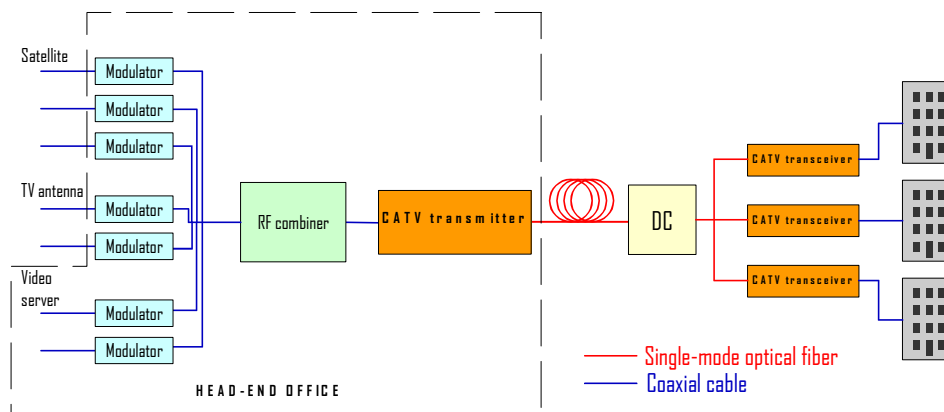


APPLICATION NOTE: CATV

Hybrid Fibre Coax (HFC), that incorporates both fiber optic transmission components and copper coaxial transmission components is a way of delivering video, voice telephony, data, and other interactive services over coaxial and fiber optic cables.



The HFC network (figure) consists of network interface units, fiber nodes, distribution center, and head-end office. The network allows installation of an optical fiber from the cable head-end to serve the distribution center and particular fiber node, in which the optical signals is converted to electrical signals. The electrical signal is redistributed using coaxial cable to the subscriber's premises, where network interface units distribute the signal to different devices. Such networks with return channel, offers a subscriber a cost-effective service upon demand with high speed.

In CATV, for which HFC was originally designed, the AM-modulated data is setting strict requirements for the network linearity and noise properties. This requirement on the other hand favours the fiber optic transmission path, but at the same places stringent requirements on the fiber optic transmitter i.e. laser module linearity and noise properties.

The relative intensity noise (RIN) is playing a key role in Carrier-to-Noise (CNR) performance of the fiber optic link, especially in short transmission distances at 1310 nm. The RIN of Modulight's pigtailed laser module series designed specifically for return-path analog applications is of the order of 150dBc/Hz and 145dBc/Hz, for Distributed Feedback (DFB) and Fabry-Pérot (FP) lasers, respectively.

In addition, the analog video signal is also quite sensitive to nonlinearity in the form of intermodulation distortion. The distortion spectrum contains many discrete lines deteriorating sensitive analog signals. Very tight linearity criteria are used in designing the HFC systems and extra attention is paid for the optical transmitter distortion, but also for distortion of the RF cascade. Modulight's pigtailed laser module series designed specifically for return-path analog applications is characterized against the stringent intermodulation distortion requirements of the CATV transmission networks.



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