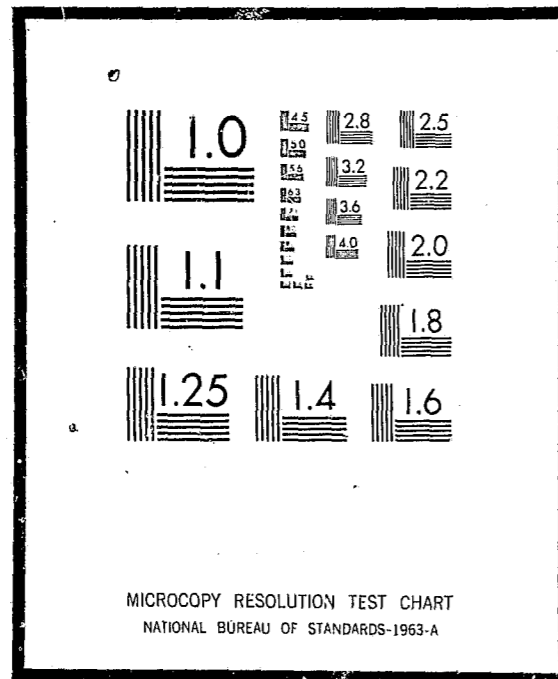


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LAW ENFORCEMENT ASSISTANCE ADMINISTRATION
NATIONAL CRIMINAL JUSTICE REFERENCE SERVICE
WASHINGTON, D.C. 20531

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11/13/75

CSC

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DEVELOPMENT OF AN OFF-TRACK BETTING SYSTEM FOR THE NEW YORK CITY OFF-TRACK BETTING CORPORATION —

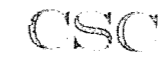
SUMMARY DESCRIPTION OF SYSTEM

AUGUST 10, 1970

COMPUTER SCIENCES CORPORATION

6565 Arlington Boulevard
Falls Church, Virginia 22046

Major Offices and Facilities Throughout the World



PREFACE

Computer Sciences Corporation (CSC) and its subcontractor, American Data Centers, Incorporated (ADC), are fully qualified to provide the New York City Off-Track Betting Corporation with a functioning turnkey Off-Track Betting System. The racetrack expertise of ADC coupled with the total system expertise of CSC provides the wide range of resources necessary to design, implement, and continue to support a computer-based Off-Track Betting System fully responsive to the demands of both the Corporation and the betting public.

CSC, the world's largest publicly-owned independent corporation in the information and system sciences, was formed specifically to develop computer-based systems to meet the needs of the public for automated services. Since 1959 when CSC was founded, the company has grown to a present strength of over 5,000 personnel, of whom approximately 3,300 are professionals; 2,200 are computer scientists and programmers.

CSC has proven that complex software/hardware systems can be engineered, installed, and placed in operation on very short schedules. CSC's ability to implement complex systems on short schedules is enhanced by its complete freedom from conflicts of interest in choice of hardware. CSC does not manufacture automatic data processing hardware nor is CSC affiliated with any hardware manufacturer. It is therefore free to choose that combination of hardware and software best suited to the client's needs.

American Data Centers, Incorporated, with its specialized Automatic Data Processing skills in support of racing operations, complements CSC capabilities in a most outstanding manner. ADC has developed and is operating computer programs which are currently being used by some 60 racing organizations for accounting, wager computation, wager verification, and other pertinent racetrack functions.

To apply this combined CSC-ADC capability most effectively to the establishment of the New York City Off-Track Betting System (OTBS), CSC has established the CSC Custom Systems Division (CSD). The CSD will be dedicated to developing, implementing, and supporting the OTBS and The Corporation. By establishing this dedicated Division, CSC can best satisfy the

CSC

stringent, complex requirements of off-track betting, maintain close and continuing liaison with the Corporation, and implement the OTBS on schedule.

SUMMARY DESCRIPTION OF SYSTEM

1.1 INTRODUCTION

This technical proposal to the New York City Off-Track Betting Corporation (OTBC) describes Computer Sciences Corporation's (CSC) understanding of the requirements and its unique approach for the rapid development and operation of a completely automated Off-Track Betting System (OTBS). To meet the objective of an operational system for Branch Office and telephone deposit betting, an approach has been chosen that stresses proven data processing equipment, existing software packages, and immediately available hardware specifically designed for terminal and ticket issuing applications. The basic system was designed by CSC to facilitate expansion in capability and effectiveness through the replacement of current system hardware and software whenever attractive, proven items become available.

The New York City Off-Track Betting System must have the capability of attracting the betting public's participation. Accordingly, it is necessary for the system to provide responsive, accurate, service in order to satisfy its customer's requirements. The following major features are judged to be requirements for a successful system:

- A short betting to pay-off cycle to retain bettor interest and to allow cash turnover for increased betting volume (churning). A turnaround time similar to that available at the tracks is a meaningful requirement as a response to this objective.
- Availability of all of the wager types provided at the New York State tracks as a minimum, plus the capability to add a number of other wager types and wager combinations such as parlays, If bets, and so forth, for additional attractiveness to the betting public.

- Ease of patron use through the provision of well designed equipment and trained personnel to assure rapid and convenient betting service.
- Prompt and simple procedures to cash winning tickets.
- Dissemination of information to the bettor so that he may easily choose and describe his wager to the operators.
- The development of a high degree of confidence by the public in the honesty and security of the system.

In addition, to insure fiscal accountability and delimit city liability, the system must:

- Retain cognizance of all bets placed and their status over a period of up to 16 months (until 4 months after the end of a year).
- Maintain financial accountability of all personnel having accessibility to cash receipts.
- Limit pay-offs to one per winning ticket.
- Detect counterfeit and invalid tickets through appropriate security and check procedures.
- Provide the operators with complete bet information for verification by the patron before the bet is entered into the system.
- Provide rapid indication of the value or status of a ticket to the operators to permit accurate and documented ticket cashing.
- Allow placing of bets as close to post-time as is feasible.
- Insure closing of betting at the time limit established.
- Provide safeguards to prevent system malfunctions from impacting the integrity of the accounting records of betting activity.

1.2 SYSTEM OBJECTIVES

To meet the anticipated system requirements the Off-Track Betting Corporation has set forth in its RFP a set of system technical objectives. These are briefly summarized in Table 1-1. Computer Sciences Corporation's proposed system fully meets these objectives. CSC has selected a management and technical approach that will result in the efficient completion of the system within the desired schedule.

Table 1-1. Summary of System Capability

POOLING	
Inclusion of OTBC bets in track pari-mutuel pools for New York State tracks. Separate pools for out-of-state tracks.	
TYPES OF BETS	
Win Place Show Daily Double	Exacta Quinella The system permits the addition of others in a flexible manner.
AMOUNTS WAGERED	
\$ 2.00 \$ 5.00 \$10.00 \$ 3.00 (only Exactas at Monticello Raceway)	\$ 50.00 \$100.00 Or multiples of these
WINDOW BETTING	
<ul style="list-style-type: none"> • 100 betting locations (expandable to 200), to be opened at an expected rate of 5 new branch offices per month • 1000 betting windows • 1,000,000 bets/day 	
TELEPHONE BETTING	
<ul style="list-style-type: none"> • 150 telephone betting stations • 75,000 deposit betting accounts • 50,000 active accounts/day • 4 to 5 bets per account daily • Status displayed in response to keyed-in account number, including account number, account code, available balance, and serial transaction number • Transaction recording at EDP facilities including time of day and station • Magnetic tape recording of voice conversations 	

Table 1-1 (Continued)

TICKET SELLING MACHINES
<ul style="list-style-type: none"> • Located at betting windows • Controlled by EDP facility to check data, closed races, and scratches • Easily tested at start of betting day • Capable of entering simply all data on any allowed bet. • Special keying mode provided which, in effect, locks any keys desired, under operator control, to speed data entry.
TICKET
<ul style="list-style-type: none"> • Contains complete bet information including date, time, and a unique ticket number generated by central computer • Counterfeit proof and non-tamperable, window machine number and location identifiable
RELIABILITY
<ul style="list-style-type: none"> • Error control • Backup procedures in case of line failure • Storage of bets by time of day for audit • Restart procedures • Extensive validation logging and accounting checks
PAY-OUT
<ul style="list-style-type: none"> • Via window machine or separate Branch Office facility • Transmission to EDP facility of ticket serial number • Confirmation of amount and validity via EDP facility • Printing of pay-out amount on ticket • Retention of paid tickets for audit by the OTBC • Manager audit by window and Branch Office total

Table 1-1 (Continued)

EDP CAPABILITY

- Duplexed computer system
- Daily testing of I/O devices and processors
- Rapid restart and recovery procedures
- Storage capacity for several million bets
- Bet payment from any office within a few weeks (afterward from special area offices only)
- Magnetic tape backup for both current and unpaid old bets
- Continued system operation despite terminal or facility failures
- Common handling of deposit betting by the Central Processing Facility (CPF)
- On-line summary of bets by track, race, and horse
- Transmittal of morning line to the tracks with 2-minute update summaries
- Lock-out of further betting at all terminals when track signals closing of race
- Entry of race results including winning horses, places, pay-out amounts and scratches
- Immediate crediting of telephone betting accounts
- Refiling of winning tickets
- Management accounting controls presented
- Computation of winnings by branch
- Daily auditing, accounting, and statistical summaries by track, race, etc., at branch and central levels
- Preparation of detailed account statements for customers
- Immediate registration of customer account transactions
- Inquiry answering, account closing
- Historical account records stored on tape
- Accommodate current management reporting needs
- Computation of pari-mutuel pay-out for out-of-state bets
- Payroll and other corporation accounting
- Capability for account audit trail

Table 1-1 (Continued)

SUPPORT REQUIREMENTS
<ul style="list-style-type: none">• One vendor responsibility for hardware, software, and operational support• Complete systems support, program management computer facility management training, programming maintenance, etc.• Subcontract monitoring and control• Documentation including training manuals, maintenance procedures, technical manuals, and software documentation• Software documentation to conform with New York City data processing standards

1.3 SYSTEM OVERVIEW*

The CSC system approach for providing an Off-Track Betting System responsive to the requirements of New York City was developed with prime emphasis on reliable implementation within the time-frame required. The system chosen uses a three element betting window equipment complement of well tested and existing terminals, printers, and optical mark sensors to handle the functions of ticket issuing and payout for winning tickets. The same terminal is also used for deposit betting. Small computers are used to provide an interface between the window machines and the communications system to the system central processor. A flexible track interface design is provided which can accommodate a range of interfaces with track processors. However, this design is dependent on methods of information exchange that yet have to be determined. To insure the merit of this approach, both in terms of speed of implementation and performance, CSC assembled a prototype Off-Track Betting Office (OTBO) using these components under computer control and demonstrated all of the essential terminal capabilities required of the final system.

The window equipment, when operated in conjunction with a small processor, is uniquely suited to the task of versatile ticket issuing and cashier verification. The terminal provides the capability of entering up to 64 characters in a fully buffered mode. By structuring the entry through the use of appropriate tabs it is possible to enter the selected number of tracks, the specified bet amounts, and all additional types of bets prescribed in the RFP. The capability also exists for adding other types of bets such as win-place-show combinations or parlays, for varying the amount wagered, for entering multiple bets on a single ticket, and for expansion to meet almost any betting requirement that may arise.

*The specific equipment proposed by CSC in this summary proposal merely constitutes the initial proposal to OTBC. The final hardware configuration is currently in the process of being determined jointly by CSC and OTBC.

The terminal incorporates a display which exhibits the entire bet for operator display and patron approval prior to entry into the system and subsequent ticket issuance. The terminal unit also provides a fully buffered memory for the ticket printing portion of the window equipment and is capable of issuing multiple, duplicate tickets in a single transaction. Each of these tickets will have a separate, unrelated identification number with validation and security features.

The printer, designed to operate with this terminal, can print a ticket with 8 rows of 39 columns of characters. Within this basic format it is possible to accommodate the entire range of bet types including up to eight bets placed on a single ticket. Two rows are used to imprint a machine readable code to simplify and speed ticket entry, validation and cashing by means of an optical mark sensing unit.

The combination of the terminal and printer permit the completion of four bet transactions per minute (the main limitation arising from operator response and verification time). When operated in conjunction with the remote processor, it is possible to accelerate ticket issuing by locking the terminal to any combination of track, amount, pool, or race. In this mode it is also possible to eliminate the initial display portion of the cycle, further reducing response time and allowing faster ticket issuing during peak periods.

To facilitate the pay-out function, an entry device capable of reading the ticket number automatically assists in entry of the number through any of the window terminals. Security and verification is insured by display of the ticket number, amount to be paid-out, and limited ticket information for the operator prior to actual pay-out. Accounting and receipt are provided for the window operator by CPF controlled printing of the pay-out amount on the ticket. If this option is not followed, the ticket number will be keyed manually by the pay-out operator.

CSC

The volume of bets to be handled by the system and the necessity for complete bet accounting and filing places heavy communication and associated processing requirements on the system. To carry this load, CSC proposes an IBM 2703 transmission control unit together with software based on BTAM* as an interface between the CPF and the remote processors. The actual information sent from a terminal to uniquely describe a bet is less than 50 characters. Approximately six times this number is required in return to operate the display and to print tickets. Requiring the CPF to format and transmit these display and printing messages would place an unnecessary load on the processor and would introduce unacceptable delays in transmission through the system. This is avoided in the CSC design through the use of local processors capable of servicing 20 window-positions (pay-out and/or ticket issuing) as concentrators and preprocessors to condense the messages from the terminals before passing on to the Central Processing System (CPS). These remote processors relieve the CPF of much format verification, formulation, and transmission of complete display and print information, terminal control for lock-up, message type interpretation, buffering between the customer and the system, and accountability for transactions in progress. They also perform other critical functions such as transmission error control and message logging.

All the hardware to implement this approach exists and is proven in the field. CSC has a sufficient inventory of the terminals and ticket printers necessary to satisfy the requirements for initial deposit betting and branch office implementation. In addition, the local processor software necessary to support ticket issuing, cashier verification, and deposit betting has been developed in an initial form by CSC and demonstrated for New York City officials in conjunction with the prototype Off-Track Betting Facility demonstration.

*Basic Telecommunications Access Method is a standard IBM 360 software system for performing functions associated with communication service.

The software packages necessary to perform the filing function in the CPF rely heavily on existing IBM 360 disk interface and monitor packages. Therefore, standard IBM 360 software will be used to good advantage. The remaining software consists of application programs which can be developed within the time-frame of the proposed system implementation. Existing software, developed and currently being used on-track for such backroom functions as pool computations and cashier account verification will be directly applicable to the OTBS.

Special consideration has been given to the communications which is a critical element in the system operation. CSC has analyzed several existing hardware/software packages reputed to be capable of performing central processing communications functions for up to 100 high-speed lines with up to 200 messages per second throughput. CSC has concluded that a most economic approach to satisfying this need within the required time schedule is to use dual IBM 2703 transmission control units with the dual system 360 processors utilizing BTAM software to control the interface. As the system grows to its full capacity, alternative approaches may become desirable. Some of these alternatives are discussed later in this proposal.

To insure system reliability, provision is made within the system for complete communication and facility backup at every level. In addition, complete message logging is maintained at all critical interfaces in the system and sufficient data for following audit trails to their sources is maintained. Window machine backup is provided through extra equipment and a floating pool of spares. Backup remote processors are accessible through dedicated lines to alternate facilities. Additional backup is provided through the normal dial telephone network, to any other alternate facility should the prime be overloaded. Redundant transmission control units are used and redundant dedicated communication service is provided between the remote processors and the CPF. The CPF is duplexed and all files are preserved on magnetic tape for restart recovery procedures.

1.4 SYSTEM CONFIGURATION*

The system is structured around a Central Processing Facility (CPF) controlling and interchanging information with 1000 Branch Office Operator Terminals, 150 Telephone Betting Operator Terminals, and a number of tracks simultaneously.

The system's CPF and the Telephone Deposit Betting Facility (TDBF) will be located at the same site.

Located throughout the five boroughs, at points to be determined, will be 100 or more Branch Offices. Each Branch Office will be a complete "retail" betting operation, fully equipped to accept and pay all wagers for all races at all racetracks covered by the system. A high degree of flexibility in the layout of these offices is possible because of the modularity of the hardware proposed by CSC.

It is anticipated that at each track two remote processors will be provided, each with a flexible complement of interface equipment to handle the interchange of information with the OTBS. The two units will operate in parallel with error correction and full redundancy of facilities to insure reliability over this vital link of the system. Exact details of the track interface must be resolved in discussions with the tracks.

The basic operating facilities of the OTBS are:

- Branch Offices
- Central Processing Facility
- Telephone Deposit Betting Facility
- Track Facility

*The specific equipment proposed by CSC in this summary proposal merely constitutes the initial proposal to OTBC. The final hardware configuration is currently in the process of being determined jointly by CSC and OTBC.

In addition to the system facilities mentioned above, internal management and support systems, while extraneous to the actual betting and computing functions, are essential for the system's continued operation. Thus three additional facilities will be incorporated into the system.

- Administrative Management Facility
- Maintenance Facility
- Training Facility

Each of these major facilities and some of the important features of the proposed system are discussed in the following pages.

1.4.1 BRANCH OFFICES

The Branch Offices are the locations at which the bettor can place a wager(s) and be issued a ticket covering his bets. The major system activity will occur in support of this function. Each of the 100 to 200 Branch Offices will have the capability to issue tickets, and to redeem winning tickets issued from any other Branch Office in the city. Each Branch Office will contain from five-to-twenty Ticket Issuing Machines (TIMS); CSC proposes that of these, about 30 percent be equipped for cashing and verification of tickets by adding an optical mark sensing unit as described elsewhere in this proposal. A small Digital Equipment Corporation (DEC) PDP-8 computer will be located in the larger Branch Offices and will service 20 TIMS. Some of these will be remotely accessed through data circuits to nearby smaller branches. Each PDP-8 computer will be connected by dedicated transmission circuits to the CPF.

1.4.2 CENTRAL PROCESSING FACILITY

All betting computations, transactions, and reporting will be handled by the CPF. The CPF will have two IBM 360/50 computers, each with a complement of peripheral equipment such as disc and drum

storage devices, and dual 2703 transmission controllers working under IBM/360 MFT* and BTAM. The transmission controllers will handle the multiplexing and polling of up to 1,000 terminals through the intermediate PDP-8's. The CPU will also process all files maintained in the computer complex to service the off-track betting operations and to provide information for the general corporate management information system.

1.4.3 TELEPHONE BETTING OFFICE

Co-located with the CPF will be the Telephone Betting Office which will accommodate up to 150 phone betting operators who will handle deposit bets by telephone. Each operator will have a terminal accessing the Central Processing Unit (CPU) via a PDP-8 to place bets, check on accounts, identify the caller, and perform other personal accounting functions. In CSC's proposed approach, the equipment and software used for telephone betting is the same as that used to support window betting. This greatly simplifies both hardware and software maintenance. Additionally it facilitates the provision of deposit betting at windows should this be desirable at a later date.

1.4.4 TRACK FACILITY

Race tracks are the focus of activity for data flow about wagers and results of races. Initially, information from the race tracks (races to be run, competing horses, original odds, etc.) is entered into the system to begin the day's activities. At an appropriate time (pre post-time) the system will be required to report to the race track pool values accumulated for each race for entry into the on-track tote system as the morning line for the tracks. Updates to the track will be provided every two minutes. After the individual race, the results from race tracks must be entered back into the system to cause the pay-out functions to occur.

*Multiprogramming with a fixed number of tasks.

1.4.5 ADMINISTRATIVE MANAGEMENT FACILITY

This facility will be equipped and provided for use by the system management personnel in the daily operation of the OTBS. Administrative monitor and hard-copy facilities will be provided at this facility. Management decisions may be communicated from this terminal and management reports produced by the system will be received at this terminal.

1.4.6 TICKET TERMINAL

CSC's Ticket Terminal, the heart of the Branch Office operation, has been designed specifically for the purpose of issuing tickets under computer control. Because of this terminal's flexibility, it is capable of handling both window betting and deposit betting functions. It is designed to work with a high-speed Ticket Printer, and the two units will comprise a Ticket Issuing Machine (TIM). The solid-state ticket terminal communicates with the computer and provides a visual display of each transaction before an actual ticket is issued. Once the print command is given, the Ticket Printer immediately issues a ticket. The mark sense reader and pay-out printer described below is also designed to work in conjunction with the terminal. This configuration of compatible components provides a significant advantage to the OTBC. By using the same terminal for all functions, maintenance throughout the system and spares inventory problems are greatly diminished. Other important benefits are that the software required to support the terminals will be uniform throughout the system and personnel can, with little additional training, be broadened in their capabilities to be able to perform as either window or deposit betting terminal operators or cashiers, in response to changing needs or peak demands on the system. The uniform software also simplifies maintenance and eases system improvement as new or broadened applications programs are applicable to all terminals.

1.4.7 TICKET PRINTER

The Ticket Printer receives print commands from the terminal. When the terminal's ACCEPT pushbutton is depressed a ticket is issued in about 5 seconds. The Ticket Printer is a high-speed unit specifically designed for on-the-spot printing, color coding, and dispensing of tickets when interfaced with an on-line, real-time, computer-communication system. Each ticket will have the control number printed on the ticket in machine readable code.

1.4.8 MARK SENSE READER

A mark sense reader capable of accepting the ticket formats described in the next section is available and is recommended for inclusion as part of the terminals used for paying winning tickets. These mark sense readers render completely automatic the entry of ticket number for cashing.

1.4.9 TICKETS

A special ticket stock with a New York City watermark may be used. This stock could be released to the ticket supplier from the paper mill only upon notification by the City. The same basic format is used for each type of ticket in order to avoid confusion and to simplify printing procedures. Each ticket may be printed with a colored stamp that facilitates rapid identification of the ticket's value.

Mark sense characters printed on the ticket permit the ticket number to be entered automatically for cashing. If this is done, it will reduce the opportunity for human error and will expedite and secure the ticket cashing process. The same information is also produced in normal character form to permit manual entry of ticket number as an alternative or in the event of mutilation or failure to read the coded marks successfully.

1.4.10 SYSTEM ACCOUNTING AND BACKROOM SOFTWARE

The applications programs to support Branch Office and system accounting including all backroom racing functions have already been developed to support the operations of many on-track systems currently in use in various parts of the country. The fact that the concepts are fully checked out, operational, and have been accepted in race track environments results in a high degree of confidence in the ability of the CSC team to satisfy the requirements of the New York City OTBS not only in providing the necessary functional capabilities, but also in doing so in accord with schedule and cost goals.

CSC

SYSTEM DEMONSTRATION

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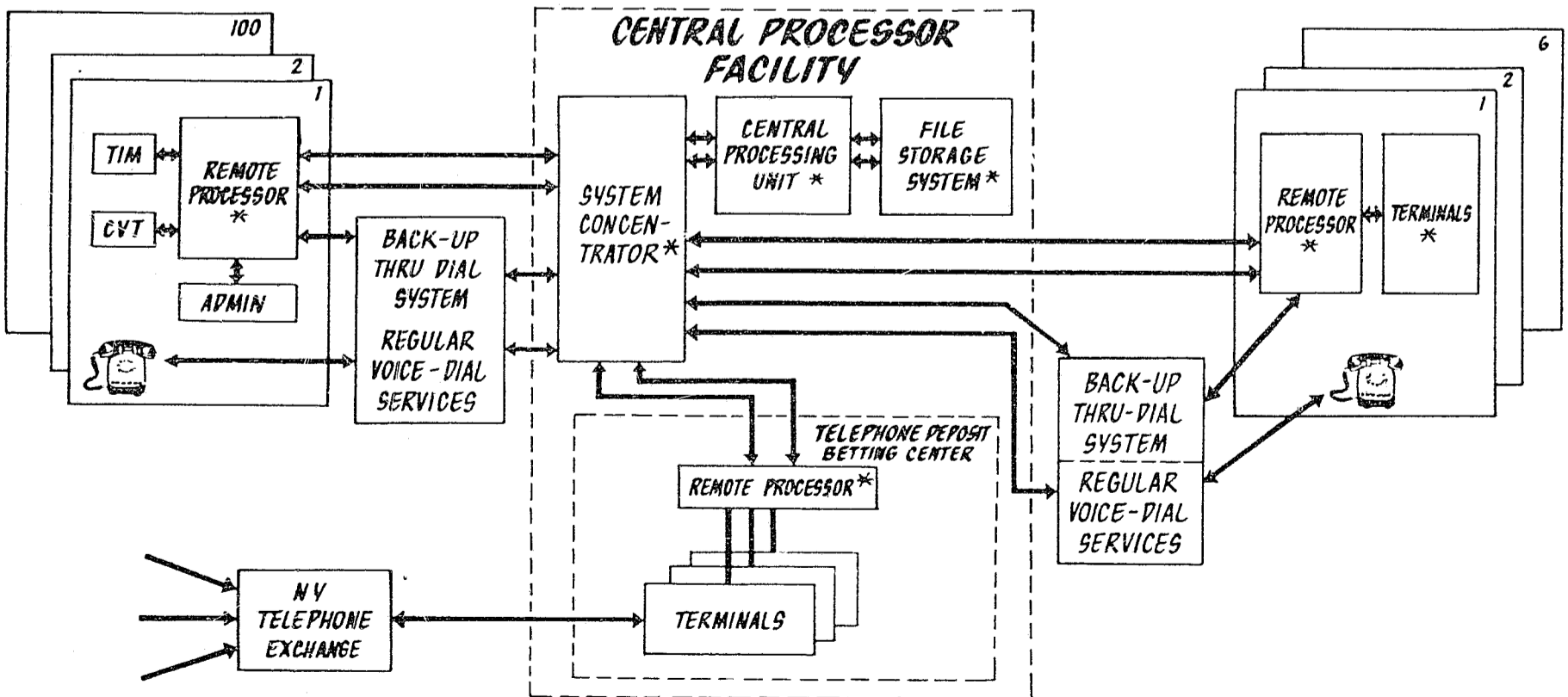
- **ACTUAL BRANCH OFFICE OPERATIONS UNDER CENTRAL COMPUTER CONTROL**
 - **GENERAL PURPOSE TICKET DISPENSING MACHINE**
 - ALL POSSIBLE POOL TYPES
 - ALL LEGAL WAGER AMOUNTS
 - ANY TRACKS
 - MULTIPLE BETS ON SINGLE TICKET
 - MULTIPLE TICKETS FOR A SINGLE WAGER
 - **SPECIAL PURPOSE TERMINAL DEDICATION UNDER OPERATOR CONTROL**
 - **AUTOMATED CASHIER VERIFICATION PAYOUT TERMINAL**
 - PAYOUT CALCULATION
 - SINGLE PAYOUT LIMITATION
- **ACTUAL TELEPHONE OPERATIONS UNDER CENTRAL COMPUTER CONTROL**
 - **FULL DEPOSIT ACCOUNT IDENTIFICATION AND STATUS**
 - **AUTOMATIC UPDATING OF ACCOUNTS AFTER TRANSACTION AND POOL RESULT DETERMINATION**

CSC OVERALL SYSTEM CONFIGURATION

COMPUTER SCIENCES CORPORATION

BRANCH OFFICE SUBSYSTEM

RACE TRACK SUBSYSTEM



* REDUNDANT

CSC *NEW YORK CITY OFF-TRACK BETTING*

COMPUTER SCIENCES CORPORATION

SYSTEM CONCEPT

LEGEND

- CPF CENTRAL PROCESSOR FACILITY
- TBF TELEPHONE BETTING FACILITY
- BRANCH OFFICE

