

DATA PROCESSING
PERFORMANCE REQUIREMENTS

396 - 68

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CHARACTERISTICS OF THE CITY OF ANN ARBOR

City Government

Ann Arbor's City Charter provides for a council-manager form of government. The mayor is elected at large and is chairman of the city council. He participates in discussion and has a vote and veto power at council meetings. Aside from the mayor, the council is composed of two councilmen from each of the city's five wards.

The city administrator serves as chief administrative officer of the city and carries out the policies of the council. He is a full-time employee hired by the council and is solely responsible to the council. His primary duty is to direct, supervise, and coordinate the work of the various administrative departments. There are 15 administrative departments in the city which report directly to the city administrator. In addition there are three departments (Planning, Attorney and Housing) reporting to the council. The administrator has the responsibility of presenting the operating budget (currently 6.7 million dollars) to the council.

Growth

Ann Arbor's present population is approximately 95-100,000 with 25% being resident students at the University. This represents a 4-5% per year increase since 1960 when the population was 67,340. The city planning department estimates the population will be over 150,000 by 1980, which is a figure largely based on projected University of Michigan growth and development.

Equipment

The present electronic data processing system in operation at the city consists of IBM Unit Record Equipment retained on a rental basis. The table below shows the specific pieces of equipment in use, the quantity, and monthly rental.

PRESENT EQUIPMENT DESCRIPTION

<u>NAMES AND CODE</u>	<u>QUANTITY</u>	<u>MONTHLY COST</u>
Card Punch (024)	2	\$ 77.40
Verifier (056)	1	48.00
Sorter (083)	1	96.80
Collator (085)	1	143.50
Accounting Machine (407)	1	751.50
Reproducing Punch (519)	1	170.00
Intepreter (557)	1	178.50
Calculating Punch (602)	1	196.00
Burster	1	<u>10.00</u>
		\$1671.70 TOTAL

¹NOTE, the burster is owned by the city. The monthly costs represents the purchase price spread over the estimated economic life.

Personnel

The present data processing staff used to operate and maintain the system consists of six full-time employees trained in the use of Unit Record Equipment. The following classifications of personnel levels exist within this group:

- 1 EDP Supervisor
- 1 Assistant Supervisor
- 1 Senior Tab Operation
- 1 Junior Tab Operation
- 2 Keypunch Operators

The supervisor engages primarily in operator training and supervision, systems analysis, control panel wiring (programming), and occasional machine operation. The assistant supervisor coordinates the activities of the other operations, performs applications during times of peak activity or absenteeism, does occasional board wiring, and is responsible for certain applications. The senior tab operation is essentially applications-oriented, in that he is primarily responsible for certain applications and along with the assistant supervisor has a basic knowledge in programming. The junior tab operator is also responsible for various applications but is not aware of the technical aspects of data processing. The two keypunch operators do all the key punching and verifying associated with the present applications.

Applications

An introduction to the present applications will be presented at this time. Later, these applications will be presented in more detail.

The City's present data processing applications can be described in the general sense as involving the billing process and traditional accounting functions. A brief description of these applications is presented in the table below. The relationship between the application and the department or functions involved are presented along with the frequency of occurrence.

APPLICATION DESCRIPTION

NAME	INPUT	OUTPUT	FREQUENCY
Payroll	All Dept.	Employees	Bi-Weekly
Sick & Vacation Report	All Dept.	All Dept.	Monthly
Overtime Anal.	All Dept.	Accounting	Monthly
Water/Sewer Billing	Water Dept.	Customer Water Dept.	District/ Week
Water/Sewer	Treasurer	Accounting-Water Department	Daily; End of Month
Tax Billing	Assessor	Customers	Twice/year
Tax A/R	Treasurer	Accounting	Daily for 2 months/year
Equipment Costs	Public Works & Water Dept.	Accounting	Monthly
Equipment Labor Transfers	All Dept.	Accounting	Monthly

NAME	INPUT	OUTPUT	FREQUENCY
Budget Distr.	All Dept.	Accounting	Monthly
Receipts	Customers	Accounting	Monthly
Standing Violat.	Police	Customers & Treasurer	Monthly
Billing			
Standing Violations A/R	Customers	Accounting	Monthly

Machine Utilization

Added insight into the scope of the present, data processing system can be gained by viewing the actual machine time utilized in performing the present applications. Since the tax processing application is a seasonal activity (i.e. Tax billing and A/R runs for 4 months) it is necessary to treat those periods involving tax activity separately. The following table presents the hours of machine time utilized on the present application during three separate periods.

MACHINE UTILIZATION (Hours)

Machine	Tax Receivable Updating		No Tax Activity		Tax Billing & Preparation	
	Daily	Daily & Month End	Daily	Daily & Month End	Daily	Daily & Mon. End
024 (2)	7.8	138	6.3	102.5	7.0	116.2
056	4.9	71	3.8	50.2	4.7	69.5
083	1.5	48.9	1.1	43.6	1.7	57.2
085	2.4	76.4	1.6	59.9	3.6	104.9

MACHINE UTILIZATION (hours) Cont.'

Machine	Tax Receivable Updating		No Tax Activity		Tax Billing & Preparation	
	Daily	Daily & Month End	Daily	Daily & Month End	Daily	Daily & Mo. End
407	5.9	137.3	4.8	125.3	8.2	197.3
519	1.7	44.3	1.5	50.9	1.6	51.7
557	1.3	30.5	1.1	26.2	3.4	75.9
602	1.5	32.8	1.3	31.8	2.7	59.1

PHILOSOPHY OF ANN ARBOR TOWARD DATA PROCESSING

History

In 1962, the City of Ann Arbor began the use of electronic data processing by acquiring Unit Record Equipment and initiating changeover from manual to machine processing for selected applications.

As of late 1965, only a few of the applications originally planned had actually been implemented. Moreover, the City administration had become aware of recent advances in the types of data processing systems available and their potential benefits to the city. Accordingly it was felt that a need existed to re-examine the present system and original plan of action and determine the extent to which the present system satisfies the City's needs.

The service of Community Systems Foundation were obtained to perform this analysis. The study was under-taken in December of 1965 and a report of the finding submitted in

March, 1966. (i.e. Analysis of Electronic Data Processing, B. Burkhalter, D. Harris, March 14, 1966). The pertinent conclusions and recommendations submitted are as follows:

1. That the use of Unit Record Equipment be continued and expanded as justified for the next two to two and one half years.
2. That the need for expanded Unit Record system resources be considered in the performance of future systems and justified on a net cost basis.
3. That the City conduct further investigations into alternative ways of acquiring a computer or the use of computer facilities by two to two and one half years.
4. That the development of a computer system providing remote direct user inquiry be considered feasible over the next five years only if such a system can be developed on a shared basis.
5. That any computer which the City uses in the future have the characteristic of expandable program and data storage capacity.

The impact of these recommendations have been realized to the extent that additional Unit Record Applications have been implemented. Furthermore, the City is in the process of investigating alternative data processing systems.

Organizational Setting

The EDP System is operated on a service-bureau basis. The data processing department's direct operating costs are distributed among those departments which make use of information processes or which would otherwise process the information themselves. This is done by "charging" each department for its portion of the direct cost. In this manner, the Data Processing Department is expected to justify its existence or use, since the cost of using its resources can be compared to the cost of the department manually processing the work. Further, the service bureau arrangement is intended to place the data processing on an organizational wide service basis rather than confining it to one department. However, in reality the department is organizationally a section of the Accounting Department with the EDP supervisor reporting to the Controller.

Future Equipment

The need for a computer arises from the fact that many potential data processing applications exist and should be implemented. However, as the present system expands, equipment needs will change in the not to distant future. More machine and labor capacity will be needed in the form of overtime or additional personnel and equipment. Therefore if additional cost must be incurred in adding other applications, different types of data processing equipment should be considered, even though there still exists other applications which can be processed using Unit Record Equipment. A description of

the performance requirements needed to accomplish the present applications as well as additional applications will not be presented.

APPLICATION REQUIREMENTS

In this section a detailed description of both the present applications and applications that should be implemented in the near future (within two years) will be presented. An Application description will consist of a short verbal description, input format including volume and frequency, file size, and output format.

The input volume represents the keypunching load (cards and characters) necessary to perform the application. The frequency associated with volume in most cases is determined by the output requirement. For example, payroll checks are distributed bi-weekly and therefore, input is measured in bi-weekly units.

File size is defined by the number of characters required for each application. Additions and deletions to the file are presented in the form of inputs.

The output volume represents the actual number of printed lines required for the application. The various documents and listings which comprise the output are also presented.

Present Applications

PAYROLL

- The bi-weekly paying of 800 city employees. The payroll run includes gross hours x rate extension, making appropriate deductions, and printing of checks. The following listings are printed; check register, deductions listing, and year to date listing.

INPUT

Volume = 74,800 Char. Frequency = Bi-weekly
(2600 detailed cards/run x 22 char./ card
800 year to date summary cards x 22 char./
card)

FILE

Volume = 53,500 Char.
(Badge No., Dept. No., Account No., Pay
Rate, Standard Deductions, Name and
Address, and Year to Date Summary)

OUTPUT

Volume = 7,500 Lines Frequency = Bi-weekly
(Checks, Check Register, Deductions, Listing,
Year to Date Listing)

PAYROLL EXPANSION

- An extension of payroll involving keeping a personnel data bank in which sick and vacation days and overtime are monitored.

INPUT

Volume = Same as Payroll Frequency = Monthly

FILE

Volume = 17,000 Char.

(Employee Data Bank)

OUTPUT

Volume = 1600 Lines Frequency = Monthly

(Sick and Vacation Report and Overtime
Analysis)

WATER AND SEWER
BILLING AND A/R

-The quarterly billing of city residents based on water consumption as reported on marked sensed cards. The bills are extended and checked against an A/R file for account status (i.e. unpaid bills, credits, charge backs, etc.). Bills are addressed, A/R status listings are printed along with a detailed billing register and customer history cards are posted. Water bill stubs initiate the payment process. This involves updating the A/R file. Delinquent accounts are sent notices (reminder, or shut-off) weekly. Advanced meter reading and billing cards are prepared for the next billing cycle.

Volume=94,500 Char. Frequency=Weekly
for billing (1350 meter cards/week x 70
char./card)

Volume=94,500 Char. Frequency=Weekly
for A/R

FILE

Volume=3,570,000 Char.
(Customer Identification, Billing
History, and A/R History)

OUTPUT

Volume=9,800 Lines , Frequency=Weekly
(Bills, Billing Register, Statistical
and Net Billing Report, Delinquent
Notices and A/R totals)

TAX BILLING
AND A/R

Assessing the value of land and determining
the appropriate tax schedule. Tax
bills are prepared and totals tabulated.
This involves making assessment changes
and sending notices; printing the
assessment roll and tax roll; maintain-
ing the name and address file.
The A/R file is updated using stubs
from paid bills. Cash Receipt
Listings and Totals are Printed.

INPUT

Volume=2,200,000 Char. Frequency=Daily for 4 months
(44,000 cards x 50 Char./card)

FILE

Volume=3,640,000 Char.
(Customer Description and A/R)

OUTPUT

Volume=40,000 Lines Frequency=Monthly for 2 months
(Assessment Roll, Tax Roll and Totals) for billing

Volume=20,000 Lines Frequency=Monthly for 2 months
(Cash Distribution Listing and Totals) for A/R

EQUIPMENT
COST

Accounting for equipment rental charges incurred
by various departments on certain jobs. Rentals
earned and hours run is shown. This equipment is
owned and maintained in a revolving account in the
Public Works Department.

INPUT

Volume=8,000 Char. Frequency=Monthly
(400 Equipment Cards x 20 charge/card)

FILE

Volume=6,000 Char.
(Year to Date Cost)

OUTPUT

Volume=250 Lines Frequency=Monthly
(Current and Year to Date Dollars and Hours)

EQUIPMENT AND
LABOR TRANSFERS
AND BUDGET
DISTRIBUTION

The charging of labor and equipment costs to the departments that incurred the expense. This involves transferring funds from the department's account which incurred the expense to the departments which loaned the labor and equipment. All labor and revolving equipment cost incurred by the departments is shown on a budget distribution listing.

INPUT

Volume=5200 Payroll Cards Frequency=Monthly

Volume=400 Equipment Cards Frequency=Monthly

FILE

Volume=48,000 Char.

(Year to Date Cost)

Volume=3600 Lines Frequency=Monthly

(Equipment and labor transfers and budget distribution)

Accounting for all monetary receipts received by the City. This involves arranging receipts into classifications (i. e. funds, bank accounts, function within department, etc.) and obtaining totals. These totals are balanced with one another for control purposes.

RECEIPTS

INPUT

Volume=9,504 Char. Frequency=Daily

(216 detailed receipt cards x 44 Charge/Card)

FILE

Volume=1,000 Char

(Account numbers and classification numbers)

OUTPUT

Volume=5,300 Lines Frequency=Monthly

(Receipt Listing and Totals)

STANDING
VIOLATIONS
BILLING AND
A/R

Monitoring of standing violation tickets issued by the Police Department. A ticket issued file is kept and purged periodically. A register (by license number and ticket number) showing tickets paid with totals is produced along with other listings (warrent notice, type of violation, and officers performance and ticket inventory). Warrent notices and warrents are printed and sent out.

INPUT

Volume=53,800 Char. Frequency=Daily

(Issued Tickets, Paid Tickets and Name and Address Entries)

FILE

Volume=2,840,000

(Unpaid Tickets and Name and Address)

OUTPUT

Volume=13,600 Lines Frequency=Monthly for Paid Tickets

(Paid Ticket Listing, Type of Violation Listing and Officers Performance and Ticket Inventory)

Volume=66,500 Lines Frequency=Monthly for 6 Months for
Unpaid Tickets.

(Warrent Notices, Warrents and Warrent Notice Listing)

Future Applications

The following applications are not presently performed by data processing. However, once further development is accomplished, these applications should become operational within the next 18 to 24 months.

ACCOUNTS
PAYABLE

Accounting for the payment of all purchases from outside vendors. This involves keeping records of all purchases, articles received, writing checks and registering checks and vouchers. A distribution listing indicating the expenses incurred (month and year to date) by department is provided.

INPUT

Volume=23,500 Char. Frequency=Daily
(75 invoice/day x 6 items/invoice x 50 Char./Item plus
20 misc. Request/Day x 50 Char./Request)

FILE

Volume=12,500 Char. (Vendor File)

OUTPUT

Volume=8,500 Lines Frequency=Twice Monthly
(Checks, Check Register, and Voucher Register)
Volume=4,500 Lines Frequency=Monthly
(Distribution Listing)

GARAGE
DISBURSEMENTS
AND EQUIPMENT
RECORDS

Accounting for all purchases associated with servicing vehicles performed at the city garage. The garage account is a revolving account and therefore, the funds associated with these changes are transferred from the departments' accounts. Per vehicle expenses are recorded on a disbursement record showing divisional and department totals along with rentals earned (by product of the equipment cost application).

INPUT

Volume=102,500 Char. Frequency=Monthly
(4,100 Gas-Oil-Repair Charges x 25 Char./Charge)

FILE

Volume=500 Char. (Unit Prices and Account Numbers)

OUTPUT

Volume=400 Lines Frequency=Monthly
(Garage Disbursement Record)

APPROPRIATIONS
LEDGER

The Appropriation or Budget Ledger is a control accounting mechanism. This ledger is a monthly statement of the actual expenditure versus the amounts appropriated for the function. This application is a by-product of:

1. Equipment Labor Budget Distribution
2. A/P Distribution
3. Transfers From the Garage, Revolving Equipment, Revolving Office Supplies and Revolving Supplies in Public Works
4. Receipts (Appropriated Receipts).

INPUT

Volume=20,200 Charges Frequency=Monthly
(52,000 Payroll Cards, 400 Equipment Cards, 10,350
A/P Charges, 4,100 Garage Charges, 30 Rev. Supplies
Public Works, 15 Rev. Office Supplies, Transfers,
and 100 Appropriated Receipts.)

FILE

Volume=1,000 Char. (Account Numbers)

OUTPUT

Volume=2,500 Lines Frequency=Monthly (Appropriations
Ledger)

COST
ACCOUNTING

Accounting for the various costs incurred on projects
in the following departments: Traffic Engineering,
Parking System, Water, Public Works (Sewer Division)

This application is a by-product of:

1. Equipment Labor Budget Distribution
2. A/P Distribution
3. Transfers

INPUT

Volume=Same as Appropriations Ledger Frequency=Monthly

FILE

Same as Appropriations Ledger

OUTPUT

Volume=3,000 Lines Frequency=Monthly
(Cost Accounting Distribution)

MONTHLY
FINANCIAL
REPORT

This report is a combination of "Statement of Actual Expenditure with Authorization" (i.e. Appropriation Ledger Totals) plus a statement of the status of each fund which involves presenting the receipts and disbursements for each of the 23 funds.

INPUT

Same as Appropriations Ledger Frequency=Monthly

FILE

Volume=3,000 Char. (Year to Date Figures)

OUTPUT

Volume 300 Lines Frequency=Monthly

(Monthly Financial Figures)

QUARTERLY
REVENUE
& DISBURSE-
MENT REPORTS

This report consists of a quarterly print-out showing initial and revised estimates for revenues and disbursements based on actual data. Information necessary for the quarterly historical recap and actual revenue and disbursements is stored. The purpose of this report is to analyze the accuracy of management's estimates.

INPUT

Volume=6,000 Char. Frequency=Quarterly

(Receipts and Disbursement Estimates)

FILE

Volume=201,000 Char. (Receipts and Disbursements)

OUTPUT

Volume=21,600 Lines Frequency=Quarterly
(Revenue and Disbursement Summary)

MOVING
VIOLATIONS
BILLING AND
RECEIVABLES

Monitoring of moving violation tickets issued by the police departments. Violations are of two main types, those requiring a court appearance and those not requiring court appearances. A ticket paid register showing totals is produced along with the following listing: Warrent Notices, Type of Violation, Location (place where ticket was issued) and Ticket Inventory.

INPUT

Volume=2,600 Char. Frequency=Daily
(45 Tickets/day x 58 Char./ Ticket plus 45 Paid
Tickets/Day x 16 Char./ Tickets).

FILE

Volume=29,000 Char. (Unpaid Tickets)

OUTPUT

Volume=2,400 Lines Frequency=Monthly
(Paid Ticket Listing, Warrent Notices Listing,
Warrents, Location and Ticket Inventory)

VOTER
REGISTRATION

This application consists of a data bank of registered voters, containing pertinent identification and voter activity information. Specifically, this involves continual registration of voters throughout the year with listings printed; removal of registrants who have not voted within a two year period (i. e. removing, sending notice, preparing listings); changing of ward and precinct boundaries and notifying those affected; posting and tabulating voter activity, showing participation by voters in separate elections in the city.

INPUT

Volume=420,000 Char. Frequency=Yearly
(6,000 File Additions/Year x 70 Char./ Req.)

FILE

Volume=2,800,000 Char. (Registered Voters)

OUTPUT

Volume=259,000 Lines Frequency=Yearly
(Roles Listing, Expired Registrants Notification,
List of Expired Registrants Voter Activity Tabulation,
Boundry Change Notices, List of Boundry Changes)

STANDING
VIOLATION
MANAGEMENT
REPORTING

Providing necessary information to assist the various departments involved to carry out their functions. This involves preparing the following reports:

1. Paid ticket listing
2. Warrent Notice Listing
3. Type of Violation
4. Officers Performance and Ticket Inventory
5. Ticket Issued Graph (Estimate vs. Actual)
6. Standing Violation Reporting System Follow-up
7. Revenue Projection
8. Warrent Notice, Warrents Issued and Warrents Paid Research Reports.

INPUT

Volume=Same as Standing Violation Billing and A/R

Frequency=Monthly

FILE

Volume=Same as Standing Violation Billing and A/R

OUTPUT

Volume=50 Lines Frequency=Monthly

(Number and Dollar Totals for Tickets, Notices, Warrents)

The previous list of applications is not intended to be entirely restrictive. There are numerous potential applications in other areas of the City. Every department has expressed a desire to make use of EDP in some manner. Therefore, this list presents a picture of the City's short-term future needs. These needs form the minimum data processing requirements and therefore, they must be reflected in the capacity capabilities of any equipment under consideration. A detailed description of additional potential applications will not be presented at this point in time. Most of these applications are only formulated ideas. Therefore, more development is required to present them in meaningful terms. For example, the City has

expressed interest in establishing a property data bank.

Although this application requires considerably more development, it will be briefly described, since it has high priority.

The main capacity consideration with respect to the property data bank is the file. It is anticipated that the file would contain information on each parcel within the city, and where multiple establishments exist, on each establishment in a parcel. Ann Arbor currently has about 20,000 parcels. Previous experience suggests another 10,000 records for multiple establishment parcels. Each of the approximately 30,000 records would contain on the order of 150 characters of substantive information (approximately 25 fields). In addition, there would be about 100 characters of identifying information per record. How much of this information should be referenced in table form and how much associated with each record is not clear at this time.

Output would consist primarily of infrequent reports and analyses for planning purposes. The analysis may consist of a large number of cross-comparisons, suggesting random access storage. Input to the file for updating purposes represents a difficult systems problem but it is unlikely to be a significant factor in determining equipment capacities.

APPLICATION

INPUT

SUMMARY OF APPLICATION REQUIREMENTS

FILE

OUTPUT

	Volume (Characters)	Frequency	Volume (Characters)	Volume (Lines)	Frequency
Payroll	74,800	Bi-weekly	53,500	75,000	Bi-weekly
Payroll Expansion	Payroll	Monthly	17,000	16,000	Monthly
Water & Sewer	94,500	Weekly	3,570,000	9,800	Weekly
Billing A/R	94,500	Weekly			
Tax Billing A/R	2,200,000	Daily for 4 months	3,640,000	40,000	Monthly for 2 mos.
Equipment Cost	8,000	Monthly	6,000	20,000	Monthly for 2 mos.
Transfers and Budget Distribution	Payroll and Equipment	Monthly	48,000	250	Monthly
Receipts	9,500	Daily	1,000	5,300	Monthly
Standing Violations Billing A/R	53,800	Daily	2,840,000	13,600	Monthly
Account Payable	23,500	Daily	12,500	8,500	Monthly for 6 mos.
Garage Disbursements & Equipment Records	102,500	Monthly	500	400	Twice Monthly
Appropriation Ledger	Receipts and Disbursements	Monthly	1,000	2,500	Monthly
Cost Accounting	Receipts and Disbursements	Monthly	1,000	3,000	Monthly
Monthly Financial Report	Receipts and Disbursements	Monthly	3,000	300	Monthly
Revenue & Disbursements Report	6,000	Quarterly	201,000	21,600	Quarterly
Moving Violations Billing A/R	2,600	Daily	29,000	2,400	Monthly
Voters Registration	420,000	Yearly	2,800,000	259,000	Yearly
Standing Violation Management & Reporting	Billing & A/R	Monthly	Billing & A/R	50	Monthly

MANUFACTURER'S REQUIREMENTS

This section specifies the information that should be furnished by the manufacturer. It is intended to serve as a guideline for manufacturers in preparing their bids.

EQUIPMENT COMPOSITION

Specify in detail the make, model, number, and quantity of each unit which will be used to meet the application requirements.

Numeric or alphanumeric, and fixed or variable field data transmission along with storage capacity storage methods (random or serial access) and operating supplies should also be specified.

OPERATING REQUIREMENTS

Specify the operating methods (i.e. the acceptance of input documents and data) and time required for each type of equipment to process the major applications in relation to potential hours available.

EXPANSION

Equipment expansion capabilities in terms of processing additional data and program storage should be specified. This involves indicating additional, input, output, storage, computing, interrogation and sorting units. Since it is impossible to consider all of the factors that contribute to increases in machine capacity, the equipment must have modularity characteristics.

DELIVERY AND INSTALLATION

Specify delivery date and installation time (check equipment and get it in operating condition). All conditions under which the manufacturer's guarantee applies should be specified. Also, size, weight, floor space for each unit including auxiliary equipment along with electric power, air conditioning and file space requirements should be presented.

ASSISTANCE

Specify the availability of personnel for analysis, programming, and installation; training courses available for programmers and operators, and the availability of manufacturer's equipment for use in program debugging. Development and change-over cost are of considerable concern, so the City will consider carefully contributions of developmental personnel.

RENTAL OR PURCHASE AGREEMENTS

Specify rental rates for different levels of usage, term of the contract, renewal, cancelation clause, adjustment for excessive down time, terms of payment, guarantees on equipment operation, and terms of special options (e. g. rental payment credit on purchase options) and maintenance contracts.