

CDATV on ISS

Compressed Digital Amateur Radio TV

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MAREXMG

Analog Video

- Analog FM Video requires 20 MHz
- Analog FM can only be Down-Linked on 13 cm and higher bands (2400 MHz).
- Analog FM can be Up-linked on 23 cm... and higher bands (1290 MHz).
- Analog FM provides good quality Video and Audio.

CDATV

- CDATV Requires < 150 kHz RF band width (128 KBPS).
- CDATV Up or Down linked on 23.
- FCC allows 1260-1270 for satellite.
- CDATV will send a lower quality image at QCIF rates of 15-30 Frames per second.

D-STAR

Digital transceiver ID-1

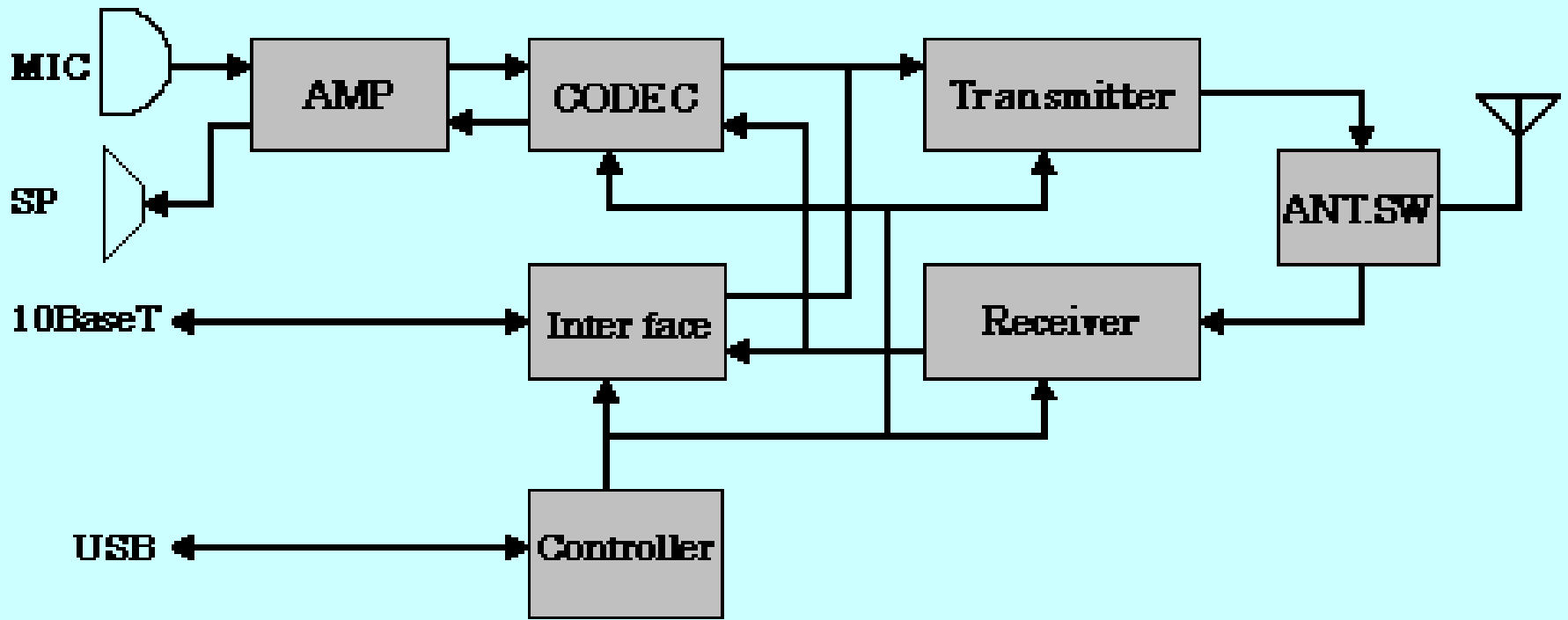




Specification

- Operating Frequency : 1.2GHz Amateur Band
- Operating MODE : FM (analog voice)
(FDMA) : 0.5GMSK (Digital voice / DATA)
- Data Rate : 4.8kbps(voice) / 128kbps(data)
- CODEC : AMBE
- Data interface : IEEE802.3 (10Base-T)
- RF Power : 10W / 1W
- Rx Sensitivity : FM -16dBu
(typical) : 4.8kbps GMSK voice -10dBu
: 128kbps GMSK Data +2dBu
- Switching Time : 10mS(Digital mode)
- GMSK Modulation : Quadrature Modulator / FPGA(Base Band)

Block Diagram of ID-1



Ground Station Requirements

CDATV

- **Antenna-U/D: 23 cm 12 dbic \$200**
- **Amp and Preamp: optional**
- **Rotor System and Tower: \$1000**
- **Radio: \$1500**
- **Transverter: None**
- **Video Converter H.323: \$200**
- **Approximate cost: less than \$3000**
- **Doppler TX/RX: 40 kHz**

Ease of use CDATV

- To receive CDATV on 23 cm, you need to compensate for a Doppler frequency shift to 40 kHz.
- The Icom ID-1 D-Star radio will automatically compensate for 5k Doppler. Future versions may be able to support a greater drift automatically.

CDATV Satellite System

- Assuming a CDATV 23cm mono band operation. The ISS receiver will include a Doppler correction circuit (AFC). This circuit will be able to compensate for signals errors of less than 10 kHz.
- The CDATV system will use existing ISS antennas.
- Transmitter output: Adjustable from 1-10 watts.
- Controller: A standard grade Lap-Top PC will perform all of the control functions, including Video and Audio Compression and De-compression.

Goal and Objective

- Install and easy to use CDATV system on ISS.
- Design the system for easy access to experience Amateur Radio Stations.
- Video will be in a Half-Duplex mono band mode.
- Provide live WEB Video

Available Options

- The CDATV project is not for beginners, however Video can be saved on Web pages for easy access to Schools.
- ISS will need other Amateur Radio Projects specifically designed for Beginners (2-Meter Mono-Band packet, etc.)
- Data modem supports 128kbit which can be used for other projects.

Today's Situation

- Analog FM Satellite video will require too much Satellite band-width.
- It will be easier to find a radio frequency for CDATV (1260 - 1270 Mhz).
- More experienced users will be able to access CDATV.
- CDATV (H.323) is compatible with LAN.

Frequency

- Part 97.207-1 (c) The following frequency bands and segments are authorized to space stations:
 - (2) ...1260-1270 MHz...
 - ARISS will need to verify this information with the ITU

Users

- Users: Estimated 10% of Amateur Population.
- Users Web: School access and more
- Usage Downlink: 300 days per year.
- Usage Uplink: 10-20 days per year.
- PR Value: Very good, reaches non licensed Amateur Radio stations.

Time-Line

- Launch Date: 2008
- Software: 2006
- Modem Upgrades: 2007
- ISS Activation: 2009