LOW-COST TIA AND EQUALIZER FOR SI-POF

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This work presents a high-performance low-cost analog receiver front-end suitable for POF links based on two optimized building blocks, a transimpedance amplifier (TIA) and an equalizer (EQ). Both blocks are designed using commercial devices and the whole structure is shown in Figure 1.

The TIA employs a passively loaded common-source stage, where a SiGe NPN transistor BFP640 (Infineon) has been chosen. This choice of the input stage guarantees a high cut-off frequency, thus minimizing the contribution of the depletion parasitic capacitance of the Si photodiode.

The equalizer is based on a passively loaded degenerated pair. The source coupling is implemented following the approach reported in [1]. The passive network includes a switch ADG902 (Maxim) that allows us an adaptive equalization. This switch is activated manually for testing purposes. Given the necessity of a good matching in all paired transistors, a SOI transistor array HFA3127 (Intersil) has been selected.

The test setup includes a 50Ω matched laser diode DL-3149-057 (Sanyo), POFs with different lengths (ESKA Premier GH 4002 2.2 mm) and a vector network analyzer ZVL-9KHz/6GHz (Rhode&Schwarz). The fibers have been well characterized previously following the approach reported in [2]. The preliminary results are shown in Figure 2. The expected final frequency response covers ranges from 700 MHz to 1.5 GHz, and thus, the bandwidth becomes up to 10 times higher than without equalization.

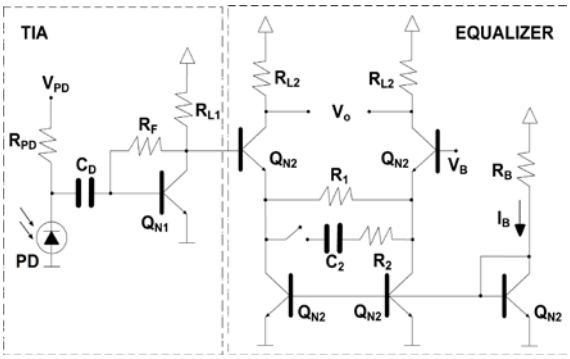

Figure 1. Schematic of the proposed receiver equalizer.

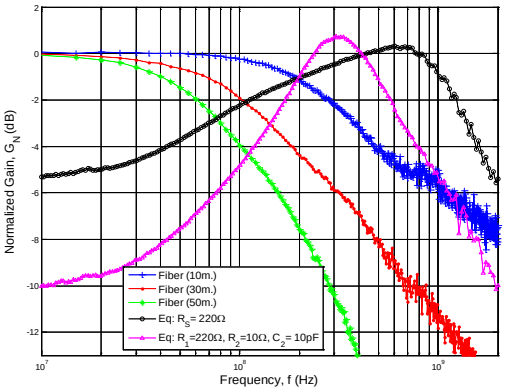

Figure 2. Experimental results of the equalizer and fibers.

[1] E. Säckinger, “Broadband circuits for optical fiber communication”. Wiley-Interscience, 2005.

[2] J. Mateo, M.A. Losada, J.J. Martínez-Muro, I. Garcés, J. Zubia, “Bandwidth measurement in POF based on general purpose equipment”. XIV International POF Conference, pp. 53-56, Hong Kong 2005.

Key word(s)	Front-end receiver, Transimpedance Amplifier, Equalizer.
Preferred presentation method	□ Oral ☒ Poster