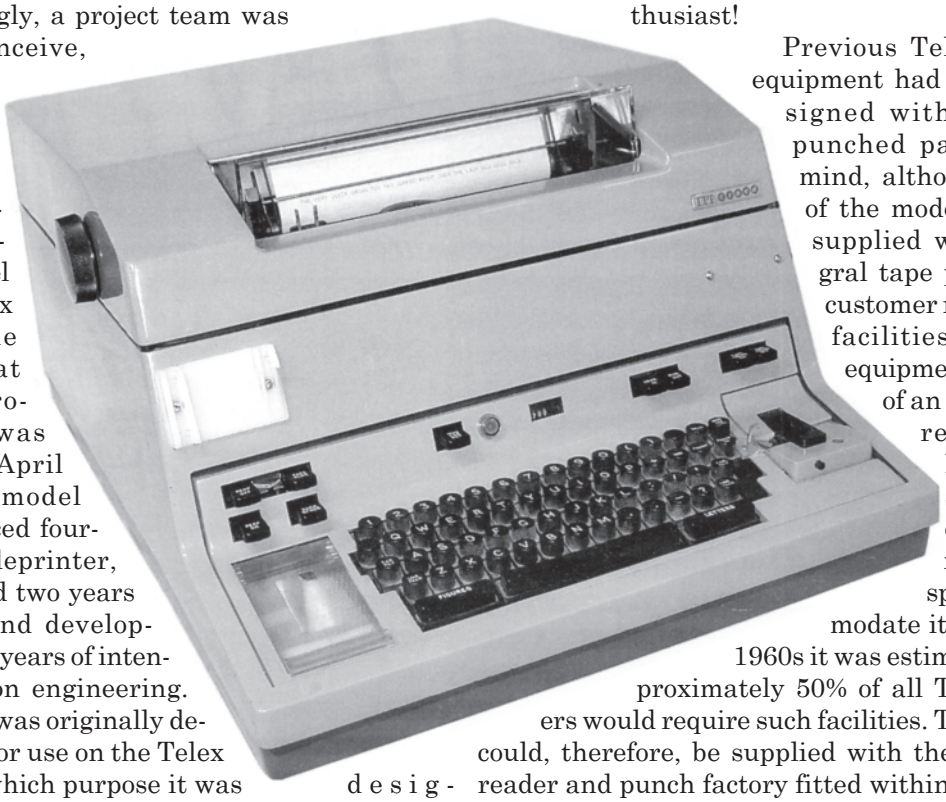
The Creed Model 444 Teleprinter

Alan G. Hobbs, G8GOJ remembers the Creed Model 444, aka the GPO Teleprinter Number 15.
Part of a series "Teleprinters I have known"

By the early 1960s Creed & Company were in something of a dilemma. Their old faithful model 7 page teleprinter (see THJ43), the stalwart of the Telex service since its inception in 1931, was now well past its development limit and desperately needed to be replaced. However, the model 75 page teleprinter (see THJ44), introduced in 1958 and intended as the basis for a new generation of machines, and as a replacement for the model 7, whilst a success in private networks and the developing electronic computer industry, had been rejected by the Post Office for use in the Telex network. Urgent steps were now required if Creed & Company were to continue as a major supplier of teleprinters to the Post Office.

Accordingly, a project team was formed to conceive, design and prepare for production an all new heavy duty page teleprinter to replace the model 7 in the Telex network. The machine that this team produced was launched in April 1966 as the model 444 (pronounced four-forty-four) teleprinter, which followed two years of research and development, and two years of intensive production engineering. This machine was originally designed solely for use on the Telex network, for which purpose it was designated Teleprinter Number 15 by the Post Office, and was not intended to be sold to other customers. In the event, however, the machine was eventually released onto the general market, where it became popular with private network users as well as the Post Office. This was to be the first major new product to be produced at the Hollingbury factory on the outskirts of Brighton in Sussex, and a new assembly line was set up for the purpose of producing the model 444.



Not only was the machine designed for an extended maintenance period of 1000 hours, but it was also designed to have a modern and streamlined appearance in accordance with the Post Office policy that the external appearance of equipment had to receive the approval of the Council of Industrial Design. The complete machine, including integral paper tape reading and paper tape punching facilities was enclosed in a stylish silencing cover. The cover, two large aluminium pressure diecastings, was designed by Mr David Mellor, RDI, DesRCA, FSIA, who had already received seven Design Centre awards, more than any other designer, and at the age of 31 was the youngest person to be honoured with the title Royal Designer for Industry. This was, indeed, a departure for Creed and Company who previously had paid, perhaps, too little attention to the aesthetics of their finished equipment. Unless, of course, you are a committed teleprinter enthusiast!

Previous Telex terminal equipment had not been designed with the use of punched paper tape in mind, although versions of the model 7 could be supplied with an integral tape punch. If the customer required such facilities, additional equipment in the form of an external tape reader would have to be supplied, requiring yet more desk space to accommodate it. By the mid-1960s it was estimated that approximately 50% of all Telex customers would require such facilities. The model 444 could, therefore, be supplied with the appropriate reader and punch factory fitted within the machine or, as a last resort, they could be fitted on site to a basic machine. This would entail the replacement of the keyboard mask assembly, and the fitting of the appropriate sub-assemblies. The machine already contained the appropriate electrical wiring required for the sub-assemblies.

To meet the need for low maintenance costs, coupled with economic production, the design approach exploited modern manufacturing techniques to obtain better and more accurate parts, and so reduce the complexity of assembly and the number of adjustments. The basic machine consisted of 12 major units which were fully inter-changeable with the minimum of re-adjustment being required. The units

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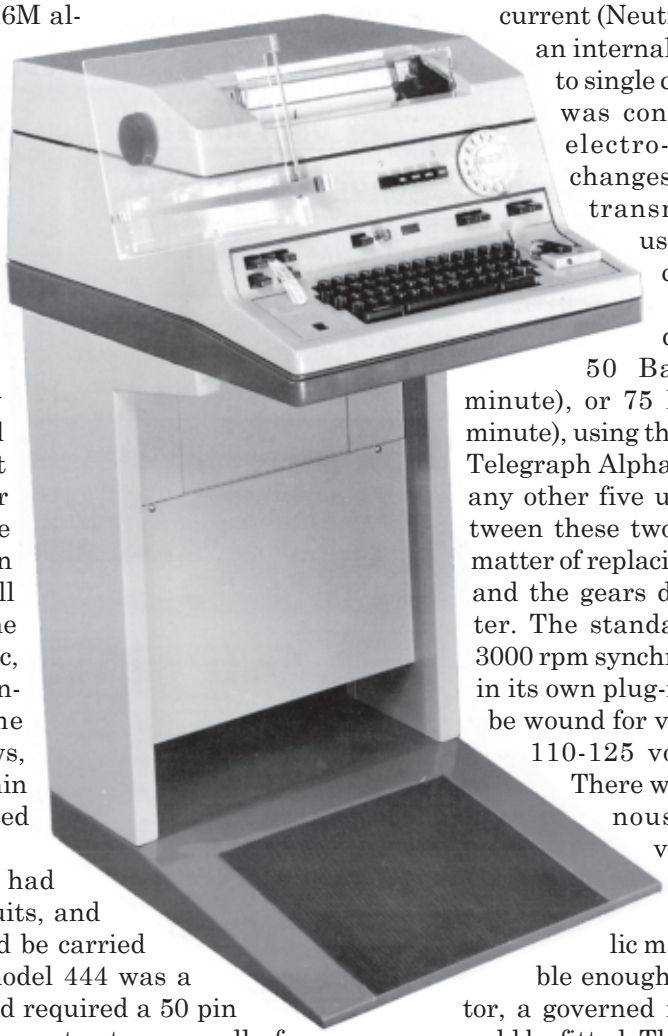
were mostly constructed on aluminium alloy castings, which were produced by a pressure die-casting process. These castings combined the advantages of good rigidity and stability, fine detail and minimum machining with low production costs. The extensive use of plastic mouldings for parts of the mechanism, as well as static parts, was an innovation that improved the product as well as reducing manufacturing costs. Shielded ball-races, lubricated for life, and with a life expectancy of 10,000 hours, were used on all rotating shafts for accuracy and quiet running.

The new paint finish used on all external parts was a high quality stoved epoxy enamel, as used on the much vandalised STD coin boxes. The cover was in light French grey, and the base tray was in dark grey. All internal aluminium castings were made from either LM24M or LM6M alloy and did not require painting. This preserved the accuracy of the machined surfaces, and avoided further operations to remove paint from tapped holes etc. Similarly, steel parts which were normally oiled were not plated but were finished with a black stain and oil-dipped. This avoided inaccuracy due to surface build up, and working surfaces did not have to be protected, or holes re-reamed to remove plating. In order to maintain the quality of the finish, all of the parts handled by the operator were either plastic, anodised aluminium, stainless steel or satin chrome plated steel. All of the screws, washers and nuts used within the machine were zinc plated and passivated.



Pre-war teleprinters had very simple electrical circuits, and all of the connections could be carried by a nine pin plug. The model 444 was a very advanced machine and required a 50 pin sub-miniature 'D' series connector to carry all of the possible connections required. In addition to the keyboard transmitting contacts and the send-receive switch, the tape reader assembly also contained its own set of transmitting contacts, whilst sharing the common send-receive switch. The tape reader and tape punch had their own local controls in the form of organ-type keys fitted above the keyboard, but they could also be operated remotely by means of separate small electrical solenoids. The 20 character answerback unit signalled when the 'Figures D' code had been received and, separately, when the answer-back unit was actually operating. A contact operating on the receipt of the 'Figures J' Bell code was fitted as standard, but there was provision for fitting many more contacts for special functions, such as switching the attachments on or off, or changing the colour of the printing. The 'Stunt Box' was capable of mechanically recognising up to 44 different characters, in either or both shifts, but not all of these could be signalled externally. For machines that were fitted with the paper tape punch, a tape low alarm contact was provided for external signalling.

The standard working arrangement for the model 444 was 80-0-80 volt double current (Polar) signalling, but it could also be used in single current (Neutral) circuits by means of an internally fitted double current to single current converter, which was connected in the receive electro-magnet circuit. No changes were required to the transmitter contacts when used in single current circuits.

The model 444 was designed to operate at 50 Bauds (66 words per minute), or 75 Bauds (100 words per minute), using the five unit International Telegraph Alphabet number 2 (ITA2) or any other five unit code. Changing between these two speeds was simply a matter of replacing the two motor gears, and the gears driving the hours counter. The standard motor was a 50Hz 3000 rpm synchronous motor, contained in its own plug-in housing, which could be wound for voltages in the ranges of 110-125 volts or 200-250 volts. There was also a 60Hz synchronous motor available for voltages in the range of 110-125 volts. For areas in which the public mains supply was not stable enough for a synchronous motor, a governed motor running at 3750 rpm would be fitted. The voltage ranges for the governed motor were similar to those for the synchronous motor. Synchronous motors were always the preferred option, whenever possible, due to the extended maintenance periods when compared with governed motors. This particularly applied to the lack of carbon dust which was generated by the brushes of commutator motors wearing down during use. Changing the motor simply entailed removing the two screws which held the motor sub-assem-

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bly to the main casting, and fitting the new motor in its place. All sub-assemblies carried their own plug and socket for the electrical connections, so that any sub-assembly could be just as easily replaced.

One of the most striking features of the model 444 was the use of a typewriter style type basket to carry out the printing. The type basket could hold up to 28 type bars, with each type bar carrying two types, giving a maximum possible capacity of 56 printed characters. As would be expected of a modern machine, the paper was kept stationary, and the type basket moved from side to side. Due to the design of the cover, the machine could be fitted with the standard 3½" diameter roll of paper or, for extended operation, a 5" diameter paper roll could be fitted. Paper platens could be supplied which were suitable for either friction feed or sprocket feed stationary, or a dual friction/ sprocket feed platen could be fitted. By suitable adjustment of the printing pressure, up to six-ply paper could be used to provide multiple copies. For the first time, two colour printing was a standard feature, with the transmitted text being in red and the received text being in black.

A four row keyboard was fitted as standard to the model 444, which was a great improvement on the three row keyboards fitted to previous machines although, if the customer requested one, a three row keyboard could be fitted in its place. The four row keyboard had 57 keys plus three pads, and the three row keyboard had 34 keys plus one pad. However, a total of 63 key slots were available, with the 63rd position being reserved for a possible third case shift key. This facility was required with certain East European languages such as Cyrillic. Indeed, the machine could be configured to print in any of the Indo-European alphabets, including those that require printing to take place from right to left instead of the usual left to right.

The design of the machine also permitted it to be used for six unit codes throughout, including both of the tape attachments. These codes would then have a transmitted character of 8½ units, including the Start and Stop units.

The printed text was viewed through a 12" wide moulded acrylic visor which was designed to provide excellent natural lighting to the printed copy, whilst eliminating unwanted reflections from room lighting etc. The visor also incorporated a serrated edge, against which, the paper could be torn from the machine. On the front cover, fitted either to the left or the right as the operator preferred, was a transparent plastic message lectern. The lectern had a horizontal springloaded cursor which served to retain the message forms, and also acted as a line guide.

Other novel uses for plastic materials in the construction of the model 444 included the new 'Answer-Back' drum. In all previous generations of Creed machines, the characters to be set up in the answer-back sequence required separate, hardened steel, 'wards' coded to the individual characters. With the model 444 all this changed. The answerback drum consisted of a moulded plastic hub, upon which were fitted five identical moulded plastic wheels each containing 20 projections, and the five wheels were held in place with another plastic moulding clipped onto the end of the hub. The whole assembly became known as a 'hedgehog', for fairly obvious reasons once you had seen one. To code the answer-back it was simply necessary to break off the individual projections with a pair of pliers. If a mistake was made in the coding, either the particular wheel that was wrong could be replaced, or the whole assembly was replaced. The coding process was then started anew.

The complete machine, including the usual supplies of paper, was 20½" wide, by 25 $^{5}/_{8}$" deep, by 12¾" high, and weighed in at approximately 82 pounds. To ease movement on desks, the base tray was fitted with two rollers at the rear in addition to the usual four rubber feet. By lifting the front of the machine, the weight could be transferred from the feet to the two rollers so that the machine could be placed in position without damaging the surface of the desk. For stand-alone applications, the model 444 could be provided with a matching free-standing plinth. In order to save space, this plinth could also be used to house the Telex signalling unit. In this configuration the Telex dial and controls were mounted on the right hand side of the front cover of the machine. The standard Telex configuration used a standard machine and a similarly styled free standing Telex control unit. This control unit, whilst designed by the Post Office, was manufactured by Creeds at their Treforest factory in South Wales.

A number of patents were granted for new features that were used in the model 444, which is a tribute to the engineers who developed what turned out to be a very popular machine. This was not just with the commercial organisations who bought the machines originally, but also with the Radio Amateurs of the 1980s who snapped them up on the surplus market when they were replaced in commercial service with later generations of machines, or computers.

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