HB

356

HB 356

Tape #	Date
29	4/17
30	4/17
32	4/19

"An Act creating the Alaska Horse Racing Commission and authorizing pari-mutuel wagering at sanctioned events."

COMMITTEE REPORT

3/28/75 HOUSE JUDICIARY

Mr. Speaker: Date _____

The Committee on COMMERCE has had HB 356 under consideration. A Majority of the members of the Committee

( ) recommends it DO PASS

( ) recommends it DO NOT PASS

( ) recommends it DO PASS WITH ATTACHED AMENDMENT(S)

( ) recommends it BE REPLACED WITH CS FOR _____ AND THAT CS FOR _____ DO PASS

( ) "and" recommends it BE REFERRED TO THE _____ COMMITTEE

( ) reports it back WITHOUT RECOMMENDATION

( ) "other"

Members signing the Majority report:

_____ _____ _____

_____ _____ _____

_____ _____ _____

_____ _____ _____

Members NOT concurring in the Majority report:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

_____ recommends:

_____ Chairman

AMENDMENT

OFFERED IN THE HOUSE: BY: Commerce Committee

TO: ______ HOUSE BILL No. 356

SENATE BILL No. ______

PAGE: ______ LINE: ______

Page 1, line 15

Change the word "twenty-five" to "eighteen"

Page 6, line 8

[illegible]

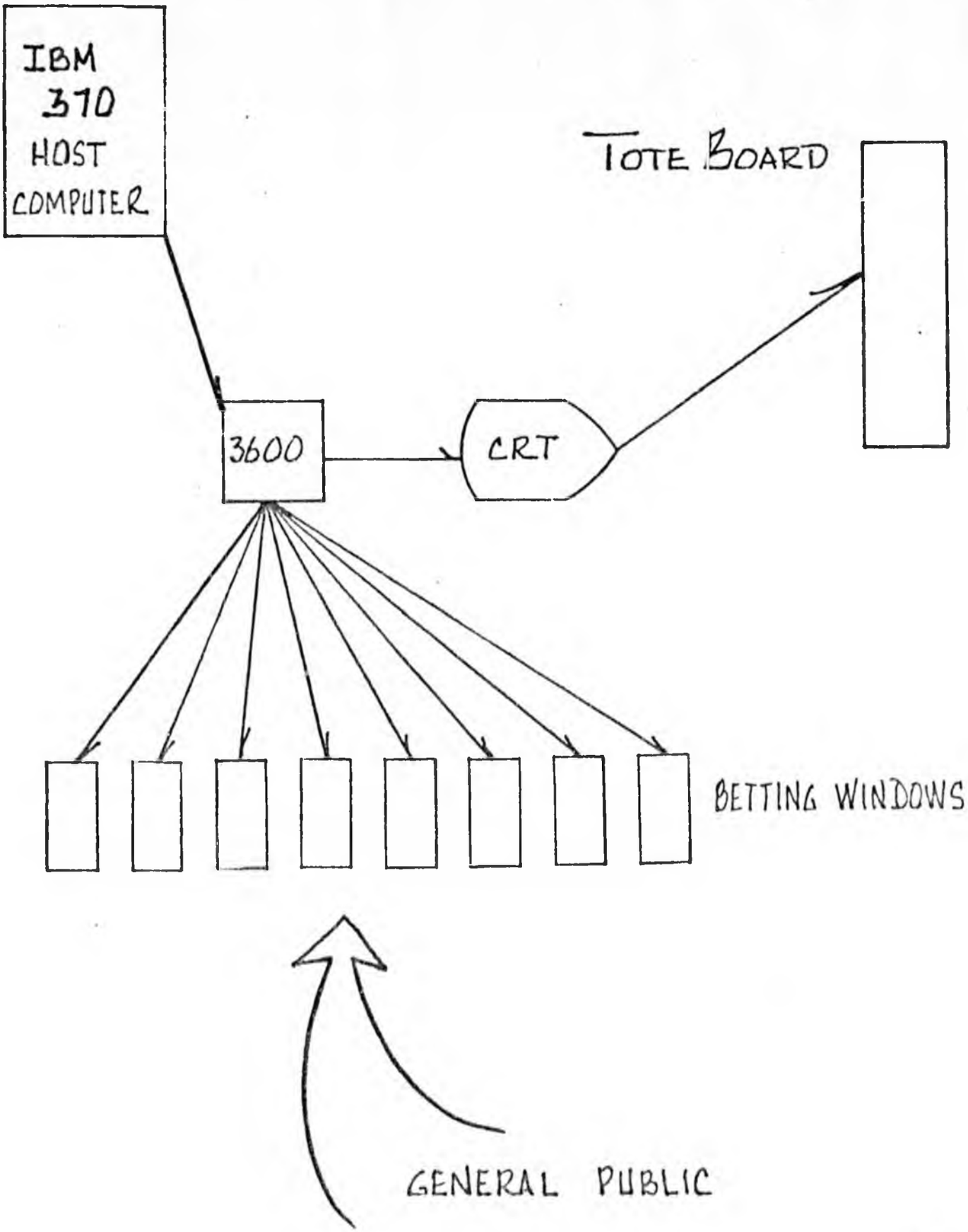
[illegible]

[illegible]

[illegible]

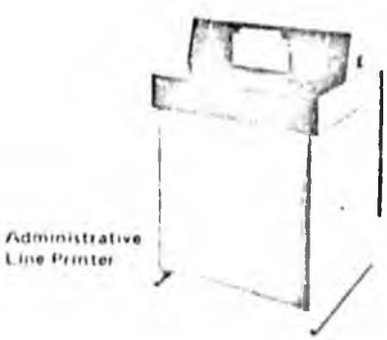
Altec
SRB 360 PALMER, ALASKA 99645
745-3072

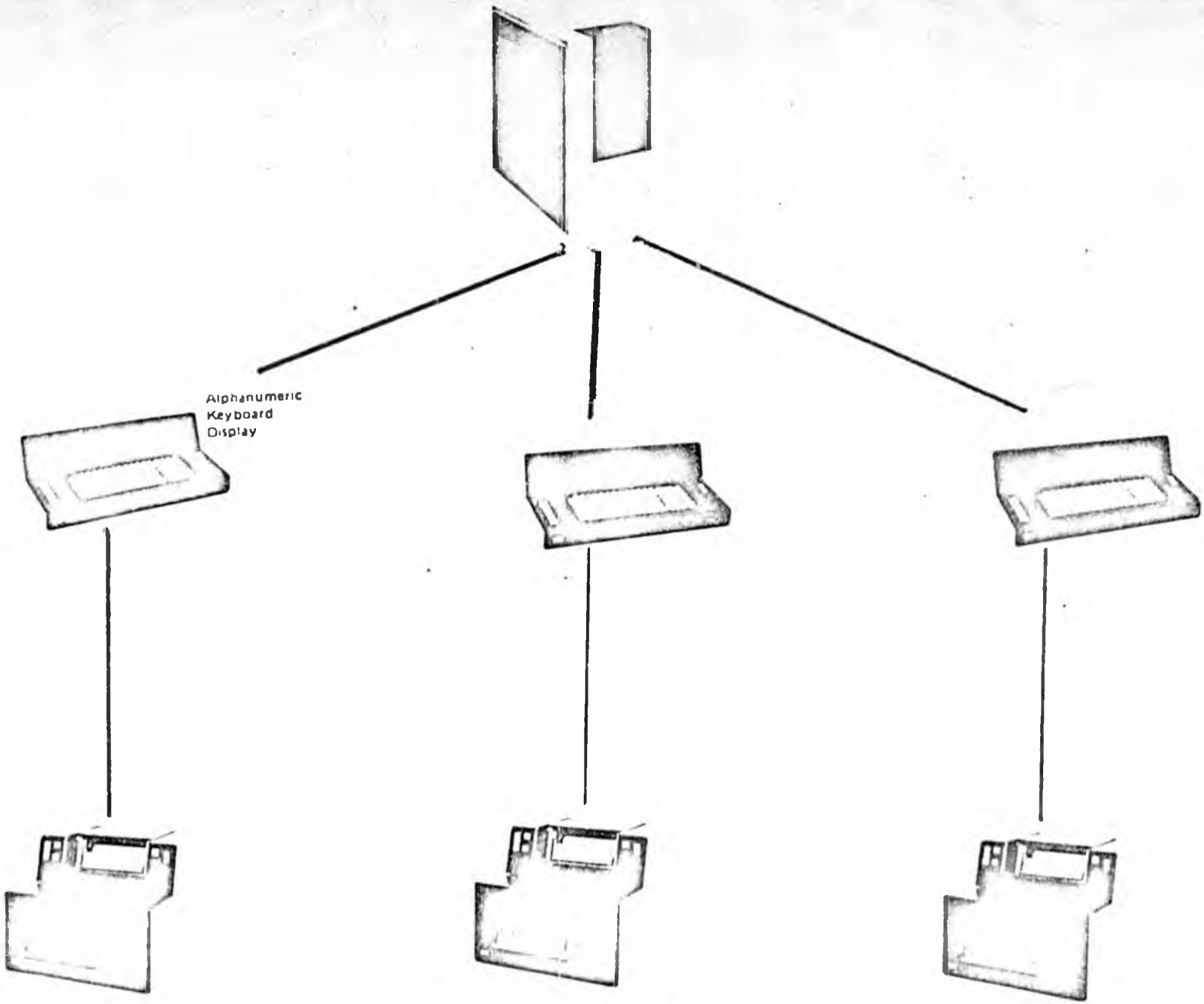
* * C O N T E N T S * *


IBM
370
HOST
COMPUTER
TOTE BOARD
3600
CRT
BETTING WINDOWS
GENERAL PUBLIC


Telephone Lines
Computer


Controller

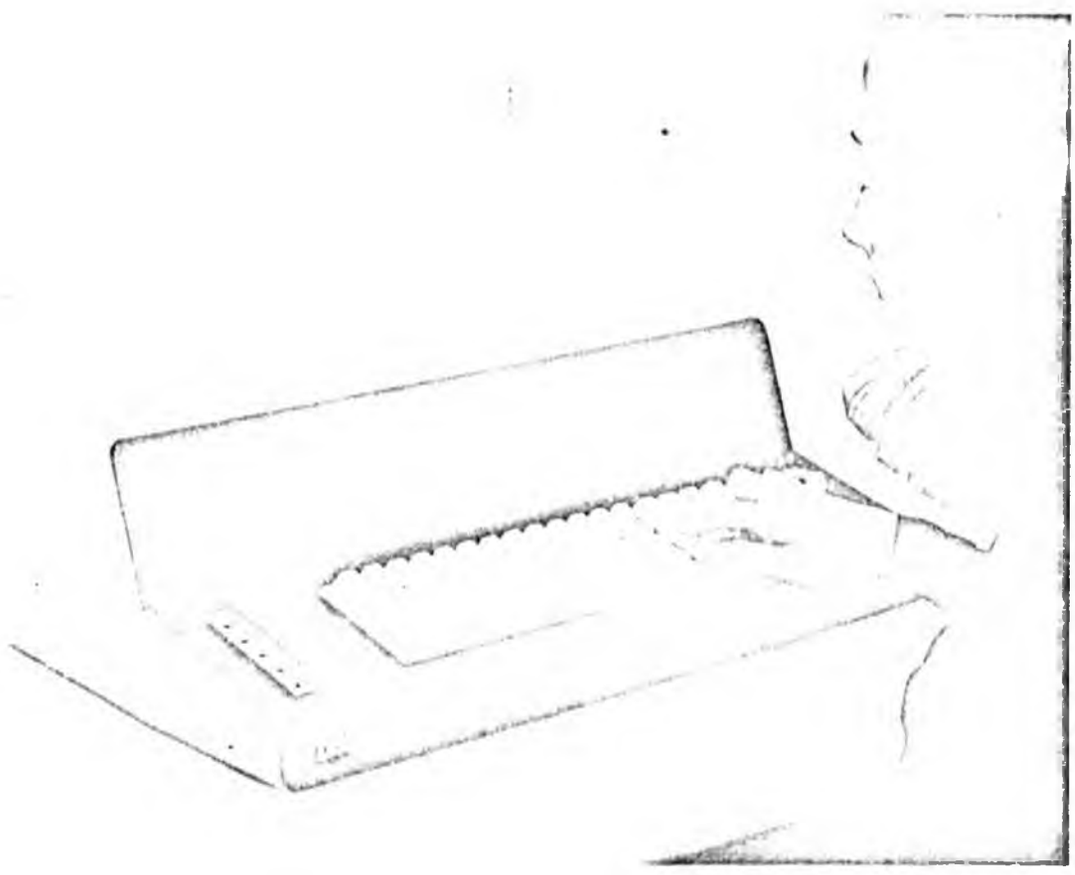

Administrative
Line Printer


Alphanumeric
Keyboard
Display

IBM 3604
Keyboard Display

The Keyboard Display (Figures 3 and 4) is an interactive terminal for use by tellers, loan officers, auditors, and others. It contains a viewing area for up to 240 characters of information. The displayed information may be customer data or operator instructions, presented under control of the IBM 3601, or it may be the information entered from the keyboard.

Several keyboard options are offered with the IBM 3604. Keyboards with special "function keys" are available as well as the standard numeric or alphanumeric keyboards. The use and nomenclature of function keys are specified as desired by the individual financial institution.



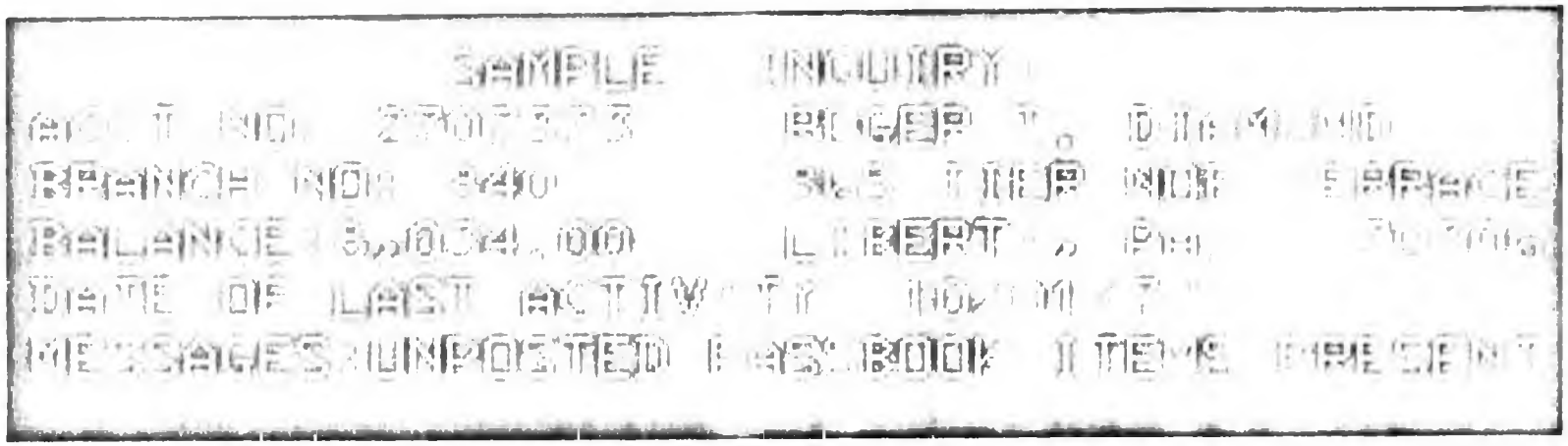
IBM 3604 Keyboard Display with Alphanumeric Keyboard Feature

Display

The display shows 240 characters (6 lines of 40 characters) sharply and steadily. It may be used to do two important things for you:

1. Display the information that you enter at your keyboard. You can thus check your message for errors before you send it to the computer or before you have it printed. If there are any errors, you can change the message and see the change on the display.
2. Display information or guidance messages for you from the computer. Examples are: (1) an answer to your inquiry (the present balance, let's say), (2) the result of a transaction (for example, the new balance after a deposit), (3) a message to help you through an unusual situation or a less frequently used transaction. Note that even though you may have only a numeric keyboard, alphanumeric messages from the controller to you can be displayed.

A sample display is shown in Figure 7.



Sample Display

Audit and Control

The use of an IBM 3600 in a branch office introduces a new way to process information. Terminals become key operational devices. Transactions are guided by terminal prompting, data is gathered by terminal keying, and system information is accessible by terminal action.

Controls and audit procedures are very important. The institution can incorporate a variety of security and control measures, audit trails, and error-detection schemes into its application programs. As an illustration, consider operator identification.

If desired, application programs can be written so that operators must identify themselves with a log-on code before they are permitted to use the system. The procedure might be simply to enter a confidential identification name or number. Each terminal user would be assigned a unique code, and code changes could be made periodically or as needed. The system could be programmed to permit only certain codes at certain terminals, and to allow no more than one log-on at a time per terminal. A log-off procedure (such as keying the term "Off") would prevent subsequent use of the terminal until another valid log-on was entered.

When two operators use the same terminal unit or units, special keyboard keys can be used to identify the operator who is processing a transaction. In this way, the system can keep track of individual activity and maintain separate records and accountings.

As an additional security measure, the system could be programmed to provide an authorization mechanism which allows operators to perform certain specific transactions but not others. This technique is valuable for restricting access to information that only certain users need: supervisors or managers, for example. It can give extra protection to particularly sensitive information.

Problem Determination and Fault Isolation

The IBM 3600 system minimizes the effect of fault conditions. Checking circuits and controls are built in to identify problems and to isolate their cause so that quick corrective action can be taken.

For example, suppose a Keyboard Display has a failure in the circuitry that exchanges data with the IBM 3601 control unit. On the terminal a CONTROL READY light (usually lit) begins to flash, or is extinguished altogether. Turning the unit off (or throwing the DSBL UNIT switch) disables the terminal and permits the remainder of the system to function normally. Therefore, the problem can be corrected with minimum effect on the system.

If a failure occurs elsewhere in the system, it may be flagged by a CONTROL READY light indication, by a special message from the IBM 3601 control unit, or by other system means.

Furthermore, IBM-designed tests are incorporated into the IBM 3601 and may be activated at any time. They exercise and test the terminals, and provide assurance that each device is performing properly.

* * 3600 Hardware Costs * *

	Monthly	Extended Monthly	Purchase
Central Processor	$523.00	$445.00	$20,140.00
Display Consoles (8)	496.00	424.00	2,120.00
Document Printers (4)	300.00	256.00	2,545.00
Central Site Prtr	125.00	108.00	2,350.00
	$1,444.00	$1,233.00	$27,155.00

These hardware costs reflect only the mainframe and peripheral devices. Additional costs will be incurred in the event of a need to configure additional mainframe modules, e.g., multiplexor, also cable considerations, and site preparation are not included.

Large Scale Off-track Betting Systems

Stephen L. Dunik
IBM Canada Limited

Introduction

While legal off-track betting in North America has only been active since April 1970 (in New York), it has been available to Australians since 1960, following the installation of telephone betting in the state of Victoria.

An off-track betting system is one that allows individuals not within the confines of a racetrack to place wagers either in person at a branch office facility, or via telephone if an account has been established. The law usually requires that all bets placed off-track be consolidated with the on-track parimutuel system of any race within a given state.

In 1971-72 the Australian public invested an average of $147 (Australian) per person in racing bets. This represents a total investment of some $1.9 billion spread over off- and on-track. The average yearly growth rate over the past eight years has been 15 percent and the current rate of increase in off-track betting is about 20 percent. The largest, New South Wales Totalizer Agency Board (N.S.W. TAB), which installed its on-line system in 1971 with an expected life of 10 years, passed its 1980 forecast bet levels in 1973.

The TAB of N.S.W. is set up under a state government act to provide legalized off-track betting facilities on horse and dog races within the state. Similar legislation and operations exist within other states in Australia, Tasmania being the last to set up such an operation. The N.S.W. Board was set up in 1964 and went on-line in 1971. Turnover in N.S.W. off-track betting for the year ended

expected to exceed $1 billion.

Of the total monies invested in the TAB, 13 percent is deducted and the remaining 87 percent is paid in dividends. Of the amount deducted, 5.5 percent goes to the state government and 7.5 percent is used to cover TAB operating costs and a distribution to the race clubs. The TAB operating cost last year was 4.5 percent of turnover.

In the U.S., OTB legislation exists in three states and is being considered in 14 others.

Racetrack Betting Betting procedures at racetracks result in fast ticket selling over a short period of time for each race. The ticket windows open about one-half hour before post time and each window generally handles only one bet type for a single amount (for example, $2 Win, $5, Show, $10 Place) and for the upcoming race only. Once at the desired window, the bettor need only give the teller the number of the horse, pay his money, and receive his ticket. The teller presses the appropriate button; the ticket is issued; and the wager recorded. To place a different type of bet, the bettor must go to another line. Under this procedure, tellers can sell tickets at a rate of about 20 per minute.

Off-Track Betting The nature of off-track betting dictates a totally different procedure from on-track betting. Betting opens for all operating tracks and races at the beginning of the working day. The variety of types of bets that may be placed at an off-track betting office precludes the use of specialized windows. One teller handles all bet types such as Win, Place, Show, Daily Double, Exacta, and Quinella, in all denominations, for up to 10 races, at each of several tracks. The bettor must specify his choice of track, race, horse, bet type, and amount for each bet he wishes to place. The teller must place the bet, validate the bet information, issue a ticket, and calculate and receive the total money due.

The ticket-issuing machine must be able to enter a bet, consisting of the above information and number of tickets, and in a short response time (approximately 3-6 seconds) issue a wallet-sized ticket, with the printed data describing the bet. This is a perfect duplication of the betting procedures a bettor would have had to perform at an on-track site, with one exception as mentioned the amount of data communicated at an off-track site is greater than that communicated on-track.

These steps can slow the off-track operation to about two bets per minute, thus creating long, slow-moving lines and discouraging the bettors. At this rate, the amount of money a teller can take in is limited, thus severely restricting the profit to the state as an off-track betting operator. Since a significant percentage of the gross must be spent on the teller operation, an increase in the number of tellers raises costs almost in proportion to the revenue generated.

This article describes the general requirements for an off-track betting system. A major system currently installed in New South Wales in Australia and a second system to be installed in Western Australia next year are also described.

Typically off-track betting is carried out in two forms. Remote branch office betting where the bettor must present himself to place bets or collect winnings and telephone betting where bets given over the telephone are placed by an operator against the bettor's account.

Central Control Function At the beginning of each day, the system is initialized from the central office using data forwarded from the previous day in addition to the track profile for the day. Branch offices are opened for business, after which branch supervisors and tellers may sign on to the system. As the system functions throughout the day, information is made available to authorized personnel concerning the status of individual tellers and branch offices as well as the system as a whole. Supervisors may also effect security changes within their area of responsibility, such as inserting, modifying, or deleting teller information. At the end of the day, the system is shut down in an orderly fashion. Terminals and branch offices are closed for business, and any data such as track profiles or winnings needed for the following day is recorded.

During system initialization, the day's racing information is gathered and entered in the track profile table. These records include (for each track) identification, races, race close times, horses, bet types, pool summaries, initial odds, allowances, and provisions for scratches, cancellations, and payout amounts. A directory of table entries is kept in main storage during betting.

When the supervisor is satisfied that the system has been correctly initialized, he may proceed to the established data verification and test procedures and, finally, to the opening of branch offices and the day's betting.

Whether a branch office opens automatically at system initialization time or by a specific command at a later time, the system must inform each branch that the off-track betting system is ready to accept transactions and must open a cash-on-hand counter for each branch opened. The branch responds with a confirming message and terminals then may sign on when they are ready to accept transactions.

The central office also handles the information that is exchanged between the track and the off-track betting system. From the track to the off-track system comes information about scheduled races and horses, horses scratched, race cancellations, and race results; to the track from the off-track system comes the data from the bet pools—that is, the total amounts of money bet on each race and horse.

To scratch a horse, the system administrator enters the track, race, and horse identification. When the transaction is confirmed, the system flags the horse in the track profile table and the horse record in the track profile record as scratched. The system prevents further betting on the horse. The bets on the bet files remain unchanged until payout. At that time, the horse is treated as a winner, with the payout equaling the original bet. If a customer wishes to redeem a bet placed on a horse he knows is scratched, he should cancel his bet. Thus, if the horse is reinstated, previously uncanceled bets go as placed.

To shut down a track for conditions such as inclement weather, the off-track betting system administrator inputs the track name and date. Once the entry is validated, the system locates the track profile table and determines the

first race not yet run for the track. The race record is marked "canceled" and the payout routine procedure is performed, making the payouts equal to the original bets.

At a given time before the race, usually a half hour, the race close-transaction is issued and the system ceases to accept bets for that race. The race close-transaction can be issued either from the system timing function or from an off-track betting system administrator at the central system.

When the system receives a race close-transaction, the track profile race record is located and flagged to discontinue betting. The transaction then waits for a fixed period, allowing any bet transactions in process to complete their updating of the pool data. The accumulated pool data is then transmitted to the system administrator. For in-state tracks, he passes the information on to the track, where it is integrated with the on-track pools. For out-of-state races, the pool data is retained until the results entry transaction is completed.

After a race has been run, the system administrator enters the results into the system, thus activating the payout of winning bets. He enters the track, date, race, finishes (up to five in the case of some perfectas) and, in the case of in-state races, the track-calculated payouts.

Payout tables are built in computer memory, either from the track-provided payouts for in-state tracks, or from parimutuel calculations based on the pool data records for out-of-state tracks.

The system displays the input data for verification of content and, once correct, locates and updates the necessary track profile information. A printed report is then available on demand to the branch office supervisor.

Betting Office Operations A teller signs on using a special entry procedure which normally includes his employee number and cash drawer balance on hand. When all input has been validated, the betting terminal may process transactions.

A teller signs off by a sign-off procedure using his employee number. The system typically responds with the closing cash drawer balance and the number of tickets sold, cashed, and canceled. Date and time of sign-off and hours worked are also recorded. No further transactions may be processed at that terminal position until a teller has signed on again.

The design of the betting and payout system incorporates fast response time with accuracy. The high volume of bets demands the ability to process bets and payouts quickly.

The primary input data consists of the track, day, race, bet type, horse(s), and amount.

The bet is placed using key-operated or optical-mark-read terminals, and the data is transmitted to the computer. Typically, the length of a bet message is 13 digits plus terminal and branch identification. Using the track profile table for reference, the selection is edited for consistency such as (1) the bettor must select two horses if the bet is a daily double, (2) betting for the selected race must be open, (3) a valid horse number must be selected, and (4) the horse must not have been scratched. For errors, the computer generates an explanatory message to be returned to the originating terminal, where the message is displayed or printed, and the transaction is terminated.

If all criteria for a valid bet are satisfied, the bet is recorded. The system logs the transaction, assigns a serial number to the bet, and creates a bet record containing the bet serial number, bet origin (teller, branch office), date and time, race date, track, race, horse, bet type, amount, payout amount, payout location, and cancellation and scratch information. Each bet entered also updates the cash-drawer balance maintained in the system for each teller terminal.

Along with the cash-on-hand maintenance for each teller are statistics such as his sign-on and sign-off times as well as value and number of tickets sold, paid out, and canceled. These are all recorded in the teller statistics file.

The betting ticket is given to the bettor. The ticket usually contains betting information, the serial number, and date. In the event of an error, the ticket may be printed with an error message.

After the race results have been processed, all the winning bets or scratching refunds (or in the case of canceled races, every bet on that race) have their payouts calculated and written onto the winning bets file.

Normally Win, Place, and Show bet processing is handled differently from other bet types. After the race is completed and before the results are official, a list of the probable winners is entered into the system. This is used to extract all of the probable winning bets from the bet file. When the final winners are known, the small work file is scanned first and the payouts calculated. This scan of the bet file is also used to prepare statistics on each branch and number of tickets sold. This makes use of the time between race completed and official results, which gives faster turnaround on payout.

On doubles, after the first race has been run and the results have been declared, the bet file is scanned for all bets corresponding to the first winner. These bets are placed in a file for processing after the second race of the double is completed. Usually all other bet types such as quinella and triella are handled by a single pass through the bet file once the results have become official.

Statistics prepared during these passes of the bet file include the total number of winners, the payout amounts, and the number of tickets and amounts for each pool. These statistics are normally broken down by branch.

To pay out a winning bet, the cashier either keys in the ticket serial number or passes the ticket through a special reader. In any event, the serial number is transmitted to the computer for verification. The system retrieves the bet record and verifies that it is, in fact, a winning (or scratched) ticket that has not been previously paid or canceled. Winning bets that have been paid off by a branch are marked on the winning bets file so that any subsequent attempts to pay off this bet will be flagged. The payout amount is then transmitted to the terminal for printing or displaying. The teller's cash-drawer total is decremented by the amount of the payout.

If the ticket is not a winner, a descriptive message is returned to the terminal and the worthless ticket is returned to the bettor for his review. In the case of a scratched horse or canceled race, the bettor is refunded an amount equal to the original wager.

To cancel a bet, the serial number of the bet encoded on the betting ticket must be entered. Upon receiving the serial number of the bet to be canceled, the system locates the

bet record, notes for the cancelled, deletes the amount from the pool(s), and updates the cash-drawer balance (for a branch office bet).

The betting authority determines how long a bet record remains payable on-line. After this period, bets are carried only off-line and winning tickets can be redeemed only by mail or at a central location.

Telephone Betting Operations The telephone accounting subsystem performs the administrative functions required for telephone betting. It is similar to a "banking operation" in that accounts are opened or closed on written authority only.

Telephone account-opening processing includes checking the completeness and reasonableness of data, providing a unique account number, establishing a password, building and adding a new account record to the telephone record file, and flagging the record to permit betting once the deposit is firm. The telephone betting account file contains all the details of the accounts that are needed during on-line operations (that is to say, the account code and number, the date and time of last transaction, and the current balance), and it contains links to the day's transactions and dividends. This file contains one record for each of the accounts, so it can be accessed either sequentially by scanning the whole file or directly by using a simple algorithm to convert the account number into a disk address. This file is updated continuously during the day's operations with all transactions—bets, dividends, deposits, and withdrawals—which can affect the balance or status of the account at any time.

Telephone account deposit requires retrieval of the telephone account record based on the account number and password. The deposit amount is added to the current balance in the record and the updated record returned to the data file.

For telephone account withdrawal, the telephone account record is retrieved on the basis of the account number and password. The current balance is checked to see if the withdrawal request can be met. The current balance must remain above the withdrawal. Once the withdrawal is approved, the current balance is reduced by the withdrawal amount and the updated record is returned to the data file.

Statements are prepared as requested by the bettors. They show opening balance, transactions occurring in the period, and closing balance.

Telephone account closing requires positively identifying the bettor as defined by the user, logging all details of the closing, deleting the account from the files, and preparing a closing statement and a check for the amount remaining in the account.

To place a telephone bet, the operator at the telephone betting station enters the customer account number into the system via the keyboard and, for a valid account number, the system displays a password, account status, date and time of last transaction, and account balance.

Once enabled, the account is blocked to all other accesses. The operator then requests the password from the customer. When the password is accepted, the operator requests betting information from the bettor and enters the bet as a transaction to the appropriate account. The system validates it as for a branch office transaction with an additional check to ensure that the bets do not exceed the customer account balance. If the updated account balance is negative, the last transaction is rejected.

Once the bet is accepted, the bet entry is basically the same as for branch office bets but with three additional considerations:

- The account balance is debited with each bet amount instead of updating the teller cash-drawer balance.
- The bet record created is keyed to the account number to enable later crediting of winnings.
- No ticket is generated; however, data is retained to generate an account statement, if required.

As each bet is entered, the telephone betting file logs the details of each bet. It also contains details of deposits, withdrawals, and account changes originated either from a branch or from a Telephone Betting Terminal, or by the system by race result processing. All the transactions for any one account are linked together to allow easy retrieval of any transaction.

After the last bet is entered, the system displays the new account balance, the total value of the bets, and the time. At this time, the processors update their telephone betting status table in memory is now updated to reflect the removal of active accounts.

Telephone bet payout differs from branch office bet payout mainly in its manner of initiation. When race results become known, the entire telephone betting bet file is scanned for any winning bets on the results just obtained. As they are found, the bet details are used to calculate the payout, and they are placed on the telephone betting payout file. This file contains details of all the winning telephone bets. After the race result processing is complete, this file is scanned, and the payout value is extracted and credited to the appropriate account. While this is being done, the file is linked in the same fashion as the bet file so that all the dividends for any one account can be easily found.

To assist with telephone betting inquiries, a display format file is used which contains the various formats displayed on the screen in response to format number entry. The functions that are normally entered include race result, scratching, inquiries as to race status, or system status.

Remote Off-Line Betting Operation A third form of bet entry is made from very remote branches using dial-up, teletypewriter-like terminals. The difference is that the bets are collated manually at the remote branch and only the collated data is transmitted. The incoming data is accepted and checked in the same way as normal bets. These bets are logged on the bet file with special identifying codes.

System Shutdown In advance of anticipated system shutdown, each branch supervisor is notified of the scheduled shutdown so that he may terminate his own operation in an orderly fashion. At shutdown time, any terminals and/or branches still open are closed automatically at the finish of the bettor transaction in process.

[illegible] a branch closes, either by specific instruction or system shutdown, the system sends summary accounting data to the branch office supervisor's terminal and prevents further processing from that branch.

When the network activity ceases, housekeeping activities begin:

1. Bet and pool information to be forwarded to the next day is recorded.
2. Bet records for the day's races are reorganized to include only those requiring payout.
3. Payout records that have passed the system retention date (typically one month) are purged to the unpaid archives file.
4. A message is written to the master system terminal indicating the completion of system shutdown.

During the day's operation, a transmission file is used which contains output messages for the teletypewriter located at the branches. These messages may either be specific messages dealing with a branch's operation, statistics, or liabilities, or may be general broadcast messages such as race results, changes, scratches, closed tracks, and system shutdown schedule.

Additional report information is made available as required and on demand at shutdown. Examples are as follows:

- tickets sold by type/amount, by teller/branch/system;
- cash on hand by teller/branch/system;
- branch liability, when race results are known;
- selected pool data;
- telephone account status.

At the end of the operating day before system shutdown, information items are selected, grouped, and sorted into a new sequence for reports of varying detail, such as:

- system liability report,
- accounting reports by location;
- average bet amount;
- race activity;
- telephone account statement;
- average number and frequency of bets per bettor (telephone);
- bets by track;
- bets by type and location;
- bet cancellation by location;
- payouts by locations;
- purged pay tickets;
- branch office activity comparisons;
- hourly branch office activity.

Fallback, Error Recovery, and Restart The system attempts to preserve data integrity and minimize inconvenience caused by some failures. High priority is given to recovering pool data since the off-track operation is liable, for practical purposes, for the track payout amounts on races where pools are combined. In addition, current bets, track profiles, and statistics must be recovered.

The central system is usually duplexed, allowing considerable equipment failure before any general effect is noted. As more and more units in the central processing system fail, less important functions are successively dropped until the system is just collecting bets, logging them, and pooling them.

One CPU, designated the master, outputs messages to the terminals. The communication controllers attached to the system detect system failures by ensuring that they are polled on a regular basis by both CPUs. Should the master fail, the subordinate immediately becomes the master, while if the subordinate fails, the master merely takes note of the fact and commences to update the subordinate disk files as well as its own.

To minimize the effect of a disk drive failure, each set of disk drives (one per CPU) has two copies of the control program and application programs. Also, if any disk drive fails on the master CPU, it begins to use the corresponding drive on the subordinate. In the event of total failure of both sets of disks, the system is reduced to the input and pooling of bets and logging them on magnetic tape. This tape can be used at the end of the day for the reconstruction of the disk files that should have been created during the day. There are a number of tape drives on each CPU, and if one should fail, the CPU automatically uses another.

If the line printer being used for the output of collations should fail, the computer operator can manually switch the other printer onto the master in place of the defective one.

In the extreme case where both sets of disk drives have failed, or if the same disk drive has failed on both systems, the off-line recovery procedures are executed at day end. The magnetic tape containing a time-sequenced log of the day's betting input is read into the CPU, and the bet messages are written to the various disk files. Once these bet files have been regenerated, it is possible to perform the race result processing. Thus it is possible, via off-line recovery, to achieve the same day-end processing completion as would have been achieved without the equipment failure.

Terminal failures at a branch are recovered through plug-for-plug replacement of a defective terminal with a known good terminal from a central pool.

Current New South Wales System

The system currently installed in New South Wales (N.S.W.) uses specialized hardware to handle the high transaction rates. The system is handling 8000 transactions per minute now and the 1978 projection is 15,000 bets per minute.

The N.S.W. ticket terminal was designed and built by Amalgamated Wire of Australia (AWA). The terminal is key-driven on a numeric keyboard from paper betting slips filled out by the bettor before he reaches the window. A gas discharge display of up to 12 digits displays the bet to the operator during keying. Bets are transmitted bet-at-a-time at 150 bps DC signalling to a remote multiplexer. The printer used is an adapted adding machine print unit. Bet information printed on the ticket is taken directly from keyed data. Throughput is directly dependent on the skill of the operator in getting the data correctly from the customer and keying it correctly.

consists of duplexed 256K IBM 360/65 CPUs driving IBM 3970 Data Set Adapter Units through four IBM 3967 Communications Controllers (with a fifth as standby) on the AWA, Teletype,* and Telex† terminals (Figure 1).

Telephone betting is handled by 96 terminals also supplied by AWA which are a modification of the cash betting terminal.

Each of the four IBM 3967's performs identical functions and handles a maximum of 400 communications lines. Their main functions are as follows:

- Line control procedures for the various terminal types.
- Message buffering between the terminals and the CPU's.
- Code conversion. All CPU outputs to the 3967 are in EBCDIC while the IBM 3967 inputs to the CPU are either EBCDIC or unsigned packed decimal.

All incoming messages are blocked in each IBM 3967, and at frequent intervals the CPU's ask for any completed blocks. On receipt of a block of messages, both central processors first validate each bet, then add it to the appropriate pools, and then generate the bet ticket number, which is sent back to the communications controller for transmission to the terminal. Thus, while the branch is printing the bet ticket, the bet details are being placed into a disk buffer area in the CPU for logging on the appropriate bet file.

Although fully hardware duplexed, on "quiet" race days the system is run in simplex while the second system is used for program development. In case of failure, the second system can be made ready within seconds.

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*Trademark of the Teletype Corporation.
†Trademark.

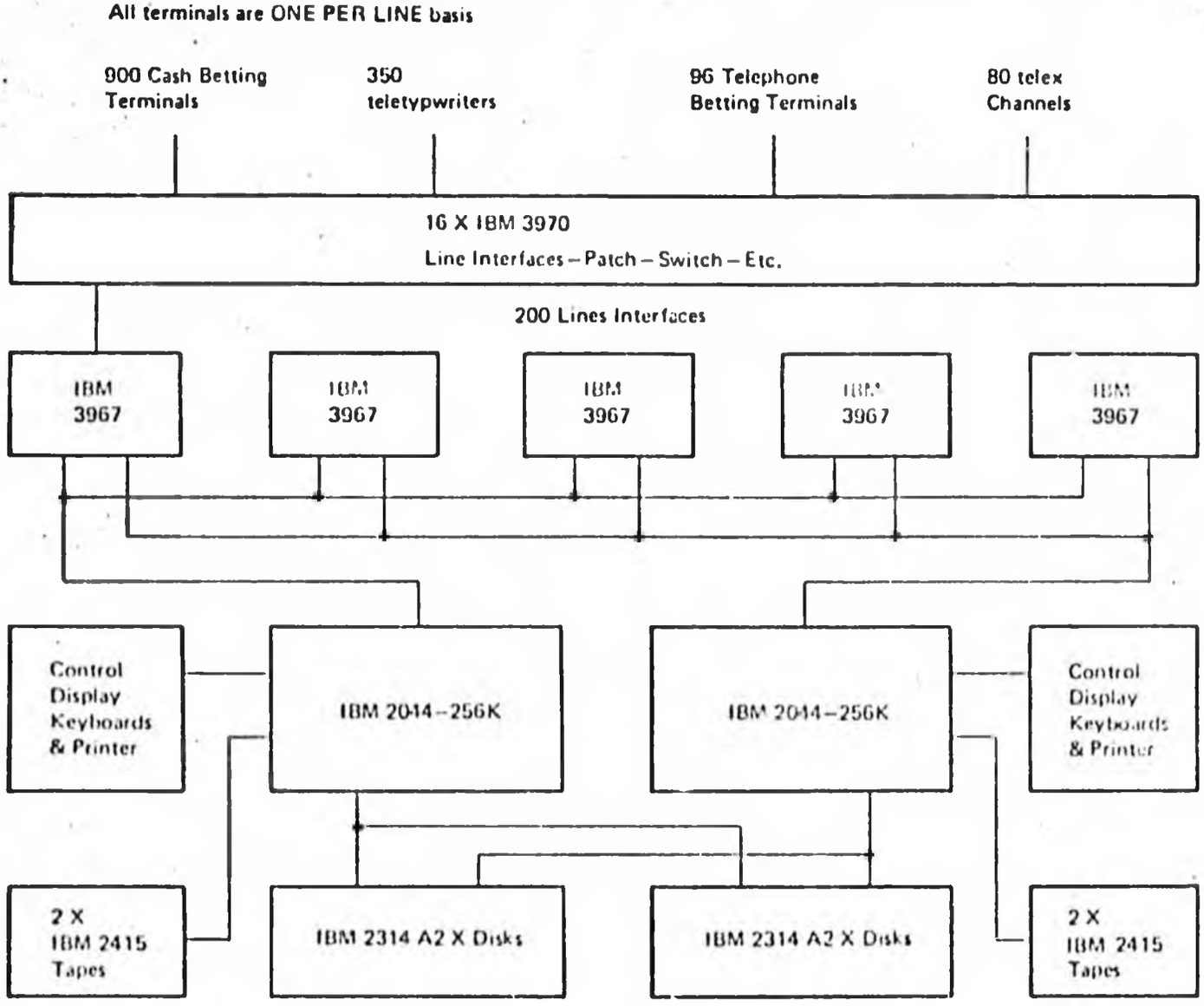


Figure 1. New South Wales TAB System

five drives giving a total capacity of 1-45 million bytes. Of this, 200 cylinders are allocated for bet files, 20 cylinders for telephone betting, and 140 cylinders for winning bets and paid tickets. In addition, parts of two disk drives are used for control program systems residence, applications program residence, and work files.

There are two 30 kb tape drives on each CPU. Their primary purpose is the dumping of disk files at day-end for historical purposes and the reconstruction of a day's betting activities as may be required for audit purposes. During periods of on-line operation, one tape drive on each CPU is used for the logging of all system inputs, to guard against the loss of data in the unlikely event of failure of both disk control units.

The line printer is used to list house total investments at the same time as they are transmitted to the control center. The card reader is used only for the input of meeting and race initialization data at the commencement of each day.

Future Western Australia System

The Western Australia (W.A.) system is scheduled for installation in late 1975. To increase flexibility and throughput, they are taking a different tack entirely—himself by using optical mark reading and standard system hardware (Figure 2).

The bettors place bets by marking their selections on IBM System/3-size paper cards (Figure 4, or longer card stock for complex bets) and inserting them directly into the terminal. The terminal, an IBM 5934-102 Ticket Terminal (Figure 3), reads the pencil marks and transmits them at 1200 bps to a remote multiplexer. After verification and editing, print information is returned over the teleprocessing line to the terminal to print the bettor's selections on the same card (Figure 5). Besides the entry method, a second major difference is that the system also prints a unique machine-readable bar code on the betting ticket, which identifies this particular bet. Invalid bet tickets are returned with an error message across the top, describing the error. Reasons for rejecting tickets include incomplete information (such as only one horse marked for a daily double, scratched horses, invalid bet amounts and types, race already closed).

After the race has been run, the bettor inserts his bet card back into the same terminal (or any terminal in the system), and this time the previously printed bar code is read in conjunction with the marked information. This bar coded serial number is used to look up the bet in the win

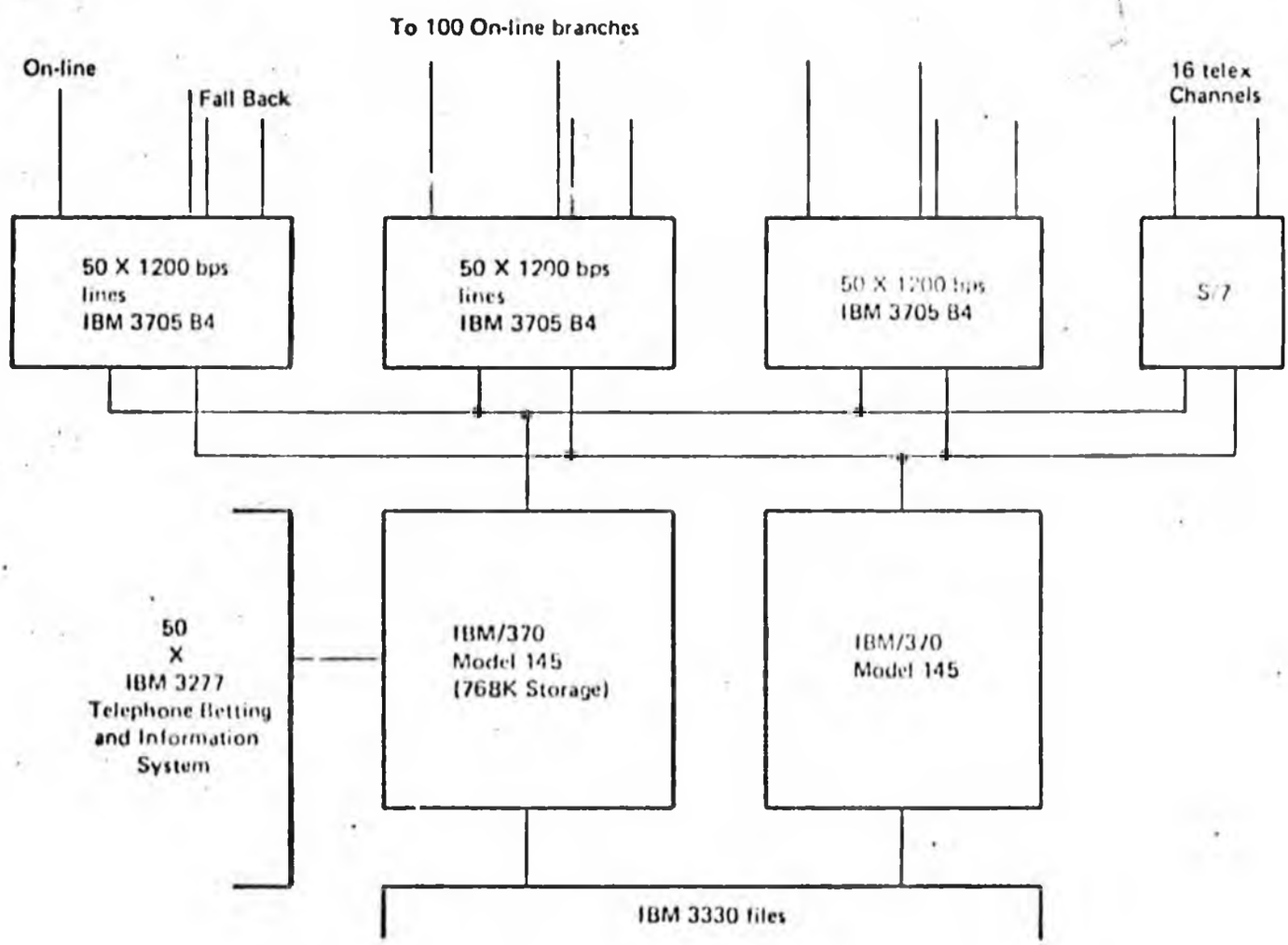


Figure 2. Western Australia TAB System

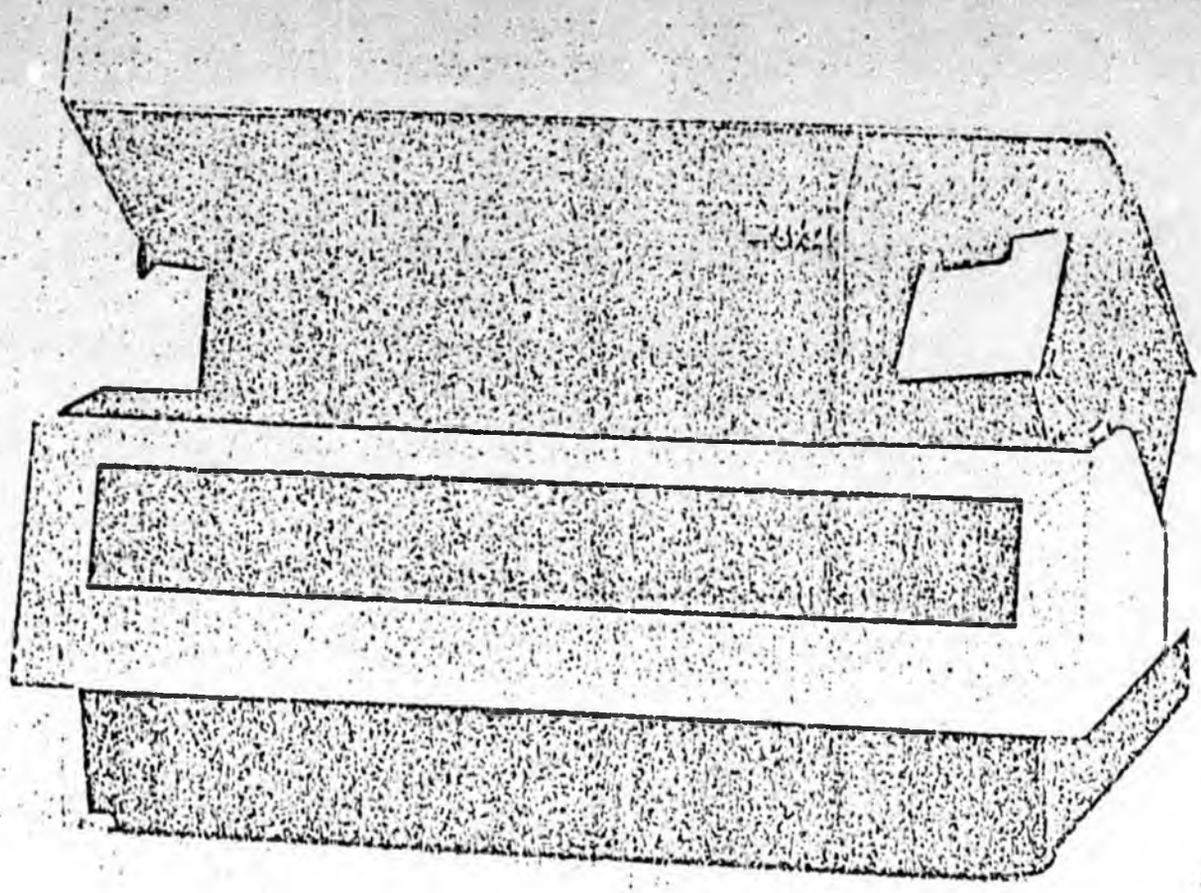
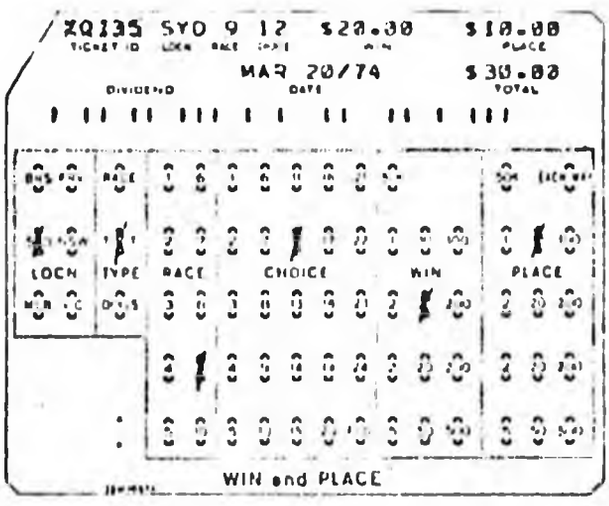


Figure 3. IBM 5934-TO2 Ticket Terminal

Card 1 shows the marking for a trotting race at Sydney for a horse #12 in the ninth race. A 20 dollar bet to win and a 20 dollar bet to place. This card has not been entered into the reader/printer.

Figure 4. Marked Card



Card 2 shows the marking and printing with the bar code on the third line. The presence of the printing indicates this bet has been entered and accepted as a valid bet.

Figure 5. Validated Card

file. The returned information printed on the card indicates "Not a winner," or the amount the bettor won, or (in the case of fraud) it prints "already paid" (Figure 6).

The bettor can place a number of bets on one card (for example, bet horses 4, 5, and 9 each to win for $2), and he can place a number of bet cards together into the 5934 hopper. In fact, he can mix previous winning bet cards from previous races with bets on future races and the self-totalizing ability of the system will tell the operator the net amount to pay out or collect.

At the branch office end, the only change for new bet types is new card stock; no modification is required to installed hardware. In addition, the key-driven terminal requires one operator per terminal, whereas two 5934's can be driven by one operator making change at one machine while the other machine is processing a different bettor's cards.

Besides these obvious features, the Optical Mark Read (OMR) approach offers a reduction in operator errors, increases customer confidentiality, reduces the total number of betting tickets through the use of multiple bets, provides the operator with totals, and provides horse names on betting tickets as an aid for bettors.

One hundred metropolitan branches equipped with IBM 5934 Terminals will connect to three IBM 3705 Communications Controllers. In standard operation, each 3705 will support one-third of the on-line agencies. However, in case of a 3705 failure, each of the other two provides fall-back for half the load of the failing unit.

A System/7 provides an interface to 16 Telex lines. Remote betting offices will transmit their collated holdings via Telex to the control center at event close time.

IBM 3277 Display Stations are used to service telephone betting customers and for the control function.

The system will eventually be required to process 6000 bets per minute. This represents 100 transactions per second.

Card 3 shows the marking and included in the printing is the dividend paid for this bet. The bar code has been voided.

Figure 6. Voided Card

In the IBM System 370/145 CPU's, a high-priority partition is required to process transactions from the terminals in the agencies. This partition processes bets, updates collation tables, controls the logging and retrieval of bets, and communicates to the Management Information System CICS partition.

As many as four IBM 3340 Direct Access Storage Facility disk drives will hold the ticket file to minimize contention during critical payout periods. Other files may be resident on the drives provided low access requirements are specified for them. Transactions are logged on the IBM 3420 Magnetic Tape Units for audit and reconstruction purposes.

The IBM 3705 Communications Controllers are attached to the System/370 processor channels and provide the teleprocessing line control and processing function. Each controller can control 50 1200-bps leased lines. Should one unit become unserviceable, then lines from this unit can be switched to other serviceable units.

The controller executes a network control program, which provides a wide range of functions and relieves the processing unit of the teleprocessing workload. The network control program also provides such standard functions as control character recognition, line-timeout control, error checking, code translation, and dynamic buffering.

Conclusion

To handle the widely fluctuating high volume of bets from the general public, an OTB system must have the three characteristics provided by the Australian systems described in this paper:

- Unique application-oriented devices to eliminate expanded teller requirements (and human errors).
- A data processing and telecommunications capability to handle peak loads.
- A completely reliable backup and recovery system to protect both bettors and OTB management. ◻

Stephen L. Dunk is Manager of Custom Products and an Advisory Engineer at the IBM Canada Ltd. Laboratory in Toronto, where he is responsible primarily for planning and developing unique product solutions for the gaming industry. Since joining IBM he has held various key positions in the manufacturing and laboratory functions. His major contributions include development of a corporate Process Control and Automated Test Language and a family of standardized controllers used in computerized test applications. He has been with IBM since his graduation from the University of British Columbia in 1963. Currently he is completing an advanced degree in the Computer Science faculty at the University of Toronto.

Dunk is a member of IEEE and the IEEE Computer Society. He has received an IBM Outstanding Contribution Award and has been responsible for a number of invention disclosures published in the IBM Technical Disclosure Bulletin. His current interests include artificial intelligence, particularly with respect to automatic program proving and voice recognition.