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Reduction of audio acoustic in Audio-visual transceiving with single port

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Abstract: In our day to day life we come across various challenges in communication. The communication is supposed to be complete only when an audio visualization is available, this can be achieved with audio visual communication. For audio visual communication a costly video-conferencing option is available for a small scale enterprise this cost is not affordable for internal communication. This paper deals with techno-economic remedy for mentioned problem by using single wireless transceiving port. When transceiving process is carried out an audio-acoustic effect hampers the communication quality. This paper further focuses on use of acoustic reduction circuitry which reduces the audio-acoustics (Larsen effect) caused as a result of single port transceivers.

Keywords: Audio-acoustics (Larsen effect); single port transceivers; audio-visual communication.

I. Introduction

Video conferencing has been with us for decades. Videoconferencing is a method of communicating between two or more locations where sound; vision and data signals are conveyed electronically to enable simultaneous interactive communication. Though the multinational corporations and television broadcasters have been using it for decades, they used dedicated connections between the sites which are very expensive and space consuming due to traditional hardware [1-2]. When the conventional system of distinct transmitter and receiver is replaced by transceiver assembly the circuit is scaled down to a smaller space. The circuit hence is more efficient in both cost and energy. But practically when single port transceivers are used for audio visual communication, the microphone and the loudspeaker comes in a closer proximity. Thus causing an acoustic noise also known as Larsen effect. The Larsen effect is the result the cycle of sound between the microphone and loudspeaker. The fact that the microphone mistakenly captures the loudspeaker output as a new input causes the said cycle of the sound.

This paper further suggests the remedy for the cyclic sound (sound acoustic) effect. After survey of existing technology and the shortcomings in them a new wireless circuitry [3] is proposed and fabricated which is further described in this paper.

II. Experimental details, Results and Discussion

The experimental details and justification of the work done is mentioned in this section. The basic design of the circuit was chalked out. It was decided to fabricate two intercommunicating nodes of single port transceivers, the anti-larsen effect circuit being the part of each node. The block schematic of a single node of the experimental setup for audio visual transceiver is shown in **Figure.1**.

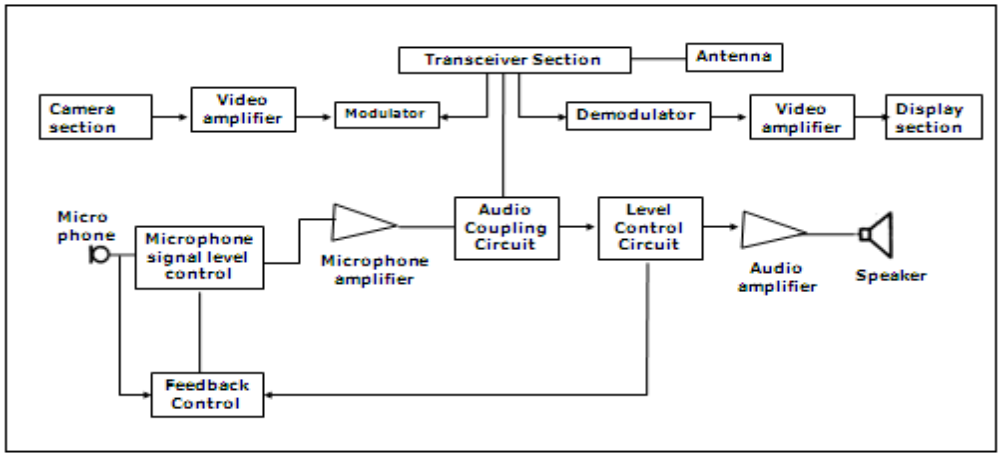

Figure.1.Block schematics of circuitry

The experimental set-up consists of transceiver assembly. The entire assembly can be sectioned into two parts as transmitter and receiver. The transmitting assembly consists of a video-camera, a video amplifier - mixer and a modulator for video transmission. The audio transmitter consists of a condenser microphone and an audio amplifier.

The video camera captures the video information and sends it to the video amplifier-mixer for strengthening the weak video signal the output of this stage is fed to the modulator where the video signal is modulated for transmission. This signal is further fed at the input of the transceiver. The vocal information is captured using a condenser microphone (in actual experimental setup embedded in camera). The audio signal is fed to the microphone signal level control circuit which controls the signal level and is monitored by feedback control circuitry. This is to reduce the acoustic noise which is described ahead in this paper. The output of signal level control circuit is fed to the audio amplifier where the weak audio signal is amplified and further fed to a coupling circuit which couples the audio section with the transceiver. The transceiver further provides the feed to the antenna which transmits the signal to free air channel.

The same set up is duplicated with different transmitting and receiving frequencies (adjustable frequencies using a variac). The receiving antenna of the other node captures the signal and the process ahead is exactly opposite to that of transmission. The video signal is demodulated then preamplified, and finally transferred to an output unit; a display. The audio signal is fed to coupling circuitry which then goes to speaker level control circuitry. This stage is monitored by feedback control circuit. The output of level control circuit is fed to an audio amplifier for boosting signal strength and finally to a loud speaker. The actual fabricated hardware of aforesaid design is shown in **Figure.2. Figure.2 (a)** & **(b)** shows outer and inner view respectively, of the fabricated device.

Figure.2 (a) Outer view of the fabricated device

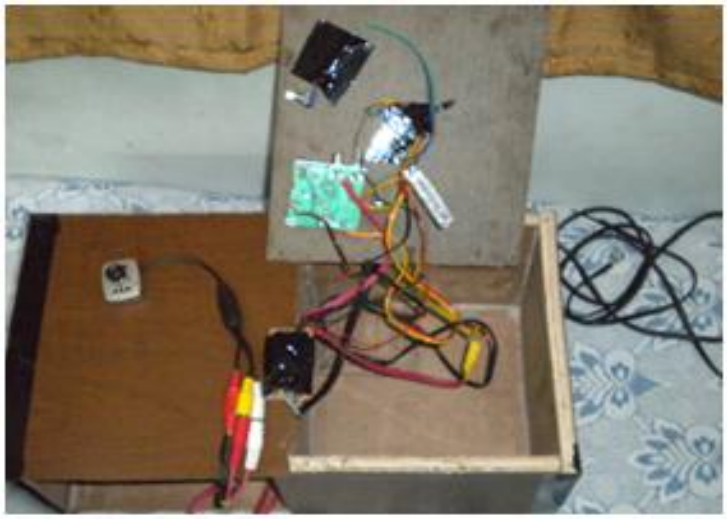

Figure.2 (b) Inner view of the fabricated device

When an individual node of experimental setup is considered, the speaker volume if large enough, the received audio information can be captured again by the condenser microphone and transmitted back which seems as an annoying acoustic effect to distant receiver [4]. This acoustic or Larsen effect is suppressed by use of feedback control unit in the audio circuitry. The feedback control unit takes the input from the microphone level control and speaker level control circuit and sends feedback accordingly, thus avoiding the acoustic effect [5].

The circuit was tested for both conditions (with and without anti Larsen effect circuit) [6]. It was observed that an acoustic echo sound was audible when the anti-larsen effect circuit was not employed whereas the same was suppressed completely after the said anti-larsen effect circuit was employed.

III. Conclusion

The single port transceiver effectively helps in the reduction of the fabricated device, size wise. The reduction of audio-acoustic effect which is introduced as a result of single port transceiver is easily achievable through the recommended circuitry. Hence from the discussion it can be concluded that the use of single port transceivers along with the anti Larsen effect is advocated as it is techno-economic.

References

1) Jing Huang, Gerasimos Potamianos, Jonathan Connell, Chalapathy Neti, "Audio-visual speech recognition using an headset", Volume 44, Issues 1–4, October 2004, Pages 83–96
2) D. Turgis, R. Puers, "Image compression in video radio transmission for capsule endoscopy", Volumes 123–124, 23 September 2005, Pages 129–136
3) Leann Christianson, Kevin Brown, "Adaptive coding schemes for support of multicast audio to wireless devices" Volume 28 Issue 2, February, 2005, Pages 125-135
4) Eberhard Hansler and Gerhard Schmidt, Acoustic Echo and Noise Control, John Wiley & Sons Inc, Hoboken, New Jersey, 2004. pp. 144-146
5) Roland-Borg Corporation, 1978. Comprehensive Feedback Elimination System Employing Notch Filter, United States Patent #4,088,835.
6) M. Gilbert and *et al.* 1984, Anti Larsen effect arrangement in telephone station equipped with loudspeaker, United States Patent #4,484,034