

**DESIGNING A PHASE-LOCKED LOOP FOR A WEATHER SATELLITE  
IMAGE RECEIVER**

**This thesis is presented in partial fulfillment for the award of the  
Bachelor of Electrical Engineering ( Hons)**

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## ABSTRACT

This thesis presents design of a phase-locked loop (PLL) at operating frequencies from 46 MHz to 48 MHz for a weather satellite image receiver. The main objective of the designed PLL is to assist the receiver system to track a radio frequency (RF) signal transmitted from the National Oceanic and Atmospheric Administration (NOAA) satellite which has been down-converted to frequency modulation (FM) frequency 90.7 MHz. The PLL is part of a low cost ground receiving system for Automatic Picture Transmission (APT) image reception. The PLL software was designed and compiled using CCS C compiler and used Peripheral Interface Controller 16F84A (PIC16F84A) as the microcontroller while the PLL hardware was designed and then fabricated on a printed circuit board (PCB) using Protel DXP 2004. The PCB design layout for the PLL was also constructed by using Protel DXP 2004. For the practical testing of the PLL a 12V DC supply, a 9V DC supply and a spectrum analyzer are used to verify the functionality of the designed PLL. From the measurement, the PLL is recorded to operate at the desired frequencies.

## TABLE OF CONTENT

CHAPTER	LIST OF TITLE	PAGE
	DECLARATION	I
	ACKNOWLEDGEMENT	II
	ABSTRACT	III
	TABLE OF CONTENT	IV
	LIST OF FIGURE	VII
	LIST OF TABLE	IX
	LIST OF ABBREVIATION	X
<b>1.0</b>	<b>INTRODUCTION</b>	
	1.1 INTRODUCTION	1
	1.2 PROBLEM STATEMENT	2
	1.3 PROJECT OBJECTIVE	3
	1.4 SCOPE OF WORK	3
	1.5 THESIS ORGANIZATION	4
<b>2.0</b>	<b>LITERATUR REVIEW</b>	
	2.1 INTRODUCTION	5
	2.2 SYSTEM OVERVIEW	5
	2.2.1 Weather Satellite Image Receiver System	6
	2.3 PHASE-LOCKED LOOP (PLL)	8
	2.3.1 Voltage-Controlled Oscillator (VCO)	9
	2.3.2 Phase Detector / Phase Comparator	10
	2.3.3 Crystal Oscillator	11
	2.3.4 Loop Filter	12
	2.4 AUTOMATIC PICTURE TRANSMISSION UNIT (APT)	13

2.4.1	Structure	13
2.4.2	Images	13
2.4.3	Receiving Images	13
2.4.4	APT Image	15
2.5	FREQUENCY SPECTRUM	16
2.5.1	VERY HIGH FREQUENCY (VHF)	17
2.6	FREQUENCY MODULATION (FM)	17
2.7	NATIONAL OCEANIC AND ATMOSPHERIC AND ADMINISTRATION (NOAA)	18
2.8	PROTEL DXP	20
2.9	CCS C COMPILER	20
2.10	PERIPHERAL INTERFACE CONTROLLER (PIC)	21
2.10.1	Core architecture	22
2.10.2	Limitations	23
2.12	INDUCTOR/CAPACITOR/RESISTOR METER (LCR METER)	26
2.13	SPECTRUM ANALYZER	27
2.14	CAPACITORS	28
2.15	TRIMMER CAPACITORS	29
2.16	VARACTOR DIODE	30
2.17	INDUCTORS	31
2.18	TRANSISTOR	33
2.19	SURFACE MOUNT TECHNOLOGY	34
2.19.1	Main Advantages	35
2.19.2	Main Disadvantages	36
<b>3.0</b>	<b>METHODOLOGY</b>	
3.1	INTRODUCTION	37
3.2	PROCESS FLOW	37
3.3	SOFTWARE DEVELOPMENT	40
3.4	HARDWARE DEVELOPMENT	43