PERMUS – A NEW RANGE OF DIMMERS

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Having graduated in Electrical Engineering at Imperial College, London in 1970, David returned to complete an apprenticeship with GEC Telecommunications in Coventry.

However, a keen interest in stage lighting, actively pursued at school and University, soon attracted him to the position of electronic design engineer with Strand in 1971. During the next few years he was responsible for the electronic design of, amongst other systems, the IDM replacement (MSR), MMS, Lightboard and DUET, and as Systems Development Manager since 1978 he subsequently supervised the TEMPUS, GALAXY and PERMUS projects.

He is now Manager, Development Engineering, responsible for all Strand lighting product.

AFTER a product life span of 17 years, Strand's standard dimmer system STM (and its predecessor JTM) are being replaced by a totally redesigned range. For an electronic product to enjoy such an extended life says a lot for the accuracy with which the product suited the market and, consequently, set exceptional requirements for its replacement! However, 17 years of sales also produced a considerable amount of hindsight, and thus PERMUS has been able to incorporate those changes most desired by today's purchaser. These were an enhanced technical specification, easier contracting, greater reliability, a range which could be stocked for improved availability and, of course, lower cost.

Inevitably, the technical performance enhancements revolve around the dimmer electronics and here three main changes occur. The new dimmers are "hard-firing", meaning that the thyristor conduction is continuously enforced for the whole duration of each half cycle it is signalled to conduct. This enables the dimmer to control very low loads and inductive (eg. transformer) loads. Secondly, the dimmer law has been improved from the traditional "S"-law to one more closely akin to the T.V. industry's "Square"-law, improving control sensitivity at the top and bottom of the scale. Thirdly, the "bottom set" adjustment on each dimmer has been replaced by an automatic compensation circuit, thus speeding dimmer alignment and improving reliability by eliminating 50% of the components susceptible to dust and dirt.

As before, the dimmer remains fully temperature stable and compatible with all Strand's current and recent Control Systems. Incidentally, the benefits of hard-firing will soon be available to new TEMPUS users.

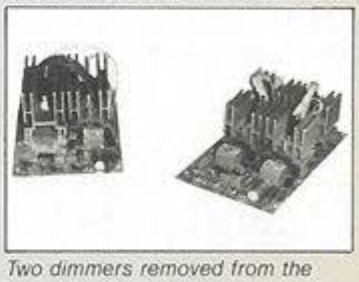
Two basic variants of dimmer module are available — a dual 10A dimmer and a single 20A (or 25A at 220v) dimmer. These are plug connected with easily released fastenings for fast service exchange. They are mounted in two sizes of dimmer rack containing 6 or 12 modules giving nominal ratings of 6 × 5kW, 12 × 5kW, 12 × 2.5kW and 24 × 2.5kW. These are all fitted with a choice of Reyrolle or Siemens EO fusing for UK or European application. The cabinets retain the slim-line features of STM with only front access needed. Mounting can be back-to-wall or back-to-back.

Great attention has been paid to ease of electrical contracting and connection. The top 20% of each rack is devoted to contracting with top access via a full width removable panel. Lifting eyes are provided for ease of mechanical handling as are brackets to allow wall- and back-to-back mounting. Incoming power cables are taken direct to large capacity compression clamps direct on the distribution bus-bars, with compression pad terminals for load and control wiring. Up to 4mm² or 10mm² wires can be accommodated in the 10A or 20/25A versions respectively. A swarf shield is fitted to cover the dimmer electronics during installation, avoiding short circuits due to wire debris.

Advantage has been taken of the change in UK I.E.E. wiring regulations in the 15th edition to simplify the phasing. The new regulations bring the UK a lot closer to European practice, particularly with regard to the removal of restrictions on outlet phasing. This allows the rack to be structured either as a balanced 3 phase rack or a single phase rack (using bussing straps provided). Limited re-phasing is provided, as modules are connected as a block of 2 to a phase (i.e. 2 × 20/25A or 4 × 10A dimmers) and each block can be reconnected to any phase. If, however, the dimmers are connected in circuit using "columns" in sequence then a strict 1-2-3 phase balance is achieved.

Reliability remains of paramount importance, and the technical and reliability improvements detailed above have been achieved with essentially the same component count as STM. With the elimination of all fans, there is now no need for scheduled maintenance. As would be expected, the equipment is designed to meet UK and European electrical equipment safety regulations as exemplified by BS415, and the counterpart IEC65, and is currently in submission for GS approval. Radio frequency interference suppression is fitted to comply with BS800 and VDE 0875 and in addition, substantial iron-cored inductors limit low frequency interference providing a TV standard of filtering on the 20/25A dimmers.

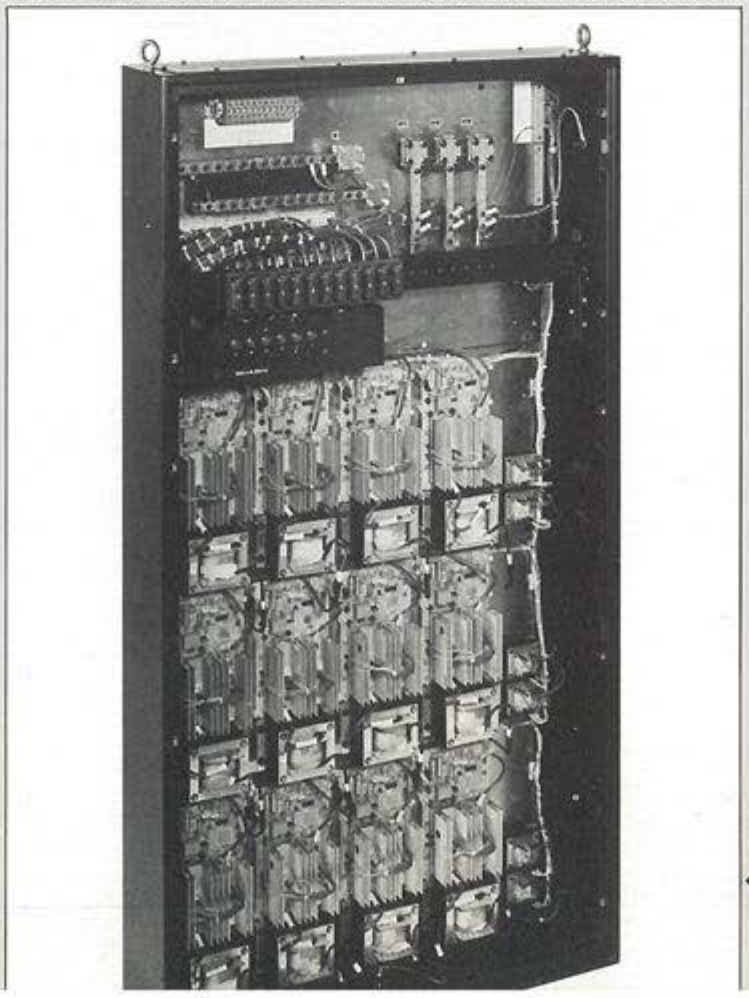
In order to ensure systemetised series production, racks are manufactured and stocked as standard items, giving greatly improved delivery times! This also, of course, aids in cost reduction, directly benefitting the purchaser. The lack of flexibility of configuration caused by inability to subtract individual modules is normally found to be insignificant in an average installation considering the overall cost benefits.



Two dimmers removed from the cabinet.

To complete the range, for custom applications two 50A (10kW) dimmers can be fitted in place of four 20/25A dimmers and a power supply can be added to power TEMPUS Desks. Also a range of Unit Dimmers under the ENVIRON brand name replacing TU, MTU and PTU has been introduced to offer control of 20/25A of tungsten lighting load or 16A of Fluorescent load, with or without 4 level control, which are being marketed under the ENVIRON label.

But why the name? Development started as the TEMPUS dimmer range was being introduced, and the development engineers couldn't resist code-naming it as a permanent dimmer system. It stuck. ■



An open Permus cabinet. Note the access space and slim depth front-to-back and the convenient lifting lugs provided.