Mega Cell

Technical Manual – Overview

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1. General Description

1.1 System Overview

Mega Cell^{TM} – A high speed, stand-alone overlay system that provides immediate access capabilities without requirements for any infrastructure alterations. It leapfrogs CDPD technology with a data rate capacity one thousand times faster than current systems. TelesciCOM's breakthrough technology is designed to transmit broadband wireless data with utmost reliability in cluttered or hostile RF environments, thus permitting the establishment of reliable data services in unlicensed bands (ISM).

Mega Cell^{TM} is an application derived from the TelesciCOM invented and tested wireless data transmission platform, based on Advanced CDMA (ACDMA), which is capable of very high speed (2Mbit/s and above), Point-to-Point, bi-directional, data transmission.

Mega Cell^{TM} supports all Ethernet 10-Base-T applications by being fully compatible with the IEEE 802.3 standard. In addition to being a highly versatile system, it is, as well, extraordinarily robust, and a highly spectrum efficient system.

Mega Cell^{TM} is a stand-alone overlay system that can be installed and maintained with great simplicity. It is, by design, independent of its operational characteristics and limitations.

1.2 System Features

General

The ***Mega-Cell***^{TM} system is composed of two main subsystems:

- ***CPE*** (Customer Premises Equipment) Master.
- ***CPE*** Slave.

The ***CPE*** is a stand-alone subscriber unit, installed on the customer's premises. The unit connects to the 110V/220V supply and with an Ethernet 10-Base T wire to the customer's PC/HUB/LAN and can support up to 50 Ethernet User's.

General Features

An ACDMA (Advanced CDMA) System:

- **Very High Data Rates**- Leapfrogging CDPD Technology.
- **Extraordinarily Robust**- Operates Totally Reliably in Unlicensed Bands.
- **Quality Transmission in Hostile RF**

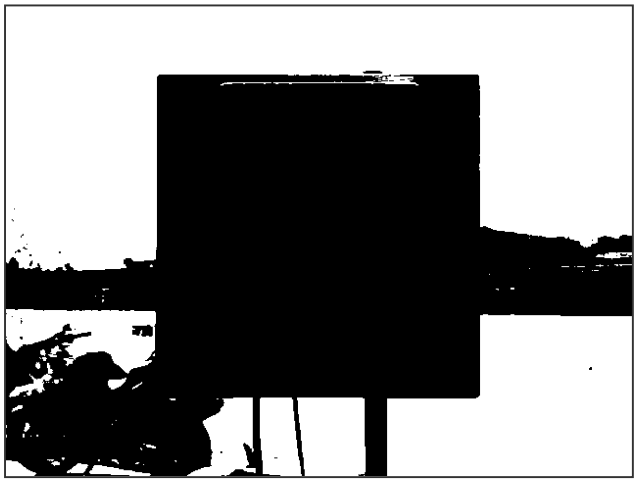


Figure 1.1 - *CPE*

Environments.

- **Requires no Alterations to Existing Infrastructure.**
- **RF at 2.4Ghz**

Economical in Size, Easy to Install and Maintain

Customer Premises Equipment (CPE) Connect to 110/220V Supply.

CPE Connects with an Ethernet 10-Base T Wire to the PC/LAN/HUB.

Silicone Enhanced System; Non-Complex Mechanically or Electronically.

User Friendly Network Management System

Application Support:

Can be Applied Simultaneously to Business and Residential Needs.

Supports ALL Ethernet, Intranet and Internet Applications.

Can Create Virtual Private Regional Networks and Nationwide Network.

Full Motion Ethernet and Internet Video-Conferencing Capabilities

Novel IPX, Windows NT (work-at-home applications), Voice-over Internet (Such as Vocaltech etc.)

Web surfing (Including Microsoft Explorer, Netscape, Chameleon, etc.).

FTP & E-Mail.

2. System Characteristics

General

System Data Rate -
2 Mb/sec; (10 Mb/sec second generation).

Access Method –
ACDMA/TDD (Proprietary Code)
Statistical Multiplexed Data.

Protocols - TCP/IP, Ethernet 802.3
Proprietary Common Air Interface.

Operating Frequencies -2.411GHz – 2.472Ghz (ISM band).
Frequency Capability Per Customer Requirements

Modulation – 4 level ACDMA, Phase and Amplitude.

Adjacent Channel Rejection -
Minimum 35dB spread

Modulation Accuracy -
0.35 Vector Magnitude

Interface -
PC/LAN Connection: Ethernet 10-Base-T RJ-45 Plug, Ethernet IEEE 802.3 Compatible.

Power -
Input AC: 110/220V 50/60 HZ.
AC Power Consumption: 15 Watts.

RF -
RF Power Output: +20 dBm.
Reception Sensitivity: -90dBm@BER 10^{-5}@.0.5Mb/sec

Dimensions - 30 cm X 30 cm X 10 cm

Network Management system

Performance Monitoring.

Security Management.

Administration Management.

Fault Location Management.

Configuration Management.

Data Rate Management.

Available Bit Rate Management (ABR).

Constant Bit Rate Management (CBR).

CIR (Committed Information Rate).

HP Open View (Optional).

SNMP (Optional).

3. CPE Description

3.1 General Description

Both ends elements CPE Master and CPE Slave consist of the same components. They are distinguished only by the firmware that determines which CPE is a Master CPE and which is a Slave CPE. The Master CPE determines whether the CPE Slave can transmit or not. The CPE interface is 1 IEEE 802.3 and it can connect to any type of HUB for supporting up to 50 users or one IEEE 802.3 users according to a typical configuration (See Chapter 1).

Figure 3.1 – CPE

3.2 CPE Block Diagram

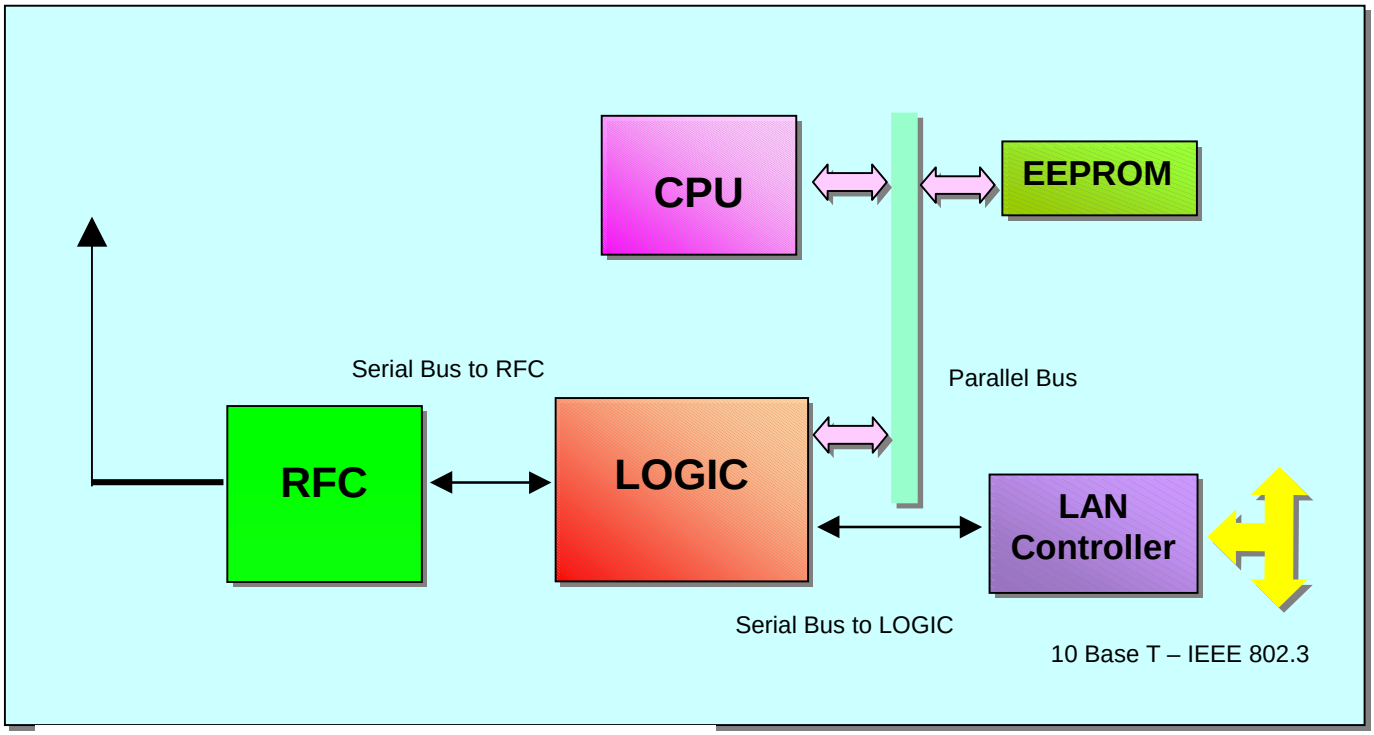


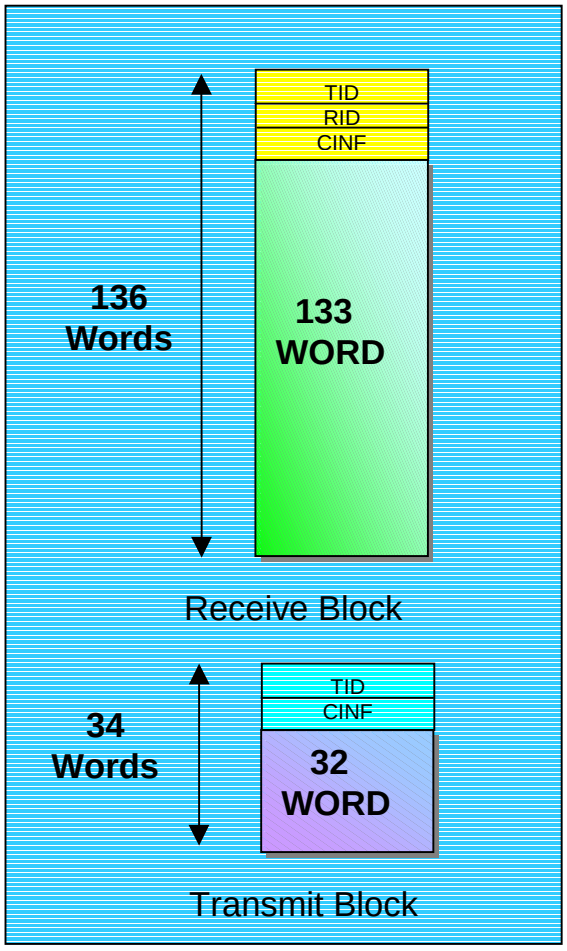
Figure 3.2 – CPE General Block Diagram

The CPE takes the Ethernet packets and converts the data to word format, 15 bits if it is not using code error correction; or 11 bits if using code error correction. The determination if the word is a 15-bit word or an 11-bit word is made by the CPE Master; or by the Slave when it detects low-quality link performances.
In the transmitting direction the CPE Slave composes 32 words of data coming from the LAN connection and adds OH (Overhead) that contains the following information:
TID (Transmit ID) - the ID of the CPE Slave that sends the block to the CPE Master.
CINF (Code Information) – this word indicates data about the code-for-error-correction.
The data indicates:

- Whether the transmitted block is with code-for-error-correction (32 words of 11 bits) or not (32 words of 15 bits).
- A Code request – the CPE Slave informs the CPE Master to send the next block with code-for-error-correction.
- A Blank Block Indication – indicates whether the block empty or not.

After adding OH words the LOGIC block interleaves the data blocks and transfers them to the RFC for transmitting to the CPE Master.

In the reception direction, the CPE Slave interprets the transmitted blocks from the CPE Master and waits to determine the CPE Slave's address in the RID word in the OH words contained in the incoming



block. If the CPE Slave recognizes that the CPE Master requests it to send data, the LOGIC block removes the OH words and transfers the 133 data words to the LAN connection.

The OH information is composed of:
TID (Transmit ID) - the ID of the CPE Master that sends the block to the CPE Slave.
RID (Receive ID) - the ID of the CPE Slave that must be transmitted after the CPE Master has finished the transmission.
CINF (Code Information) – this word indicates the code-for-error-correction.

The data indicates:

- Whether the transmitted block is with code-for-error-correction (133 words of 11 bits) or not (133 words of 15 bits).

- A Code request – the CPE Master requests the CPE Slave to send the next block with code-for-error-correction.

Please note: if the CPE Master requests the CPE Slave to send data and the CPE Slave does not have data from the LAN connection to send to the CPE Master, the CPE Slave sends an empty block and sets the bit in the CINF word that indicates an empty block.

The CPE unit is composed of 6 blocks:

CPU – The CPU block loads the firmware to the LOGIC block and to the RFC block.

EEPORM – Flash bank that contains the firmware for the LOGIC and RFC block.

LOGIC – The LOGIC Block is the main block of the CPE.
This block is responsible for collecting the data (word) from the LAN Controller and transferring it to the RFC and vice versa. The Logic block monitors the incoming data to determine when to send it to the CPE Master.

LAN Controller – The LAN Controller block is the IEEE 802.3 interface that determines and processes the LAN data.

RFC – The RFC is a Direct Sequence Spread Spectrum Wireless Transceiver card. This subsystem is responsible for transmitting data to the Master CPE and receiving data from the Master CPE. The RFC receives the data for transmitting from the LOGIC block through the Serial bus and sends it to the Master CPE. The data that is received from the Master CPE and sent to the RFC is transfered to the LOGIC block through the serial bus.