

THE SPREADING CODE SIGNAL TRANSFER IMPLEMENTATIONS FOR CODE DIVISION MULTIPLE ACCESS

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Abstract

In the frame of reference of high-performance on-chip networking (NOCs), the CDMA had implemented. The new standard encoding/decoding process has been suggesting the cost and productivity of CDMA Network On-Chip in locations, power assumption, and network performance. The decrement of 30-5 percent in encoding/decoding phenomena relates to Walsh's (WB) code method and can save up to 81.24 percent region and 67.46 percent power. Using our coding/decoding process can benefit up to 22.91 percent of 20.25 percent, 103.26 percent respectively region saving, and power-saving output increment compared with the CDMA NOC WB. The theme of our work is to connect to a standard CDMA transport by implementing CDMA overloading practices to increase the quality of the transportation [1].

Index Terms CDMA, TDMA, NOC, Walsh Code, Standard Code, NETWORK ON CHIP, Point to Point Protocol, Optical CDMA.T and Sprint mobiles, IS 95 devices.

1.INTRODUCTION

The Operators who provide CDMA service in India are Reliance and Tata Indicom. The method for transmitting simultaneous signals over a shared serving of the spectrum is called code multiplexing. There is no Subscriber Identity Module (SIM) card which unlike in the GSM. This technology developed during World War II by English allies to guard their wireless broadcasts from blocking. When the war ended, Qualcomm patented this technology and made it commercially prevailing. The first CDMA system was tossed in September 1995 in Hong Kong by Hutchison Telephone Co.ng [2].

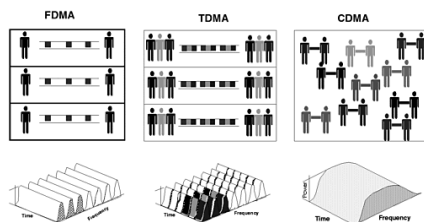


Fig1: The FDMA, TDMA and CDMA correlation

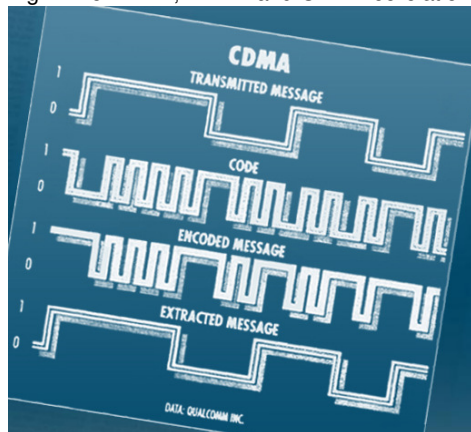


Fig2: Network On-Chip CDMA Signal Generation

The fig1 and fig2 above illustrates how the signal of each consumer is encrypted and decoded.

1.A pseudo-random code was induced and the data modulates the pseudo-random codes then a carrier signal gets modulated.

2.The modulated carrier signal is amplified and spread [5].

2. The OverloadCDMA Interconnect: Existed Method:

The principal contrast between the overburden and traditional CDMA switches is that $M > N - 1$ because of channel over-burdening. Every Development Division is allied with two system interfaces (NICs), transmit and get NI modules.

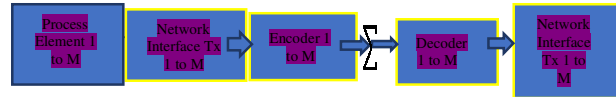


Fig2: Encode/decode of Overload OCI CDMA

To avoid using parallel exchange lines and point-to-point (PTP) transport method, a thoughtful methodology from TDMA mediators, overhead CDMA-based fringe transport has been introduced.

The switch consents the CDMA codes to transmit and gets Network Interface media. They don't subsidize for MAI (Multiple Access Interference) to the CDMA channel collective. But we have to design a original and unique code for it[4].

3.Proposed Method: Network on Chip (NOC) CDMA Interconnect

The 64-bit Walsh codes are used to encode the signal for differentiation between IS-95 devices.The CDMA utilizes particular coding and spectrum expertise and a scheme to simplify this without any unwanted stoppage between customers.

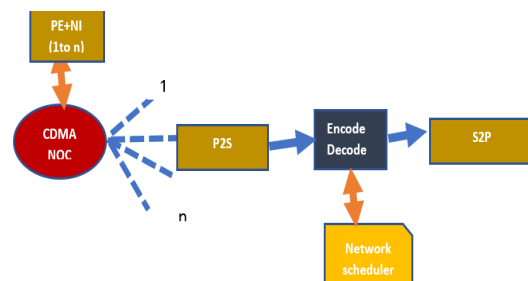


Fig3: Network On-Chip CDMA Signal Generation

Encode Operation

- The initial database will accumulate with a Standard code XOR operation.

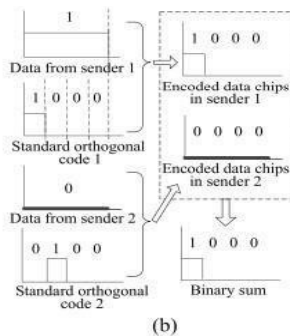
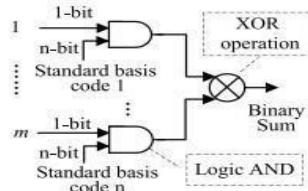


Fig 4(a):The Standard base Encode method

- The encrypted information will combine with different senders with an XOR process.
- An initial data sender bit is chip by chip fed into an AND gate and transmitted with a standard orthogonal coding over n-chip encoded data.
- When the binary sum signal reaches the recipient, the binary sum and orthogonal message would be chip by chip AND service, and then the resulting Chips are sent to a builder.

Decode Operation

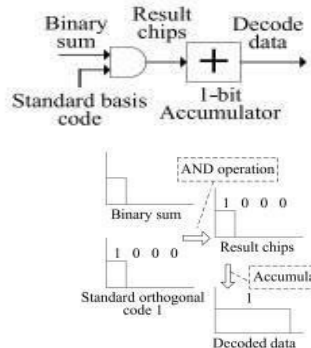


Fig4(a): The Gate level Standard Base decode method

Fig4(b): Decode Operation

- In the Figures 4(a)& 4(b), the accumulator output value is the corresponding original data when result chips are accumulated.
- When the binary sum signal reaches the recipient, binary sum and orthogonal will be Decode by AND operation.

4.Verilog Source code for Gate level implementation

The Verilog includes some claims that are not equivalent to real hardware consist of a \$display that might not execute in several languages. The following examples are the classical language sub-set with fast mapping to the original logic gates. The source codes are vital to interpreting the gate level implementation of CDMA Chip [6].

AD-flop variant of an asynchronous reset must be accountable for a reset state in the event of a clause in the declaration.

```

Wire: out;
Assign out: sel? a: b;
Reg: out;
always@ (a or b or sel)
begin case sel;
1'b0 out = b;1'b1
Out=a;
endcase;
end;
    
```

Race Around Condition:

If a program depending on threads that run in unpredictable scenarios, a race condition may occur. A simple example is a logic gate that handles Boolean values of the equation [6].

```

initial
a=0;
initial
    
```

```
b=a;
initial
begin
#1;
$display (“value %b value of b= %b, b, a);
end;
```

5.SynchronousCDMA Network on Chip Decode Message

The SynchronousCDMA Digital representation of Data Vector Strings such as ‘0’s and ‘1’ s.

- Illustration for Suppose sender zero code and data= (1, -1) and (1,0,11) [0->’-1’] Sender 0 information=(1, -1) □(1, -1,1,1) = (1, -1, -1, 1, 1, -1, 1, -1) and Sender 1 encoded data is= (-1, -1, -1, -1, 1, 1, 1, 1).
- Because of the sender zero information and sender, one is information transmitted with a certain period of a time into the air then raw signal generated. (1, -1, -1, 1, 1, -1, 1, -1) + (-1, -1, -1, -1, 1, 1, 1, 1) = (0, -2, -2,0,2,0,2,0) [4].

6.Summary of Design

Timing Constraint details

Path analysis Number of total

pathways /Destination Ports:35/8

Delay =>7.4ns (Logic Level=2)

Source b(PAD)

Destination: out <4> (PAD)

Data Path: b to out<4> [7]

7.CDMA Signal toInterference Ratio (SIR)

In IS-95 and conventional CDMA systems, the near-far problem was mitigated by controlling the output power of the mobile units with a tight feedback loop so that the users' signals all arrive at the base station with approximately the same power consumption, which results in a consistent quality of service as each user experiences an approximate Signal to Interference Ratio (SIR). The program depends on the timing of one or more processes to function correctly[8].

7.1 Equations

The processing gain of is calculated as follows:

$$10 \cdot \log_{10} 128 = 21 \text{db} \quad (1)$$

Generally, the CDMA bus bandwidth BW

is given by the following equation:

$$A = \left(\frac{N \text{bits } f_b}{n} MR \right)^{nt} \quad (2)$$

Where “N” bits are the number of interconnected bits per IP core (data bus width), f_b is the bus frequency, and R is the number of replicas of the bus adder [5].

BUS sum = $\sum_{j=1}^{N-1} (-1)^j d_c(j) C_0(j) + 2 \sum_{j=N+1}^{N-1} d_T(j) \cdot T(j - N + 1) +$

$$\sum_{j=N+1}^{2N-1} d_T(j) \cdot T(j - N + 1)$$

$$\text{corrdec}(k) = (-1)^k d_C \frac{(j)N}{2}$$

$$+ C_0(k) \cdot C_n(dT) = \sum_{j=1}^{N-1} (-1)^j d_c(j) C_0(j)$$

$$+ \sum_{j=N+1}^{2N-1} d_T(j) \cdot T(j - N + 1)$$

$$S = \sum_{j=1}^{N-1} (-1)^j d_c(j) C_0(j) + \sum_{j=N+1}^{2N-1} d_T(j) \cdot T(j - N + 1) \quad (3)$$

Where S is the N cycle waveform of CDMA channel

$d_c(j)$ is the symmetrical CDMA information bit sent by the J_{th} client?

$d_T(j)$ is the non symmetrical TDMA information bit sent by the J_{th} client

$C_0(j)$ is the symmetrical code allocated to the J_{th} client

T (j-N +1) is the TDMA code appointed to the J_{th} client.

7.2. Mobile Technology pertaining different radio Technologies

The CDMA allows several users to share a band of frequencies without undue interference between the users. The CDMA is used as an access method in many mobile phone standards [9].

S.No	Type	Technology	Application
01	GSM	TDMA Wireless	Electronic Gadgets
02	Bandwidth	Bits Per Sec: kilo/Mega/Giga	
03	Broadband	Multi Frequencies	For Transmit information
04	Edge	GSM Wireless Service	Multimedia
05	GTPRS	Packet Wireless Communication	Mobile and Computers
06	LTE	UMTS(3Network),	4G network also.

Table 1. Mobile Technology pertaining different radio Technologies

7.3 Performance

The developed 741 crossbars are evaluated for different spreading code lengths 742 $N = \{8, 16, 32, 64\}$.

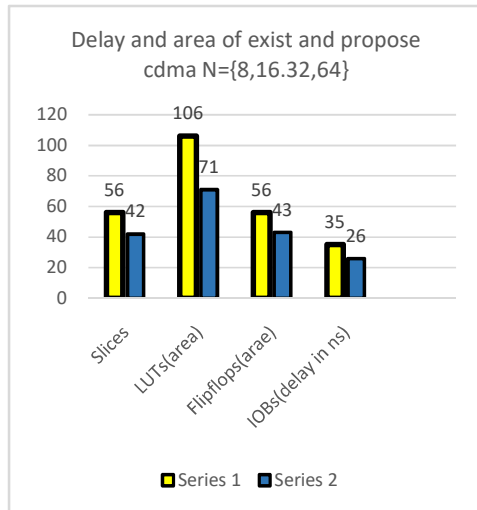


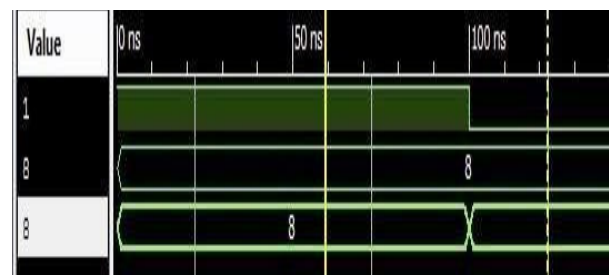
Figure 5: Delay and area Performance
 To build a fair comparison between 742 different crossbar designs with various numbers of ports, 748 all utilization metrics are minimizing to the amount of crossbar 740 ports M. The evaluation results, including the resource 744 utilization represented in the number of lookup tables (LUTs) and 740 FFs per port, maximum crossbar frequency, dynamic power 746 using per port, and crossbar bandwidth.

7.4 Simulated Result

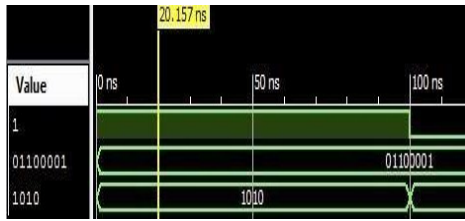
The CDMA bus ratio of $M a = 1, b = 0$ for both the conventional and TOCI buses for the P-OCI bus, $R = N$. Therefore, the P-OCI bus allows $2N$ times the bandwidth of the existed method. CDMA bus at the expense of the supply utilization [5]. From the Walsh Base method of decoding, the Walsh chip value will obtain an increment by utilizing the comparator for the output of multibit quantities as a positive component or negatively. The original details are 1, whether the chip value is better than the negative value.



(a)



(b)



(c)

8. Advantages and Applications

Since the information conveyed is beneath the noise floor, the CDMA range is challenging to different scenario strategies. The CDMA language used in the traffic channel is challenging for hackers to decode.

- It has the adaptable designation of assets.
- It has Low force prerequisite has increment proficiency because it can serve more clients.
- It has high voice quality same as assigned quality.
- It Works with a very extreme low force level.
- The CDMA doesn't need any synchronization [11].

8.2 Applications

An arrayed waveguide grating in CDMA: Arrayed waveguide gratings (AWG) commonly used as optical demultiplexers in wavelength division multiplexed (WDM) systems. The devices have the capacity of multiplexing many wavelengths into a single optical fiber and augments the transmission capacity of optical networks considerably.

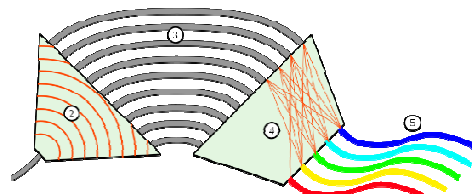


Fig7: The waveguide grating Patterns of Wavelength

The signal will communicate with the device via an optical fiber (1) connected to the input port. Light diffracting out of the input waveguide at the coupler/slab interface propagates through the free-space region

Fig6(a), (b), (c), (d) Standard and Walsh encode, decode outputs

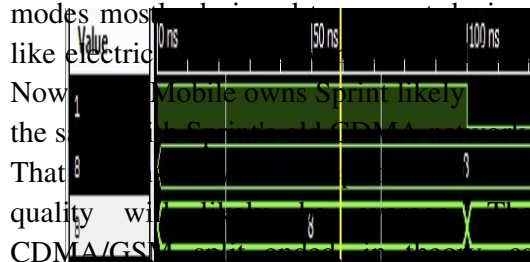
d illuminates the grating with a Gaussian distribution. Each wavelength of light coupled to the grating waveguides (3) undergoes a constant change of phase.

9. Conclusion

The nonpathological spreading codes and pipeline architectures have been configuring for each crossbar version the output of the OCI corresponds to the normal crossbar of CDMA. The T-OCI crossbar decreased dynamic strength by 45% compared to 133% for the P-OCI crossbar. The transverse On-Chip Interconnect (OCI) requires 31 percent less energy than the standard CDMA transverse bar, whereas the P-OCI crossbar consumes 400% more capacity. The OCI cross-balance of a NOC has been explaining by the theoretical and experimental review of a fully functioning OCI-based NOC.

10. Future Scope

In 2021, AT&T and T-Mobile will keep their 3G networks in very low-bandwidth modes most like electric Now Mobile owns Sprint likely the s That quality wi CDMA/GSM carriers all switched to LTE, a single,



global 4G standard, starting in 2010. But the difference remained because phones still needed to access the older 2G and 3G networks, primarily for voice calls [11]



Fig8: T-Mobile and Sprint SIM card

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The sprint and T-mobiles in 4G-LTE technologies.