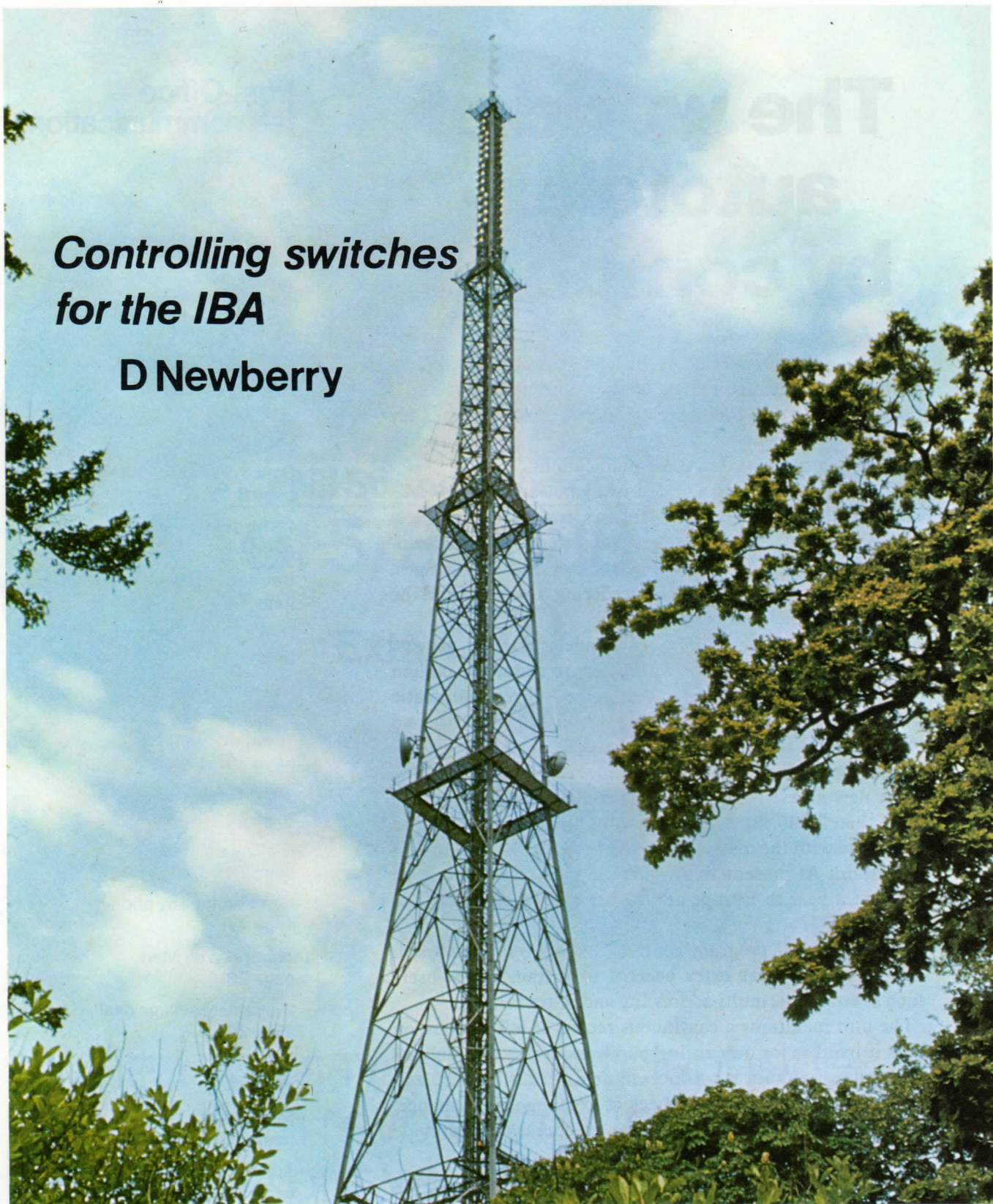


Controlling switches for the IBA

D Newberry



The IBA's Croydon transmitter.

AS MILLIONS of viewers settle back each evening to watch television programmes like *Coronation Street*, *Crossroads*, and other popular offerings from the Independent Broadcasting Authority (IBA), Post Office staff at network switching centres (NSCs) up and down the country are busy making sure that what appears on the

screen is in line with the schedules of the programme companies.

The NSCs are, of course, the vital control points in the national network of vision and sound links which the Post Office provides for both the IBA and the BBC. These links interconnect the broadcasting authorities' own programme switching centres (PSCs), stu-

dios, monitor centres and transmitters. Fifteen NSCs are currently operating in the main population centres where broadcasters' and other customers' studios and other premises are located.

The NSCs do not perform switching for the BBC as the BBC1 and BBC2 networks are static and programmes

come mainly from London. Any switching for local news etc. is usually done by the BBC itself at its own switching centres. The independent television programmes, however, are transmitted over the IBA network of links which are switched by Post Office staff at the NSCs in accordance with the requirements of the programme companies.

The switching of the links is co-ordinated by the IBA at their lines booking office. A daily schedule of switching and the connections to be made are normally sent out a week in advance of programmes to nine of the NSCs where switching is frequent and random. The remaining NSCs, where switching is infrequent and at regular times throughout the week, hold a permanent schedule.

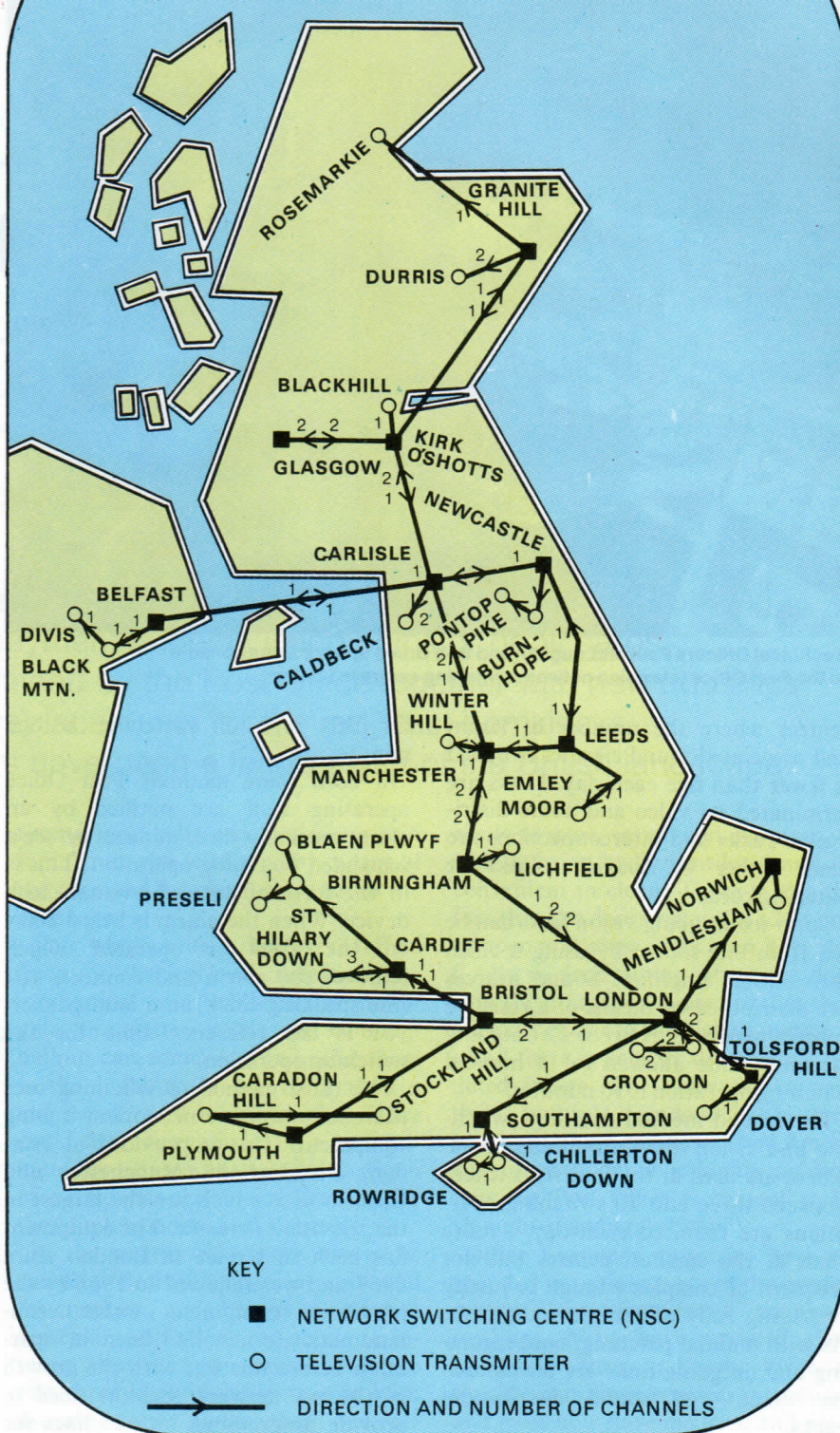
Amendments to the scheduled switching patterns – often caused by late programme changes – are received regularly from the booking office and half an hour is allowed as the minimum notice. A large number of amendments are accepted, however, within a tighter timescale depending on the NSC workload at the time.

Links can be switched to enable the programme companies to pass information to each other or allow them to transmit locally only and/or nationally. The NSCs, for example, connect the links that enable viewers to see the main news from ITN (London) followed by a local news programme produced by the company covering their particular region. Later they might see Crossroads from ATV (Birmingham), Coronation Street from Granada TV (Manchester), and then perhaps a documentary from Scottish TV (Glasgow), as well as programmes from other companies.

The programme companies have their own switching equipment in their programme switching centres and using this they switch incoming programmes, or their own programmes, to the local IBA transmitter. They can also switch their programmes to the outgoing network link and can use the equipment for internal purposes, such as connecting studios, where programmes are being made, to video tape recorders, which may be housed in a different part of the building.

Between programmes and at allotted times during programmes, advertisements are shown. These may be sent out by the company using the network at the time or alternatively other companies may switch from the network to show their own commercials

The permanent vision network provided by the Post Office for the IBA



locally. It is during this period that Post Office staff at the NSCs rearrange link connections to conform with the next pattern required.

Basically, Post Office switching equipment provides for the interconnection of incoming and outgoing links so that any source or incoming link can be connected to any destination or outgoing link. An outgoing

link, however, can only be connected to one incoming link at any given time: the equipment is also designed to ensure that transmission suffers minimal distortion.

There are three ways in which the switching operation is performed. The first method is by manual patching which is done in all NSCs and is the main switching facility in seven small



Technical Officers Paul McLoughlin and Bob Bruce at work at the console in the Post Office television network switching centre in London.

centres where the number of vision and associated sound circuits switched is fewer than five each day. Links are terminated on video and audio distribution racks and interconnections are made either by coaxial u-links or patching cords.

Up to six outgoing vision links can be fed from one source by using a video distribution amplifier. Sound sources are distributed by means of a resistive splitter which feeds up to 12 outgoing circuits. Time allowed for a manual patching operation is 10 minutes.

The second method uses key switching and vision distribution amplifiers. These are used at the four NSCs where between three and 10 switching operations are required each day – more than at the smallest centres but not frequent or complex enough to justify providing fully automatic equipment. As with manual patching, both incoming and outgoing links are terminated on vision and sound distribution racks.

For vision, incoming circuits are permanently connected by u-links to distribution amplifiers and for sound, incoming circuits are permanently connected by u-links to resistive splitters. Switching is effected by manual operation of one or more keys. These select the appropriate outputs from the amplifiers and splitters and connect them to the outgoing circuits on the distribution racks. Time allowed

for this type of switching is one minute.

In both these methods Post Office operating staff are notified by an alarm normally three minutes before a scheduled switching operation. This is in the form of an audio-visual clock device. When the alarm is heard a key on the clock is operated which removes the alarm and connects TIM (the speaking clock) to a loudspeaker. TIM is the reference time for the switching operation.

The third method of switching uses Marconi automatic network switching equipment. This is provided at London, Birmingham, Manchester and Carlisle NSCs which are the largest in the television network. The equipment has been in service in London since 1967 and was followed in 1968 by the provincial equipment. Other semi-automatic devices had been in operation before this but with the growth of the IBA network and the need to provide programmes on 625 lines for colour transmissions, a contract to Post Office specification was placed for fully automatic equipment.

Incoming and outgoing links are connected automatically at pre-set times after first being programmed by an operator. In London the equipment provides for 30 sources and 40 destinations while at the other three centres there is provision for 15 of each. The time allowed for this type of

switching is 10 seconds except for the Friday night change-over in London between the Thames and London Weekend Television companies. On this occasion the feeds to the Croydon transmitter are switched over almost instantaneously, and on odd occasions viewers may detect a frame roll.

The equipment is in four basic parts. The control panel and the visual display panel are in the television control room, while the clock unit and the switching equipment are housed in the television repeater station. The control panel is mounted in a console and has two modes of operation – monitor or operate. In the operate mode the console controls are energised, thus allowing the operator to program the equipment for source to destination connections and their timing. In this mode, control of switching operations can also be effected under manual control if necessary. The monitor mode enables monitoring at the console for sound and vision on all sources and destinations.

The visual display panel is mounted in front of the console. It gives an alphanumeric display of all patterns programmed into the equipment. Each destination has three displays each showing the sources, represented by two-digit numbers, which are and will be connected to that destination in the next two switching operations. As each switch occurs the information moves up one stage – “Next Event” to “On Air”, “Store” to “Next Event” and the “Store” display is extinguished ready for the operator to program a new event.

The switching equipment is made up of electronic transmission path and electro-mechanical control and storage equipment. The latter uses motor uniselectors because of their high rate of search – 200 steps a second.

Operation of this equipment calls for the ability to translate switching requirements into the minimum number of switching operations. In the four years ending December 1977 a total of 151,154 switches had been made of which only 0.032 per cent were subject to mis-operations due to human error. This reflects a very high degree of operational efficiency to which, almost certainly, the average viewer never even gives a second thought. . .

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