



Television Transmission Testing

THE EXPANDING field of television transmission was given considerable attention in papers presented at the 98th Technical Conference in Montreal. There were papers covering transmission by satellite, cable and long distance network as well as papers discussing new techniques and approaches to the more usual television broadcasting. In the Conference program's six television topic sessions there were papers from numerous countries which indicated our involvement in the shrinking world resulting from trans-ocean transmission. We are now dealing with the recommendations of such supra-national standardization bodies as the CCIR and CCITT—abbreviations as familiar to the transmission engineer as FCC and NTSC to the studio engineer.

One session of the 98th Conference was devoted to the problems and advantages of Vertical Interval Test Signaling. This procedure enables various test, telemetry, identifying or time signals, as required, to be added to the normal television signal in such a way that they are not normally visible on the receiver display tube, but may be extracted and examined by sophisticated oscilloscopes or automatic monitoring equipment. These signals can be used at studios and transmitters but are of the greatest benefit to the users and operators of long-distance transmission systems. The continuous measurement of system performance has become routine in many countries, including Australia and Canada from which three of the following papers have been received.—*Michael W. Barlow*, Associate Program Chairman, 98th SMPTE Technical Conference.

Vertical Interval Test and Reference Signals (VITS) in the CBC Television Network

By C. A. SIOCOS

The technical quality of the CBC television network is supervised by test and reference signals transmitted along with the program signal during the vertical blanking period. A pilot plant for VIT has been installed to evaluate the use of such signals and to gain experience. Permanent VIT facilities, including system concepts and equipments are described. Considerations regarding the full use of vertical interval test and reference signals are presented.

TECHNICAL QUALITY CONTROL in the rather extensive television network of the Canadian Broadcasting Corporation (CBC) is a continuous task of sizable proportions. It is rendered even more necessary because of the variety of communications companies supplying network transmission to the CBC. As a result, the development of an in-service testing technique by insertion of signals in the vertical blanking interval of a television signal has been followed with interest by the CBC network since its invention in Germany.¹

It was recognized at the beginning that incomplete knowledge existed regarding integration of such signals in a complex system and also regarding the adequacy of commercial vertical interval test equipment that had just appeared on the

market. For this reason, a pilot installation of vertical interval and reference signals (VITS) was, at the outset, made in Toronto, the central station of the English language television network, to gain experience in the utilization of VITS.

As a result of this experiment, it was decided to extend VIT coverage over the complete television network. Newer equipment of improved performance and operational flexibility was developed by the Canadian electronics industry to meet CBC specifications for this application. Also, a waveform monitor was developed in the USA to comply with CBC requirements for use of VITS.

Experimental Installations

Vertical interval test and reference signals were inserted in Toronto, Ont., the English language network center. They were available to that part of the network extending east to Halifax, N.S., and west to the first video-tape recording

delay station, first at Calgary, Alta., and later, Winnipeg, Manit.

First Phase of Experiment

In the first phase of the experiment, a 5- μ s pulse extending from blanking level to reference white level was transmitted in the vertical blanking interval during almost the entirety of the network day. Also, during two periods, of 20 min each, every day, three video test signals were substituted, in rotation, for the white reference pulse. Switching between reference and test signals was manual and remotely controlled.

All main CBC TV centers reached by the above VITS were required to take a photograph of these signals from an oscilloscope and forward the photograph to a central office charged with the supervision of TV network transmission quality. During the remainder of the network day, the white reference pulse (rather than the program signal) was used by receiving points as their main guide for judging incoming network level.

Some of the program material which Toronto feeds to the network originates from the USA and often carries test and reference signals of the US TV networks on the same lines of the vertical blanking interval as the ones used in Canada. It was therefore necessary to use a special

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