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Confravision

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Confravision is a new service which enables business conferences to be conducted over long distances.

For some years now there has been an experimental link between the British Post Office (B.P.O.) Research Department at Dollis Hill and Telecommunications Headquarters at Gresham Street. A great deal of interest has been shown in these experimental links and the Marketing Department of the B.P.O. have, therefore, decided to set up a trial network. If successful, the network will be extended.

FIG. 1—Inside the Confravision studio

INTRODUCTION

Business conferences often involve top executives in a great deal of travelling, and in spite of the benefits of making personal contact with other executives, most of the time away from the office is ineffective. By means of Confravision, face-to-face meetings can be held without the waste of time, inconvenience and expense involved in long-distance travelling. To enable such conferences to take place, new studios have been built in London, Birmingham, Manchester, Glasgow and Bristol, these centres being chosen partly because they are business centres and partly because they are on the B.P.O. network of microwave radio links and can easily be interconnected.

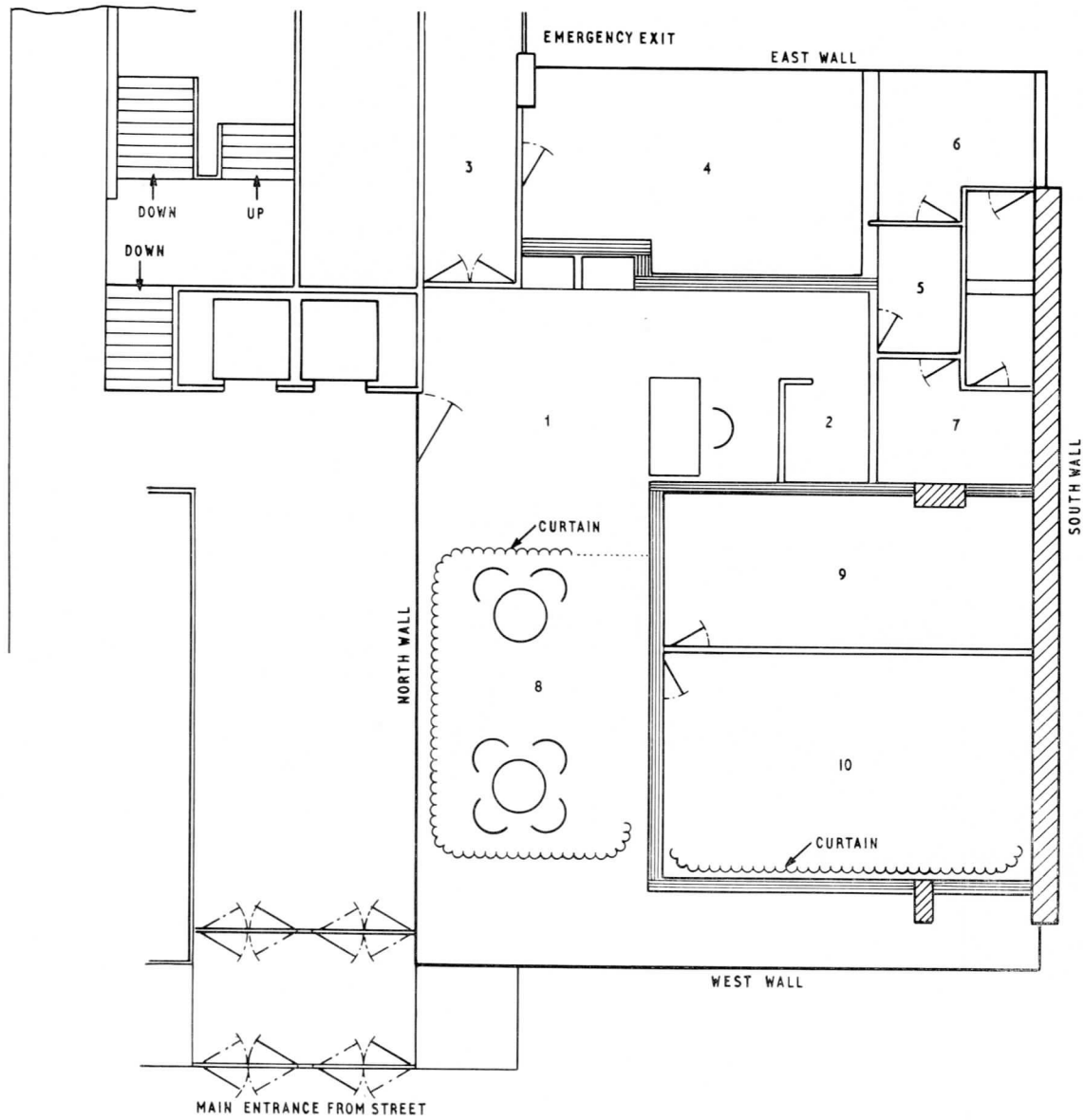
The experimental Confravision links in this country and in the U.S.A. have indicated that the number of people taking part in a conference will be small. Consequently, the studio has been designed to seat five people in camera with two additional seats out of camera. One of the objects of the trial is to decide if this is the best arrangement or if changes should be made.

The trial service will be restricted to monochrome only because colour would add little to the realism, the additional cost involved would far outweigh any benefits gained, and full-time engineering attendance would be required.

CONFRAVISION SUITE

A photograph of the inside of the Glasgow studio is shown in Fig. 1 and a plan of the Glasgow suite is shown in Fig. 2. All the suites are not identical in plan as they depend on the accommodation offered but, in general, the facilities are the same. The suite is composed of the studio, equipment room,

† Network Planning Department, Telecommunications Headquarters.



1. Reception 2. Galley 3. Emergency exit passage 4. Air-conditioning plant and switchgear 5. Toilet lobby 6. Ladies' toilet 7. Gentlemen's toilet 8. Display/waiting area 9. Confravision equipment room 10. Confravision production area

FIG. 2—Plan of Glasgow Confravision suite

reception area, a waiting room where conferees can assemble, a small kitchen for the use of the attendant, cloaks cupboard, air-conditioning plant and toilets. The air-conditioning plant is described in another article in this issue.

The suites have been designed with some degree of luxury to give an attractive setting and to present a first-class image of this new British Post Office service. For these reasons, a Consultant Designer, Kenneth Grange, Hampstead, was employed to design and furnish the suites.

Conference Studio

A plan of the conference studio and the equipment room is shown in Fig. 3. These are completely enclosed and sound-proofed to attenuate outside noise by at least 50 dB.

The conference table will seat five conferees, each position having a swivel chair and directional microphone. Facing the table and mounted behind the partition in the equipment room, is a camera with remotely-controlled two-turret lens. In one position, all five conferees are in view of the camera, but if there are only three or less conferees taking part, or if the chairman wishes to address the distant end, then the second lens can be used to give a close-up of the three central positions. Also facing the table, but physically mounted to the rear of the partition, are two monitors having 24 in screens with 4 × 3 aspect ratio. One is used to display the incoming signal and the other to display the outgoing signal. This is useful when sending pictures of a document or model, as both studios see the same image.

A loudspeaker is mounted on the partition and although adequate power is available, the positioning of the loudspeaker and microphones and the choice of sound absorbing materials have been arranged to give a margin against howling of about 9 dB per studio.

A second camera, with remotely-controlled zoom lens, is mounted in the ceiling above the display table so that maps, documents, manuscripts or models can be displayed. This permits items as large as 36 in by 27 in to be examined, or the monitor screen to be filled with an item only 6 in by 4½ in. About 30 lines of typescript, each line having up to 78 characters, can be displayed and read over the system.

A table is provided for a secretary and mounted on the partition to the left of this table is an audio tape recorder which enables pre-recorded messages to be sent out over the circuit or the sound content of the conference to be recorded.

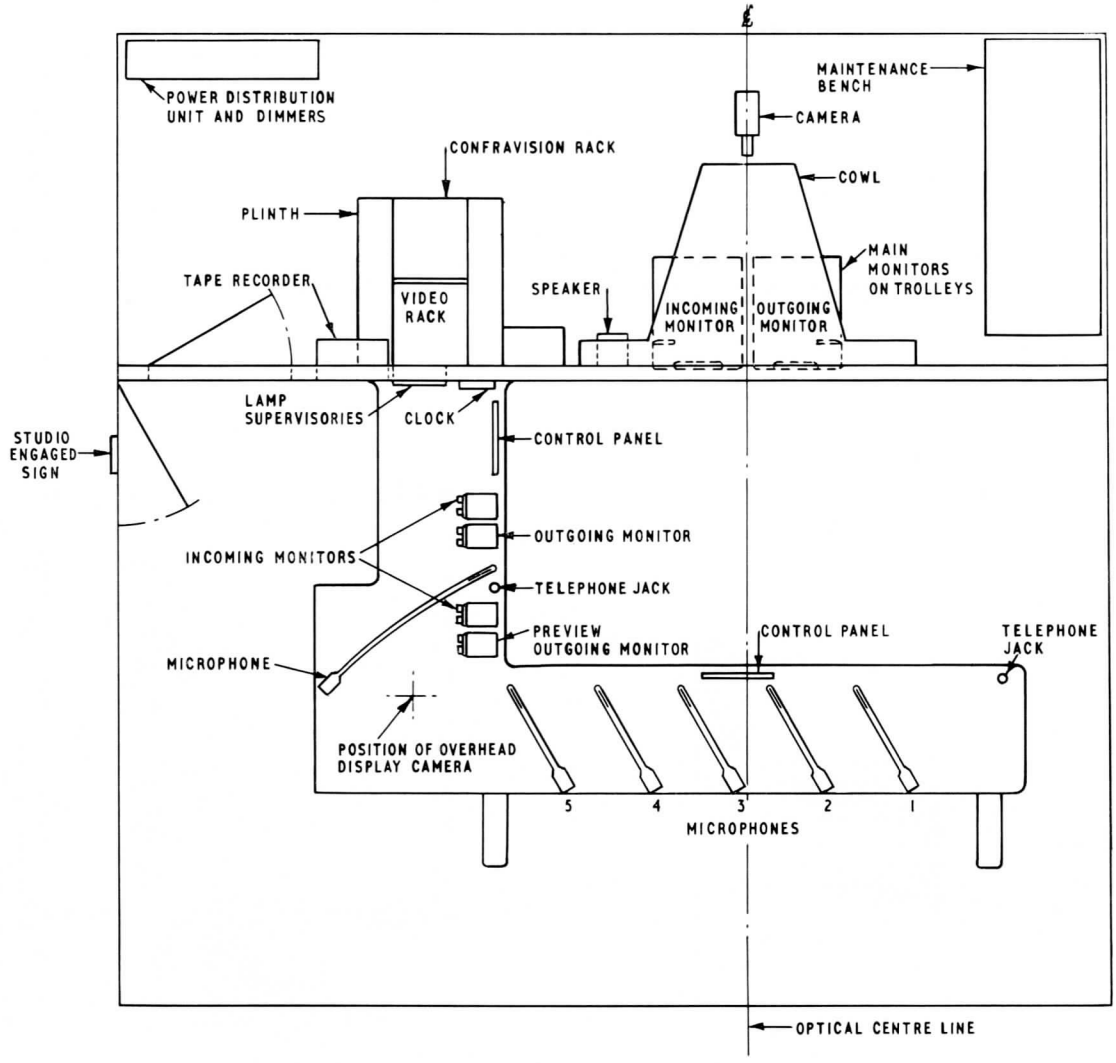


FIG. 3—Plan of conference studio and equipment room

Two small monitors mounted on the secretary's table (see Fig. 4) enable him to see what is displayed on the main monitors and a preview button enables him to view the display material before the signals are connected to the outgoing circuit.

A clock, which is in view of all the conferees, shows real time and light signals indicate five minutes and three minutes from the end of the booked conference period and also the end of the booked period. The circuits will not be cut automatically at this stage but the chairman will be expected to wind up the meeting when the light indications appear. Both the chairman and the secretary have identical control panels so that either one may operate the controls. Control is effected by illuminated push-buttons as shown in Fig. 5.

The design requirements of a Confravision studio are considerably different from those of any other type of television studio. In some ways, because cameras, seating and lighting are fixed, the problems are easier but, in other ways, because unrestricted bothway speech and vision are required, the technical problems are much greater. In addition, it is essential that the system be simple to operate, since Confravision studios will mostly be used by non-technical people.

The display monitors and loudspeaker circuits have been extended to outlet sockets in the reception area, so that extra viewers can see and hear the conference if this is requested by the chairman in advance.

Equipment Room

In addition to the camera, monitors and loudspeaker, the equipment room also houses the two equipment racks, a work bench, power controls and test equipment. One equipment rack holds the video- and sound-circuit terminal equipment and the other, all the equipment associated with the studio facilities, such as microphone amplifiers. A block diagram of the communications system is given in Fig. 6.

Three rack-mounted telephone handsets have been provided and space allocated for the provision of *sound-in-sync* equipment which will be installed early in 1972. Because of the unusual design requirements and the short time-scale available, all the design work and the construction of the equipment was done by B.P.O. staff.

CIRCUITS

Vision Circuits

For the trial period, the vision signal will be carried on second-choice radio protection channels. Protection channels are provided on most microwave radio routes to improve the circuit reliability, and if one of the working radio channels fails, the protection channel is automatically switched into service. On some routes, two protection channels are provided and the second protection channel is only taken on

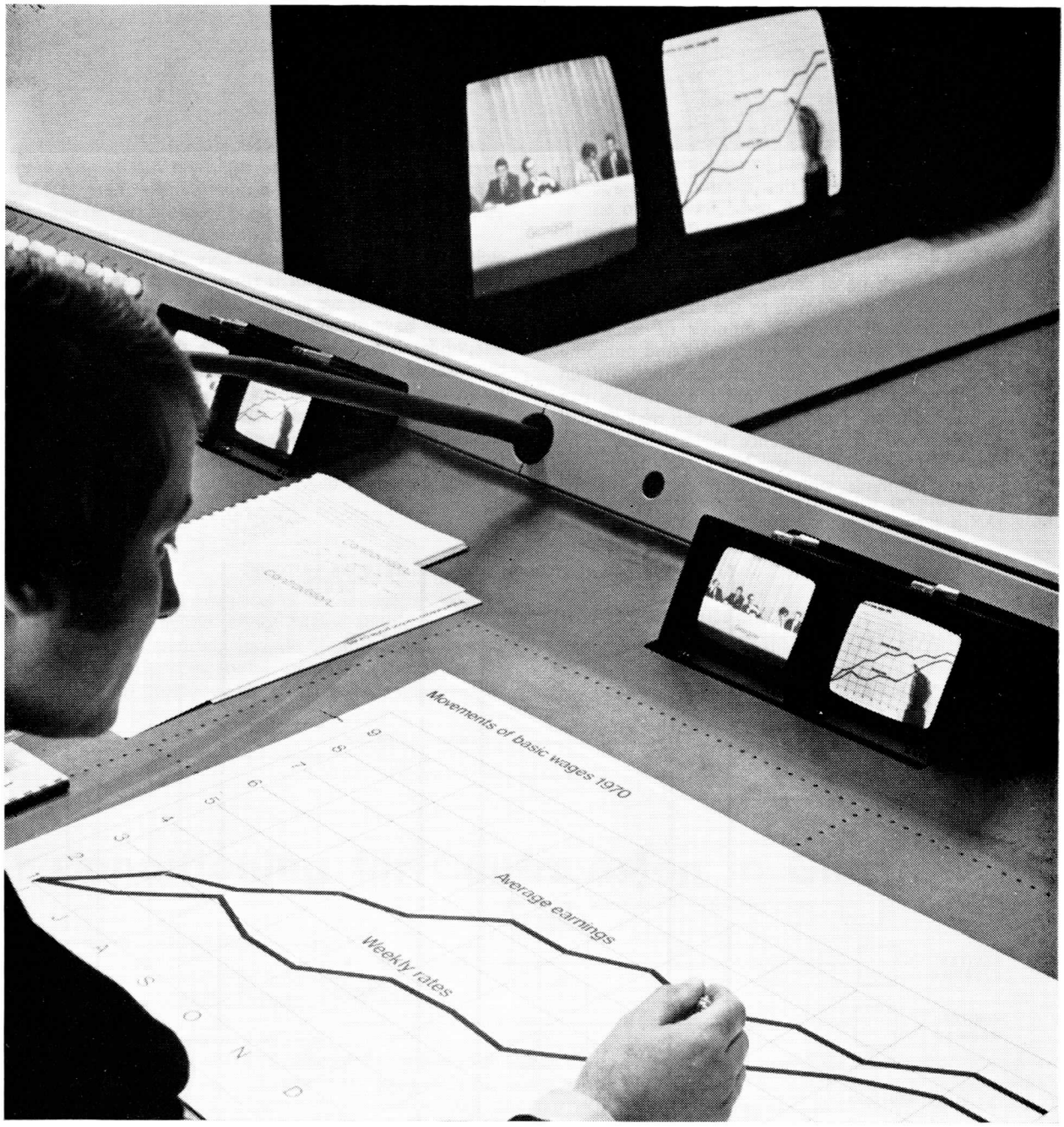


FIG. 4—Display facilities on secretary's table

those rare occasions when there are two simultaneous failures. For Confravision purposes, the second-choice protection channels have been connected via the automatic switches to video extensions which terminate in the Network Switching Centres (N.S.C.). Hence, when the automatic switches are in the normal position, there is a vision circuit through from N.S.C. to N.S.C. and all the setting-up required for conferences can be done in the N.S.C.s. This reduces the number of points to which instructions have to be sent to set up calls and also the risk of errors.

These arrangements do not affect the normal operation of the protection channels which will be automatically switched from Confravision to a working channel if the need arises. It might be argued that this will give an unreliable service and be a source of complaint if communications are broken during a conference. However, this is unlikely because the second protection channel is rarely switched so the loss of service during a Confravision call is highly improbable.

Sound Circuits

The sound circuits must be capable of giving high-quality speech and so program circuits have been provided. The circuits link the N.S.C.s and can be switched in tandem in the N.S.C.s as required except in Scotland where the circuits are routed into Glasgow direct and not via the N.S.C. at Kirk O'Shotts. Arrangements are being made to replace these sound circuits with *sound-in-sync* equipment. This is a system developed by the B.B.C., capable of handling frequencies up to 14 kHz. The sound signal is converted into a form of pulse-code modulation which is injected into the line synchronizing pulses of the vision waveform. The reliability of the system as a whole is improved because separate sound circuits and the associated sound-switching equipment are not required. The obvious disadvantage is that when a fault occurs both sound and vision are lost simultaneously. The effect of this, and the customers' reactions, must be evaluated during the trial period.

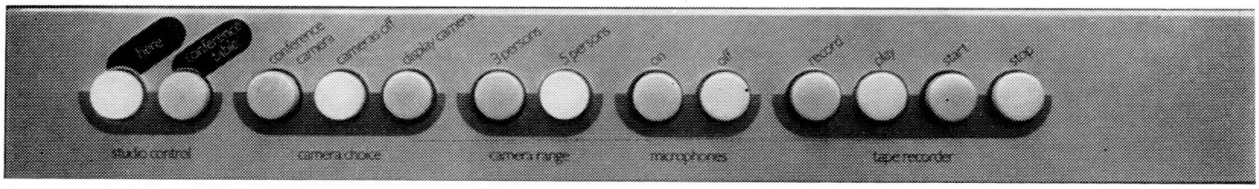


FIG. 5—Control panel

Telephone Circuits

With a Confravision type of service, reliable communication is essential and so, in addition to the main sound and vision circuits mentioned above, a number of telephone circuits have also been provided. For incoming and outgoing calls, the studio attendant has an exchange line with an extension telephone in the studio so that the conferees can speak to the attendant or, if required, they can make a call from the studio whilst the conference is in session. The attendant also has a direct line to the N.S.C. so that immediate contact can be made with the staff responsible for switching and maintenance. A second telephone mounted on the rack in the equipment room is connected in parallel so that the maintenance staff, working in the equipment room, can also have direct contact with the N.S.C. Two other telephones have been provided in the equipment room for the use of the maintenance staff. Their main function is to give an alternative means of communication if a Confravision sound circuit fails. In such an emergency, the staff can set up calls to the distant studio and, thereby, restore the sound circuit to enable the conference to continue, although the quality will be degraded.

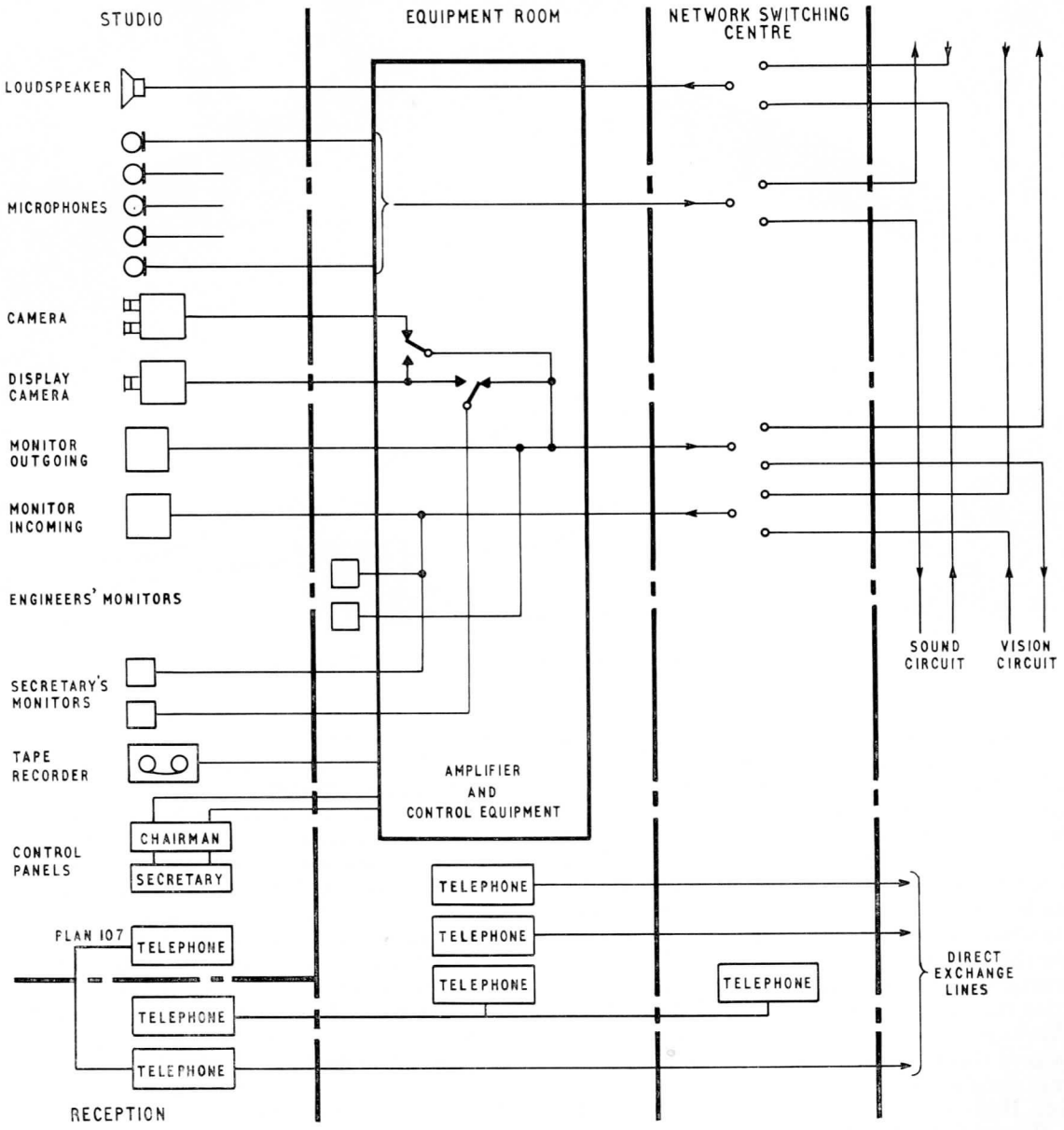


FIG. 6—Block diagram of communications system

PROCEDURE

It is essential that the conference facilities are available for the required periods and to ensure that this is so, all conference facilities must be booked in advance. A centralized booking duty has been established in Telecommunications Headquarters, Gresham Street, London, which will deal with all circuit and studio bookings on a first-come first-served basis. B.P.O. staff, wishing to use the circuits or studios for maintenance or conferences, must also book time to ensure that the facilities are available to them when required.

The booking duty will telex details to the regional Confravision marketing managers, so that they can arrange for the studios to be attended when the conferees arrive, and to the N.S.C.s giving the times when the circuits must be switched.

On entering the suite, the conferees will be met by the attendant who will give them what information they require on the use of the studio and instruct the chairman (and secretary if there is one) on the operation of the simple controls which have been provided. The attendant will stay outside the studio and maintenance staff will not be allowed into the equipment room during the conference sessions.

THE FUTURE

The market trial will be conducted until late 1972 in order to assess the commercial prospects of the service, and establish whether changes in the service offered should be made. Factors to be considered will include the difficulties created from simultaneous loss of sound and vision transmission, the serviceability of protection channels, and the effectiveness of the booking and switching procedures. If the market trial is successful, permanent circuits will be provided and extension of the service to other centres will be considered. Although the emphasis during the trial period will be on Confravision between B.P.O. studios, other forms of utilization may have to be considered. Private firms who foresee a large use for this service may prefer to have a studio on their headquarters premises, and if a similar studio is not warranted at the outstations, then the outstation staff will be able to attend at a B.P.O. studio and hold a conference with their headquarters. The studios might also be of occasional use to the broadcasting authorities. News reporters could use them and be linked directly into the television network or they could be utilized for the interview type of program, the interviewer being in the main television studio and the interviewees in any B.P.O. studio.

International Confravision is no pipe dream. There is at present a regular world-wide exchange of television programs by microwave and satellite and the same circuits, with standard conversion equipment if necessary, can be utilized for Confravision. It is, therefore, feasible for any studio which may have been designed for broadcast television or Confravision to be directly connected to a B.P.O. studio in this country.

ACKNOWLEDGEMENTS

The author wishes to thank Kenneth Grange for permission to reproduce Fig. 2 and colleagues in Telecommunications Headquarters for their assistance in preparing this article.

Air Conditioning for Confravision in Glasgow

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The introduction of the British Post Office Confravision service required the provision of small television studios in each of the cities from which the service is to operate. This article describes the air-conditioning system installed at Glasgow where the first of the uniformly-designed studio suites has been completed.

INTRODUCTION

The Confravision studio suite in Glasgow comprises the studio with its associated equipment room, a reception room and waiting area, male and female toilets, and a plant room for air-conditioning equipment. Although the suite is not large, the total floor area being about 1,500 ft^2, the enclosed nature of the accommodation and the stringent environmental requirements mean that air conditioning is the major accommodation service.

DESIGN REQUIREMENTS

The design conditions for the Confravision studio and equipment room are:

temperature – 68°F ± 3°F dry bulb,
humidity – not to exceed 60 per cent relative humidity,
noise level – not to exceed Noise Criterion No. 20.[1]

In addition to these requirements, the system must allow for an occupancy of 10 persons, with smoking permitted, and there must be no transfer of speech sound from within the studio area. Conditions for the reception areas and toilets are based on the studio space conditions but need not necessarily be held to the same limits. As the suite is constructed within an existing building and as the construction is massive to achieve acoustic isolation, the heat losses are negligible. The plant must, therefore, handle all 15 kW of heat dissipated by equipment, lighting and people.

AIR DISTRIBUTION

Input air distribution is at high level with ducts above false ceilings. Ceiling-mounted diffusers are used in all rooms except the studio, which requires an air change rate of 22·5 air changes per hour. This is too high for conventional diffusers, bearing in mind the low permissible noise level, so a ventilated ceiling is utilized in the studio. Air is fed into the space above the ceiling, the surface of which is a perforated material

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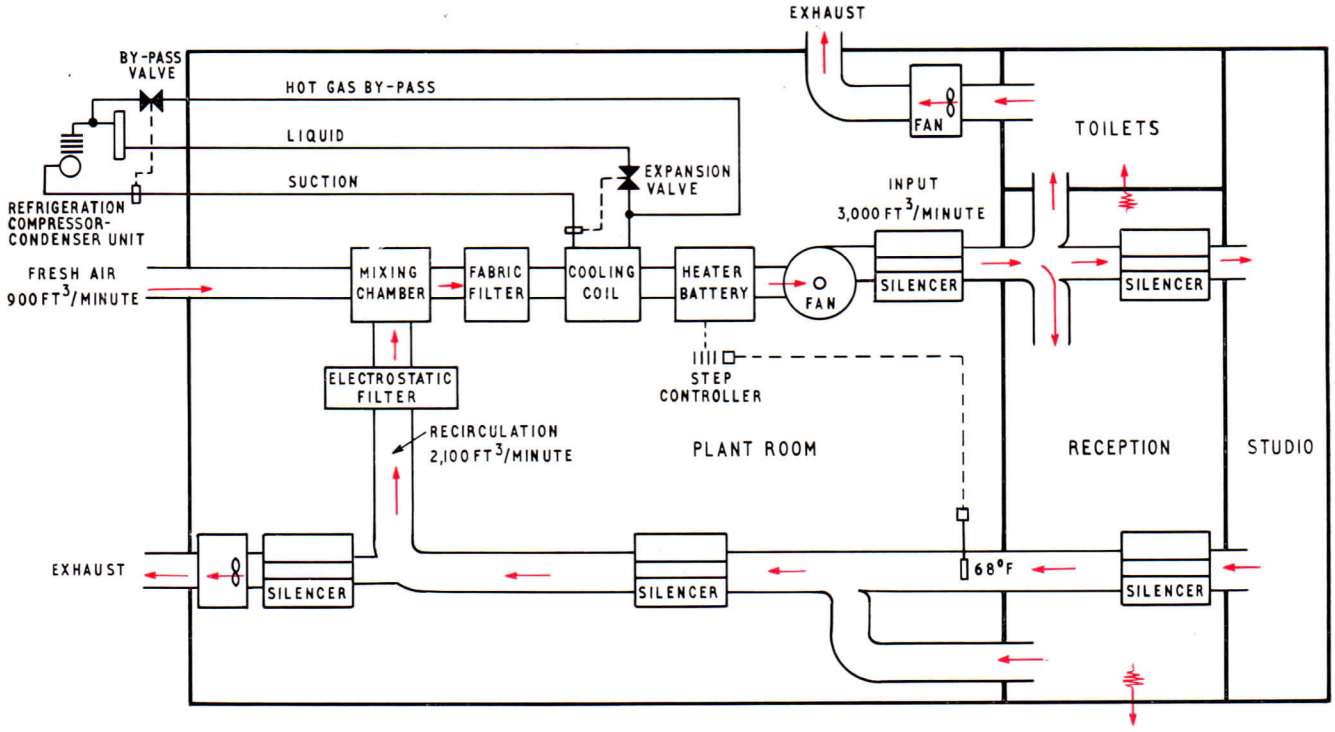

FIG. 1—Glasgow Confravision air-conditioning System

allowing an even distribution of air from its whole area. To operate successfully there must be a uniform pressure above this ceiling. In the Glasgow studio, the total space above the ceiling is too great to ensure an adequate pressure build up and, therefore, a functional ceiling has had to be installed between the decorative ceiling and the structural slab above.

As the studio area is well sealed, the air extract must equal the input so that there is no pressure differential. The reception and waiting areas are kept at a positive pressure to prevent infiltration from the entrance and the toilets, a negative pressure being maintained in the latter.

THE PLANT

The requirements of the system, related to its size, indicate that closeness of control is more important than economy of operation and, as the heat load is fairly constant, a system was designed using fixed air quantities with maximum recirculation. The capacity of the air-handling plant is 3,000 ft^3/min. Fig. 1 is a block diagram of the system. Allowing for a possible maximum of 10 people in the studio, and also 10 in the waiting area, the fresh-air requirement is 900 ft^3/min which is 30 per cent of the input quantity. Re-circulated air is filtered by an electrostatic air-cleaner to remove tobacco smoke before mixing with the incoming fresh air. From the mixing chamber, the input air passes through a fabric filter before reaching the cooling coil and heater battery.

Operation of the system, having high internal heat-gains and 70 per cent recirculation, requires cooling at all times irrespective of the outside ambient conditions. Direct expansion cooling is used, evaporation of the refrigerant liquid taking place in the cooling coil. Heating is required for final adjustment of the room air condition and this is provided by an electric heater battery. The refrigeration compressor and air-cooled condenser unit has a capacity of 7 tons refrigeration[2] (84,000 B.t.u./h). It is installed outside the building in a suitable open-air location to ease condenser cooling and to isolate compressor noise from the studio suite.

CONTROL

The refrigerated cooling is controlled by the evaporator suction-pressure being maintained constant in the cooling coil. A hot gas by-pass is used in addition to the normal expansion valve on the cooling-coil liquid inlet. A by-pass valve, modulating in response to a rise or fall in suction pressure, injects compressor discharge-gas back to the evaporator inlet. Air leaving the coil is thereby kept at a steady condition of 50·5°F dry-bulb, the wet-bulb temperature being 49°F at maximum summer ambient load. Subsequent control of the air condition is effected by the heater battery which is operated by a step controller in response to a potentiometric thermostat in the return air-duct. This maintains the room temperature within the design limits and inherently provides the re-heat facility to keep the relative humidity below the required 60 per cent.

NOISE

Silencers are installed in the main supply and return air-ducts in the plant room and again in the supply and return air-ducts to the studio and equipment-room area. A small silencer is also fitted to the exhaust air fan. In addition to the silencers, the main ducts are lined internally with 1 in thick acoustic lining. The fans have the normal anti-vibration mountings and flexible duct connexions.

CONCLUSION

The concept of Confravision required the design, decor and finish of the whole studio suite, and its associated engineering services, to be of a very high standard. This, coupled with the special technical requirements produced many unusual problems in planning and installation which were solved by close co-operation between all concerned with the project.

References

1 *Institution of Heating and Ventilating Engineers (I.H.V.E.). Guide 1965*, Section 15G1.1.
2 *I.H.V.E. Guide 1965*, Section 13.2.3.