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T&M news

from the
Test and Measuring Department

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PHILIPS

New 50 MHz addition to high band width oscilloscope family

The requirements for a general purpose oscilloscope, which has to satisfy the measuring needs of the laboratory as well as those of field service, seem to be highly conflicting. Both areas demand great versatility - the fullest technical specification and the highest electrical stability. Also, and this is especially true in field testing, mechanical robustness. Furthermore, with the increasing versatility and complexity of today's oscilloscopes, special care has to be taken to ensure that the instrument is logically arranged and easy to operate. In parallel with these and other requirements, the instrument must be as portable as possible, so that it can be brought easily to the measuring location.

With the introduction of the PM 3260 oscilloscope, which combines a large (8x10 cm) screen, dual-trace 120 MHz performance and main- and delayed sweeps, with the high portability offered by a weight of 9 kg many of these apparently contrasting requirements were met.

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T&M news

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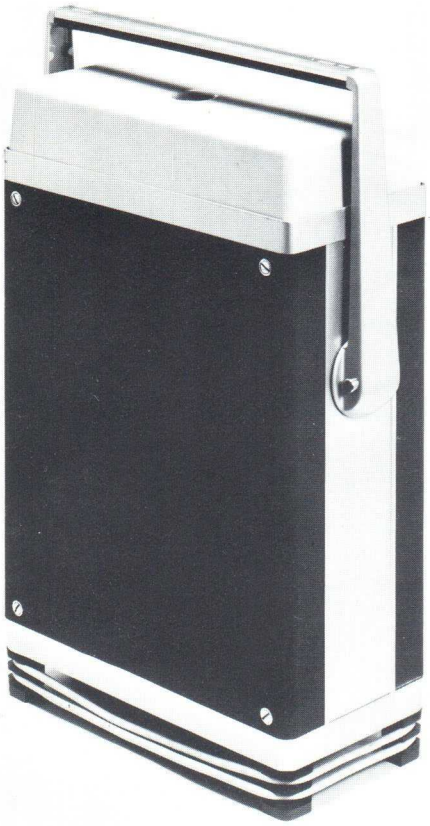
The PM 3240

We, at Philips, could see that many of our customers would not need all of the advanced facilities, offered by our 120 MHz model, but that they would appreciate many of its features. We therefore developed the PM 3240 oscilloscope, which offers 50 MHz bandwidth, even lower weight at 8 kg and perhaps more important, a very attractive price. The PM 3240 and PM 3260 were designed as members of a family. The same construction principles have been followed and as one result, many of the components are identical for both instruments. This results in considerable cost savings because of standardization and efficiency in production, which are reflected in the economic prices.

Both oscilloscopes combine their high performance with minimum weight. The use of magnesium-alloy castings, instead of the more commonly used aluminium, and the use of a transformerless power supply brought the overall weight of the PM 3240 down to some 8 kg only. The saving of a heavy mains transformer is not only a weight factor: the very high efficiency power supply that is used, plus the extremely low overall power consumption of the instrument (23W) allows the use of a totally closed cabinet.

The advantages are clear: the absence of holes in the cabinet excludes dust from the instrument thus enhancing the overall reliability. And the power supply employed allows the user to forget about the mains voltage adjustment. The PM 3240 operates on all mains voltages between 90 VAC and 264 VAC, in one range without adaption. This also ensures stable operation if the mains voltage varies.



BRIEF SPECIFICATION

CRT

Type
Philips D 14 - 125 rectangular mesh type tube with 10 kV acceleration potential and metal backed phosphor
Useful screen area
8 x 10 div. of full centimeters
Graticule
Internal illuminated graticule. 10% and 90% lines are indicated

Y-axes
Bandwidth
DC . . . 50 MHz (—3 dB)
Risetime
~7 ns
Deflection coefficients
5 mV/div . . . 2 V/div. 1-2-5 sequency
Uncalibrated, continuous control between the steps 1: 2.5
Display modes
Channel A
Channel B
Alternate
Chopped at approx 1 MHz
Added
Channel B can be inverted
Input impedance
1 MΩ//15 pF
Maximum input voltage
400 V (DC + AC peak)

X-axis
Display modes
Main time base
Main time base intensified by delayed time base
Delayed time base
X-Y or X-Y/Y operation with X- deflection by Y_A, Y_B, External or Mains (line)

Main time base
Modes
Auto-triggered-Single shot
Time coefficients
0.5 s/div. . . . 50 ns/div., 1-2-5 sequence
Uncalibrated continuous control between steps 1:2.5
x 5 magnifier extends max sweep rate to 10 ns/div
Trigger source:
Y_A, Y_B, External mains

Delayed time base
The delayed time base either starts immediately after delay time or is triggerable after delay time. by the selected delayed time base trigger source
Time coefficients
1 ms/div. . . . 50 ns/div. 1-2-5 sequence. Uncalibrated control between steps 1:2.5
Trigger source
Y_A, Y_B External
Sweep delay
Continuously variable with 10-turn potentiometer between approx. 0 x and 10 x the time coefficient of the main time base

Power supply voltages
Accepts any voltage between 100 and 240 V ± 10%, and any frequency between 46 and 440 Hz in one range, without switching
Power consumption
23 W

Operation

When operating the PM 3240, the clear separation of functional units on the front panel is a feature which will be greatly appreciated by the user. The large (8 x 10 cm) screen with its associated CRT controls, the two vertical channels Y_A and Y_B and the main and delayed time bases, including their associated trigger controls, can be clearly distinguished. The main controls are all on the same level, with one function execution per push button.

This all makes for quick familiarization with the instrument and error free operation. Furthermore, the grouping of controls and input connectors leaves the screen free from cables or even from the hands of the user.

New ways of control

The freedom in design that allows the controls to be located on their most logical and ergonomically correct positions is mainly due to another design innovation. Nearly all controls on the front panel, including those for the attenuators and time-bases activate, by DC-voltages, the actual reed-relay attenuators or semiconductor switching devices on the printed circuit boards.

Beside providing freedom to place the controls where they are most convenient for operating the instrument, this system improves the overall performance. There is no critical HF wiring to complex multi-deck switches; furthermore the simple controls on the front panel improve the overall reliability when compared with complex types of switch commonly used.

For the wiring between front panel and pcb's, as well as between one unit and another use is made of multipole connectors and cable bundles. This, in conjunction with the easily removable functional units, will keep down-time to a minimum.

Conclusion

The PM 3240 oscilloscope, being the second member of the family of which the PM 3260 was the first, provides the same benefits of easy transportation and operation, high reliability and minimum service cost. Its specification and mechanical ruggedness, combined with its low weight, make it highly suitable for service work, for example in data systems, and telecommunications and also fit it for application in laboratories as an easy to use general purpose instrument.

For further information, please check reply card ①

New low frequency synthesizers

Our new 100 kHz and 1 MHz synthesizers (our first in this market area) are the first to cover the lower end of the frequency spectrum. These new sine/square wave instruments, designated the PM 5141 and '42 respectively, also offer the optional facility of programmable operation, which make them ideal for automated test procedures.

The resolution, accuracy and stability of these instruments are, of course, extremely high since they are basic to the synthesizing technique. Now, thanks to dramatic reductions in the cost of integrated circuits, these benefits have been extended to the LF market.

The PM 5141 and '42 fall into the same price class as conventional tuned circuit oscillators, have a superior specification and are easier to operate thanks e.g. to the clear layout of the controls on the front panel as illustrated in fig. 1. Moreover since the technique is fundamentally digital, the instruments can be programmed to give high-speed, low-cost, zero-error test signals and are even economically viable for automated applications.

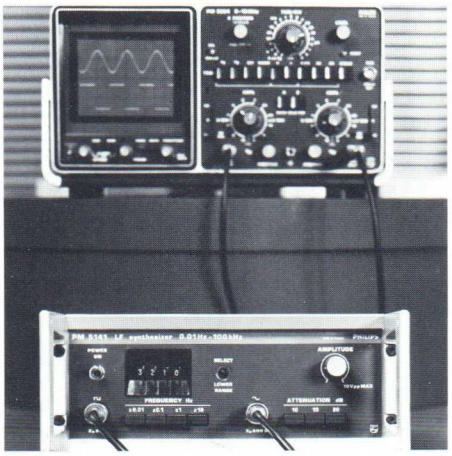


Fig. 1. The front panel of the new Philips synthesizers indicates the frequency setting at a glance.

Easy operation

The frequency is set by four thumbwheel switches on the front panel and five push-buttons which determine the range. Any 'out of range' setting is immediately indicated by a warning light. Settings are thus easy to read at a glance and the high resolution of 10^{-4} of the range selected eliminates the need for additional monitoring instruments.

The PM 5141/42 is thus ideal for educational purposes. The amplitude is high: 10 V open circuit, 5 V into 600 ohm. It can be push-button attenuated in two 10 dB steps and one 20 dB, with an additional continuous attenuation of 20 dB giving a total of —60 dB. A low 10 mV open circuit, 5 mV into 600 ohm signal can therefore be realised.

When the synthesizers are remote-controlled, the thumbwheel and range settings are determined by an external programming device. The amplitude is then fixed and determined as an optional extra and can be fitted by the user at a later date since it simply entails plugging in a printed circuit board. The BCD parallel code at TTL levels used for the frequency setting is the same as that used for the rest of the Philips range of programmable instruments and automated equipment. It can therefore be incorporated into the Philips low-cost, automated test and measuring system, a print-out of which is illustrated in fig. 2.

Fig. 2. Print-out of the PM 5142 when used in an automated test set-up. The printer used is the PM 2466.

For further information, please check reply card ②

Application of multipoint recorders in computerized data handling*

Two Philips PM 8235 multipoint recorders are being used for visual display and recording purposes in a computerized system for measuring and processing data on road-surface conditions for an experimental ice-warning project.

The computer keeps a weather eye open

The Dutch Rijkswegenbouwlaboratorium and the department of Information Services (State Road Laboratory) in Delft are currently engaged in an experimental ice-warning project in which data on road-surface conditions are measured automatically and transmitted to a central station, where they are recorded and processed with the aid of a computer-controlled system.[1])

The use of multipoint recorders forms an essential point of such a project. Such recorders provide the operatives in the data-processing centre (who are in general road-maintenance staff rather than computer specialists) with "feel of the road" thanks to an instant, clearly legible read-out of the hour-to-hour conditions on the stretch of road under investigation.

The measuring set-up

The 70 km stretch of motor-way covered by the ice-warning project is shown in fig. 1. A measuring station is situated at each of the points indicated by a block in this figure. The output voltages of the various measuring units are converted into multi-tone frequencies at the measuring station (see fig. 2) and transmitted via the post-office telephone cable serving the roadside emergency phones to the central station at 't Harde (fig. 1) for recording and processing. The block diagram of the set-up in the central station is shown in fig. 3, and the interfacing for the two recorders is shown in fig. 4.

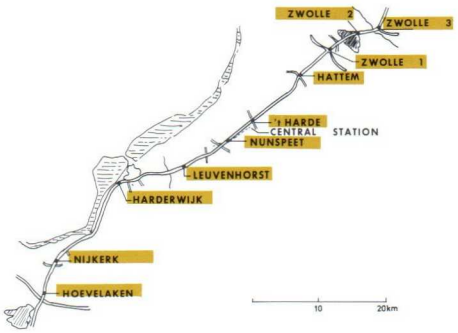
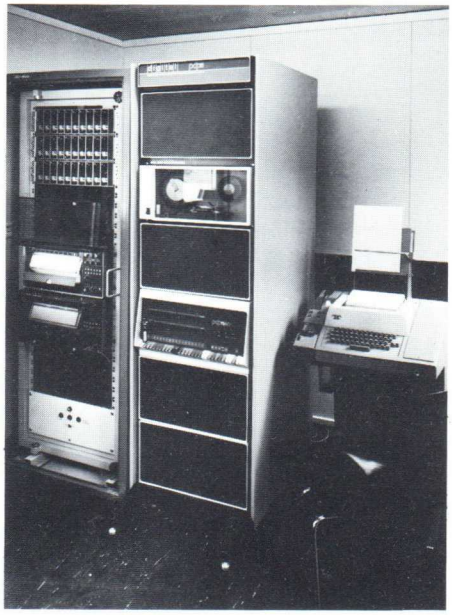


Fig. 1. The stretch of roadway covered by the experimental ice-warning project.



The data from one or two outstations can be handled at a time by the central station. The outstation(s) to be dealt with are selected by the computer programme. The input data are presented in parallel, in analog and digital form, on the input lines shown bottom left in fig. 3, and are converted from tone frequencies into current signals with a maximum range of 0-20 mA by means of data converters.

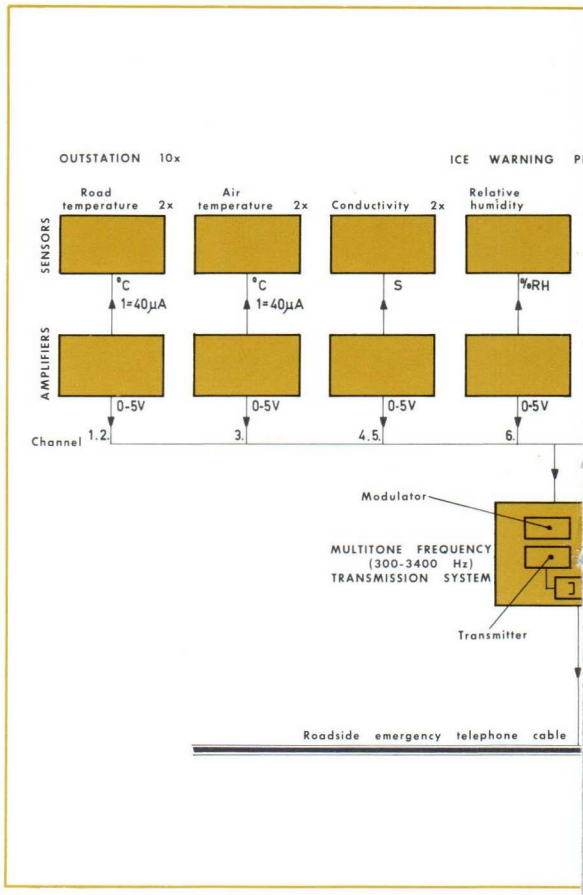


Fig. 2. Block diagram of one of the ten out-stations.

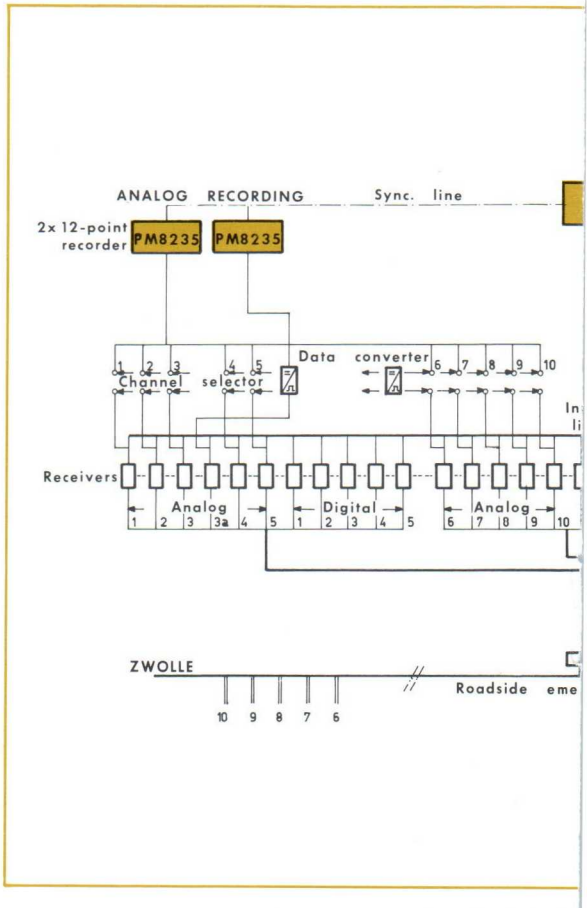
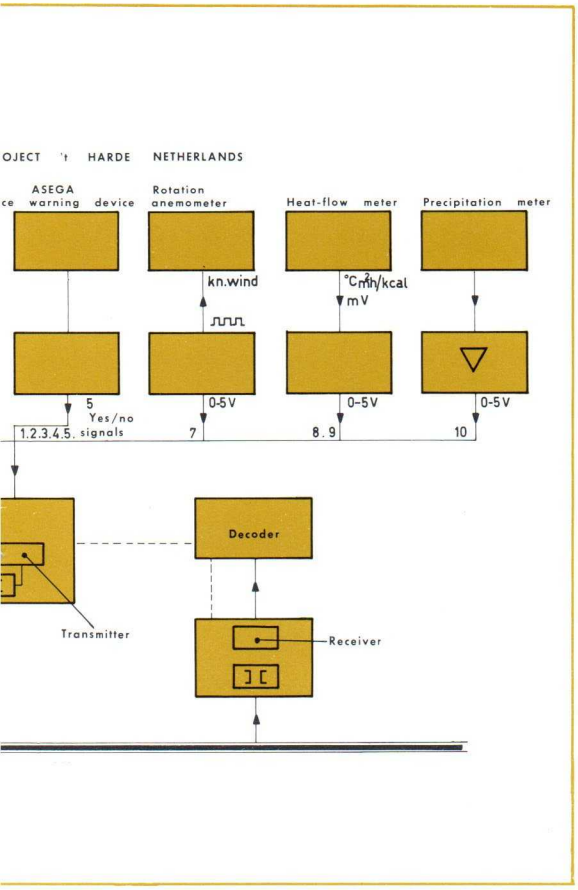


Fig. 3. Block diagram of the central station. A photo of

** We thank the Dutch Rijkswegenbouwlaboratorium in Delft for permission to publish this article.*

[1]) *OTAR, written by Mr. H. Hoekstra.*



The computer checks that all data are present in parallel before a recorder printing cycle begins, and also controls the sequence of the printing cycle. The latter could of course also be done by an automatic scanner such as the PM 2460, but this solution was not chosen as the software for computer control was available.

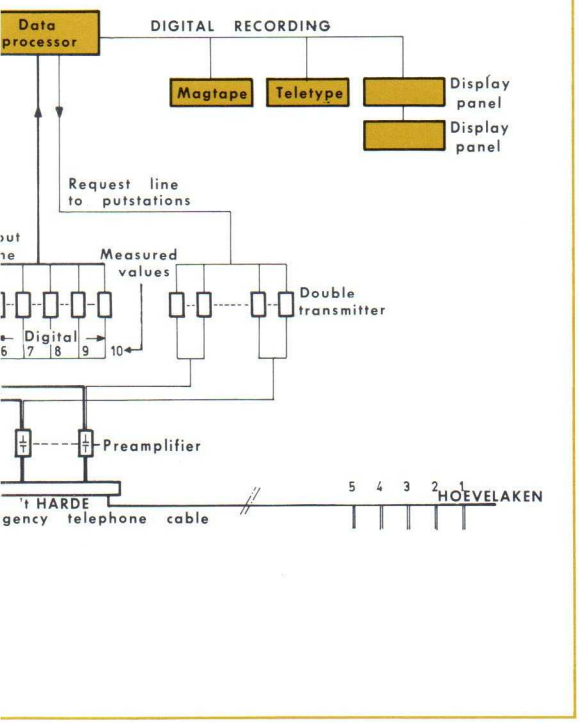
The scanning of the channels was performed with a two-pole reed relay, one contact for recorder 1 and one for recorder 2. When the computer had requested e.g. channel 1, this channel was selected in both recorders. The channel setting was also checked by the computer; for this purpose, the internally programmable contact points in the recorder channel programming matrix were brought outside as external contact points. After a delay of 5 - 15 s (to avoid switching transients over the transmission path), the computer gave the PRINT command and the value of the signal in channel 1 (road temperature) was recorded. The length of the recording cycle for a single experimental point was 20-50 s, and that for a complete set of measurements about 5 minutes.

The PM 8235 is normally designed for the recording of voltages but can easily be modified for the recording of currents as in the present case by shunting precision resistors (PM 9850) across the inputs of the range cards in the range modules.

When the variables exceed certain values, built-in computer criteria can give a signal, e.g. that it is time for the salt and grit scattering team to take action. This could also have been done with the plug-in set-point unit PM 9834/00 in conjunction with the selective unit PM 9834/05.

The Philips PM 8235 multipoint recorder proved to have so many advantages for this application that it was practically an automatic choice - while later discussion with our representative revealed that it even had a number of important advantages which had not been made use of - another reason for intensive contact with your Philips specialists before you try to get the most out of the T & M equipment you have chosen!

For further information, please check reply card ③



this equipment is shown along side.

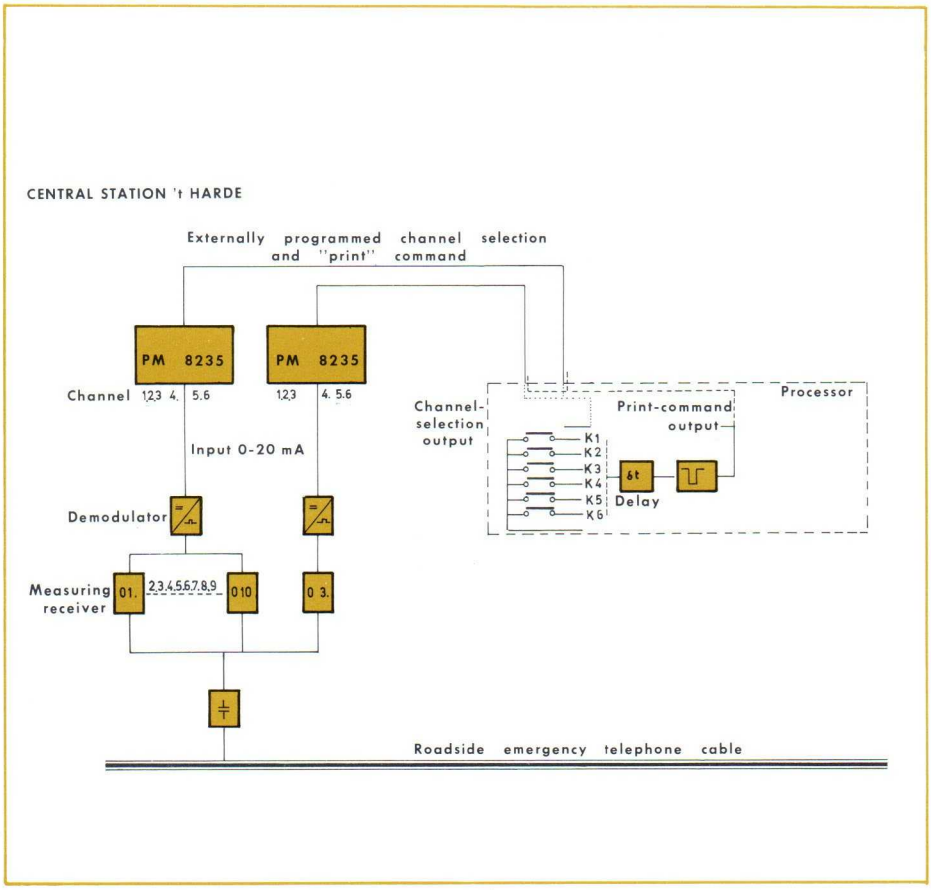


Fig. 4. Interfacing of the two recorders.

Philips PTV equipment in new TV signal distribution projects

Philips professional TV measuring equipment is being used increasingly in big new TV signal distribution projects, demonstrating the full confidence felt by broadcasting authorities in the reliability and quality of this equipment.

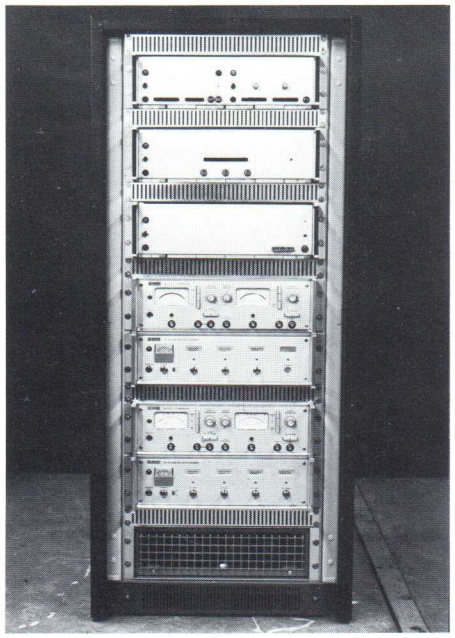
Three such projects will be briefly mentioned here. Fig. 1 shows two racks of equipment for a TV factory in Singapore, containing sync. and pattern generators and coders from the Philips PTV range, together with a 10 kV mains stabilizer and LF sweep generators.

Fig. 2 shows a smaller set-up for a TV factory in Hungary. Note the ventilation unit at the bottom, which greatly improves the thermal balance in the rack-mounted equipment.

Fig. 3 shows three racks of equipment for the Madrid cable TV system. Philips is building a network for 4000 subscribers as the first phase of this project; this network employs a total of 1150 amplifiers. The various TV signals are modulated on IF carriers by PM 5524 modulators and then converted to the desired channels by PM 5591..95 VHF/UHF converters.

These examples illustrate Philips' ability to deal with any TV signal distribution project, big or small.

1



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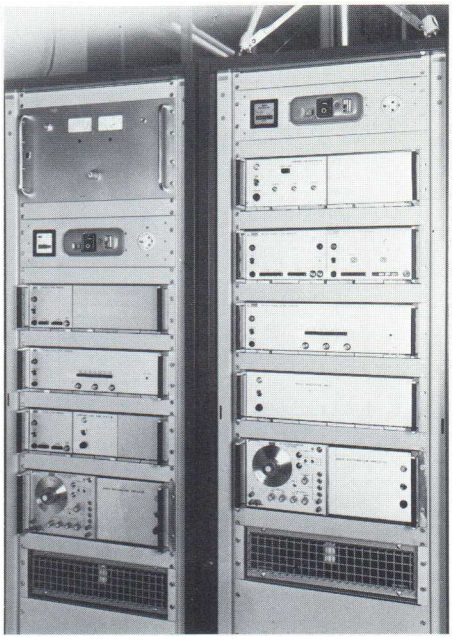

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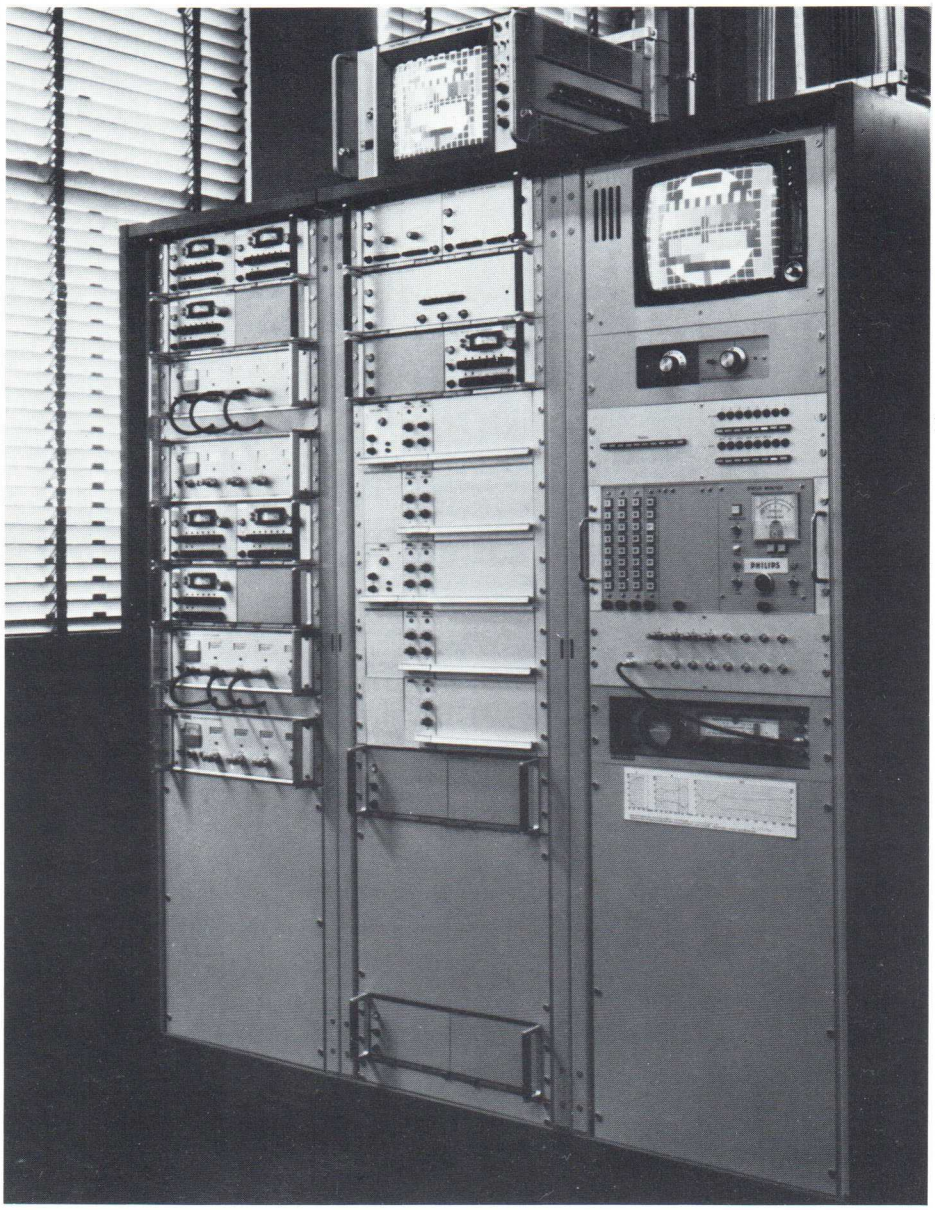

TMI '74

International Electronics Press Visit T & M in Eindhoven

Some sixty journalists, representing electronics magazines from all over the world, including the U.S. and Japan, visited a press reception put on at Eindhoven recently by Philips T & M. The two day event began with a visit to Philips' permanent technology exhibition, the Evoluon, followed by an informal dinner, with entertainment by a famous Dutch singing star - all on the first day.

On the second day a presentation was given on Philips' T & M operation, spearheaded by a lively multi-screen audio-visual show specially prepared for the occasion.

The proceedings were opened by W. Vogel, commercial adjunct director who introduced lectures by H. Bodt, C. Coenraads and R. Dekker, on the overall T & M market, oscilloscopes and counter timers respectively. These were followed by an exhibition highlighting a number of major products launched at the event. The day finished with a question and answer session between the press and Philips technical and marketing experts.

New instruments

The occasion was chosen for the launching of eight important additions to the existing wide range from Philips T & M. These were:

Oscilloscopes

Two additions to the now well-known family, of which the "first-born" was the 120 MHz PM 3260, were launched - the PM 3240, a 50 MHz instrument with all the basic features of the PM 3260 and the PM 3265 - the world's first 150 MHz oscilloscope with built-in analog multiplier.

Chart recorders

The PM 8200 series of low-profile compact chart recorders designed for a wide range of OEM and general end-user and laboratory applications was shown.

Digital multimeters

The new Philips low-cost, high accuracy PM 2522 digital multimeter was demonstrated. A feature is the extensive use of in-house developed LOCMOS circuitry. Its companion the PM 2513, which will come on the market shortly was shown in prototype form - it offers many of the design features of the PM 2522, but at an even lower cost.

Synthesizers

The new synthesizers type PM 5141 and PM 5142 are important additions to the T & M range, being the first instruments of this type to be marketed by Philips. They cover the ranges 100 kHz and 1 MHz, respectively and have the optional facility of programmability, making them ideal for automated test procedures.

Fig. 1. The panel for the question and answer session consisted, left to right, of: A. Katz, General Manager Philips TMI Inc., U.S.A.; H. Bodt, Manager T & M Department, Eindhoven; W. Vogel, Commercial Adjunct Director, Philips Science & Industry Division; H. de Lange, Technical Operations Manager, Benelux; S. Lodder, Science & Industry Division Press Officer.

Fig. 3. Professor Reuber of "Radio Mentor Electronic" (West Germany) putting a question to the panel.

Fig. 4. B. Barrier of "Mesures" fills in a questionnaire at the exhibition information center under the guidance of Miss S. Brokking of Science & Industry Division's press office.

Fig. 5. J. Overzee, Product Manager for Professional TV equipment (left foreground), demonstrating the video insertion test signal (VITS) analyser, type PM 5578 coupled to the EBU insertion signal generator type PM 5575 to simulate the measurement of TV broadcast signal parameters.

Fig. 2. The exhibition took place in the foyer of the modern Philips entertainment center.