

**Real Time Data
Transmission over FM
Sub-Carrier Frequencies**



Project Objectives

- o To develop a cheap, long range means of transmitting data.
- o To be able to broadcast data *in real-time*.
- o To utilize existing infrastructure in developing the system.

Possible solutions

- o Transmit data over telephone lines or other wired solutions
- o Transmit data over existing GSM networks
- o Transmit data over existing analog cellular networks
- o Transmit data over wireless wide area network
- o Transmit data over FM frequencies

Decision: Utilize existing FM radio stations

- **ADVANTAGES**

- Cheap, no recurring costs
- No need for cables/wires
- Can be received even when mobile

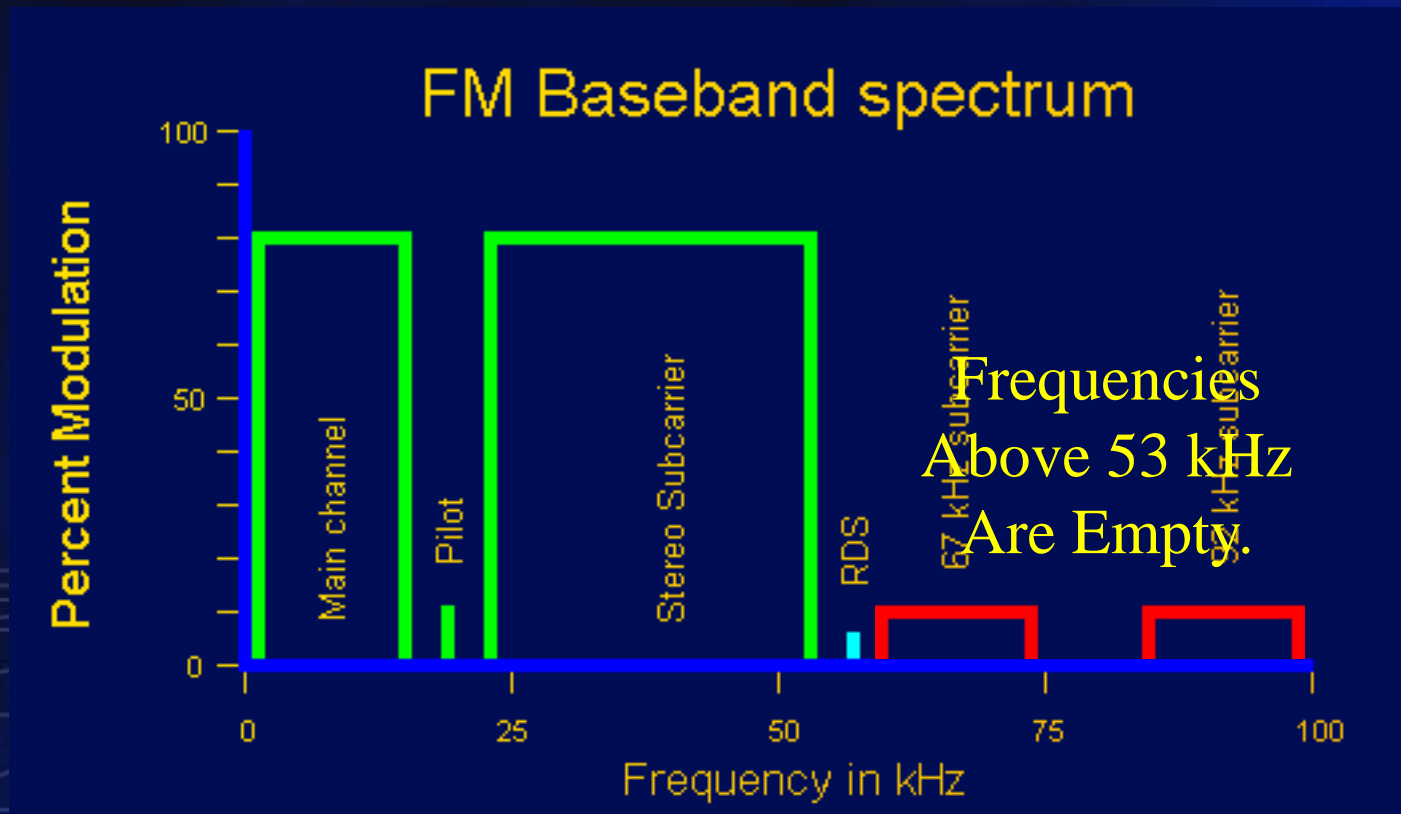
- **DISADVANTAGES**

- One-way only
- Technology is relatively new to the country
- Requires consent/partnership with FM broadcast stations

The FM Radio Spectrum

- o The FM Radio Band is between 87.5-108 MHz
- o An FM Signal is allocated 200 kHz each of space to transmit its signal
 - o FM Mono and Stereo Signal occupies 53% of this space
 - o 47% of the space allocated is empty

The FM Radio Spectrum



It is possible to place up to two additional signals in this area

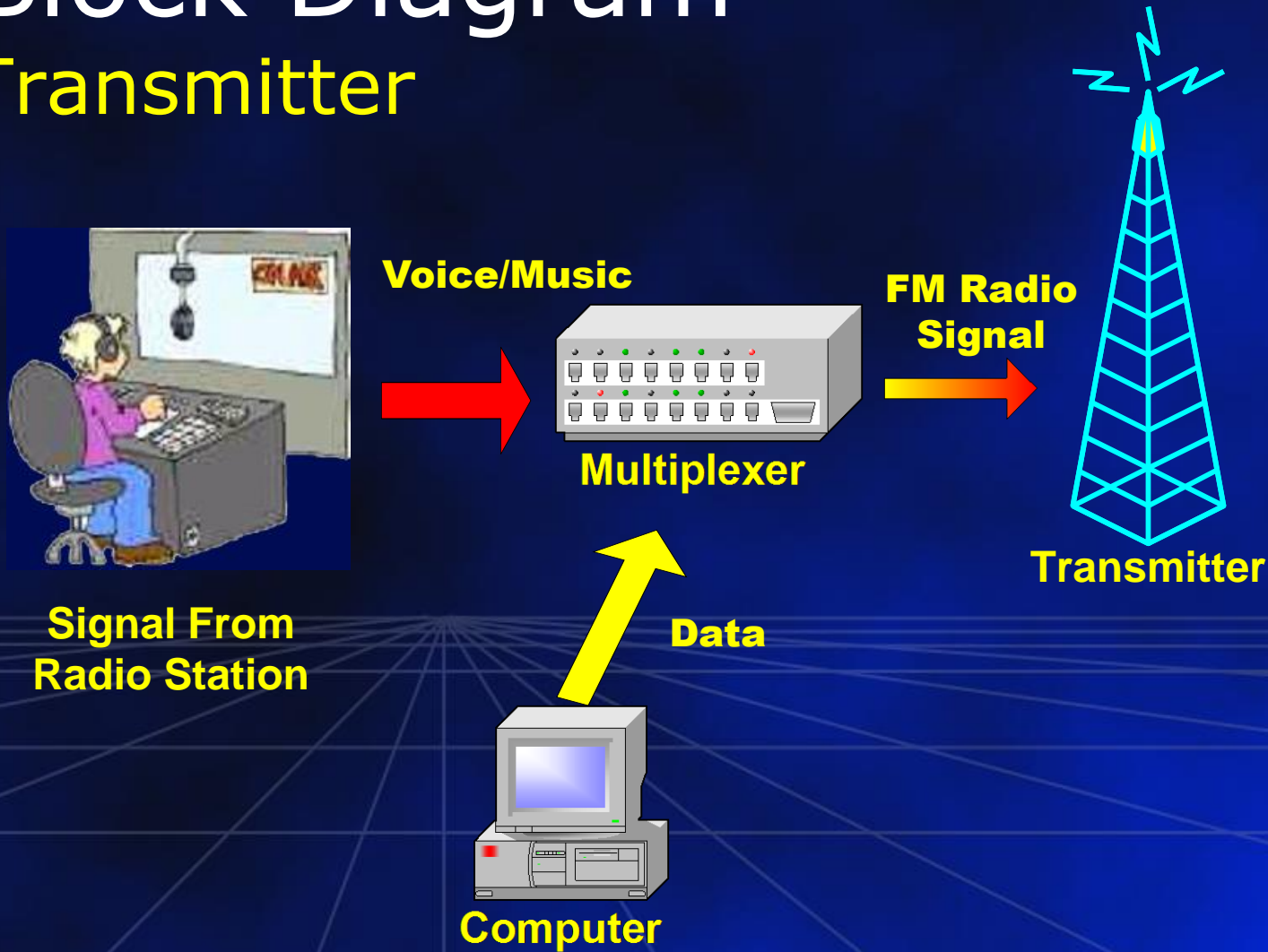
The FM Radio Spectrum

- o These Signals are Called FM Sub-carrier Frequencies.
 - o Historically, these signals are used for music.
 - o Recent developments have made it feasible for these signals to be used for Real Time Data Broadcasting.

Real Time Data Broadcasting

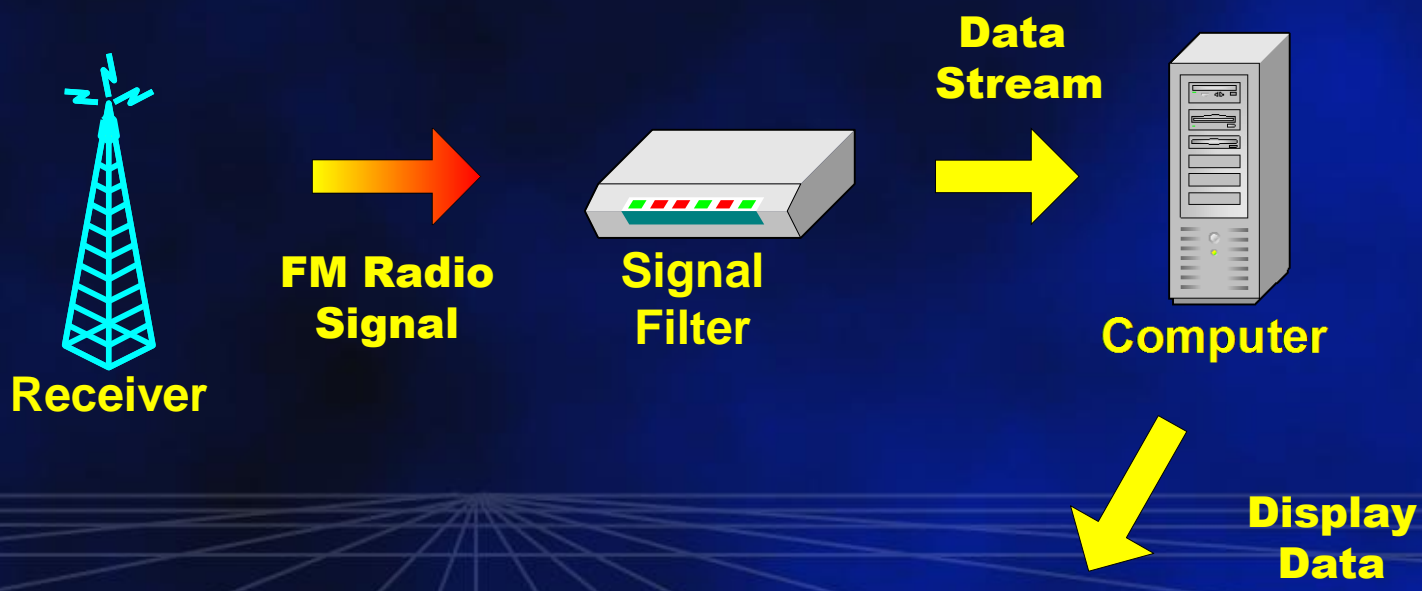
- o Using an available FM sub-carrier of an existing station, EACOMM Corporation can broadcast data over the whole station coverage area where receivers can decode the signal and display them.

Block Diagram Transmitter



Block Diagram

Receiver



LED MATRIX DISPLAY

FM Subcarrier Data Transmission System

Functional Blocks:

- o **User Interface System (UIS)**

- o Facilitates data entry

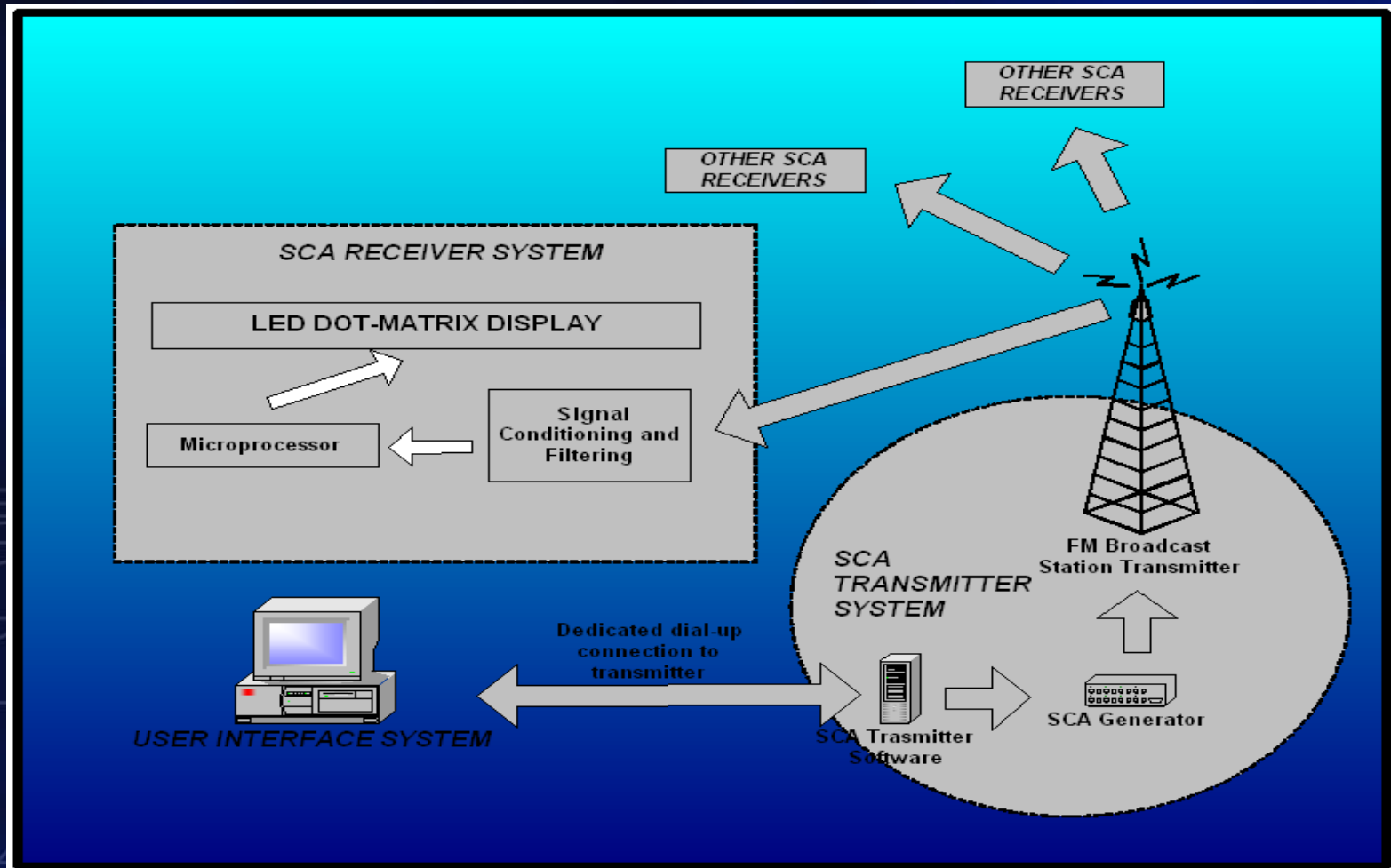
- o **Transmitter System**

- o Converts digital computer data to FM frequencies

- o **Receiver/Display System**

- o Filters out data from FM signal and displays it

EACOMM Corporation



Technology Applications

- o Advertising
- o Real-time Traffic Information
- o Real-time Stock Updates
- o Real-time Commodities Prices Updates
- o Announcement/News broadcasting
- o Weather Updates
- o Others

Technology Status

- o EACOMM Corporation has completed proof-of-concept testing in Iba, Zambales with 98.92% accuracy from 10KM away from the FM broadcast station at speeds of 1200 bits per second (1.2 kbps).
- o Development of the user interface, and final hardware/software design for the SCA transmitter and receiver is on-going.

Current Application

- o Adspace Specialists Inc., has acquired EACOMM Corporation's services in developing a FM sub-carrier data transmission system for advertising and information broadcasting services.



Future Innovations

- **Improvement on the current system in terms of accuracy, and transmission speeds**
- **Incorporation of a Feedback loop via a GSM network**
- **Adoption of, or Compatibility with, existing transmission standards**
 - Data Radio Channel (DARC)
 - RDS (Radio Data Service)
 - Others
- **Digital FM radio**
- **Wireless Broadband**