



University of Engineering & Technology  
Lahore, Pakistan

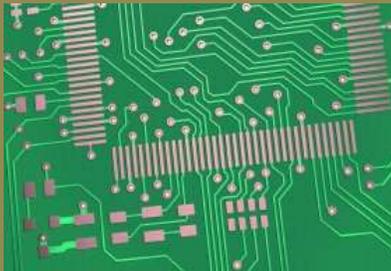
## Printed Circuit Board - Laboratory

Printed circuit boards ( PCB ) are one of the most important parts of electrical and electronic devices. The increasing miniaturisation of integrated circuits, higher packing density and smaller layout-dimensions make high demands on PCB - manufacture.

The department of Electrical Engineering disposes of a variety of devices and machines to produce double sided plated- through PCB's, to insert leaded and surface mounted devices. Proceeding from a double sided copper clad PCB substrate the students learn in detail the individual manufacturing steps up to the printed board assembly. During their practical courses and their thesis the students can



use and operate the different devices and machines of the PCB-lab and can produce and test the functions of their manufactured prototype boards.



For a practical-oriented education and support of the students, for handling and operating the lab-equipment and for supervising the individual manufacturing steps, done by the students a well

educated and specialised staff is available.

## CAD - system

Graphical CAD-systems with powerful schematic entry-, physical routing- and layout verification-modules are available. Via extensive libraries with electrical and mechanical data schematics are strictly connected to the layouts by netlists and component properties. Modern design tools allow schematic- and layout - consistency checks and automatically generate part lists as well as numerical controlfiles for the CNC drilling / milling machine and the photoplotter.

A number of simulating software are also being used which include:

1. Ansoft HFSS



2. ADS



3. Microwave Office



## CNC-drilling-/milling

### **LPKF ProtoMat S100**

#### ***Circuit board plotter for in-house RF and microwave board prototyping***

The LPKF ProtoMat S100 is a compact system for PCB prototyping and low volume production, especially for RF and microwave applications. With its unique precision, the ProtoMat S100 is particularly suitable for machining soft and flexible substrates with sensitive surfaces. With a maximum milling speed of 6 inch per second, a resolution of 0.01 mils (0.25 microns) and a variable speed 100,000 RPM spindle motor, the ProtoMat S100 produces extremely fine structures on all types of substrates.

It is also the ideal system for a whole range of applications thanks to its flexibility and high speed: in addition to the production of multilayer PCBs, it also easily machines three-dimensional components. The system is compact and ready to use with plug-and-play software. Its high level of automation makes in-house prototyping easier than ever.



## laminator

After preheating the base material this dry-film laminator enables the lamination of the total board area. The light-sensitive laminate is rolled under pressure on both sides of the moving board by heatable feed rollers. The feed speed of the board is adjustable.



## exposure system

After an exact fixation of the layout-films on both sides of the laminated board the light sensitive cover is exposed by a double-sided drawer-type ultraviolet light exposure unit with a vacuum system. After the exposure that part of the laminate, which is not protected by the layout film is etchresistent.



## Faculty People

### 1. Dr. Muhammad Saleem

#### Chairman Electrical Engineering Department

**EDUCATION:** Ph D Electrical Engineering, 1998  
University of Manchester U. K.

M Sc Electrical Engineering, 1979  
University of Engineering & Tech. Lahore

B Sc Electrical Engineering, 1972  
University of Engineering & Tech. Lahore

B B A (A & B Courses of Math), 1968  
University of Punjab Lahore

**Phone:** 00-92-42-9029227, 9029507

**Fax:** 00-92-42-9250224

**email:** drmsaleem@uet.edu.pk  
drmsaleem@gmail.com  
drmsaleem@hotmail.com



#### RESEARCH WORK:

1. Worked in a DSP research group for audio compression in University of Manchester UK. 1993-1998
2. Designed and developed a secure script machine for Government of the Punjab and won a research prize of Rs: 100,000/- from UET in Convocation 2002.
3. Working as consultant in a DSP research group for development of a secure phone and indigenous Security Algorithm

**2. Mr. Muhammad Mughees**

Lecturer/Lab Engineer

**EDUCATION:** B Sc Electrical Engineering, 2007  
University of Engineering & Tech.  
Lahore

**Phone:** +923004718615

**email:** [mughees.muhammad@uet.edu.pk](mailto:mughees.muhammad@uet.edu.pk)



**RESEARCH AREA:**

Fabrication of IFF Transponder RF Front End

**3. Mr. Zohaib**

Lecturer/Lab Engineer

**EDUCATION:** B Sc Electrical Engineering, 2007  
University of Engineering & Tech. Lahore

**Phone:** +923004470475

**email:** [zohaib@uet.edu.pk](mailto:zohaib@uet.edu.pk)

**RESEARCH AREA:**

Fabrication of IFF Transponder RF Front End and Baseband Processing

**4. Mr. Qamar Hussain Abbasi**

Lecturer/Lab Engineer



**EDUCATION:** B Sc Electrical Engineering, 2007  
University of Engineering & Tech. Lahore

**Phone:** +923008326661

**email:** majorqam@uet.edu.pk

**RESEARCH AREA:**

Ultra Wideband Antenna Design, Microwave components and devices design



staff

1. Muhammad Ahsan

Contact: 03228034237

2. Babar Saleem

Contact: 03224729023



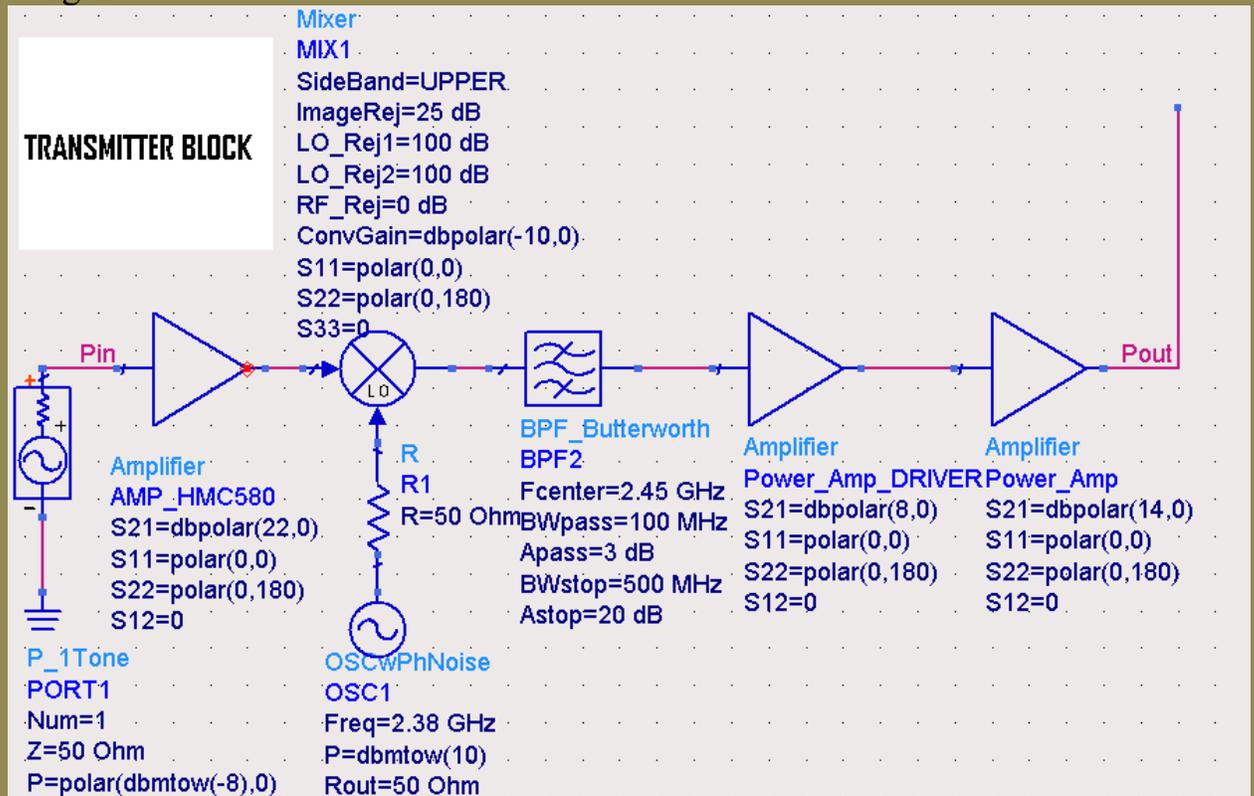
Research

## **Design, Simulation and Hardware Implementation of RF S- Band TRANSCEIVER FOR SATELLITE COMMUNICATION**

### Transmitter Specifications

- Bandwidth = 100 MHz
- Input center frequency = 70 MHz
- Output center frequency = 2.45 GHz
- Maximum output power (without antenna) = +30 dBm

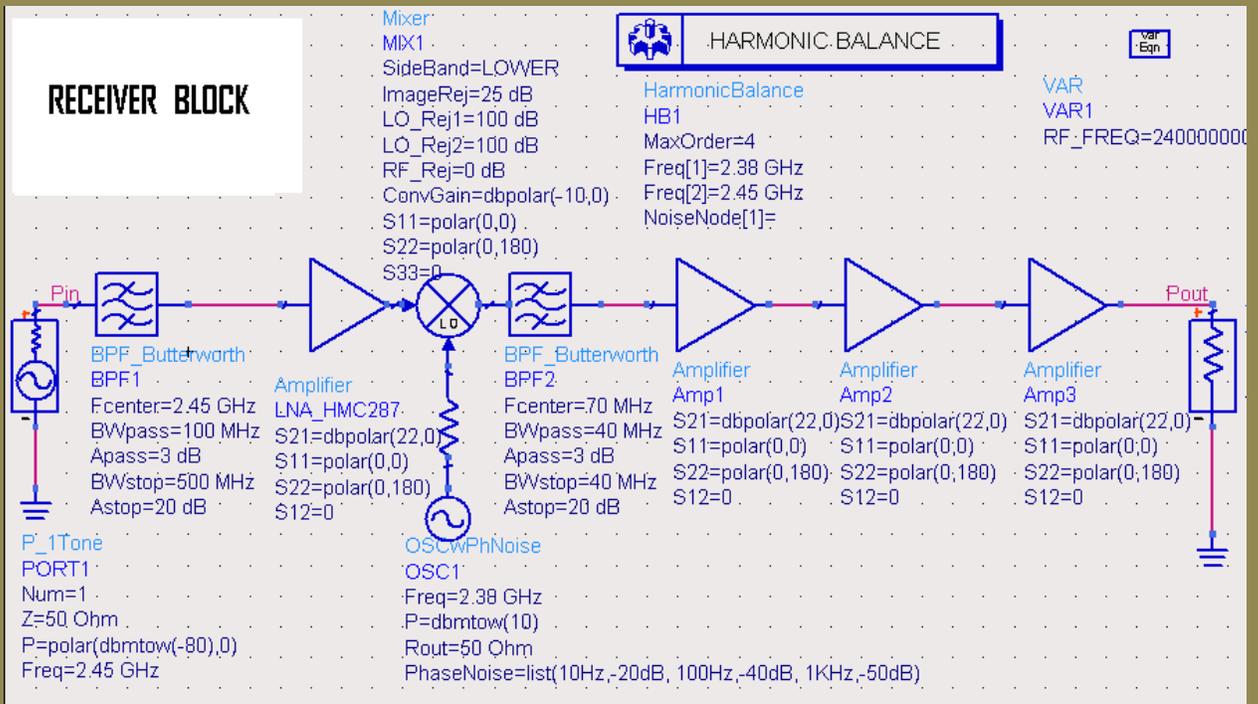
## Transmitter Block Diagram



## Receiver Specifications

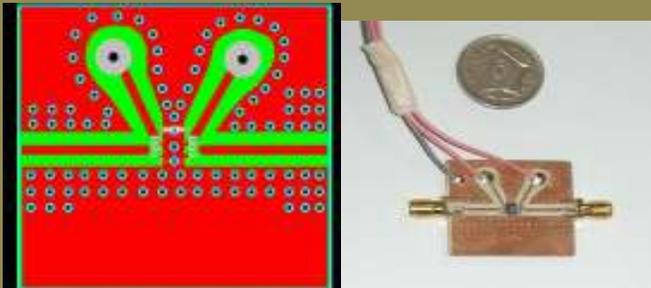
- Bandwidth = 100 MHz
- Input center frequency = 2.45 GHz
- Output center frequency = 70 MHz
- Minimum input power = -85 dBm
- Maximum output power = +22 dBm

## Receiver Block Diagram



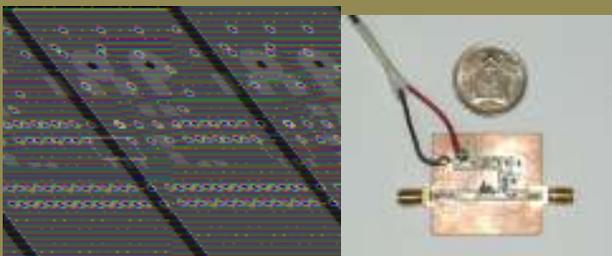
## Low Noise Amplifier (LNA)

PCB Layout



## IF Amplifier

PCB Layout



## Mixer

# PCB Layout

