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The new wake-up call system WA 490

Hansgeorg NÄGELI, Berne

1 Review and generalities

The Swiss PTT has been taking and carrying out wake-up call orders for several decades. Taking in the orders as well as executing them originally had to be performed by the telephone operators. Other solutions were sought as the ever increasing number of orders requiring attention by the personnel during the early morning period became very uneconomical in the course of time.

In 1969, the first fully automatic wake-up call system type WA 49 from Autophon Co. in Solothurn went into operation. It enabled the subscribers to dial-in their individual orders. The service was extended so that by 31 January 1983 it covered the whole of Switzerland and Liechtenstein, thereby enabling every subscriber to dial-in their orders personally by calling the service number 150. More than 18 million calls were registered in 1984.

The new generation of wake-up call system, the WA 490, again developed by Autophon, has been based on a specification drawn up by the Swiss PTT to meet both the current needs and those of the future. Detailed specifications were produced collaboratively by all concerned.

2 Main features of the new system

The capacity of each rack has been increased to 1500 orders compared to the 560 previously. Visual display units (VDUs) and operator's consoles together with printers provide the necessary system access and supervision. Billing of repetitive orders is carried out by the PTT's central accounting department automatically instead of through the use of tickets.

3 Technique and concept

The new wake-up call system WA 490 is computer-controlled, each of the autonomous racks being linked to a master control rack *(Fig. 1)*. The system may be expanded up to 20 racks.

4 Wake-up call racks

The tried and trusted concept of using autonomous racks has been kept. It provides a high level of redundancy which is raised still further by the additional back-up storage. Use of the most modern technology ensures the greatest adaptability and compact construction *(Fig. 2)*. Each rack has six input circuits (ES) for the acceptance of orders which are then registered in a store. A similar sized store is used as a back-up for the data in the neighbouring rack. The data store is interrogated every 10 minutes; time-coincidences result in the corresponding orders being executed via the 30 output circuits (AS) provided in each rack. A newly introduced five-minute interrogation interval is now also possible.

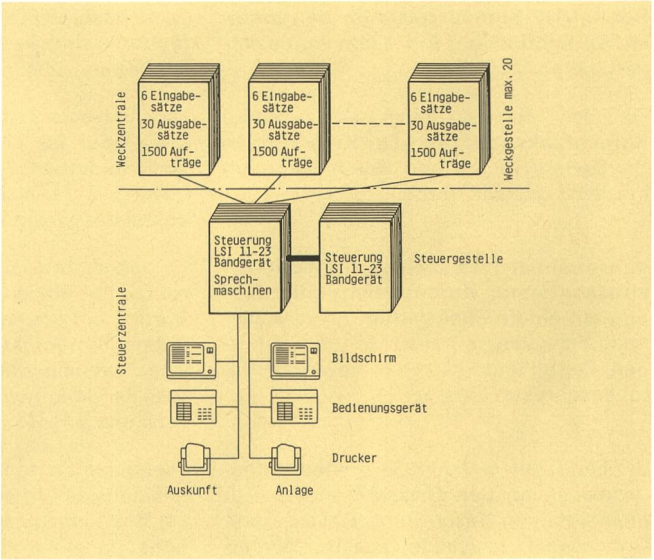

Fig. 1
Configuration of the wake-up call system, WA 490
Weckzentrale – Wake-up call system
6 Eingabesätze – Capacity of each rack input lines 6
30 Eingabesätze – Output lines 30
1500 Aufträge – Call orders 1500
Weckgestelle max. 20 – Max. No. of racks 20
Steuerzentrale – Central controller
Steuerung – Processor LSI 11—23
Steuergestelle – Control rack
Bandgerät – Magn. tape dev.
Sprechmaschinen – Speech machine
Bildschirm – Video display unit
Bedienungsgerät – Operator's console
Drucker – Printer
Auskunft – Information
Anlage – Installation

Microprocessor 8085 (LP 490 MPE8) on circuit board is used throughout for control purposes with the associated programs stored in PROMs. Control of the peripherals (input and output circuits) is effected by a controller (ST) via an interface RS-232. Data transfers take place at 600 baud in a full duplex, asynchronous mode; the controller is the master unit in most cases.

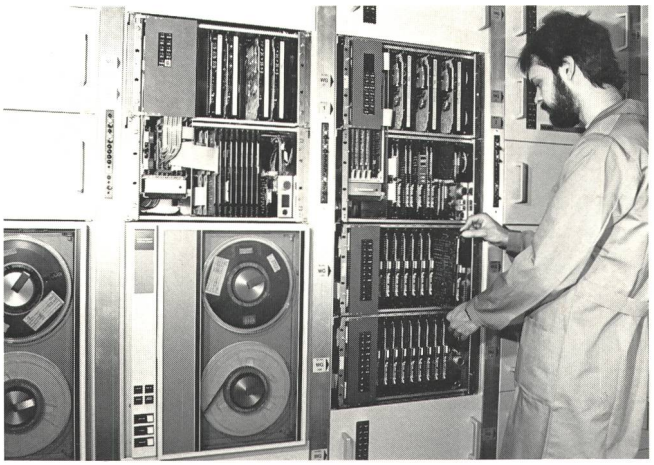

Fig. 2
General view of the system

The three relevant programs (ES, AS and ST) are configured to run in a multi-tasking system consisting of an operating system OS 85 together with user software written in ASM-80 and PLM-80 languages.

5 Central controller

The central controller is the functional unit that is in overall command of the racks. It is responsible for the operation, supervision and control of the wake-up call service. The central controller consists of two racks as well as various peripheral devices. One rack is always on stand-by while the other is in operation. To share the operating time, the racks are switched over automatically each week; change-over occurs instantaneously in the event of an operational fault happening.

A controller rack contains a processor chassis, a Kennedy tape unit, and Amesa type 2829 speech machines for the acknowledgment messages. A computer, type LSI 11/23, is housed in the processor chassis together with the requisite RAM/PROM stores, the interface boards to the various peripheral units and the racks, the video channel, and a power supply unit. The racks are linked to the central controller through an RS-422 interface.

The central controller also runs a multi-tasking program consisting of the RSX-11S operating system with user software written in Macro 11 and Pascal 2. Ready adaptability for future requirements is ensured by the modular nature of the software and hardware architecture.

All the repetitive orders that have been executed are recorded on a magnetic tape on a weekly basis for further processing in the PTT's central accounting department. Subscribers are charged directly via the normal charge counters for all individual wake-up call orders.

6 Peripheral units

The telephone operators's console consists of a keyboard and a video monitor. This enables individual and repetitive orders to be entered, cleared and altered. A ticket is automatically produced on a printer as confirmation of each transaction by the operator. The telephone operator can also carry out various monitoring functions.

A further operating unit with a monitor is installed near the racks to facilitate various controls and to enable maintenance programs to be run *(Fig. 3)*. Operational irregularities and status messages are reported on the system printer. A daily statistical record is also produced for planning purposes.

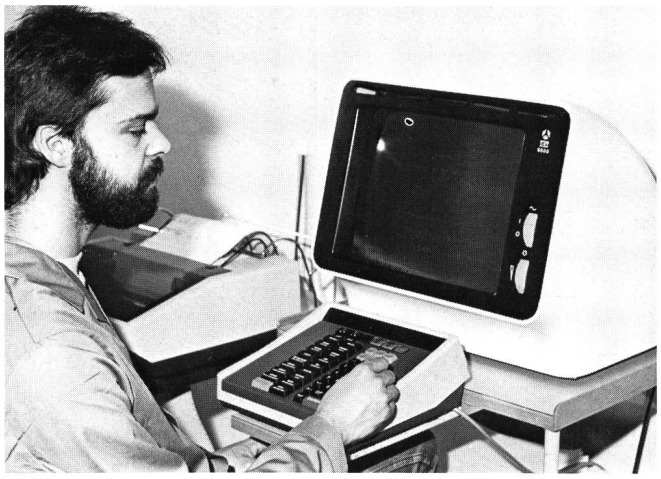

Fig. 3
Operating unit for monitoring functions and running maintenance programs

7 Training

A thorough training of the personnel is a prerequisite if a modern system is to be operated correctly. Training for the wake-up system is divided into two one-week theory courses plus a six-day practical instruction course on the system. Since the introduction is on a step-by-step basis and always related to a specific system, participation in the courses is extended right up to the maintenance engineers. The courses are conducted by instructors from the system supplier. Training of the instructors at the Regional Telecommunication Directorates is, however, carried out directly by specialists from the PTT.

8 Conclusions

The first system has gone into operation in Zurich. This has been initially configured to have 12 racks with installation during the Summer of 1985. Further systems are foreseen for Basle and Berne. A rationalization plan is to be produced which will take into account the needs foreseen in a 10-year plan. In view of the large capacity of the new system, the development and equipment costs must be carefully considered before deciding whether each telecommunication directorate shall have a separate system or whether a shared system might be a worthwhile proposition.

The growth rate to date indicates that the wake-up call service is valued by the subscribers. The new system will enable the service to be offered with even better quality.