

THE BIRTH OF TABPRINT

THE BEGINNINGS

Around 1975, plans were under way to introduce IBM 5934 mark sensing terminals to NSW TAB operations to replace the then current aging and unreliable operator/keyboard input technology.

These terminals were introduced gradually over a four to five year period starting in 1977 and used OMR (Optical Mark Recognition) methodology, ie "reading" customer markings.

The new OMR terminals were developed from car parking machine and toll road terminals used in Canada and elsewhere and TAB's plan was to use them to replace the operator input, hand keyed terminals (AWA Branch Input Devices - BIDs). The new terminals were operated by customers feeding the terminals with their own tickets.

The IBM manufactured terminals, known as TABMARK 1, replaced BIDs in 11 city TAB outlets, the outer western suburbs as far as Katoomba (where the older NCR cash register type ticket validators were being used), Newcastle and the Central Coast districts. With the later addition of the AWA MRT2 terminal (TABMARK 2) in 1982, the IBM terminals in the city and the entire metropolitan area of Sydney were replaced again with TABMARK 2 terminals.

The relief of IBM terminals from the city and outer western areas resulted in their redeployment to all country areas replacing the then aging NCR validators.

At that time, TABPRINT didn't exist and tickets being used by the TAB's terminals were produced by three suppliers: IBM, Mark Sensing and FairPlay Print.

TABMARK 1- IBM 5934

These terminals used a form of mark sense cards derived from the IBM 80 column punched cards commonly used for computer data input. The "customer mark area" and background printing needed to be produced with an optically non-existent (OMR blind) ink as far as the terminal was concerned, ie the terminal must not be able to "see" the background ink otherwise it registered as a mark.

Each card type had to be identified with the terminal as it was read. This was achieved by printing a sequence of pre-coded marks in the first three columns of each card. As the terminal only read black or blue marks, these "precode" marks had to be preprinted in black on each ticket during the production process and involved incorporating two colours very accurately in one very high speed printing process. This process proved to be one of the most difficult and resource consuming problems to overcome through the entire life of the TABMARK operations.

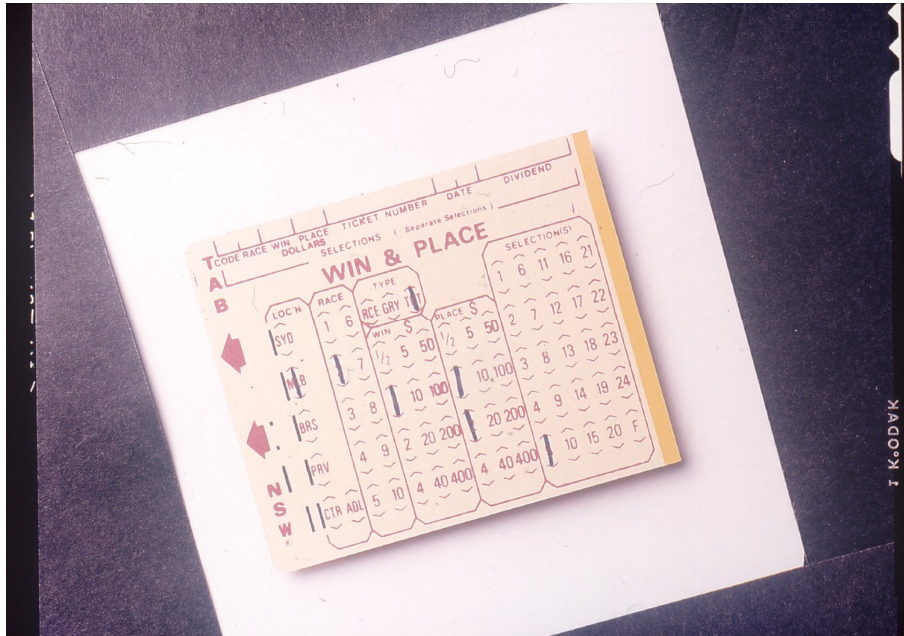


Terry Walsh inspecting a card for ink splashes

Each TABMARK 1 ticket consisted of five mark rows (for customer marks) on the lower part of the ticket while two rows were reserved along the top of the ticket for the terminal to print. The top row was for bet details (including the ticket number) and the second row for the terminal to print a unique barcode for each ticket. While there were five customer mark rows the terminal was capable of reading six rows (five for customer marks and one for the barcode).

The barcode was a sequence of up to 32 vertical bars printed on the ticket by the terminal. The position of bars in the sequence represented the ticket number. The barcode could be detected and read back by the terminal when winning tickets were presented for payment. The terminal then printed the dividend on the ticket and cancelled the barcode to prevent further presentation.

Instead of “reading” punched holes, the terminal “read” the marks placed by a customer. These marks made by blue or black pen or pencil were placed by the customer “selecting” the betting information preprinted on the ticket. Customers’ marks “selecting” the venue of the race, the code of racing (races, greyhounds or trots), the race number, the runner(s) and the amount to be wagered were detected by the terminal. Some tickets were only 32 columns long (win and place, quinellas, doubles), while others were lengthened to 48 columns to accommodate the more complicated bet types (trifectas).



TABMARK 1 win and place ticket

When the tickets had been processed by the terminal, they were returned to customers as their receipt together with a customer balance ticket showing the total of the transaction.

TABMARK 2 – AWA MRT2

Tickets for TABMARK 2 terminals had the same physical dimensions as TABMARK 1 and used the same card stock. This was part of TAB specification and not just good luck as it was prudent to make the best use of the existing ticket production infrastructure.

The TABMARK 2 terminal (AWA MRT2) began development in about 1980. Five years of technology development saw significant improvements in ticket reading, introduction of a high speed print mechanism and a more reliable ticket transportation path.

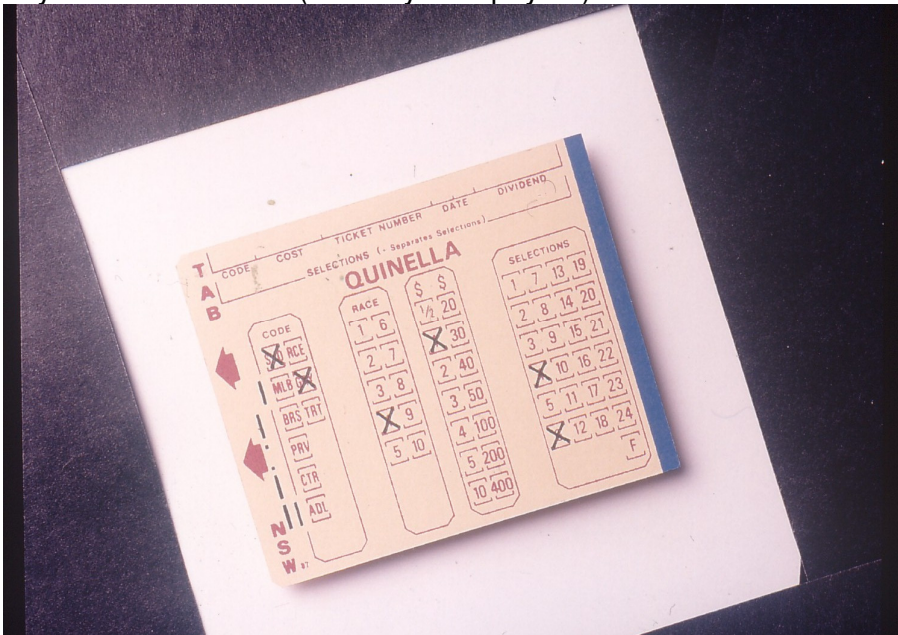
Unlike the TABMARK 1 terminal the TABMARK 2 terminal was only blind to red in the customer marking areas of the ticket so all tickets had to be printed in red. However, the TABMARK 2 terminal was far more flexible with regard to the shade and density of the red ink, unlike the TABMARK 1 ticket which was printed in blue. Thus, TAB ticket printers were able to produce a fairly crisp, clear red ticket.

The TABMARK 2 tickets also required black precode marks. However the development of TAB's ticket printers, by almost eliminating the ink splatter/transfer problem of two colour printing, was somewhat negated by the superior sensitivity of the TABMARK 2 reader. The tiniest visible black dot on the wrong part of the ticket

sometimes produced embarrassing results for the operator with the customer being surprised by incorrect bet details. Customer mark detection by the TABMARK 2 terminal was achieved by electronically sensing the amount of light reflected from the card surface and the lack of reflection, or momentary drop in reflected signal, was determined to be a customer mark. This was known technically as the PCS value (print contrast signal).

The TABMARK 2 terminal also offered seven customer mark rows instead of five allowing TAB a little more flexibility in ticket design and layout. Ralph Walsh used his own personal Amiga computer to create the original TABMARK 2 layouts which, owing to the Amiga's graphics capabilities, produced a very realistic facsimile of the real tickets.

TABMARK 2 tickets required the customer to mark a cross (X) instead of the vertical stroke (|) required by the TABMARK 1 terminal. A considerable amount of re-engineering by TAB terminal maintenance staff was invested in the TABMARK 2 read head to significantly improve reliability and accuracy over the TABMARK 1 original. The TABMARK 2 also required a setup/test ticket, but it was not production critical like the TABMARK 1 TO2 test ticket (described later). When a customer's bet was printed on the ticket by a TABMARK 2 terminal, the barcode was printed in the same position as the TABMARK1 terminal. Again this was part of TAB's design specification. This enabled TAB to offer dividend collection across both systems, ie anywhere in the state (cross system payout).



TABMARK 2 Quinella ticket

Conversion of the metropolitan area offices from BID to TABMARK 2 was much easier than the original state wide TABMARK1 conversions because in the

preceding five years most of the customers had some exposure to the mark sense operation either in the central city or some country areas.

The fact that the TABMARK 2 was a faster selling machine than the TABMARK 1 terminal helped smooth the transition. Up until the TABMARK 2's introduction, queuing in TAB outlets, especially on Saturday mornings, was horrendous. The throughput rate (time to read/print/eject a ticket) of the TABMARK 1 terminal was at best five seconds per ticket, but typically more like seven to eight seconds per ticket on busy networks. However the TABMARK 2 terminal could process tickets in two to three seconds. The TABMARK 2 eliminated the frustrations of long slow queues in every outlet on normal race days where they were installed.

The TABMARK1 terminal was in service for 15 years while the TABMARK 2 terminal lasted 12.

By the mid 1980's, the entire state was equipped with mark sense terminals and the TAB began introducing AmTote RT7 terminals for PubTAB operations which used larger 80 column tickets. The IBM printing equipment described below also included a printing press capable of producing the 80 column tickets.

The PubTAB terminal was designated by AmTote as the RT7, ie the RT7 and FLIGHT, and comprised two different terminals. RT7 was TAB's 3rd Generation Mark Sense terminal intended for PubTAB and small sub agency outlets.

The "FLIGHT" terminal introduced in 1992 was TAB's 4th Generation Mark Sense terminal intended to replace the TABMARK 1 and 2 machines. FLIGHT was a TAB derived name as was TABMARK and EUREKA, while 5934, MRT2 and RT7 were manufacturer designations.

TABMARK 1 AND 2 TICKETS

These tickets were manufactured by IBM on 32 column or 48 column printing presses specially designed by IBM. A jumbo sized roll of card stock was loaded onto a "slitter" that cut the jumbo roll into 20 rolls of card stock known as "cheeses".

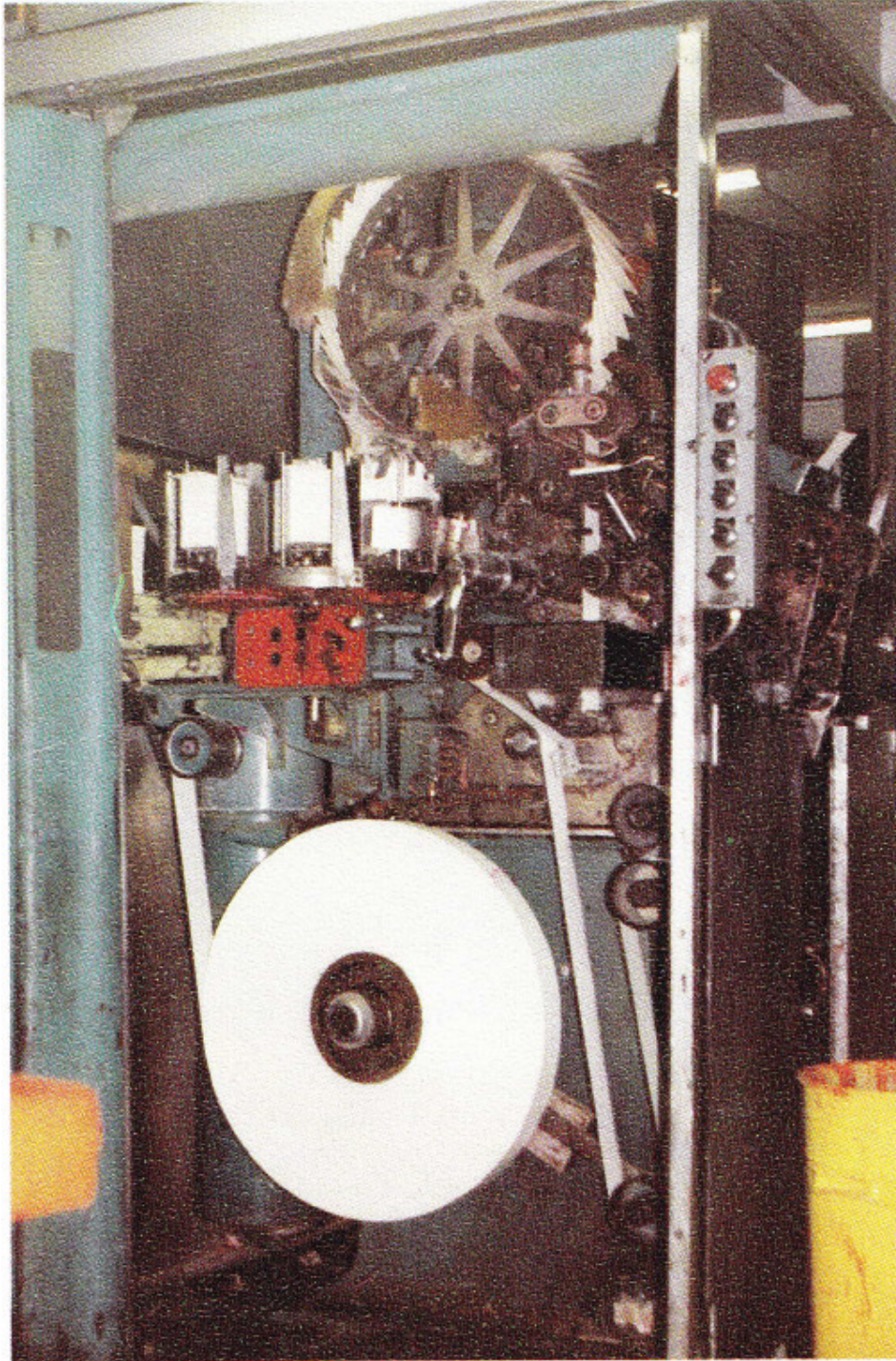


The slitter converted a jumbo roll into 20 cheeses

Each single "cheese" was loaded onto the printing presses.



Terry Walsh setting up a cheese on the printing press



The 48 column printing press printed around 700,000 tickets per day

The printing process then converted the blank cheeses into 32 or 48 column cards. The printing presses were capable of high speed printing and cutting of the tickets to

an exacting ink, print and size standard required for the ticket to be reliably processed by the terminals' operation.

IBM, with their well known technical expertise, designed both printing presses to pack the printed cards into cardboard sleeves containing 2,000 cards. These sleeves were then manually packed into cardboard cartons containing 8,000 x 32 column cards or 4,000 x 48 column cards. The design of these IBM printing presses enabled one operator to print and pack tickets. The ticket cartons were then loaded onto a roller carousel which moved the cartons for pallet packing. As mentioned earlier, printing on the cards where the customer would mark was made using colours from the red end of the spectrum so the detection of the customer's requirements was not compromised.

Drawing of the artwork for the cards was a very skilled operation. TAB was able to use Alf Vassalo, a previous employee of IBM, to create the artwork.

Once the artwork was completed a negative was made depending on the card required. The 48 column was letter press, ie the print block was made the correct way around so it could be read normally from the print block. There were three cards per print block, and for the 32 column offset printer the type was a mirror image, ie back to front. Again these produced three cards per print block.

The negative was then cut to size to fit a frame. From there a cylinder was wrapped with a film and it was exposed to light for a period of roughly 20 minutes. The block with the film was placed into a wash tank where it was sprayed with high pressure water to wash away the unexposed film and caused the type to rise. It was then placed in a specially made box where it was slowly rotated and hardened by ultraviolet light. Once hardened the block was then pushed onto a tapered mandrel and set onto the printing press where it was aligned with a corresponding print block which had the timing marks. This allowed the ticket to be read by the terminals in the TAB outlets.

The 32 column cards were colour coded on the trailing edge: win and place, brown; doubles, green; quinellas, blue. Oddly for a high speed process the cards passed over a small brush to obtain the colour on the cards' edges. The 48 column cards were not colour coded.

THE CARD GAUGE

This gauge was the "gospel" to test check the startup run before the main run commenced. It was made of clear acrylic plate with a very strong alloy border.

On the gauge were etched very fine lines of all shapes and sizes and angles. The gauge was used to show that the relationship between the leading edge of the ticket, precode and customer mark area were correct and the ticket size and corner cut were correct and at the right angle. The practice was to lay the card face up under the plate aligned hard up against the alloy border. Then, by looking through the

acrylic plate, the etched marks should line up with all the critical components of the ticket. If they didn't, the ticket printing was out of alignment.

PURCHASE FROM IBM - THE BACKGROUND

In late 1984 TAB was informed that IBM, the current supplier of its betting tickets, was to cease production of the tickets during 1985. Betting activities consumed about 400,000,000 tickets a year. This would create a significant impact regarding operating costs as well as being vital to continued operations. IBM had other customers for the 32 column cards as Australian banks used them for customer receipts at their ATMs.

In mid January 1985 Russ Mannell and Ern Crowle, executives of IBM, met with the Deputy General Manager (DGM) Allen Windross. At the meeting a proposal was put forward that IBM would sell their card printing business at an agreed price to the TAB on the basis that TAB would continue producing the ATM cards for IBM's current bank customers for two years. The DGM visited the IBM operation situated in a building in Rothschild Avenue, Rosebery, which had been the site of the original Sweetacres confectionary factory.

The DGM called the Management Team together and informed them of the proposal. He appointed Stephen Jack as Services Manager to be in charge of the project. Stephen nominated Philip Bell, Deputy Printroom Manager, as the Project Leader responsible for a Feasibility Study to consider whether the purchase would be cost effective. The timeframe to complete the Feasibility Study was very short. The Study was completed in February 1985 with the recommendation that the TAB purchase the IBM card plant under the terms and conditions outlined in IBM's proposal.

The Board approved the recommendations with the expectation that the IBM equipment would be relocated and in operation by August 1985. An IBM employee, Kevern Jackson, was seconded to assist Project Leader Bell in setting up the operating structure including costings, scheduling and billings. The transfer of key operating staff was critical to the successful transfer from IBM to TAB.

TAB Human Resources made approaches to the key IBM staff members. After negotiations Derrick Adams, Anton Vosila and Mel Pullen transferred to TAB staff at their current wage levels which by TAB standards was very generous. With Linda Candrick from Personnel, Project Leader Bell conducted interviews for additional staff and appointed Ray Harris, Ray Zahra and Bruce Pavlovic.

Nothing precluded the Board from establishing card printing facilities for its own use, but a commercial activity involving production and sale of cards to other organisations, in this case the banks, was outside the provisions of the Totalizator (Off-course Betting) Act. Minister Michael Cleary supported the proposal but an amendment was required to the Totalizator (Off-course Betting) Act.

In April 1985 the Totalizator (Off-course Betting) Act 1964, under which the Board was established and conducted its betting operations, was amended to enable facilities which were not fully utilised for the Board's betting operations to be used for

commercial activities. Such commercial activities were subject to the prior approval of the Governor and these arrangements were subject to the approval of the Treasurer. Approval was obtained from both the Governor and Treasurer.

YAMMA STREET, SEFTON

Ray Hayes, the then Deputy Property Manager, was instructed by TAB to locate and lease suitable premises as a matter of urgency.

Premises were located at 5 Yamma Street, Sefton. These premises had previously been used by the Commonwealth Bank as a cheque printing facility. Consequently they were well suited to TAB's requirements and had the advantage of "existing use rights". This meant that they could be used as a printing facility without the TAB being required to lodge a Development Application with Council. A Building Application was required for minor building works which included a reinforced concrete floor section to take the weight of the slitter.



Entry to Sefton printing factory

The premises had a mezzanine office area as well as lunch rooms, toilet facilities and meeting rooms.

Project Manager Bell and TAB's architect designed the complete layout of the premises to accommodate all the equipment. So well was this operation planned that over the two days the equipment was moved from Rosebery, not one power point was relocated and each piece of equipment was placed in its ideal location just once.

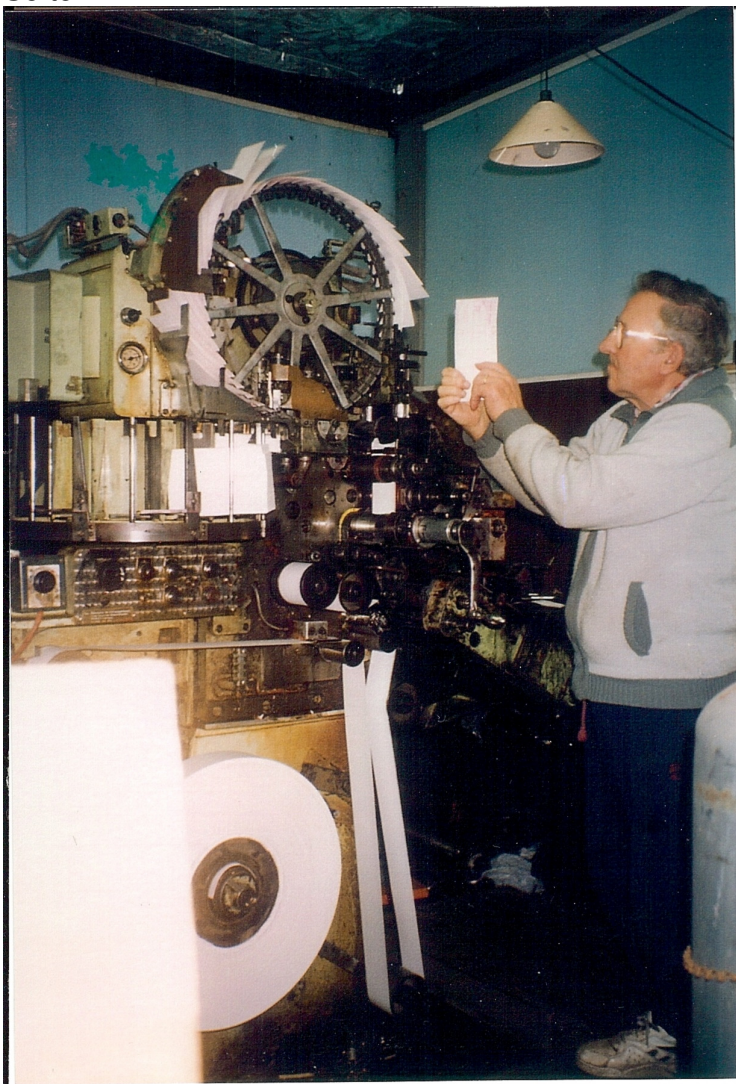
Experience showed the building was not perfect - the location was difficult for trucks to collect the finished boxes of cards and deliver the rolls of card stock. Although under IBM's contract of sale the TAB was expected to supply the ATM cards for the banks, the banks required the TAB to provide commercial quotes in competition with other card printers (Mark Sensing from Victoria, FairPlay Print from Western Australia and Moore Paragon from South Australia). Even though this was a new venture for TAB printing staff the quotes were mostly successful. Not only were they successful but with the exception of one contract always showed a good profit for the TAB. Unfortunately the NSW Treasury took 50% of the net profit. This situation always left staff with the feeling that their good work did not benefit the TAB.

Because of the success of this operation it became apparent that to meet the demand of the TABMARK 1 and 2 tickets and ATM cards before the two year contract date expired, additional printing and slitting equipment would be required particularly as a backup to current equipment. Often two shifts were operated to

maintain supplies. Because of Project Leader Bell's commercial experience, these shifts were run economically and proved again TAB's ability to meet and overcome such challenges.

Thus TABPRINT was born as part of the TAB's family.

A current and highly regarded small supplier of the 32, 48 and 80 column cards to the TAB was GST Enterprises. Gerry Cox the Proprietor was a highly respected printer and during the initial learning process provided TAB staff with much valued advice on printing processes and selection of card stock. Gerry had also indicated that he wanted to retire from the card printing business and was prepared to sell his printing press and slitter to the TAB at a fair and reasonable price. The Board approved the acquisition and arrangements were made to transport the equipment to Sefton.



Gerry Cox inspecting
one of his 80 column
cards

GST Enterprises' 48 column cards were far superior to the other suppliers' cards, just as cost effective but had hand cut corners and were manually packed into sleeves of 2,000. Although trained by expert GST staff, TAB staff could not reach the output by GST to make the production of 48 column cards cost effective. The 48

column press was returned to GST Enterprises who continued to produce the cards on material supplied by TAB. This also enabled TAB to have a backup supplier should there be a major problem with the IBM equipment as the other suppliers did not print the 48 column cards.

Sefton continued to commercially produce 80 column cards for a number of universities at an attractive profit margin.

A problem that occurred with the acquisition of the IBM equipment was that the IBM Maintenance Fitter did not transfer to TAB. Derrick Adams, although familiar with all the printing equipment, did not have the complete expertise that was required to keep the printing presses operating to full capacity. After interviews Bruce Pavlovich was appointed and trained by the IBM Maintenance Fitter. This was not the ideal situation – if a problem occurred outside the expertise of Bruce then down time was experienced until the IBM Maintenance Fitter was able to attend Sefton. The IBM equipment was manufactured in Spain and was aging rapidly. With Bruce's newly gained expertise the equipment was well maintained until he left and John Hannan, a very experienced fitter and turner, continued to keep the equipment running including at times machining parts.

CARD STOCK

The type of card stock used in the production of the cards was critical to successful operation of the betting terminals. The cardstock was specified as 160 gsm and needed a high level of reflectivity to enable the TABMARK 2 terminal's reader to successfully recognise the customers' pencil or pen marks and conversely a high level of purity for the TABMARK 1 terminal which read white light through the card.

Crown Zellabach, a card stock from Canada, was the choice of IBM. It was in their opinion the best available as they had produced ATM cards and TABMARK cards without any problems.

As the TABMARK 1 reader actually read through the card, not only did the customer mark area background ink have to be OMR blind, but the card stock had to meet very stringent specifications with regard to light penetration. This included thickness, colour, density, opacity and purity – any inclusion such as dust, grit etc would register as a customer mark.

Even though the reader technology of the TABMARK 2 was reflective, card stock specifications for tickets were the same as that for the TABMARK 1. Under Government Purchasing Guidelines it was expected that an Australian made card stock should be used. Australian Pulp and Paper Mills (APPM), after discussions with the TAB, was trying to develop a suitable card stock at its Burnie mill in Tasmania. Unfortunately the card stock could not be made to the standard required and the overseas product continued to be used. However it was the most expensive of the cardstock.

In an endeavour to reduce the price of Crown Zellabach the suppliers were advised that the TAB was in negotiations with Australian manufacturers to find a suitable

alternative. In a short period of time, Project Leader Bell arranged a substantial rebate on Crown Zellabach. This in turn produced an improved profit on card production.

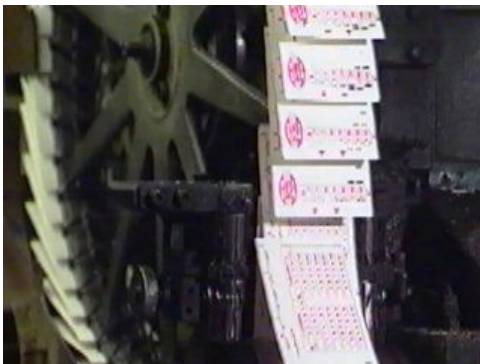
The card stock and ticket production were extremely costly and as such ticket cost as a consumable was quite high. Due to the handy pocket size of the TABMARK tickets the wastage was very high. It was not unusual to find shops writing customers' orders on the back of unused TABMARK tickets. Several initiatives attempted to address the wastage issue but none were completely successful. Ticket cost was significantly reduced when the Flight terminal was introduced as it actually used 120 gsm paper and did not share the strict specifications of the TABMARK ticket. Ticket production was also less costly as the ticket layout was single colour and could be produced on a wider range of printing press equipment.

FOOTYTAB CARDS

When FootyTAB commenced in 1983 generic cards were produced for the Pick the Winners game without showing team names as they were in later years for the Pick the Score and Pick the Margins games. Each week a FootyTAB leaflet was printed with team names and points start to be used by customers to mark their generic FootyTAB card.

As the staff at Yamma Street became more skilled at producing printing plates the turnaround time was reduced allowing for a new process to be developed. This reduced production time to such an extent that by the late eighties the FootyTAB cards could be produced and distributed with the names of teams and points start on a weekly basis - a great boon for customers and a considerable reduction in printing costs.

Further innovation by the TABPRINT staff in the nineties allowed for "special event" cards to be printed. These included black pre-marked constraints saving the customer the effort of marking all fields on a card. Although black ink "splatter" was a minefield for potential terminal read errors, the skill of the TABPRINT staff resulted in a high quality "special event" card which could be used for major events including Melbourne Cup day.



Footy TAB ticket in production on the 48 column printing press

TABMARK 1 TO2 TEST CARDS

This card was IBM's engineering card for the TABMARK 1 terminals. The terminals required a card with a special printed layout of various black ink densities and mark sizes on it for setting up reader alignment. It was so critical that originally it could only be produced on a very accurate flat bed press. The TO2 test cards were used by technicians and any variation in image position, ticket cut, ink density or ink splatter was disastrous as any terminal set up using faulty TO2 cards could not read betting tickets correctly.

There were never any problems with TO2 test cards produced by IBM. However as IBM's stock depleted and the cards were produced at Sefton, complaints began to surface from technicians that the cards were not printed correctly. Despite the combined efforts of Sefton printing staff and TAB maintenance staff the problem remained. However a departing IBM employee revealed the previously non disclosed correct printing for these cards to Sefton printing staff.

The TABMARK 2 terminal also had a test/setup card but it was far less critical than the TO2.

BEVEL CUTS

The major maintenance problem with the printing presses was keeping the bevels sharp to do the corner cut on the betting cards. The corner cut made it easier for the agents and staff to sort the cards. Eventually due to the cost of bevels and down time of the printing presses it was decided to stop doing the corner cuts.

ACCOUNTING AND PAYROLL

As a "commercial operation" the financial accounting was kept separate to the TAB's financial accounting system. A number of commercially developed packages were evaluated and "Attaché" was considered the most appropriate. The Attaché package was delivered to Philip Bell who used it during the years Yamma Street operated. In fact Philip still has the leather case it came in!

Philip was also responsible for the payment of TABPRINT staff. He picked up cash from the Sefton TAB and carried it in a security brief case locked to his wrist and the staff was paid in his office.

Although TABPRINT staff was included in all TAB functions and communications, this system of payment seemed to set the staff aside from other TAB staff. The remoteness from Head Office "fostered" staff members feeling that they worked for TABPRINT rather than TAB. To the chagrin of ex-IBM staff, no production bonuses were paid, however morale among the staff remained high as production continued - at times under difficult circumstances.

CLOSE OF COMMERCIAL PRINTING

By the second year of operations the banks were moving away from ATM cards to the use of thermal rolls. Although card production for the banks was decreasing, TAB's use of the 32 and 48 column cards was increasing rapidly.

It was a sad day for the staff when the highly competitive commercial printing operation stopped. A large compliment was paid by Westpac when they asked if TAB could continue to print their ATM cards as no other supplier would be able to match TAB quality or deliver on time.

Although commercial operations had ceased, the Sefton team continued to produce the bulk of the tickets needed for betting operations.

The commercial equipment was sold to Arthur Frost who still had it running a few years later.

The author, Stephen Jack, has asked that the following persons be acknowledged for their assistance in the completion of this work: Philip Bell, Peter De Low, Grant Green-Smith, Ray Hayes, Mary Janes, Mel Pullen, Peter Staunton, Ralph Walsh, John Willett and Allen Windross. (Editor TABLET)