

GREEN CHIPS

THE TECH. THAT MADE WORLD SMALLER

*Submitted in partial fulfilment of the requirements for the award of
degree of*

Bachelor of Technology

In

Electronics and Communication Engineering

by

KARTHIK M.B

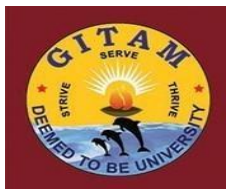
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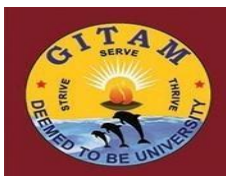
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Department of Electronics and Communication Engineering

**GITAM School of Technology GITAM Deemed University
Hyderabad Campus**

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CERTIFICATE

This is to certify that the Technical Seminar work entitled "**GREEN CHIPS**" being submitted by '**KARTHIK M.B**' (PIN No: **2210416132**) for partial fulfilment of the requirement for the award of **Bachelor of Technology in Electronics and Communication Engineering** to GITAM School of Technology, GITAM Deemed University, Hyderabad campus during the academic year 2018 - 2019 is a record of Bonafide piece of work, undertaken by him/her the supervision of the undersigned.

DECLARATION

We submit the Technical Seminar Report entitled "**GREEN CHIPS**" to GITAM School of Technology, Hyderabad in partial fulfilment of the requirements for the award of the degree of **Bachelor of Technology** in "**Electronics and Communication Engineering**". We declare that it was carried out independently by us under the guidance of (Mr. Masood Ahmed), Assistant Professor, GITAM Hyderabad, India.

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ABSTRACT

In microchip design, as in life, small things sometimes add up to big things. Dream up a clever microcircuit, get it sculpted in a sliver of silicon, and your little creation may unleash a technological revolution. It happened with the Intel 8088 microprocessor and the Mostek MK4096 4-kilobit DRAM and the Texas Instruments TMS32010 digital signal processor. Among the many great chips that have emerged from fabs during the half-century reign of the integrated circuit, a small group stands out. Their designs proved so cutting-edge, so out of the box, so ahead of their time, that we are left groping for more technology clichés to describe them. Suffice it to say that they gave us the technology that made our brief, otherwise tedious existence in this universe worth living.

I've compiled here few ICs that we think deserve the best spot on the mantelpiece of the house that Jack Kilby and Robert Noyce built. Some have become enduring objects of worship among the chiperati: the Signetics 555 timer, for example. Others, such as the Fairchild 741 operational amplifier, became textbook design examples. Some, like Microchip Technology's PIC microcontrollers, have sold billions, and are still doing so. A precious few, like Toshiba's flash memory, created whole new markets. And one, at least, became a geeky reference in popular culture. What these chips have in common is that they're part of the reason why engineers don't get out enough.

ACKNOWLEDGEMENT

I would also like to thank my parents and friends who helped me a lot in finalizing this project within the limited time frame

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TABLE OF CONTENT	Pg. NO.
INTRODUCTION.....	8
HISTORY.....	8
LIST OF LINEAR INTEGRATED CIRCUITS	9
SIGNETICS NE555 TIMER (1971)	10
TEXAS INSTRUMENTS TMC0281 (1978)	11
MOS TECHNALOGY 6502 MICROPROCESSOR	11
TMS32010 DIGITAL SIGNAL PROCESSOR	11
PIC 16C84 MICROCONTROLLER	12
MA741 OP-AMP	12
ICL8038 WAVEFORM GENERATOR	12

REFERENCE	13
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INTRODUCTION

There are many definitions for integrated circuits, one from Wikipedia says, ‘an integrated circuit or monolithic integrated circuit is a set of electronics circuits on one small flat piece of semiconductor material that is normally silicon’. You can see these IC’s in day to day life in various examples like, television, mobile phones, smart watches, computers, electronic gadgets, rockets, etc., which had changed the standard of living of a human being. Within my research, an IC acts as a brain as for humans. It considers each input provided to it, any feedback generated and provides an output. Behind every circuit an IC plays a major role, so here in this report I shall discuss few IC’s that played a game changing tasks in the electronic field.

HISTORY

Early developments of the integrated circuit go back to 1949, when German engineer Werner Jacobi (Siemens AG) filed a patent for an integrated-circuit-like semiconductor amplifying device showing five transistors on a common substrate in a 3-stage amplifier arrangement. Jacobi disclosed small and cheap hearing aids as typical industrial applications of his patent.

The idea of the integrated circuit was conceived by Geoffrey Dummer (1909–2002), a radar scientist working for the Royal Radar Establishment of the British Ministry of Defence. Dummer presented the idea to the public at the Symposium on Progress in Quality Electronic Components in Washington, D.C. on 7 May 1952. He gave many symposia publicly to propagate his ideas and unsuccessfully attempted to build such a circuit in 1956.

Kilby recorded his initial ideas concerning the integrated circuit in July 1958, successfully demonstrating the first working integrated example on 12 September 1958. In his patent application of 6 February 1959, Kilby described

his new device as "a body of semiconductor material ... wherein all the components of the electronic circuit are completely integrated." The first customer for the new invention was the US Air Force.

LIST OF LINEAR INTEGRATED CIRCUITS

Part number	Description
555 timer IC	Timer, pulse generation, and oscillator applications.
78xx	Family of self-contained fixed linear voltage regulator integrated circuits.
Current conveyor	Electronic amplifier with unity gain. Three versions of generations of the idealised device, CCI, CCII and CCIII. ^[2]
Low-dropout regulator (LDO)	DC linear voltage regulator that can regulate the output voltage even when the supply voltage is very close to the output voltage. ^[3]
Hitachi HA12043	CX noise reduction system for phonograph records in the 1980s.
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MK484	Fully functional AM radio detector on a chip. Constructed in a TO-92 case. ^{[4][5]}
NE612	Oscillator and a mixer. Used in ham radio applications. ^[6]
Operational amplifier	DC-coupled high-gain electronic voltage amplifier with a differential input and, usually, a single-ended output. ^[7]
Telefunken U401B	High quality High Com analogue compander for audio in the 1970s.
Telefunken U401BG	High quality High Com analogue compander for audio in the 1970s.
Telefunken U401BR	High quality High Com analogue compander for audio in the 1970s/1980s.
Telefunken U2141B	CX noise reduction system for phonograph records in the 1980s.
ZN414	Single-chip AM radio integrated circuit from 1972.
LM317	Adjustable 1.5 A positive voltage regulator (1.25 V-37 V) ^[8]

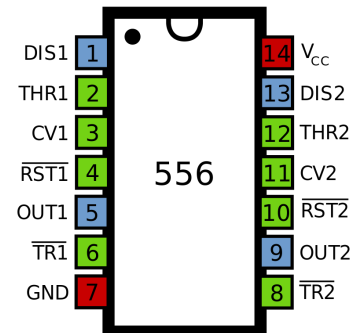
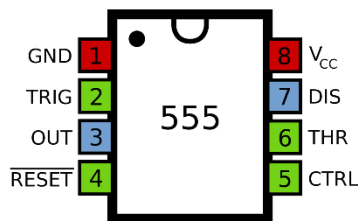
Source: wiki

SIGNETICS NE555 TIMER (1971)

It was the summer of 1970 and chip designer Hans Camenzind could tell you a thing or two about Chinese restaurants: His small office was squeezed between two of them in downtown Sunnyvale, Calif. Camenzind was working as a consultant to Signetics, a local semiconductor firm.

And so he did, One of the greatest chips of all time, in fact. The 555 was a simple IC that could function as a timer or an oscillator. It would become a best seller in analog semiconductors, winding up in kitchen appliances, toys, spacecraft, and a few thousand other things.

The idea for the 555 came to him when he was working on a kind of system called a phase-locked loop. With some modifications, the circuit could work as a simple timer: You'd trigger it and it would run for a certain period. Simple as it may sound, there was nothing like that around.



Modes

Astable (free-running)

Uses include LED
and lamp flashers

Monostable

Applications include
timers, missing pulse
detection

Bistable (schmitt trigger)

Uses include
bounce-free latched
switches.

Fig: 555 timer with 8 pins, Modes of timer, 555 timer with 14 pin package.

TEXAS INSTRUMENTS TMC0281 SPEECH SYNTHESIZER (1978)

If it weren't for the TMC0281, E.T. would've never been able to "phone home." That's because the TMC0281, the first single-chip speech synthesizer, was the heart of Texas Instruments' Speak & Spell learning toy. In the Steven Spielberg movie, the flat-headed alien uses it to build his interplanetary communicator.

The TMC0281 conveyed voice using a technique called linear predictive coding; the sound came out as a combination of buzzing, hissing, and popping. It was a surprising solution for something deemed "impossible to do in an integrated circuit," said by Gene A.

MOS TECHNOLOGY 6502 MICROPROCESSOR (1975)

This was a 8-bit microprocessor. Designed by a team led by Chuck Peddle for MOS technology. This was introduced in 1975. Most of its uses was seen in video game consoles and computers, such as the Atari 2600, Atari 8-bit family, Apple II.

TEXAS INSTRUMENTS TMS32010 DIGITAL SIGNAL PROCESSOR (1983)

This was introduced in April 8, 1983. the processor had different variants, like fixed point arithmetic and floating-point arithmetic. It is made up of Harvard architecture. In this analog signal is processed using a analog to digital converter, a digital signal processor, and a digital to analog converter. The processor is accomplished by using the following basic concepts:

- 1) Harvard architecture
- 2) Extensive pipelining
- 3) Dedicated Harvard multiplier
- 4) Special DSP instructions

5)Fast instruction cycle

MICROCHIP TECHNOLOGY PIC 16C84 MICROCONTROLLER (1993)

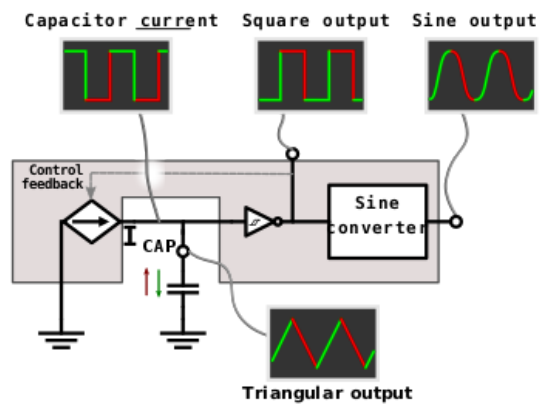
The microcontroller is a reprogrammable eeprom based on 8-bit architecture. It has an operating voltage of 2 to 6 volts. It is based on Harvard architecture. This is a RISC based instruction set. The microcontroller is more powerful than previous versions, flexible, cheaper, and pin compatible PIC's.

FAIRCHILD SEMICONDUCTOR MA741 OP-AMP (1968)

741 Op amp is one of the most successful operational amplifiers. It was invented by Karl D. Swartzel Jr. in 1967. This op amp operates in two modes namely, inverting mode and non-inverting mode. Most of its applications involve electronic circuit design, voltage comparator, non-inverting amplifier, analog to digital converter, DAC's, voltage clamping, oscillators, clipper.

INTERSIL ICL8038 WAVEFORM GENERATOR (1983)

This is 14 pin IC. It has a low frequency drift with temperature 250ppm/C, low distortion of 1% (sine wave output), high linearity of 0.1% (triangle wave output, wide frequency range of 0.001hz to 3000khz, variable duty cycle of 2%to 98% high level outputs of TTL to 28%. It is easy to use. Applications of include sine wave output buffer amplifier, variable audio oscillator, linear voltage-controlled oscillator, VCO in phase locked loop.



RESOURCES

https://en.wikipedia.org/wiki/Integrated_circuit

https://en.wikipedia.org/wiki/555_timer_IC

[google images](#)

