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# Summaries and Notices

## Summaries

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### Coaxial Voltage Divider Element as Building Block for High Power Rating Wideband Microwave Attenuator with Arbitrary Attenuation

Chr. Stäger, Berne

This paper portrays a new design of microwave attenuator which is built by linking individual series of voltage dividers of coaxial configuration. The elements of the attenuator positioned at the outer conductor permit a higher power rating as the heat overflow into the outside environment is best with cooling fins. Due to geometrical constraints these attenuators show a lower frequency limit between 1 to 2 GHz for handy units. However, the upper working frequency is limited only by the dimension of the applied coaxial system. A range of measurements for a series of units serves to fix the specifications for the industry that produces these attenuators under license.

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### Graphical Symbols in Electrical Engineering

M. Ducommun, B. Gnehm and P. Grünig, Berne

Graphical symbols are an indispensable universal language in engineering. The paper proceeds from the historical development of the symbols to the present status of standardization and indicates the future trends. A list of graphical symbols from IEC and ASE has been compiled in the appendix to provide the reader with an overview of the published standards.

p. 112...115

### Model 80 Charge Indicator without Battery

B. Mühlethaler, Berne

Replacing the 1977 version without battery of the model 73 charge indicator, model 80 will be introduced in 1980. It is of simpler construction and has a new, energy-saving drive. Besides some general aspects, the design, functioning, circuit diagrams and installation of this lowcost, modern device are dealt with.

## News Items

### Posts

A computer-based material information system for the Motor Vehicles Division (MATICO A) was introduced in December 1979. This system connects the central warehouse in Berne with 53 garage depots for inventory management of the replacement parts.

### Telephone

The temporary microwave link Berne—Jungfraujoch—Thun, put into operation in December 1979, is the first to use a 2,700-channel system.

The PTT last year paid 12.5 million francs rental for transit circuits in Europe and received 3.2 million francs for transit circuits through Switzerland.

International subscriber dialling with Egypt, Nigeria, Ethiopia, Zambia, Cuba, Nauru and New Hebrides was established on 1 February 1980.

At the end of 1979 there were 436 subscriber lines and 704 telephone stations per 1,000 inhabitants in Switzerland.

Last year the Swiss telephone network was extended by 300,751 wire-pair km of local subscriber line and 29,605 wire-pair km of junction line. Installed coaxial cable went up to a conduit run of 1,850 km. More than 11,883 telephone circuits connect Switzerland to foreign countries.

The microwave telephone network was increased last year by 8 links, extending overall length by 568 to 12,408 km of wideband channel, or by 383,400 to 5,222,220 km of voice channel.

Satellite circuits via Leuk earth station last year increased by 88 to 290, operated to 16 countries extra-European (Argentina 8, Brazil 7, Chile 2, Ivory Coast 4, Iraq 6, Iran 14, Israel 9, Canada 17, Kuwait 6, Mexico 10, Nigeria 4, Saudi Arabia 18, South Africa 9, Sudan 2, USA 169, Venezuela 5).

The second aerial at Leuk earth station was taken into operation at the beginning of February 1980.

## Telegraph, Telex

Telex terminals rose from 439 to 457 per 100,000 inhabitants in Switzerland at the end of 1979.

Automatic message switching system (SAM) connected 19 customer networks with 1,202 message terminals at the end of 1979. In March this service was opened to the public over the telex network.

Leased circuits on trunk routes at the end of 1979 reached 2,757, an increase of 257 over the previous year. These circuits were shared between 32 pc telex channels and 68 pc telephone circuits. The number of modems in operation within the telecommunication network increased by about 21 pc to 11,995, of which 40 pc were placed in the public telephone network and 60 pc on leased lines.

## Radio, Television

In 1979, 36 new TV transposers came into operation. At the end of the year the Swiss television network consisted of 1,093 transmitters and transposers at 348 sites.

Shortwave Radiophone Service with Aircraft was used by more than 300 national and international companies at the end of 1979. The number of radiophone calls rose around 7 pc compared with last year.

Radio broadcast receiving licenses grew from 345 to 350 per 1,000 inhabitants in Switzerland at the end of 1979. Each licensee can operate more than one receiver.

Television receiving licenses increased from 301 to 307 per 1,000 inhabitants in Switzerland.

Thirty new microwave links bringing television programmes from neighbouring countries to CATV-systems were introduced in 1979. These links are for the base network and for distributing networks.

## Miscellaneous

Last year the PTT ordered telecommunication equipment worth 955 million francs, which is 55 million francs more than in 1978.