to the coaxial port of the satellite meter. This port gets the power input from satellite power and gives the signal to the satellite receiver.

Step 3: Power satellite receiver. Then tune your meter's pointer to number 2 using the round button on the satellite meter.

Step 4: Ensure the dish is loosened and moveable. You'll be adjusting the dish in the next steps, so you better loosen the nuts that keep it steady.

Step 5: Move your dish antenna left-right to tune. When your satellite meter starts to beep, it means it receives the signal from the satellite.

Step 6: Keep tuning the dish until you hear continuous beeping/ All lids are lit. Then begin moving your dish along the horizontal (azimuth) axis by following your satellite finder's direction..

Step 7: If it didn't work on the horizontal axis, move the dish on the vertical axis. Repeat the previous step but in the elevation angle. Once again, move the dish until the satellite finder read Note: This can shift from 2 db to 3 db or 4 db to 5 db, but try to fix it on 5 db as much as possible.

Step 8: When it reaches nearby 5 db, lock your dish in place. Once you've achieved maximum signal strength, tighten the nuts on your dish to lock in place. You should now have an excellent satellite signal

3.4 Connecting and disconnecting signal finder

A satellite finder works by measuring the signal strength of various satellites in geostationary orbit. That way, you can align your dish in the right direction and get a strong signal for TV reception.

It's simple and convenient to use.

3.4.1 Types of Satellite Finder

There are two types of satellite finder **a**vailable**,** and these are **analogue** and digital.

An analogue satellite finder is a passive electronic device, which requires external power to operate. This external power is provided by the satellite receiver.

A satellite receiver is a device that receives and decodes radio signals suitable for TV viewing over the air.

What's more, there's no need for batteries as it's powered by the receiver.

A digital satellite finder, in contrast, is an active device. Unlike its analogue counterpart, it doesn't need external power to work.

Most models are microprocessor controlled, making them reliable and accurate. The signal strength is graphically shown on the LCD in the form of a thermometer scale or in numbers.

Digital satellite finders can also present pitch tones on a buzzer. The higher the tone, the better the signal.

They have the same connectivity as analogue, but they're more expensive. This connectivity is via RF connectors: one for the dish antenna and one for the satellite receiver (IRD).

3.4.2 step satellite finder:

Step 1: Connect the dish to your satellite finder. Do this by connecting a coaxial cable from the LNB (low noise block down converter) to your satellite finder.

Step 2: Connect a coaxial cable from the satellite receiver to the coaxial port of the satellite meter. This port gets the power input from satellite power and gives the signal to the satellite receiver.

Step 3: Power satellite receiver. Then tune your meter's pointer to number 2 using the round button on the satellite meter.

Step 4: Ensure the dish is loosened and moveable. You'll be adjusting the dish in the next steps, so you better loosen the nuts that keep it steady. It's important that you can move it on the horizontal and vertical axes respectively (azimuth and elevation).

Step 5: Move your dish antenna left-right to tune. When your satellite meter starts to beep, it means it receives the signal from the satellite.

Step 6: Keep tuning the dish until you hear continuous beeping/ All leds are lit. Then begin moving your dish along the horizontal (azimuth) axis by following your satellite finder's direction. Do this until the finder measures the maximum signal strength.

Step 7: If it didn't work on the horizontal axis, move the dish on the vertical axis. Repeat the previous step but in the elevation angle. Once again, move the dish until the satellite finder read Note: This can shift from 2 db to 3 db or 4 db to 5 db, but try to fix it on 5 db as much as possible.

Step 8: When it reaches nearby 5 db, lock your dish in place. Once you've achieved maximum signal strength, tighten the nuts on your dish to lock in place. You should now have an excellent satellite signal.

Note: A continuous loud beep or fully lit led's, as well as the pointer's right side position (high db), defines the fine-tuning of the satellite. This results in strong satellite signals.

The Bottom Line Satellite finders are inexpensive devices that work wonders in setting up satellite dishes and finding the best signal. If you don't know the offset angle of your satellite dish, investing in a satellite finder can be your best option.



Figure 69

Where To Buy a Satellite Finder There are tons of satellite finders you can find online. But if you're looking for an affordable yet great quality model, then look no further than the Satellite Signal Finder Meter with LED Display.

This handheld satellite finder (JLS3302) is reliable and accurate. The meter connected between the satellite dish and the set-top box shows signal strength on the 6 LED.



Fig3.1.1a. Analog soiled signal finder meter fig3.1.1b. Digital signal finder meter

Figure 70

Once the meter picks up a signal, use the adjustable sensitivity to fine-tune the angle and lock in on the signal. Designed with a small compass, tuning a satellite is a lot easier and quicker.

This model is perfect for setting up permanent dishes as well as portable systems on caravans or RVs.

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics –

3.5 Performing operational check image

Performance management, take account of the quality management programmers currently in place and review their suitability. A culture of open communication across the whole organization is vital.

An **operational readiness checklist** is a structured project assessment tool that outlines the pre-startup processes and specifications that will bring a project to a state of readiness to commence or restart. It is performed prior to start-up of new processes or existing processes that were previously shut down.

3.6 Determining azimuth and Television

Azimuth and elevation is important to determine the strongest signal before bolting down the satellite dish. After finding and adjusting the azimuth and elevation of dish for optimum signal, check again to make sure. To do this, move the dish very slightly, and then move it back to the previous position.

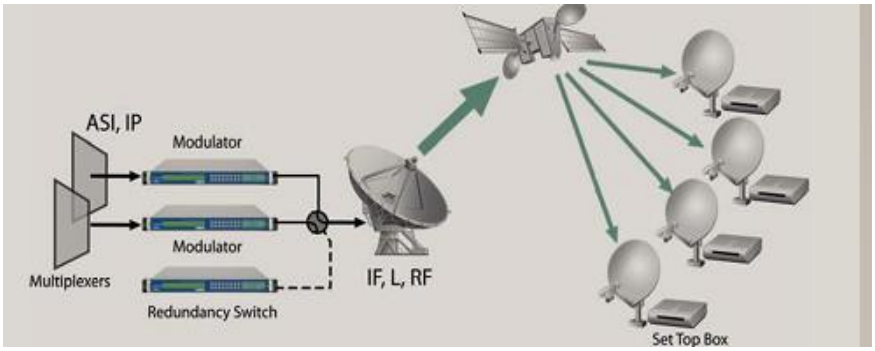


Figure 71

The issue of antenna azimuth position control has become one of the many aspects that have drawn

the attention of researchers in the control of antenna placement

Several .

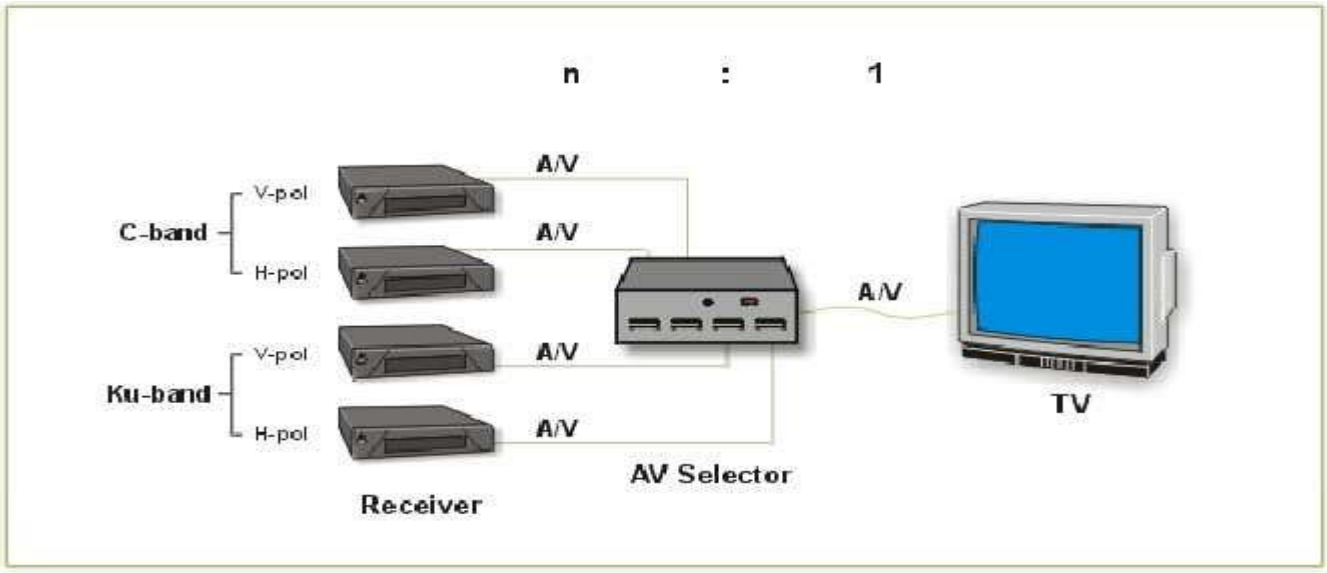
azimuth positioning a challenging control problem. There is need for a high-

performance controller; hence

the motivation of this paper is to come up with a better solution to the mentioned

problems

Satellite receivera satellite receiver is a unit which takes signals from the LNB(s) and decodes the TV video andaudio so they can appear on TV. Because both C-band and Ku-band lnbs normally have thesame output frequency, which is from 950 - 2150 mhz, a receiver shall be capable of receivingeither C-band or Ku-band programmes.An analogue receiver is needed for the reception of analogue channels whereas a digital receiverto receive digital channels.



TOP

Figure 72

Self-Check 1.1

WRITE thru or floes

_____1 Workplace is a location someone works, for their employer or themselves, a place of employment. Such a place can range from a home office to a large office building or factory

_____2, element is a fundamental item that can't be easily broken into smaller pieces.

_____3 Satellite is communications relayed by satellite, starts

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____1 is radiation pattern typically has a peak radiation direction

A) Micro strip antennas B Hand Gloves C Eye Glass D) All

_____-2 Patch antennas are low cost, have a low profile and are easily fabricated

A) Wire Antenna B) The spiral antenna's C) Eye Glass D) All

_____3 is a metallic devices used for radiating or receiving radio waves

A) The spiral antenna's B) Hand Gloves C) Wire Antenna D) All

Operation title: Assembling petals/arms of the dish and LNB unit

Purpose: To practice and demonstrate the knowledge and skill required design and construct dish and to LNB) to construct

Instruction: Use the given select tools,

Step 1 - Identify location to place dish antenna.

Step 2 . Install mount / foundation for antenna at installation site

Step 3 . Assemble and mount dish.

step 4 Run cable from dish indoors to location of computer workstation

Step5 Install and configure DVB-S / S2 receiver card.

Step 6 . Attach cable

Step 7 Install Kencast Fazzt client

Step8 . Start up Fazzt client and receiver card.

Step 9 Receive broadcast.

Step 10 . Smile

question :1 unsettle dish and LNB unit for TV

Unit Four	Prepare to install and set up reception antennae and signal distribution systems

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

4.1 Establishing sources of materials
4.2 Obtaining and checking equipment and testing devices
4.3 Requiring supervisor advice
4.4 Obtaining nature and location of the work
4.5 Identifying safety hazards and risk control

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

4.1 Establishing sources of materials
4.2 Obtaining and checking equipment and testing devices
4.3 Requiring supervisor advice
4.4 Obtaining nature and location of the work
4.5 Identifying safety hazards and risk control

4.1 Establishing sources of materials

Raw materials are materials or substances used in the primary production or manufacturing of goods. Raw materials are commodities that are bought and sold on commodities exchanges worldwide..

Raw materials are used in a multitude of products and can take many different forms. Raw materials are the input goods or inventory that a company needs to manufacture its products. For example, the steel used to manufacture vehicles would be a raw material for an automobile manufacturer.

4.2 Obtaining and checking equipment and testing devices

An antenna is defined by Webster‘s Dictionary as ―a usually metallic device (as a rod or wire) for radiating or receiving radio waves.‖ The IEEE Standard Definitions of Terms for Antennas (IEEE Std 145–1983) defines the antenna or aerial as ―a means for radiating or

receiving radio waves. In the former case, we have a transmitting antenna and in the latter a receiving antenna as shown
in figure 1.1

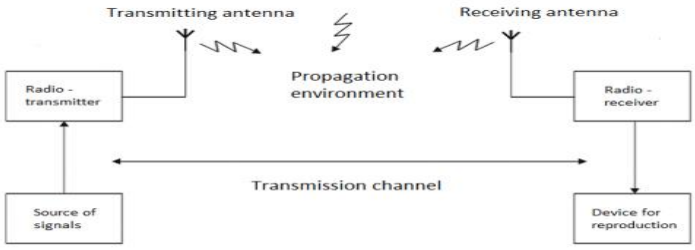


Fig.1.1 .Antenna Fundamentals

An antenna is basically a transducer. It converts radio frequency (RF) signal into an electromagnetic (EM) wave of the same frequency. It forms a part of transmitter as well as the receiver circuits. Its equivalent circuit is characterized by the presence of resistance, inductance, and capacitance. The current produces a magnetic field and a charge produces an electrostatic field. These two in turn create an induction field.

Definition of antenna

1. An antenna may be a piece of conducting material in the form of a wire, rod or any other shape with excitation.
2. An antenna is Major lobe.
3. An antenna is a sensor of electromagnetic waves.
4. An antenna is a transducer.
5. An antenna is an impedance matching device.
6. An antenna is a coupler between a generator and space or vice-versa. The radiation from the antenna takes place when the Electromagnetic field generated by the source is transmitted to the antenna system through the Transmission line and separated from the Antenna into free space.

Antenna parameters :

- ✓ The energy radiated in a particular direction is measured in terms of field strength at a point
- ✓ Radiation pattern- graph which shows the variation in actual field strength of electromagnetic field at all points ,equal distance from the antenna

- ✓ If the radiation from the antenna is expressed in terms of field strength E (V/m)- Field strength pattern
- ✓ If the radiation in a given direction is expressed in terms of power per unit solid-power pattern Radiation pattern lobes
- ✓ Portion of radiation pattern
- ✓ Having greater radiation intensity and lesser radiation intensity
- ✓ Major lobe-main beam, maximum radiation intensity, exists more than one major lobe
- ✓ Minor lobe- any lobe except major lobe
- ✓ Side lobe-adjacent to the main lobe ,occupies the hemisphere in direction of the main lobe
- ✓ Back lobe-occupies the hemisphere in a direction opposite to that of the major lob

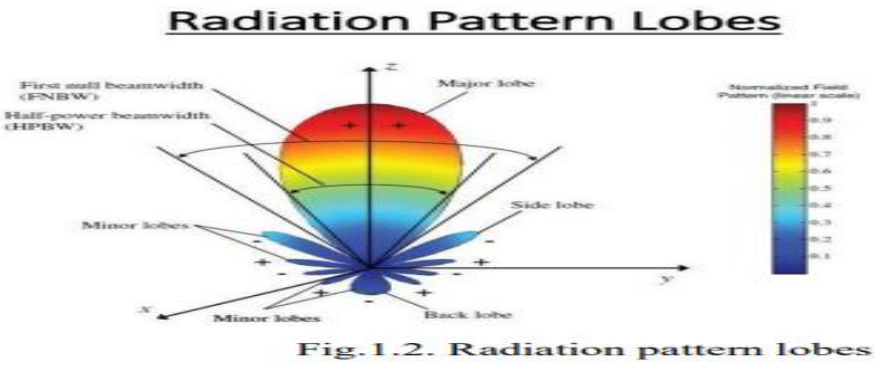


Fig.1.2. Radiation pattern lobes

There are various factors that determine the quality of the power supply like the load voltage, load current, voltage regulation, source regulation, output impedance, ripple rejection, and so on. Some of

4.3 Requiring supervisor advice

I have a question regarding antenna supervisor, I want to use LEA-M8T for timing use. In which case is it better to use antenna supervisor supply than no antenna supervisor.

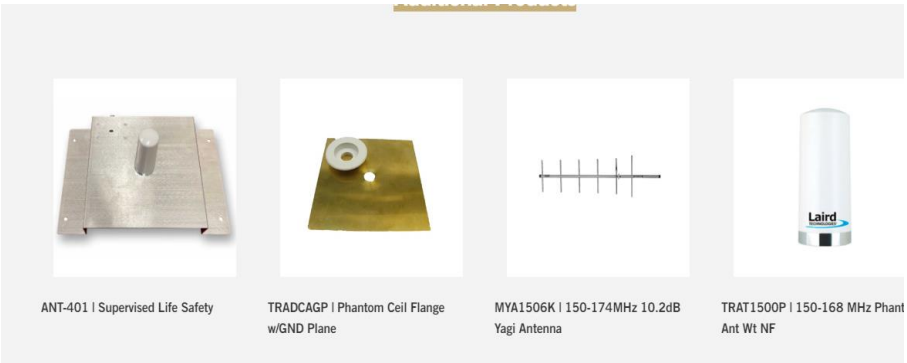
Product Features

Adds Supervision Functions To Standard Antennas, Creating a Supervised Life Safety Antenna

Facilitates the Integrity Monitoring of All Coaxial Infrastructure and Passive Devices

- ➢ Addressable by BBAS-1

- Polling Status LED



Adds Supervision Functions To Standard Antennas, Creating a Supervised Life Safety Antenna

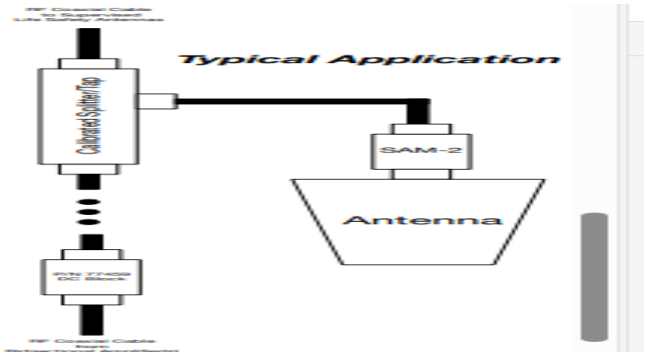
► Facilitates the Integrity Monitoring of All Coaxial Infrastructure and Passive Devices

► Addressable by BBAS-1

► Polling Status LE



Supervised Antenna Module is an intelligent addressable device that it supervised by a BDA Buddy BBAS-1 Antenna Supervision Module. The BBAS-1 provides a Signaling Line Circuit that is electrically combined with the radio frequency signals delivered to each antenna in a building's Distributed Antenna System. Up to 125 SAM-2 devices can be monitored by a single BBAS-1.



Electrical specifications

Operating voltage	24v nominal
Operating current	1ma average
Frequency range	100mhz-1000mhz
Vswr	2:1
Attenuation	0.8db max
Impedance	50 Ohm
Connector RF	N Female
Connector Antenna	N Male
Operating Temperature	0°C to 49°C
Operating Relative Humidity Range	0% to 93% @ 32°C
Dimensions	1.25x1.25x3.56 in
Weight	0.35 lb.

All specifications are subject to change without notice. For more information contact: FIRECOM, INC

4.4 Obtaining nature and location of the work

Installing antennas and radio equipment is very much like painting. Almost everybody can paint a picture, including my two year old son. The one thing that everybody agrees on is that my two-year old son's paintings still leave much to be desired when compared to an artwork by Da Vinci or Van Gogh.

1 Radio Waves In 1873 a man called James Clark Maxwell put together his theory of electromagnetism. His theory basically consists of four equations (based upon the experiments

of other great scientists like Faraday) that, among other things, predicted the existence of radio waves. It was only about 15 years later in 1888 that Heinrich Rudolf Hertz demonstrated the transmission and reception of electromagnetic waves as described by Maxwell, thereby becoming the first person to intentionally transmit and receive radio waves. It was after these famous experiments that he made the following equally famous statement.

The positive charge on your hair pushes each other away and makes your hair stand upright.

. It turns out that a changing electric field will create a magnetic field that is perpendicular to the electric field! And as if that is not amazing enough, a changing magnetic field will also create an electric field that is perpendicular to the magnetic field.

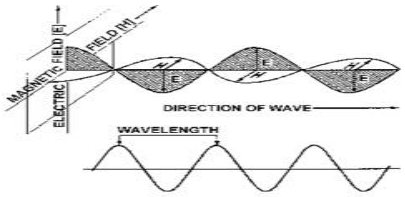


Figure 2. Electromagnetic wave

Propagation This electromagnetic wave, which basically feeds on itself, is travelling along space perpendicular to both the electric and the magnetic field at the speed of light. All electromagnetic waves (EM waves for short) travel at the speed of light

Frequency and Wavelength If one could now pause the electromagnetic wave, one will notice that wave repeats itself every so often and each of these repeating waves is called a cycle..

4.5 Identifying safety hazards and risk control

Hazard identification is part of the process used to evaluate if any particular situation, item, thing, etc. may have the potential to cause harm. The term often used to describe the full process is risk assessment:

A hazard is any source of potential damage, harm or adverse health effects on something or someone

4 steps to manage hazards and risk

The best way to prevent injuries or illness in your workplace is to find the hazards that could cause injury or illness, and fix them. Do this by following four simple steps:

- **S**pot the Hazard
- **A**ssess the Risk
- **F**ix the Problem
- **E**valuate Results

4.5.1 Hazard Prevention and Control

Action item 1: Collect existing information about workplace hazards

Action item 2: Inspect the workplace for safety hazards

Action item 3: Identify health hazards

Action item 4: Conduct incident investigations

Action item 5: Identify hazards associated with emergency and nonroutine situations

Action item 6: Characterize the nature of identified hazards, identify interim control measures, and prioritize the hazards for control

Self-Check 1.1

WRITE thru or floes

_____**1** Raw materials are materials or substances used in the primary production or manufacturing of goods

_____2 An antenna is defined by Webster‘s Dictionary as ―a usually metallic device (as a rod or wire) for radiating or receiving radio wave

_____3 Facilitates the Integrity Monitoring of All Coaxial Infrastructure and Passive Devices.

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____ 1 identification is part of the process used to evaluate if any particular situation, item, thing, A) Linear circuit B Antenna C Eye Glass D) Hazard

_____**-2** is an intelligent addressable device that it supervised by a BDA Buddy BBAS-1A) Supervised Antenna Module B) The spiral antenna's C) Horizontal D) Bilateral circuit

_____3 -main beam, maximum radiation intensity, exists more than one major lobe A) The spiral antenna's B) Final Alignment C) Major lobe D) Unilateral circuit

Test I: short Answer writing

Instruction: write short answer for the given blank space provided question.

----------1 is a sensor of electromagnetic waves

_____2 is Module is an intelligent addressable device that it supervised by a BDA Buddy BBAS-1 Antenna Supervision Module

_____3 - graph which shows the variation in actual field strength of

	Unit Five: Install reception antennae and signal distribution systems

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

5.1 Checking circuits/components

5.2 Determining optimum location for an antenna

5.3 Installing accessories

5.4 Terminating cables and conductors

5.5 Following supervisor procedures and directions

5.6 Carrying out installation

5.7 surrounding environment and using sustainable energy practices.

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon

completion of this learning guide, you will be able to:

5.1 Checking circuits/components

5.2 Determining optimum location for an antenna

5.3 Installing accessories

5.4 Terminating cables and conductors

5.5 Following supervisor procedures and directions

5.6 Carrying out installation

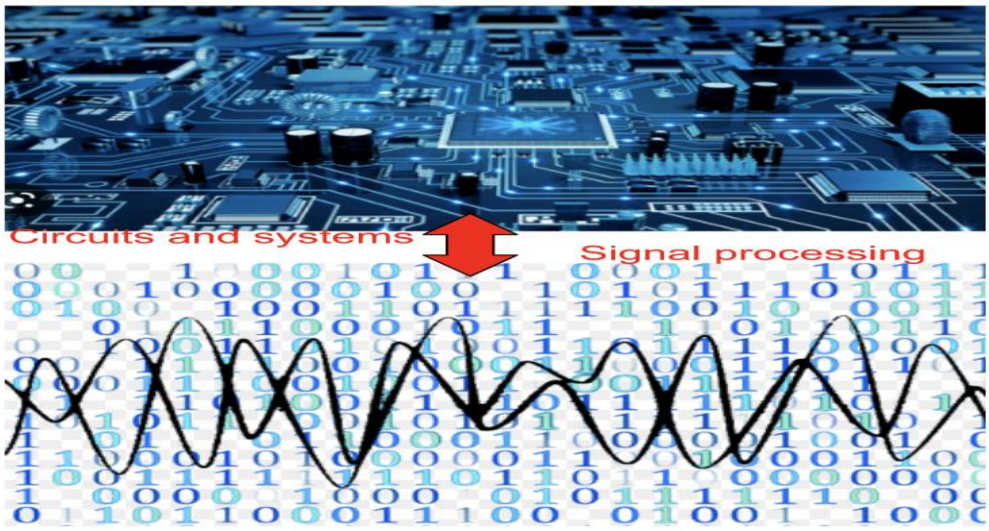
5.7 surrounding environment and using sustainable energy practices.

5.1 Checking circuits/components

Circuits, systems, and signal processing is a vast area of study that enables engineers to analyze, design, and optimize electronic systems.

The main goal of a system is to produce the desired outcome by changing the control (software part) based on the inputs and present outputs.

Signal processing finds extensive application in fields such as communication, image processing, smart systems, biomedical systems, etc.



5.1.1 Circuits Systems and Signal Processing

The electronics industry strives to bring performance improvements and quality products to its consumers. Circuits, systems, and signal processing are interdependent areas in electronics engineering.. The growth in signal processing has contributed immensely to communications and embedded system developments.

.Circuits are classified based on their signal type, characteristics, connection pattern, etc them.

5.1.2 Types of Circuits

Linear circuit	The circuit in which current or voltage obeys Ohm's law. Current varies linearly with voltage.
Non-linear circuit	The change in voltage or current is not governed by Ohm’s law.
Unilateral circuit	Current can flow in only one direction.
Bilateral circuit	Current can flow in either direction.
Passive circuit	A circuit consisting of electrical components that do not generate power, but instead store,

	dissipate, and/or release it.
Active circuit	A circuit consisting of electrical components that have the ability to electrically control charge flow.

5.1.4. Signal Processing

Signal processing is based on inputs such as an image or any physical or biological signal such as temperature, pressure, motion, etc. The primary purpose of signal processing is to convert the physical quantity to electrical signals and vice versa. Signal processing also focuses on quality

Electronic systems.

5.2 Determining optimum location for an antenna

Each antenna is excited in the presence of the RAC structure and other antennas and its pattern computed and assessed as a function of location and operating frequency. Optimum antenna configuration was determined by iteration starting with a baseline configuration based on experience. Initial tests indicate good agreement with simulation predictions

Antenna locations Te possible variable antenna locations were identified based on a simple regular grid with 10° spacing in latitude and 8° spacing in longitude over the main global land areas, resulting in 477 possible antenna positions as shown in

5.3 Installing accessories

Installation Accessories means all materials and accessories required and used in the Installation of the Decoder System**s**, including, but not limited to, cabling, wiring, special tools and/or brackets, parts, instruction manuals and all other items necessary to install the Decoder Systems at a Customer's premises Heater installed in the outdoor air duct Installation and connection

. After sensor configuration is changed, select the analog input to which the installed outdoor air temperature sensor (OAT) is connected (for example AI5) and configure it as Outdoor Air Temp. S

Heater installed in the supply air duct Installation and connection 1. Install an electric heater (ELH) at least 100 mm distance from the unit in the supply air duct. A relay (RL) is used to

control the heater. Connect relay to any free digital output on the connection board (CB). 2. Connect the power supply to the electric heater via a relay. A circuit breaker (BRK) is not included in the package and must be ordered separately. It must be installed in the circuit. 3. Install a duct temperature sensor (SAT) after the electric heater and connect it to any free analog input on the connection board (CB).

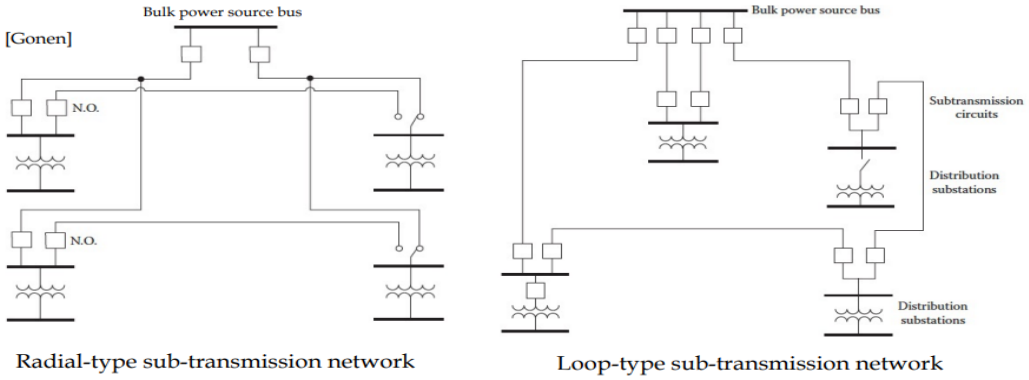
5.4 Terminating cables and conductors

Conductors & Terminations Application Considerations.. Inserting too many conductors will cause a poor connection, which can result in heat or other problems. Other important aspects in the electrical and thermal relationship for circuit components in a circuit are the conductor size, conductor rated ampacity, the conductor insulation temperature rating and the permissible connector device conductor temperature limits. Conductors have specified maximum ampacities that are based on many variables including the size of the conductor and its insulation temperature rating. The NEC® establishes the allowable ampacity of conductors for various variables and applications. In addition, there are some overriding requirements in the NEC® and product standards that dictate the ampacity of conductors when connected to terminals. For instance, the ampacity for a conductor with 90°C insulation is generally greater than the ampacity of a conductor of the same size but with 60°C insulation. However, the greater ampacity of a conductor with 90°C insulation is not always permitted to be used due to limitations of the terminal temperature rating and/or the requirements of the NEC®. (Reference 110.14 in the NEC® for specific requirements.) However, there are some simple rules to follow for circuits of 100A and less. These simple rules generally should be followed because these are the norms for the device component product standards and performance evaluation to these standards for fuses, blocks, disconnects, holders, circuit breakers, etc. Simple rules for 100 amps and less: 1. Use 60°C rated conductors [110.14(C)(1)(a)(1)]. This assumes all terminations are rated for 60°C rated conductors. 2. Higher temperature rated conductors can be used, but the ampacity of these conductors must be as if they are 60°C rated conductors. In other words, even if a 90°C conductor is used, it has to be rated for ampacity as if it were a 60°C conductor [110.14(C)(1)(a)(2)]. For instance, assume an ampacity of 60A is needed in a circuit that has terminations that are rated for 60°C conductors. If a 90°C conductor is to be

used, what is the minimum conductor size required? Wire Size 60°C Ampacity 90°C Ampacity 6 AWG 55 75 4 AWG 70 95 The answer is 4 AWG, 90°C conductor. A 6 AWG, 90°C conductor has an ampacity of 75 amps per (NEC® Table 310.16); but this ampacity can not be used for a 60°C termination. For this circuit, if a 90°C, 6 AWG conductor is evaluated, the ampacity of this conductor must be according to the 60°C conductor ampacity, which is 55A. Amp cities are from NEC® Table 310.16. 3. Conductors with higher temperature ratings can be used at their rated amp cities if the t

5.5 Following supervisor procedures and directions

Directions to employees are a tool used by managers to convey important information to employees about acceptable behavior or procedures to be followed in the workplace. Employees are required to follow directions that are both lawful and reasonable, and given by a person with authority to do so



Radial-type sub-transmission network

Loop-type sub-transmission network

- What does *radial or tree* structure mean?

Activate Windows
Go to Settings to activate

Confirm the height and diameter of the antenna unit shown in the following figure before installing it. The mounting surface and overall space occupied by the antenna must be sufficient for the fully constructed random on top of its base frame. Using a crane during the antenna installation is strongly suggested

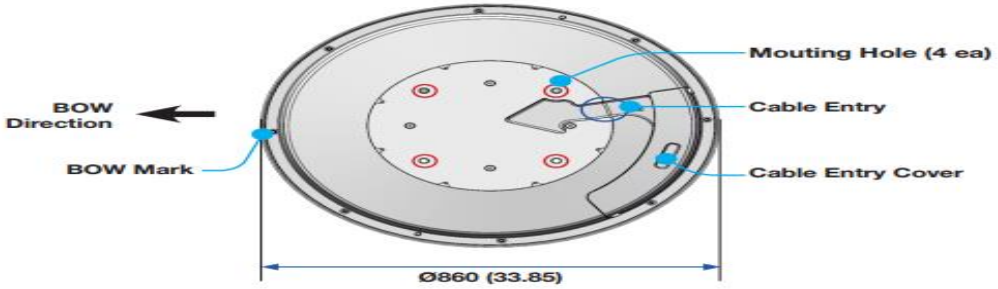
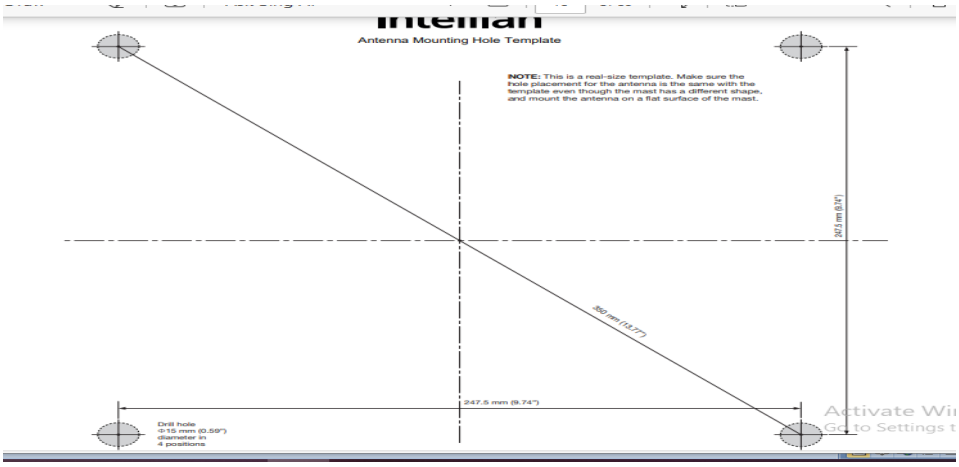


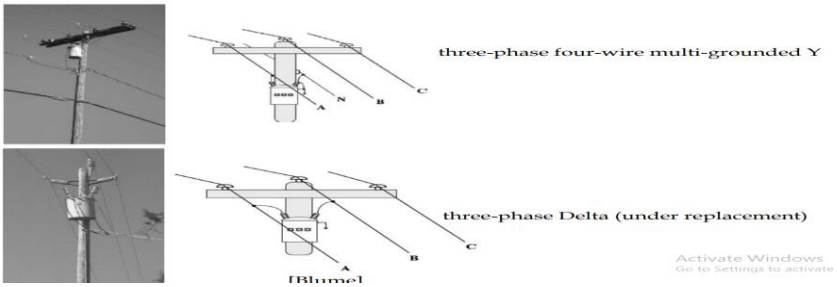
Figure 7: Antenna Dimensions

Antenna Mounting Hole Pattern Use the supplied mounting template when drilling mounting holes on the mast. The hole placement for the antenna must match the mounting hole pattern on the template



Designing Mast The installation mast must be robust enough to prevent flex, vibration, and sway when an external force is exerted on the mast with antenna and radome. Refer to the following mast drawings for more details..

• To use the supplied bolts (M12 x 60L) for mounting antenna on a mast, the thickness of mast plate must be 10 ~ 15 mm. A If the mast plate is thinner than 10 mm, the bolt thread stick-out protruding beyond the nut inside the random can damage the AZ belt of the antenna. B If the mast plate is thicker than 15 mm; the supplied antenna-mast mounting bolts can be too short to mount the antenna on the mast securely.



5.6 Carrying out installation

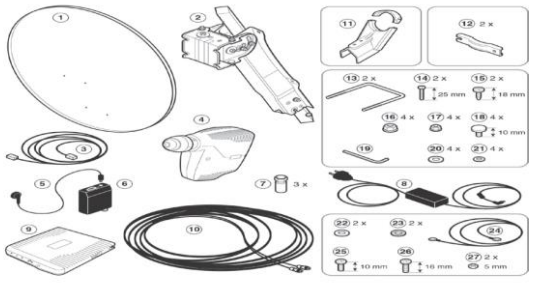
Installation of a new circuit, replacing a consumer unit, or an addition or alteration to an existing circuit in a special location

Step 1: Choosing a Suitable Location Outdoors: antenna & ilnb

• When setting up the antenna base, take into account the orientation of the antenna. Orientation data is provided by your Service Provider.

• The antenna must have a clear view towards the satellite (without any buildings, trees,... That may hinder the signal).

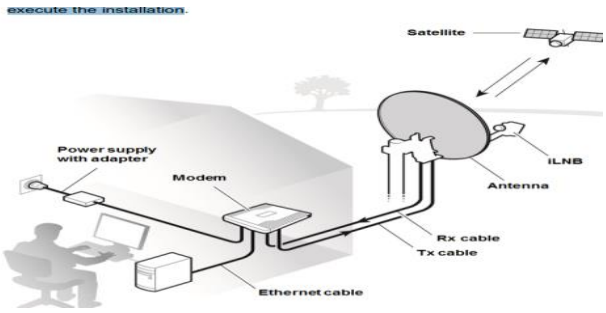
• To connect the ilnb to the Modem, use a coax cable. You can use the provided coax cable or a coax cable with the same specifications as described in section 6. The coax cable included in the box is 30 metres long. Indoors: Modem and computer Put the Modem indoors in a dry room and connect to:



Material you need to provide yourself

- A solid base for the antenna, made of concrete or firmly attached to a wall; - An antenna pole;
- A Phillips head screwdriver PZ2

Installation Overview The image below shows the result of a typical installation as described in the following pages. Please read these pages carefully and follow the step-by-step procedure to execute the installation



Step 1: Choosing a Suitable Location Outdoors: antenna & ilnb

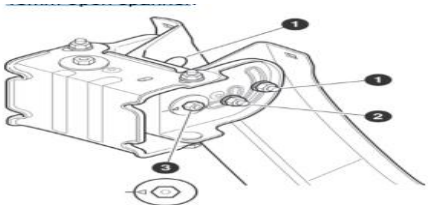
• When setting up the antenna base, take into account the orientation of the antenna

. Orientation data is provided by your Service Provider.

• The antenna must have a clear view towards the satellite (without any buildings, trees,.. That may hinder the signal).

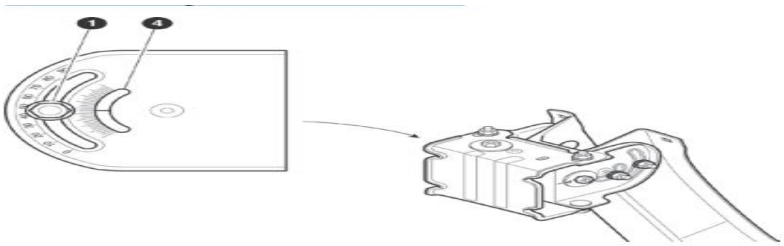
• To connect the limb to the Modem, use a coax cable. You can use the provided coax cable or a coax cable with the same specifications as described in section

Step 3: Installing the earthling kit on the masthead 1. Unfold the feed arm and fix its position by tightening the two pre-mounted screws on the masthead



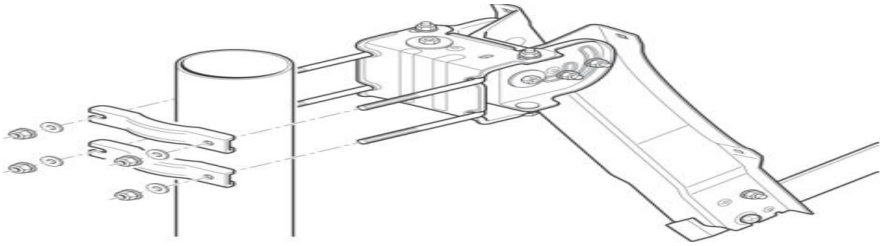
Make sure the elevation fine adjustment bolt (3) is pointing to the middle position (arrow pointing to the middle marker). If not, adjust with a 10mm spanner or use the hex key included until this is the case

Using the elevation scale (4) on the left side of the masthead, set the elevation angle to the value you have found in the antenna pointing information, and tighten nut (2) to fix the elevation angle. Note: the elevation scale is located on the left side of the masthead, nut (2) is located on the right side of the masthead.



Note: this nut must be tightened strongly, as the elevation position should not move when mounting the antenna later on. This completes the setting of the elevation angle. The two other elevation nuts (1) (one on either side of the masthead) should not yet be tightened, as some finepointing still needs to be done later on. You can now proceed to the next step.

.

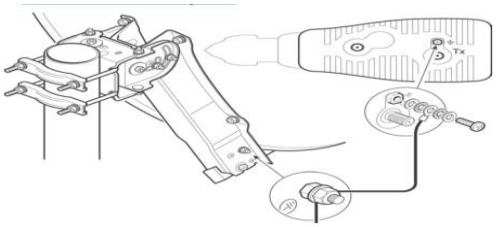


Secondly, mount the antenna dish onto the masthead. The four M6 bolts (10mm), nuts and washers can be found in the accessory bag.

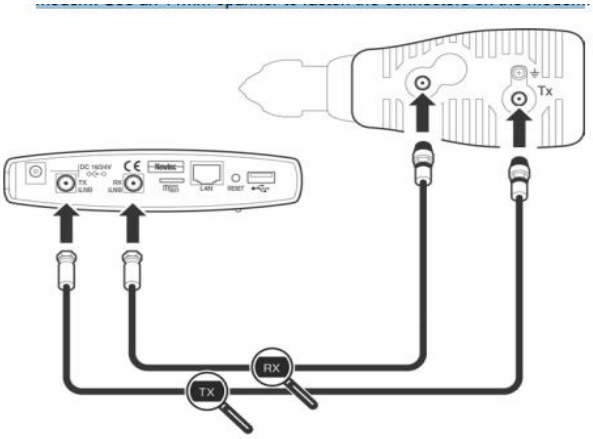
Step 6: Connecting the Equipment 2.6.1 preparing the Coax Cable The twin coax cable is delivered with two remounted waterproof connectors on one side. This is the outdoor end of the cable. The other side of the cable has no connectors attached yet, which allows the length of the cable to be reduced (e.g. If required for practical reasons). This is the indoor end of the cable

Execute the following steps to attach the F-connectors to the indoor end of the cable. You will need a cutter (and possibly pliers) to connect the F-connectors. 1. Strip the coax cable as shown below. Do not remove the aluminum foil or fold it back

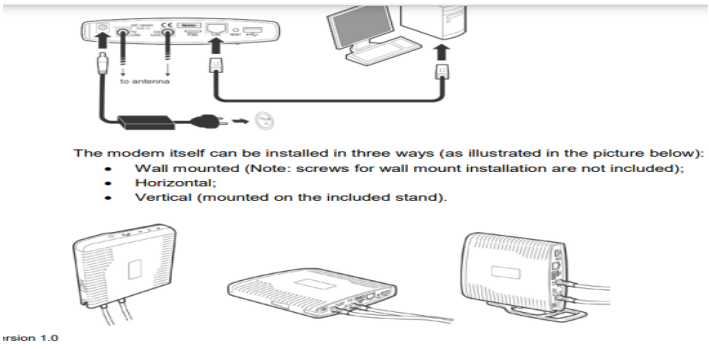
Grounding the ilnb 1. Connect the grounding wire to the ilnb as shown in the figure below, using the washers and M4 grounding screw which can be found in the grounding kit bag. 2. Connect the other side of the grounding wire to the grounding screw on the masthead as shown in the figure below. 3. The masthead needs to be grounded according to local regulations. Consult with a licensed electrician if in any doubt



Connecting the Modem to the ilnb To connect the modem to the ilnb: Note: the TX cable must to be disconnected again later when pointing the antenna. 3. Put the indoor TX and RX connectors in the appropriate TX and RX jacks on the modem. Use an 11mm spanner to fasten the connectors on the modem



Connecting the Modem to your Computer 1. Plug the network cable in the modem's and your computer's Ethernet ports. Use the network cable provided in the box or a cable of your choice. 2. Connect the power adapter provided in the box gently to the modem and a wall outlet. The result should resemble like the figure below



.

5.7 surrounding environment and using sustainable energy practices.

Sustainable energy development is a complex multi-dimensional concept that can vary in meaning based

On the context it is applied in and the perspective of the user.

Consisted of was not made clear. Since then, the concept of sustainable energy development has developed

Relevant to the concept were identified. A thematic analysis of these most cited publications led to the

Identification of four interrelated themes of sustainable energy development; access to affordable modern

Energy services, sustainable energy supply, sustainable energy consumption, and energy security. The

Overarching goal of sustainable energy development was defined as furthering sustainability. Equitable

Access to affordable and reliable modern energy services is integral to sustainable development.

Transformation of the current energy system is necessary to reduce its harmful impacts, both on the supply

And demand side. This transformation is not possible unless it is economically viable through, for instance,

Recent advances in renewable energy technologies and changes in the electric utility infrastructures have increased the interest of the power utilities in utilisation of distributed. The recent trends in the development and utilization of DG resources for power generation application are subject to the deregulation of the electric power sector and technical constraints to extend distribution and transmission networks to some areas. The electric power system planners, regulators and the policy makers have derived many benefits from integration of DG units into the distribution networks. These benefits depend on the characteristics of DG units such as photovoltaic (PV), wind system and reciprocating engines, characteristics of the loads, local renewable resources and network configuration.

This study also reviews the current status of renewable DG technologies based on different characteristics and the operational issues of integration of renewable DG into the electric power syst

1. Drainage system should be installed in PVC Ø50mm and Ø 110mm.
2. The hand wash basin may be wall hang or pedestal type.
3. Use 2% slope for drainage line.
4. All measurement are in CM / centimeter/
5. Allowable tolerance of water supply and drainage line is +/-3mm
6. Project allowable time 4:00 hr

WRITE thru or floes

_____1 Signal processing is based on inputs such as an image or any physical or biological signal such as temperature, pressure

_____2 Installation Accessories means all materials and accessories required and used in the Installation of the Decoder System**s**,.

_____3 Terminations Application Considerations.. Inserting too many conductors will cause a poor connection, which can result in heat or other problems.

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____ The circuit in which current or voltage obeys Ohm's law. Current varies linearly with voltage A) Linear circuit B Antenna C Eye Glass D) All

_____-2 Current can flow in either direction A) Wire Antenna B) The spiral antenna's C) Horizontal D) Bilateral circuit

_____3 Current can flow in only one direction A) The spiral antenna's B) Final Alignment C) Wire Antenna D) Unilateral circuit

Test I: short Answer writing

Instruction: write short answer for the given blank space provided question.

----------1 The growth in signal processing has contributed immensely to communications and embedded system developments

_____2 The change in voltage or current is not governed by Ohm’s law

_____3 A circuit consisting of electrical components that have the ability to electrically control charge flow.

Unit sixes: Set-up reception antennae and signal distribution systems and report

This learning guide is developed to provide you the necessary information regarding the following content coverage and topics:

6.1 Completing adjustments of antenna

6.2 Cleaning and completing work site

6.3Notifying work supervisor

This guide will also assist you to attain the learning outcomes stated in the cover page. Specifically, upon completion of this learning guide, you will be able to:

6.1 Completing adjustments of antenna

6.2 Cleaning and completing work site

6.3Notifying work supervisor

6.1 Completing adjustments of antenna

The optimal tilt angle depends on:-base station height-vertical beam width-site spacing Antenna vertical radiation patterns show that in real life, the antenna doesn't have the main beam only but additional side lobes. These take effect in case of very high antenna positions and large down tilt values. In this case, an additional down tilt can lead to a stronger signal in big distance as the side lobes are pointing in this direction.

Antenna is a device that provides a transition between guided electromagnetic waves in wires and electromagnetic waves in free space

Antenna alignment most common issues and challenges One of the most important stages of installing a microwave point-to-point link is proper alignment of the antenna system.

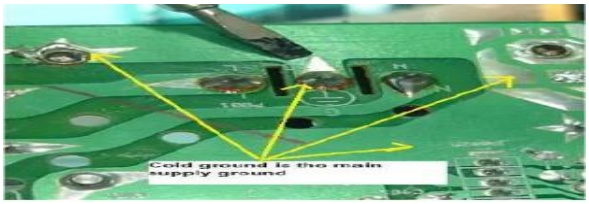


Figure 1. Antenna alignment scenarios.

Before starting the antenna alignment:

Know your target received signal level (and according radio RSSI voltage) from link budget calculation. Typically, the target received signal level in the field is within +/- 3dB of the calculated value;

• Know the azimuth and elevation angles for alignment;

• Ensure radios are fully configured and tested on the bench before taking them into the field;

• Agree on antenna polarization. It can be frustrating to attempt aligning the antenna only to discover that the other team is using a different polarization.

. Radios installed with incorrect polarizations may have a signal loss of 20 - 30dB or greater

Coarse alignment

1) Vertical • It is recommended to begin with vertical alignment. Using a level tool, set both antennas to null position

2) Horizontal • Position the antenna horizontally using a compass or GPS (note the difference between true and magnetic azimuth).

• If you are building a link in an area with a few landmarks, self-made landmark such as a kite, balloon, floodlight, flare, or reflection from a mirror might help. Fine alignment before:

• Get a good quality voltmeter that you will connect to the radio;

• Have a team at each end to make the alignment process easier and faster;

• Remember to adjust only one side of the link at a time; .

3 Final Alignment Target Voltage Possible First Try Possible ’First Try Possible First Try Common First Try - Center Location Below Target Voltage Finding The Main Lobe 1st scenario 2nd scenario 3rd scenario 4th scenario frequency, and class. Small antennas in low frequency range typically have strong side lobes, which sometimes results in installation crews aligning the antenna on a side lobe instead of the main lobe.

Step by step actions:

1. Perform full vertical sweep by moving the antenna up and down (vertically). Start by moving the antenna from the upper side to avoid alignment to a signal reflected from the ground.

2. After you have found the point where the signal is the highest vertically, perform full horizontal sweep by moving the antenna right and left (horizontally

3. The point that has the highest received signal level horizontally will be the point where the received signal level is the strongest on the antenna.

4. When the highest signal level is obtained during the alignment of the first antenna, fix it and repeat the same steps with the second antenna.

5. After finding the highest signal level on the second antenna, repeat alignment steps again on the first antenna until the maximum calculated signal level (+/- 3dBm) is reached.

6.2 Cleaning and completing work site

The final year project looks into construction cleanliness and waste management for the construction company EKE-Ravenous On.

As a part of its development, the company wants to establish a general guideline for building site cleanliness and waste management adapted to its own projects. Most projects of EKE-Ravenous On are new accommodation buildings in the Helsinki area.

Construction site cleanliness generalities Construction activities create various types of dust which is often a health hazard. Figure

1. Caring for construction cleanliness is more than improving comfort, it can save lives. Diseases caused by dust are numerous and depends on the type of dust and its components, and range from skin, eye, respiratory or lung problems to cancers. Dust accumulation in some areas is easier to handle than in others. It is more convenient to clean the dust which is on the floor than dust in technical spaces, such as false ceilings and air conditioning equipment

Dust and its spreading, as well as the costs of its cleaning may be higher than dust avoidance itself. Dust can slow down the project and shorter the equipment life time, which means extra costs not considered at the planning stage of the construction project.

6.3 Notifying work supervisor

Step 1: Make a Difference Why the supervisor is so important when a person is hired or promoted to the position of a supervisor; it usually means a pay raise. But it also means more responsibilities, including legal responsibilities relating to the health and safety of the workers under your supervision. It's a natural thing for a new supervisor to wonder if he or she is up to the challenge. In fact, asking yourself that question will help you figure out what additional information or instruction you might need to do your job well. People expect a lot from a supervisor, no matter how big or small the workplace is.

Think about the roles that people play at a basketball game. From the list below, check off the roles that you think apply to a supervisor's work:

- Coach
- Trainer
- Referee
- Cheerleader
- Captain

If you didn't check off all of the above boxes, go ahead and do it now. Because chances are you will be called upon to play any and all of the above roles as you strive to keep your workplace healthy, safe and productive. As a supervisor, you are a crucial part of your workplace's Internal Responsibility System. This is a very important concept for workplace health and safety and you will learn more about this throughout this training. The number of people in Ontario who suffer a work-related illness or injury each year would fill the seats of

a dozen big hockey arenas. Your duties as a supervisor Under the OHSA, every supervisor is also considered to be a worker and has the same workplace duties and rights as a worker. But the OHSA also gives you specific duties related to your role as a supervisor, including

Telling workers about hazards and dangers and responding to their concerns.

Showing workers how to work safely and making sure they follow the law, and the workplace health and safety policies and procedures

Teamwork and the Internal Responsibility System (IRS) People in successful workplaces understand that a safe and healthy workplace is a productive workplace. They also know that they have to work together to create and maintain a safe and healthy workplace. As you have seen, the Occupational Health and Safety Act is very clear about the different roles of the employer, supervisor and worker, and how those roles cooperate to make a safe and healthy workplace. As the person in the highest leadership position, the employer has the most important role in creating an effective Internal Responsibility System in the workplace.. You should inform the employer of any health and safety concern, even if you have the ability and authority to handle it yourself. Your employer may need to know about the problem in order to fulfill his or her duties. The three rights of workers The OHSA gives workers three important rights:

• The right to know about workplace hazards and what to do about them

• The right to participate in solving workplace health and safety problems

• The right to refuse work that they believe is unsafe As a supervisor, it's important that you know and understand those three worker rights. They are at the heart of the OHSA and the Internal Responsibility System and they connect directly to your duties as a supervisor and those of the employer. Here's how: 1. The right to know. It's your job to tell the workers about any health or safety hazards and to show them how to work safely. This supports workers' right to know about hazards to which they might be exposed. For example, the law says workers have to receive information and training on the chemicals or hazardous materials that are used, handled or stored at work. This information is available either on warning labels or information sheets. Sometimes you may also have to give the worker written instructions on how to do the work. The employer supports the workers' right to know by making sure they get:

• Information about the hazards in the work they are doing

• Training to do the work in a healthy and safe way.

• Competent supervision to stay healthy and safe. That means the employer has made sure that you know how to do your job. 10 2. The right to p arty capote. As a supervisor, you support the workers' right to participate in health and safety by encouraging them to get involved. There are various ways to be involved in workplace health and safety such as asking questions, raising concerns and giving positive feedback. One of the most effective ways workers can participate in health and safety is by becoming a health and safety representative or a joint health and safety committee member.

Self-Check 1.1

WRITE thru or floes

_____1 Antenna is a device that provides a transition between guided electromagnetic waves in wires and electromagnetic waves in free space

_____2 Vertical • It is recommended to begin with vertical alignment. Using a level tool, set both antennas to null position.

_____3 signal level is obtained during the alignment of the first antenna, fix it and repeat the same steps with the second antenna.

TEST. II : <u>Choose The best answer (each 5 points)</u>

_____ a transition between guided electromagnetic waves in wires and electromagnetic waves in free space A) Micro strip antennas B Antenna C Eye Glass D) All

_____-2 Position the antenna horizontally using a compass or GPS (note the difference between true and magnetic azimuth A) Wire Antenna B) The spiral antenna's C) Horizontal D) All

_____3 Target Voltage Possible First Try Possible 'First Try Possible First Try Common First Try - Center Location

A) The spiral antenna's B) Final Alignment C) Wire Antenna D) All

Test I: short Answer writing

Instruction: write short answer for the given blank space provided question.

----------1 is vertical sweep by moving the antenna up and down (vertically). Start by moving

_____2 so important when a person is hired or promoted to the position

_____3 is The final year project looks into construction cleanliness and waste management for the construction company EKE-Ravenou

References

The following books are excellent references for definitions and basic theory. They also contain a wealth of antenna theory that may be somewhat challenging. John D. Kraus and Ronald J. Marhefka, Antennas for all Applications, McGraw-Hill, 2002 Constantine Balanis, Antenna Theory, John Wiley & Sons, 199

Arm® Cortex® Microcontrollers cypress.com/arm

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cypress.com/clocks

Interface cypress.com/

cypress.com/iot

Memory cypress.com/memory

Microcontrollers cypress.com/mcu

PSoC cypress.com/

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The trainers who Revised the curriculum							
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