

Satellite Communication Lab STC10 Features:

- * 7 PLL Uplink 5.8GHz & 4 PLL Downlink 2.4GHz channels.
- * Different Baud rates PC-PC link.
- * Variable path loss at uplink and downlink channels
- * PLL synthesized frequency in Transmitter, Receiver and Satellite Emulator
- * Gold Plated SMA connectors & Silver Teflon cables
- * Dish & Patch array for linear & circular polarization.
- * C/N and S/N measurement facility
- * Transmit Audio, Video, Digital/analog data, Tone, Voice, function generator waveforms etc.
- * Receives & demodulates 3 Signals Simultaneously.
- * Camera and Monitor for video link

1. Satellite Uplink Transmitter



Technical specifications:

Frequency	: 7 channels in 5.8 Ghz band ; PLL with frequency selection switch & LED indication
Spurious output	: -30 dB typical
RF Output	: 50 Ohms Unbalanced SMA
RF output level	: +3 dBm nominal with wideband RF amplifier
Audio 1 & 2	: Int. 1KHz sine wave / Ext Mic Ext. Function Generator waveform
Video	: Analog Camera compatible
Waveform	: upto 5MHz Function Generator
Digital	: Max rate 100KHz typical
Baseband	: Transmits 3 signals simultaneously at each uplink frequency
Tele-command	: Selectable 4 bit binary input with selectable 4 bit addresses
Enable	: Telecommand Frame available at digital input
Processor	: PIC16F4 - 8 bit RISC processor based PLL with 4 Mhz clock
Bandwidth	: 20 Mhz
Modulation	: 5/5.5MHz Audio FM Modulation 8 Mhz Video FM Modulation
Antenna	: Detachable Parabolic dish with mount
Power Supply	: 100-240V AC 47-63Hz

2. Satellite Downlink Receiver



Technical specifications:

Frequency	: 4 channels in 2.4 to 2.5 Ghz band PLL Controlled ISM Band
RF Input	: 50 Ohms Unbalanced SMA
Sensitivity	: -95dBm
Audio 1 out	: Speaker inbuilt/output
Audio 2 out	: Speaker inbuilt/output
Video Out	: 5MHz, 1V p/p
Digital	: Max rate 100KHz typical TTL
RSSI Out	: Received signal strength output for C/N measurement
Telemetry	: 4 bit binary LED output with Selectable 4 bit addresses
Valid/Error Correction	: Tele-command Frame available at digital output
IF	: 479.5MHz
Antenna	: Detachable Parabolic dish with mount
Demodulation	: receives & demodulates 3 signals simultaneously
Power Supply	: 100-240V AC 47-63Hz

3. Satellite link Emulator



Technical Specifications:

Transponder Uplink

Frequency	: 7 channels in 5.8 Ghz band ; PLL Synthesized ISM Band with select switch
RF Input Z	: 50 Ohms Unbalanced SMA
Sensitivity	: -95dBm
Telemetry	: 4 bit binary LED output with Selectable 4 addresses
Valid/Error Correction	: Telemetry Frame available at digital output

Transponder Downlink

Frequency	: 4 channels in 2.4 to 2.5 Ghz band ; PLL Synthesized ISM Band
RF output level	: 0 dBm nominal
Path Loss	: 20dB
Tele-command	: Selectable 4 bit binary input with selectable 4 addresses
Enable	: Telecommand Frame available at digital input
Test Output	: Audio 1, Audio2, Video, Digital
RSSI Out	: Received signal strength output for C/N measurement
Noise addition	: Variable
Signal delay	: upto 0.6s on Audio1 channel
Antennas	: Patch array antenna -2X2

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4. Camera



Camera : Colour CCD Type
 Power Supply : From Tx
 Resolution : 400 Lines
 Size : 1/3" CCD
 Video O/P : 1Vp-p composite

5. Monitor



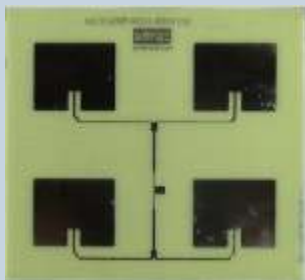
Screen : 7" Colour LCD
 AV input : Analog
 Power Supply : Adapter
 Display Mode : 16 : 9
 Viewing Angle : Wide
 Adjustable : Colour, Brightness, Contrast
 Remote control : card style

6. Microstrip Circular Patch Array 2 X 2- 2.4GHz



F_c : 2.4 \pm 0.1 GHz
 S_{11} : 10 \pm 2dB
 Polarisation : Circular
 Gain : 7dBi
 Impedance : 50 Ohms
 Connector : SMA

7. Microstrip Rectangular Patch Array 2 X 2- 2.4 GHz



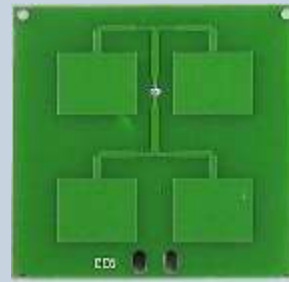
F_c : 2.4 \pm 0.1 GHz
 S_{11} : 10 \pm 2dB
 Polarisation : Linear
 Gain : 9dBi
 Impedance : 50 Ohms
 Connector : SMA

8. Parabolic Dish - 2 Nos.



S_{11} : >10dB
 Bandwidth : 2.4 \pm 0.1GHz
 Gain : 6dBi
 Beamwidth : E plane 40°
 Beamwidth : H Plane 60°
 Polarisation : Linear
 Front to Back Ratio : 10dB
 Connector : SMA

9. Microstrip rectangular patch array 2 X 2- 5.8 GHz



F_c : 5.8 \pm 0.1 GHz
 S_{11} : 10 \pm 2dB
 Polarisation : Linear
 Gain : 7dBi
 Impedance : 50 Ohms
 Connector : SMA

10. Serial Communication Software



Serial communication software
 Baud rate: 1200 bps-38,600bps
 Comport: User Selectable

11. Accessories

- 1) Transmitter antenna mounting stand.
- 3) All necessary connectors & Teflon RF cables.
- 4) Experimental Manual
- 5) Software CD
- 6) BNC-BNC Cables - 2 Nos.
- 7) RS232 Lead - 2 Nos.
- 8) SMA-SMA lead - 2 No
- 9) BNC Tee - 1 Nos.
- 10) RS 232 adapter

E-Manual: Installation Video for ease of Learning

Dimensions: 56X45X25cms Weight: 15Kgs
 Warranty: 3 yrs.

Areas of Experimentation and scope of study

- * To set up an active & passive satellite communication link and study their difference. To study the communication satellite link design: process of transmitting a signal to a satellite (UPLINKING), reception of same signal via satellite (DOWN LINKING) and functioning of transponder of a satellite.
- * To measure the baseband analog signal parameters in a satellite link.
- * To measure the signal parameters in an analog FM/FDM TV Satellite link.
- * To study the functionality of a satellite MODEM.
- * To study the phenomenon of Linear polarization.
- * To measure the C/N ratio.
- * To measure the S/N ratio.
- * To study the effect of fading and measure the fading margin of a received signal.
- * To measure the digital baseband signal parameters in a satcom link.
- * To setup a RS-232 satellite communication link using com ports of PC.
- * To calculate Bit Error Rate in a satcom link.
- * To measure the Propagation Delay of signal.
- * To measure pathloss.
- * To study noise.
- * To send telecommand and receive the telemetry Data.

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