CB40085210v300508a

# Radio Frequency (RF) Printed Circuit Board Design for Wireless Telecommunication Products

## *5 July 2008 (Saturday)*

## Background

One of the most important applications of RF is in wireless telecommunication.

A well-designed Radio Frequency Printed Circuit Board (RF PCB) contributes significantly to the success of any wireless product as the layout of the PCB greatly affects the performance, stability and reliability of the product. In today's highly competitive wireless products market with increasingly compressed development timeframes there is a strong demand for RF professionals who possess the knowledge and experience to design top-performing RF PCBs in less number of iterations. **What matters is whether your level of competence is up to the required standard to meet such demand**.

Jointly organized by **Hong Kong Productivity Council**, **Lexiwave Technology (Hong Kong) Ltd.**, and **Hong Kong Science and Technology Parks Corporation**, this course aims to provide participants with an insightful training on RF PCB design from a practical, industrial perspective. Participants will be led through a systematic, theoretical presentation with case studies on commercial products in the training. The course will be conducted by RF experts with rich local and overseas industrial experience. It is suitable for RF professionals who want to keep up-to-date their skills and knowledge in RF PCB design and stay competitive.

## Who Should Attend

RF Designers, Wireless Product Designers, Field Application Engineers, Design Managers, Business Development Engineers and Managers, and related professionals.

**Organizers:**

PRODUCTIVITY 生產力培訓學院 Training Institute

LEXIWAVE Reinventing RFIC

**Co-organizer:**

Hong Kong 香港科技園 Science & Technology Parks

**Supporting Organization:**

Agilent Technologies

**Please circulate this leaflet to those who are interested.**

*Advanced & Manufacturing Technology*

## Course Structure

1. Printed circuit board design for RF circuits

- circuit design, schematic diagram to PCB design
- single / double side component placement
- best utilization of board area
- arrangement of layers
- trace routing : length minimization and width maximization
- board material / characteristic de-sensitization
- grounding and ground plane
- power line routing and power plane
- decoupling
- via holes : location, size and quantity
- shielding
- design examples

2. Printed circuits board design for analog and digital circuits

- analog circuits
- component placement
- isolation of weak / strong signals / noise /
- differential pair
- linear / switching power supply
- digital circuits
- digital noise : clock, signal and power
- trace length equalization
- decoupling
- design examples

3. EMC issues

- EM interference : prevention and suppression
- EM susceptibility : anti-jamming improvement
- Electrostatic discharge : component location, grounding and trace routing

4. Mechanical design

- chassis design for maximum board area
- placement of components, antenna, and input / output connectors
- mounting, mechanical strength
- heat sink / ventilation / heat transfer / thermo relief

5. PCB design for mass production

- single / double side component placement
- single / double side surface mounted components for wave soldering / reflow soldering
- penalization / breakaway / fiducial marks
- test points and test pins

## About the Instructors

**Dr C.M. Yuen** received his B.Eng. and Ph.D degrees in Electronic Engineering from the City University of Hong Kong. His research interest is mainly in the design of RF and Microwave circuits for low voltage and low power consumption wireless systems. He has twenty years of experience in RF product design and manufacturing in Hong Kong and Mainland China. Dr Yuen is currently an advisory engineer in the field of HDTV and IPTV.

**Mr Henry Lau** received his M.Sc. and MBA degrees from UK and USA respectively. He has more than 20 years of experience in designing RF systems, products and RFICs in both Hong Kong and US. He worked for Motorola and Conexant in US as Principal Engineer on developing RFICs for cellular phone and silicon tuner applications. Mr Lau holds four US patents and has two patents pending. He is currently running Lexiwave Technology Ltd., a fabless semiconductor company in Hong Kong and US designing and selling RFICs.

## Supporting Organization

Each participant will receive a souvenir from **Agilent Technologies Hong Kong Ltd.**, supporting organization of this course.

## Medium of Instruction

Cantonese (with English terminology)

## Award of Certificate

A Certificate of Completion will be awarded to participants who have attended the 1-day training

## Date & Time

5 July 2008 (Saturday) ; 9:30 – 12:30 & 14:00 – 17:00

## Venue

1/F., HKPC Building, 78 Tat Chee Avenue, Kowloon

## Course Code

40085210

## Course Fee (including course materials)

Normal: HK$1,100 / Early Bird: HK$990 **(for those who enroll on / before 13/6/2008)**

## Application

To enroll, please complete the attached enrolment form and send it together with the appropriate fee to

Ms Catherine Lam

PTI, Hong Kong Productivity Council, 3/F., HKPC Building, 78 Tat Chee Avenue, Kowloon

(All cheques should be crossed and made payable to 'Hong Kong Productivity Council')

## Enquiries

Hong Kong Productivity Council
Tel: 2788 5563 or 2788 5716 Fax: 2788 5567 Email: catlam@hkpc.org

Lexiwave Technology (Hong Kong) Limited
Tel: 2144 2592 Fax: 2144 2595 Email: henry.lau@lexiwave.com

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Hong Kong Productivity Council
香港生產力促進局

# Enrolment Form 報名表

1. Course 課程 Radio Frequency (RF) Printed Circuit Board Design for Wireless Telecommunication Products

   Course Fee 學費 ☐ HK$1,100 (Normal) / ☐ HK$990 (Early Bird)

   Duration 日期 5 July 2008 (Sat) Course Code 課程編號 40085210

2. Name (English) (Mr/Mrs/Ms*) 姓名 (中文) (先生/女士/小姐*)

   Mobile / Pager 手提 / 傳呼機 _____ E-mail Address 電郵地址 _____

3. Organization (English) _____ 公司名稱 (中文) _____

   Position 職位 _____

   Mailing Address 通訊地址 _____

   Tel 電話 (Day 日間) _____ (Night 晚間) _____ Fax 傳真 _____

4. **Payment Method** 付款方法

**(A) By Credit Card (No.):** _____ — _____ — _____ — _____ Expiry Date 有效日期____ (yy)____ (mm)

**Please debit my credit card A/C for HK$** _____ **Name of Cardholder** _____ ☐ VISA ☐ MASTER

**Signature** _____ **Date** _____

(B) Enclosed is my cheque of HK$_____. Cheque No._____. **(The cheque has to be crossed and made payable to the "Hong Kong Productivity Council.")**

** For cheque payment, please send the cheque for the appropriate fee with this completed form to Productivity Training Institute, 3/F., Hong Kong Productivity Council, HKPC Building, 78 Tat Chee Avenue, Kowloon Tong, Kowloon (Attn: Ms. Catherine Lam)

** For reservation (if applicable), please fax the completed form to (852) 2788 5567.

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**IMPORTANT NOTE 注意:** 21.9.07

**1.** Course fee must accompany this form (or its photocopy), otherwise enrolment may be rejected.
報名表(可用影印本)必須連同學費一併繳交，否則報名可能無效。

**2.** HKPC has adopted a Personal Data (Privacy) Policy. Information about the policy is available at HKPC enrolment counters for collection. You may also contact our Personal Data Controlling Officer for further details.
本局已實施個人資料(私隱)政策，有關資料單張可於報名處索閱，或閣下可與本局個人資料管理主任查詢。

**3.** Applicants are encouraged to pay by credit cards, EPS or cheques, if possible. Amount received will be imprinted. Cheques are subject to bank clearance.
本局建議申請者以信用咭、易辦事或支票繳交學費。學費收據以本局機印方爲有效，支票收妥作實。

**4.** Enrolment fee is not refundable unless HKPC is notified in writing of your withdrawal **at least** 5 working days before the course commences. A handling charge of HK$200 will also be levied.
除非本局於課程開始前最少五個工作日收到申請者書面通知退學，否則已繳學費概不退還。申請者申請退還學費需繳交手續費二百元正。

**5.** An applicant may, subject to approval from HKPC, nominate a person to attend the course on his/her behalf.
申請者可提名他人代替其本人出席課程，惟事先須得本局同意。

**6.** HKPC reserves the right to reject any application in any circumstances and for whatever reasons. Payment of fees should only be construed as conditional acceptance of application.
香港生產力促進局保留在任何情況下及以任何原因拒絕任何入學申請的權利。申請者繳付學費後，仍須符合入學的所有條件，其申請方可獲得接納。

**7.** HKPC reserves the right to change the contents, venue and / or time as necessary.
香港生產力促進局保留在任何情況下更改課程內容、授課地點、日期及時間的權利。

**8.** Classes in the morning, afternoon or evening will be cancelled if typhoon signal No. 8 or above OR black rainstorm warning is still hoisted after (or is announced by the Hong Kong Observatory to be hoisted at/after) 6:00 a.m., 11:00 a.m. and 4:00 p.m. respectively. Participants will be notified when the class will be made up as soon as possible.
颱風及黑雨警告：如課堂時間是在早上(9:00-12:00)、下午(2:00-5:00)或晚間(6:30-9:00)，將在下列情況下取消：(一)八號或以上颱風訊號或黑色暴雨警告訊號在早上 6:00、11:00 或下午 4:00 仍然懸掛；或(二)香港天文台在早上 6:00、11:00 或下午 4:00 或之後，宣佈將懸掛八號或以上颱風訊號或黑色暴雨警告訊號。本局將盡早通知學員補課的日期及時間。