

Unit → 7

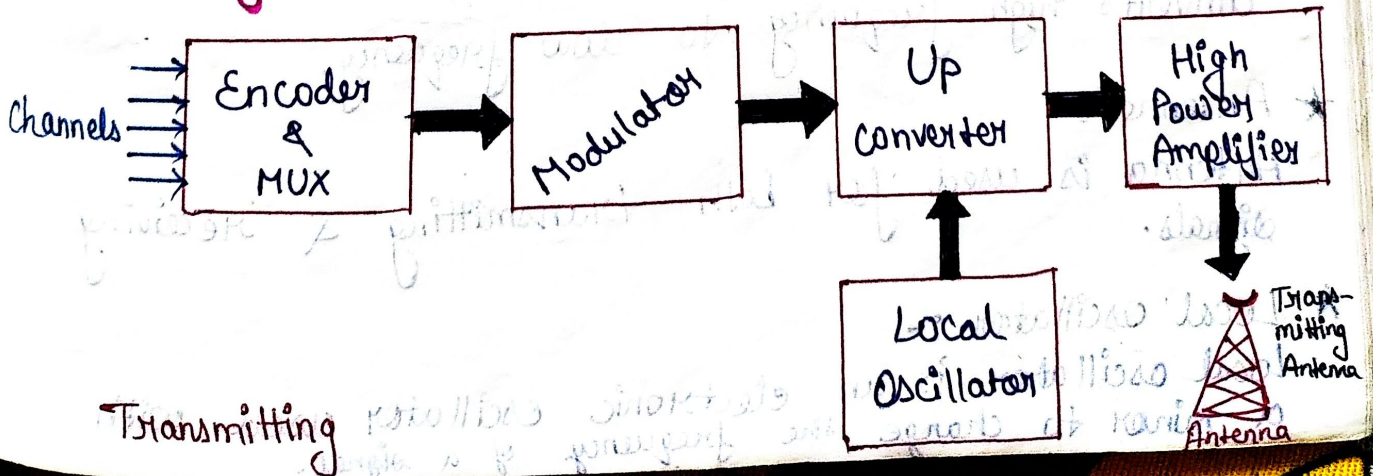
Topics

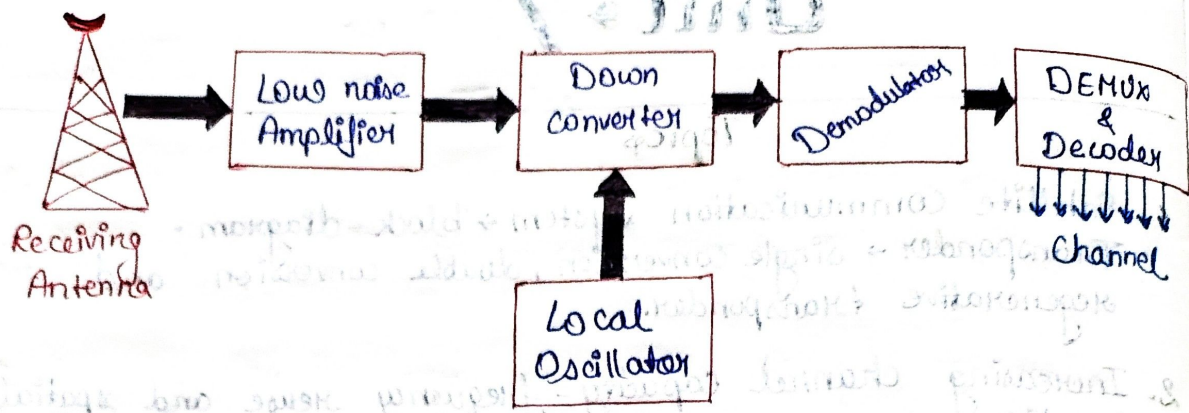
1. Satellite communication system → block-diagram. Transponder → single conversion, double conversion and regenerative transponder.
2. Increasing channel capacity - frequency reuse and spatial isolation. Communication satellite - satellite subsystems.
3. Earth Station - block diagram, Applications payload.

3.) Earth Station...

- The earth segment of satellite communication system mainly consists of two earth stations. These are transmitting earth station and receiving earth station.
- The transmitting earth station transmits the information signals to satellite. Whereas, the receiving earth station receives the information signals from satellite. Sometimes, the same earth station can be used for both transmitting and receiving purpose.
- In general, earth stations receive the baseband signals in one of the following forms. Voice signals and video signals either in analog form or digital form.

Block diagram...





★ Encoder :- An encoder is an electronic device used to convert an analog signal to digital signal. The encoder encodes more number of inputs to few outputs.

★ Decoder :- The decoder is an electronic device that is used to convert digital signal to an analog signal. It allows single input & generates many outputs.

★ Modulator :- Combines microwave signal and information.

★ Demodulator :- microwave signal & information gets separated.

★ Upconverter :- Converts low frequency to high frequency.

★ Down converter :- Converts high frequency to low frequency.

★ Antenna :- Antenna is used for both transmitting & receiving signals.

★ Local oscillator :- Local oscillator is an electronic oscillator used with a mixer to change the frequency of a signal.

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Applications Payload ...

The applications payload on a satellite is designed to perform the specific task for which the satellite is intended. Some examples include :-

* Communication Payload

These payloads consist of transponders that receive signals from Earth stations, amplify and translate them to a different frequency, and retransmit them back to Earth.

* Remote Sensing Payload

These payloads include sensors and cameras that collect data about the Earth's surface, atmosphere, or oceans. Example include optical imagers, radar systems, and spectrometers.

* Navigation Payloads

These payloads transmit signals that enable GPS receivers on Earth to determine their location.

* Scientific Payloads

These payloads carry instruments for conducting scientific research, such as monitoring space weather, studying the Earth's magnetic field, or observing celestial objects.

Relationship between Earth Station and Payload ...

The earth station acts as the ground-based interface for the satellite's payload. The earth station transmits signals to the satellite payload, which processes them (e.g., amplifies, translates frequencies) and retransmits them back to the earth station or another earth station. The earth station also receives signals from the satellite payload and processes them for various applications.