GENERAL ELECTRIC
COMPUTERS

GE-625/635 PERT/COST

ADVANCE INFORMATION

GENERAL ELECTRIC

XCPB-1190A

TIB 600-177;

GE-625/635
PERT/COST

Program Number
CD600K1.002

November 1965

Rev. April 1966

GENERAL ELECTRIC

INFORMATION SYSTEMS DIVISION

PREFACE

Suggestions and criticisms relative to form, content, purpose, or use of this manual are invited. Comments may be sent on the Document Review Sheet in the back of this manual or may be addressed directly to Engineering Publications Standards, B-90, Computer Equipment Department, General Electric Company, 13430 North Black Canyon Highway, Phoenix, Arizona, 85029.

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1. INTRODUCTION

The GE-625/635 PERT/COST program design is based on the specifications stipulated within the DOD and NASA GUIDE PERT/COST Systems Design manual, June 1962 and the Supplement No. 1 to DOD and NASA GUIDE PERT/COST Output Reports manual, March 1963.

These manuals and three volumes in the USAF PERT series -- Volume III, PERT/COST System Description Manual, December 1963, Volume IV, PERT/COST System Computer Handbook, Part 1, December 1963, and Volume V, PERT Implementation Manual, April 1964 -- provide the user with a detailed description of the use of the PERT/COST System. All of these manuals are obtainable from:

Superintendent of Documents
Pentagon Building
Wasington, D. C.

2. GENERAL DESCRIPTION

WORK BREAKDOWN STRUCTURE

The work breakdown structure is basic to the operation of a PERT/COST System. Its construction starts in the early stages of a program and expands in detail until a sufficient control tool evolves. Beginning at the highest level of the program it emanates into major end items and their components and subcomponents. The level of detail of the finished structure is the level necessary for effective control. A summary numbering system through which effective cost summarization and reporting takes place is associated with the work breakdown structure. Figure 1 is an example of a work breakdown structure.

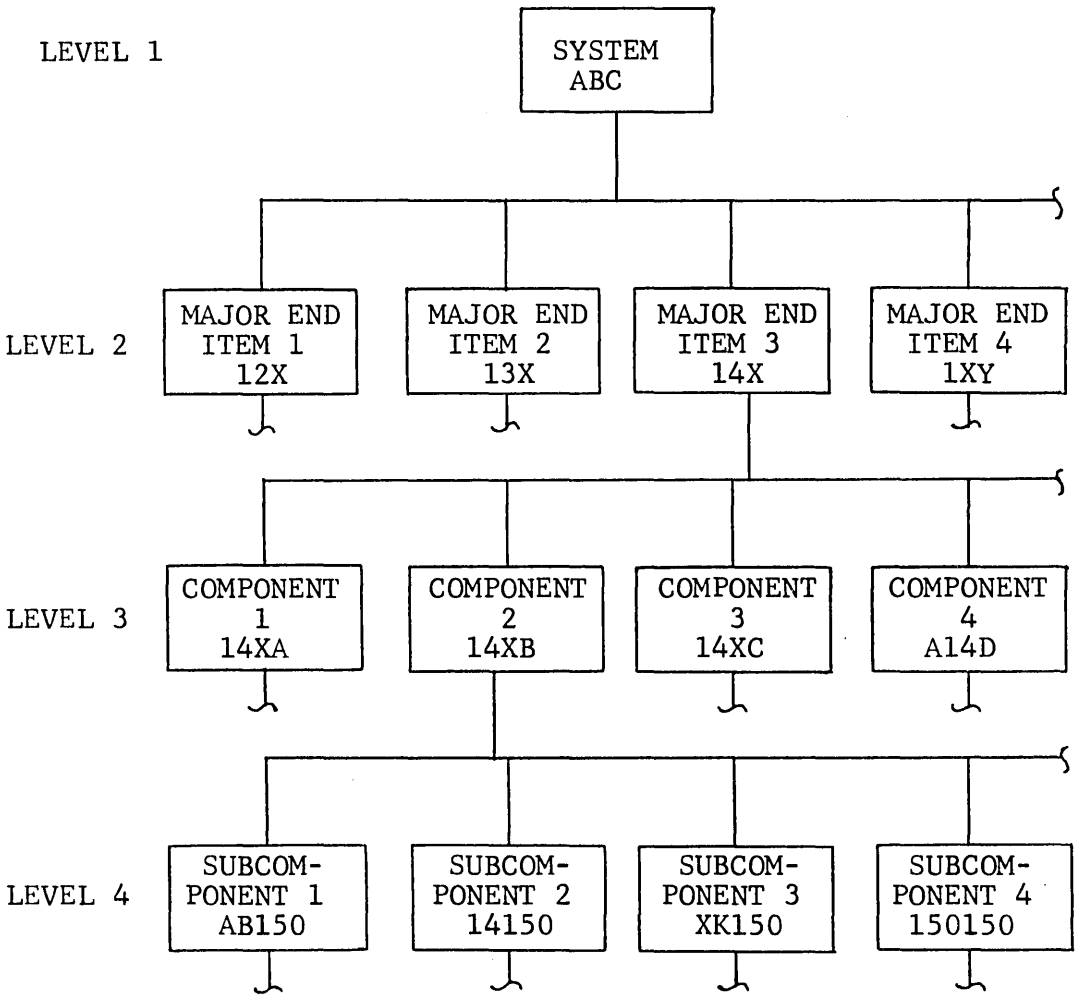


Figure 1. Sample Work Breakdown Structure

Summary Numbers

A unique summary number is associated with each end item. These numbers represent points within the work breakdown structure into which costs are accumulated. They have a "parent-child" relationship. A "parent" represents an item into which costs are accumulated from one or more "child" items. For example, in Figure 1, summary number 14X is a parent of 14XA, 14XB, 14XC, A14D, . . . , and AB150 is a child of 14XB. Each summary number is additionally associated with a "level" within the work breakdown structure. A parent summary number must be at a higher level than that of each of its children. A child is normally, but not necessarily, exactly one level below its parent. Unique charge numbers, instead of summary numbers, are associated with end items which have no children. Charge numbers are further subdivided into work packages (performing organizations within a charge number); these are the smallest easily controllable cost elements within the system. In general, this is the point of association of PERT networks with the work breakdown structure.

Level Codes

The GE-625/635 PERT/COST program provides numerical, 2-digit level assignments. A diagnostic is given if the level code of a charge or summary number is not exactly one level below that of its parent. However, this occurence does not impede further operation of the program. A diagnostic is given for all charge or summary numbers which have no indicated parent, unless they are on level 1. Again, if this happens, the execution of successive program parts is not hampered.

COSTS

General

Costs in the GE-625/635 PERT/COST program are divided into three categories:

1. Budgets
2. Estimates
3. Actuals

A cost piece is generally applied to a unique charge number, performing organization, resource code combination. However, it may be applied at a summary level.

3. INPUT CARDS

GENERAL

All input cards use column 1 for master file control and column 2 as the card type identifier. The identification or file control fields for this card type follow immediately. All control fields are terminated by a sequence column. Where 1 card is sufficient to enter all the information necessary for a card type, this column is blank. When more than 1 card is necessary for a card type, this field contains a sequencing of A through Z. The remainder of each card type is then used to hold whatever fields have been defined as necessary. Optional numeric entries (0-9) define up to 10 comment cards describing the item entered in the control field. Their only purpose is to appear on a master file report for this card type.

The column 1 file control field is restricted to the following characters:

1. Blank or A

   Represents a card to be added to the master file.

2. C

   Represents changes to cards already on the master file. In addition to the card type, the control field and the sequence column, the only information necessary on a card headed by a C is that which has changed. Ignored fields are updated with the information which appears on the old master file.

3. D

   A deletion prevents the old master file card identified by this card type, control field, and sequence column from appearing on the new master. The remainder of this card is not interrogated.

There are 9 types of input cards. These are listed below with their card type identifiers.

W	Work Breakdown Structure
4	Estimating Card
5	Budget Card

A	Actual
R	Rate Table
6	Charge or Summary Number Category
P	Project Parameter Inputs
M	Master File Information
O	Output Request

These cards are described in detail in the following sections.

WORK BREAKDOWN STRUCTURE

FORMAT (FIRST CARD)

FC	Type	Charge or Summary #	Seq	Level	Parent	Charge or Summary # Description
1	1	18	1	2	18	39
	W		A			

TYPE: W

CHARGE OR SUMMARY NUMBER: 18 columns

Unique designation of the particular item or element of the work breakdown structure being defined.

SEQUENCE: A

Defines the first of the three possible cards for each charge or summary number of the work breakdown structure. The use of this card is mandatory.

LEVEL: 2 columns

The number of the tier or level on the work breakdown structure at which this charge or summary number appears.

PARENT: 18 columns

The summary number of the higher item on the program breakdown into which the time and cost data for this item are summarized. If the parent is not at the next higher level, a precautionary diagnostic will be produced and normal processing will continue.

CHARGE OR SUMMARY NUMBER DESCRIPTION: 39 columns

Noun description of the summary item being defined.

FORMAT (SECOND CARD)

FC	Type	Charge or Summary #	Seq	Start Date	End Date	Start Event	End Event	Resp. Organ.	Contract #
1	1	18	1	7	7	8	8	6	18
	W		B						

TYPE: W

CHARGE OR SUMMARY NUMBER: 18 columns

Unique identification of the end item being defined.

SEQUENCE: B

Defines the second of three possible cards for each charge or summary number of the work breakdown structure. The use of this card is optional.

START DATE: 7 columns

The scheduled start date for this charge or summary number. This date indicates when the monthly type costs (card types 4 and 5) applicable to this charge or summary number are to be applied.

END DATE: 7 columns

The scheduled finish date for this charge or summary number.

START EVENT: 8 columns

The network event corresponding to the start of this charge or summary number.

END EVENT: 8 columns

The network event corresponding to the end of this charge or summary number.

RESPONSIBLE ORGANIZATION: 6 columns

The internal organization responsible for accomplishment of the work defined by the charge or summary number.

CONTRACT NUMBER: 18 columns

The numeric designation, or a representative code, for the contract(s) or agreement(s) included in each report.

FORMAT (THIRD CARD)

FC	Type	Charge or Summary #	Seq.	Reporting Organ.	Reporting Organ. Description
1	1	18	1	14	21
	W		C		

TYPE: W

CHARGE OR SUMMARY NUMBER: 18 columns

Unique identification of the end item being defined.

SEQUENCE: C

Defines the third of three possible cards for each charge or summary number of the work breakdown structure. The use of this card is optional.

REPORTING ORGANIZATION: 14 columns

The name or identification of the organization responsible for the work identified in the contract number.

REPORTING ORGANIZATION DESCRIPTION: 21 columns

The designation of the total (or part of the total) system program or project that is identified with the reporting organization.

ESTIMATING CARD

FORMAT:

FC	Type	Charge or Summary #	Perf. Organ.	Res. Code	Card Code	UDC	Incremental Resource Estimates					
1	1	18	6	4	1	1	8	8	8	8	8	8
	4											

TYPE: 4

CHARGE OR SUMMARY NUMBER: 18 columns

The identification of a specific charge or summary number.

PERFORMING ORGANIZATION: 6 columns

The identification of the department or organization that will do the work.

RESOURCE CODE: 4 columns

The identification of the particular manpower skill or material type used by the performing organization.

CARD CODE: 1 column

Whenever the number of reporting cycle increments exceeds 6, multiple cards must be used. The maximum number of cards is 10. This column, therefore, must contain the sequence letter of a multiple card input. In order to maintain the sequence of these increments, each card must be assigned a unique letter in ascending order beginning with A.

UDC: 1 column

Identifier of the types of values appearing further on this card. The characters which are permitted in this field are:

H - labor (man)-hours
M - man-months
D - direct dollars
T - total dollars

In order to effect a conversion, such as man-hours to direct dollars, the character entered in this column must be correlated to the corresponding performing organization - resource code entries in the rate table. If man-months are indicated, the proper conversion in the hour-month tables is performed.

RESOURCE ESTIMATES: 6 fields of 8 columns each

The values placed in these 6 fields will be automatically assigned to specific reporting cycles in reference to the scheduled start date of the summary or charge number.

BUDGET CARD

FORMAT:

FC	Type	Charge or Summary #	Perf. Organ.	Resource Code	Card Code	UDC	Incremental Budget Values
1	1	18	6	4	1	1	8 8 8 8 8 8
	5						

TYPE: 5

CHARGE OR SUMMARY NUMBER: 18 columns

The identification of a specific charge or summary number.

PERFORMING ORGANIZATION: 6 columns

The identification of the department or organization that will do the work.

RESOURCE CODE: 4 columns

The identification of the particular manpower skill or material type used by the performing organization.

CARD CODE: 1 column

Whenever the number of reporting cycle increments exceeds 6, multiple cards must be used. The maximum number of cards is 10. This column, therefore, must contain the sequence letter of a multiple card input. In order to maintain the sequence of these increments, each card must be assigned a unique letter in ascending order beginning with A.

UDC: 1 column

Identifier of the types of values appearing further on this card. The characters which are permitted in this field are:

H - labor (man)-hours
M - man-months
D - direct dollars
T - total dollars

In order to effect a conversion, such as man-hours to direct dollars, the character entered in this column must be correlated to the corresponding performing organization-resource code entries in the rate table. Note that, if man-months are indicated, the proper conversion in the hour-month tables is performed.

BUDGET VALUES: 6 fields of 8 columns each

The values placed in these 6 fields will be automatically assigned to specific reporting cycles in reference to the scheduled start date of the summary or charge number.

ACTUAL CARD

FORMAT:

FC	Type	Charge or Summary #	Perf. Organ.	Resource Code	Seq	UDC	Sign	Unit Amount
1	1	18	6	4	1	1	1	8
	A							

TYPE: A

CHARGE OR SUMMARY NUMBER: 18 columns

The identification of a specific charge or summary number.

PERFORMING ORGANIZATION: 6 columns

The identification of the department or organization that will do the work.

RESOURCE CODE: 4 columns

The identification of the particular manpower skill or material type used by the performing organization.

SEQUENCE: 1 column

Since 1 card is sufficient to define the necessary parameters for this card type, this column is normally blank. Numeric entries cause the remainder of each card to be treated as one comment field. Up to 10 comment cards are allowed and these cards appear only on a master file report for this card type.

UDC: 1 column

Identifier of the type of value appearing further on this card. The characters which are permitted in this field are:

H - labor (man)-hours
M - man-months
D - direct dollars
T - total dollars

In order to effect a conversion, such as man-hours to direct dollars, the character entered in this column must be correlated to the corresponding performing organization - resource code entries in the rate table.

SIGN: 1 column

If a minus sign is entered here the unit amount will be subtracted from the current actuals carried on the Old Master to correct previous amounts erroneously entered. If this column is left blank or a plus sign is entered the values are added to those on the Old Master.

UNIT AMOUNT: 8 columns

The number of units (man-hours, for example) that are to be converted to dollars. The conversion depends on the specific UDC code entered.

RATE TABLE

FORMAT:

FC	Type	Perf. Organ.	Res. Code	Effec. Date	Budget or Estimate	Seq	Unit Conversion Factor
1	1 R	6	4	5	1	1	xxxxxxxx.xxx

Overhead Unit Conversion Factor	Overhead Conversion %
xxxxxxxx.xxx	xxx.xxxx

TYPE: R

PERFORMING ORGANIZATION: 6 columns

The contractor or government organization which performs work on a work package.

RESOURCE CODE: 4 columns

The contractor's code for a particular manpower skill or material type.

EFFECTIVE DATE: 5 columns

The date that the rate described on this card takes effect. This rate takes precedence over any chronologically previous rate for cost pieces falling in this time period.

BUDGET OR ESTIMATE: 1 column

This column allows different rates to be applied to budget and estimate cost pieces. A budget amount uses only a rate entry with a blank or B entry in this column; the B takes precedence over the blank. An estimate amount uses only a rate entry with a blank or E entry in this column; the E takes precedence over the blank.

SEQUENCE: 1 column

Since 1 card is sufficient to define the necessary parameters for this card type, this column is normally blank. Numeric entries cause each card to be treated as one comment field. Up to 10 comment cards are allowed, and each card appears only on a master file report for this card type.

UNIT CONVERSION FACTOR: 11 columns

The number of equivalent dollars per unit for this rate. A decimal point is assumed between the 8th and 9th digits.

OVERHEAD UNIT CONVERSION FACTOR: 11 columns

The overhead unit conversion amount for this rate. A decimal point is assumed between the 8th and 9th digits.

OVERHEAD CONVERSION %: 7 columns

The dollar amount as obtained through the unit conversion factor will be raised by this indicated percentage. A decimal point is assumed between the 3rd and 4th digits. An entry in the overhead unit conversion factor causes this field to be ignored.

CHARGE OR SUMMARY NUMBER CATEGORY

FORMAT:

FC	Type	Category Ident.	Seq	Category Member	Category Member	Category Member
1	1	6	1	18	18	18

6

TYPE: 6

CATEGORY IDENTIFICATION: 6 columns

SEQUENCE: 1 column

Since more than 1 card might be necessary to define the parameters for this card type, this sequence field must contain an alphabetical sequencing for each card used. Up to 26 cards may be used to define up to 78 charge or summary numbers. Letters may be skipped. Numeric entries (0-9)

cause each card to be treated as one comment field. Up to 10 comment cards are allowed, and each card appears only on a master file report for this card type.

CATEGORY MEMBER: 18 columns each

Each alphabetically sequenced card defines up to 3 charge or summary numbers belonging to this category. A card does not have to be full, even though it is followed by later cards in the sequence.

PROJECT PARAMETER INPUTS

FORMAT:

FC	Type	Seq	Overhead % # 1	Applicable Level	Overhead % # 2	Applicable Level	Term (Span)
1	1 P	1	xxx.xxxx	2	xxx.xxxx	2	14

Cut Off Date	Release Date
7	9

TYPE: P

SEQUENCE: 1 column

An entry of A defines the first of the project parameter input cards. Currently, only one exists.

OVERHEAD % # 1: 7 columns

This is a general percentage factor to be applied to the total of budget and estimate costs applied to (or summing into) an end item. A decimal point is assumed between the 3rd and 4th characters.

APPLICABLE LEVEL: 2 columns

This field defines the level at which the overhead % # 1 applies. All costs applied to (or summing into) end items at this level will be increased by the indicated percentage.

OVERHEAD % # 2: 7 columns

This is an independent percentage factor but similar to overhead % # 1.

APPLICABLE LEVEL: 2 columns

This is the level at which overhead % # 2 applies.

TERM (SPAN): 14 columns

The beginning and ending date for the total increment being covered in the report.

CUT OFF DATE: 7 columns

The accounting cut off date for the period of actual costs being reported.

RELEASE DATE: 9 columns

The date that the report is to be released to management. In the event of subsequent rerun and redistribution of reports, it is permissible to suffix the report release date with a revision number.

MASTER FILE INFORMATION

FORMAT:

FC	Type	Seq	Blank If No Old Master	Blank If New Master Not Wanted	Update Run	WBS MFR	Estimate MFR	Budget MFR
1	1	1	6	6	1	1	1	1
	M							

Actual MFR	Rate MFR	Category MFR
1	1	6

FILE CONTROL: 1 column (not used)

TYPE: M

SEQUENCE: 1 column

Since 1 card is sufficient to define the necessary parameters for this card type, this column is normally blank. Unlike most card types this card is not entered onto the Master File, and numeric sequence entries have no meaning.

BLANK IF NO OLD MASTER: 6 columns

Any entry into this field indicates that an Old Master file is present.

BLANK IF NEW MASTER NOT WANTED: 6 columns

Any entry in this field causes the generated new master to be saved.

UPDATE RUN: 1 column

Any entry into this field causes "current cycle" actuals appearing on the old master to be added into the "all previous" actuals as the new master is written. Actuals appearing on update cards on this run are accumulated into the current cycle.

WBS MFR: 1 column

Any entry causes a Work Breakdown Structure Master File Report to be generated.

ESTIMATE MFR: 1 column

Any entry causes an Estimate Master File Report to be generated.

BUDGET MFR: 1 column

Any entry causes a Budget Master File Report to be generated.

ACTUAL MFR: 1 column

Any entry causes an Actual Master File Report to be generated.

RATE MFR: 1 column

Any entry causes a RATE Master File Report to be generated.

CATEGORY MFR: 1 column

Any entry causes a Category Master File Report to be generated.

OUTPUT REQUEST CARD

FORMAT:

FC	Type	Seq	Management Summary Report	Program/Project Status Report	Organization Status Report (Resp., Charge, Perf., Reso
1	1	1	2	2	2
	O				

Organization Status Report (Perf., Charge, Resp., Resource)	Organization Status Report (Perf., Charge)	Organization Status Report (Charge, Perf.)
2	2	2

Financial Plan and Status Report (Month, Charge)	Financial Plan and Status Report (Month)	Manpower Loading Report (Resource, Month, Perf., Charge)
2	2	2

Manpower Loading Report (Resource, Month)	Manpower Loading Report (Perf., Month, Resource)	Cost Category Status Report
2	2	2

FILE CONTROL: 1 column, not used

TYPE: O

SEQUENCE: 1 column

This column must contain an alphabetical sequencing for each card used. Unlike most card types this card is not entered onto the Master File, and numeric sequence entries have no meaning. Up to 10 Output Request cards may be used, and letters may be skipped.

OUTPUT REQUESTS: 2 columns each (12 entries)

Output reports are requested by level. Enter the level at which each report is desired. If a report is desired at more than one level, multiple Output Request cards must be used.

4. OUTPUT REPORTS

Once the analyst knows which elements of data are available from the system and understands how these values are derived, he must determine the reports from which these data are available, and the value of each report to the analysis function.

This section discusses each PERT COST report produced by the GE-625/635 PERT/COST computer program in relation to the data elements contained in the report.

In addition to selecting the appropriate reports, the analyst must carefully select the appropriate level of reporting. Any of the PERT COST reports may be produced at any level of the work breakdown structure.

MANAGEMENT SUMMARY REPORT

The Management Summary Report (Figure 2) tells management which area or areas of the program may need management attention. It shows current and project schedule and cost status of the total program and of each of the major component items or elements within the program.

Time Data

The Management Summary Reports present schedule information for each level of the work breakdown structure; that is, a level 1 Management Summary Report provides level 1 and 2 schedule data, level 2 Management Summary Report provides level 2 and 3 schedule data, etc. These schedule values have been summed upward through the work breakdown structure.

The most critical slack is displayed for each charge/summary number appearing in the report. It represents the slack with the lowest algebraic value, derived from the activities associated with the corresponding charge/summary number.

Completion dates are computed for each charge/summary number appearing on the report. These values represent the actual, scheduled, earliest, and latest completion dates.

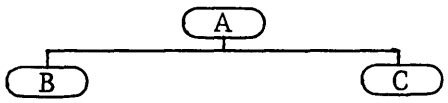
Total Costs

The Management Summary Reports present total costs in the form of planned and latest revised estimates. These costs are shown by charge/summary number for any level of the work breakdown structure and are summed through the work breakdown structure. The value of work performed to date is computed for each charge/summary number appearing on this report. The value is computed at the lowest level of the work breakdown structure and is summed upward to the desired level.

Figure 2

Management Summary Report (To Be Supplied)

The following example illustrates the calculation of this value on the work breakdown structure shown below:



The computation for the value of work performed is started at the work package level for each performing organization-resource code combination associated with charge number B. The sum of these values then becomes the value of work performed for charge number B.

The value of work performed is then computed for each performing organization-resource code combination associated with charge number C. The sum of these values then becomes the value of work performed for charge number C.

Finally, the value of work performed is computed for each of the combinations associated with charge/summary number A. The sum of these values is then added to the values computed for charge numbers B and C. This sum then becomes the value of work performed for charge/summary number A.

For those combinations that are not yet in progress, the value of work performed is zero. For those combinations that are completed, the value is the planned total cost.

For those combinations that are in progress, the value is computed as follows:

$$\text{Value of Work Performed} = \frac{\text{Actual Total Cost x Planned Total Cost}}{\text{Latest Revised Estimate}}$$

(Overrun)/underrun to date is also expressed as a percentage of the value of work performed and is computed as follows:

$$\%\text{(Overrun)/Underrun to date} = \frac{\text{(Overrun)/Underrun}}{\text{Value}} \times 100$$

The latest revised estimate is computed for each charge/summary number appearing in this report. For those charge/summary numbers not yet in progress, this figure represents the estimated total costs. For those combinations in progress, this figure represents the actual total costs incurred to date plus the amount of total costs estimated for completion. For those combinations that are completed, this figure represents the actual total costs incurred.

The projected (overrun)/underrun is also computed for each charge/summary number. This figure represents the planned total costs minus the latest revised estimate. An underrun condition exists when:

Latest Revised Estimate - Planned Total Costs < 0

An overrun condition exists when:

Latest Revised Estimate - Planned Total Costs > 0

(Overrun)/underrun is also computed as a percentage of the planned total costs; this is computed as follows:

$$\%(\text{Overrun})/\text{Underrun} = \frac{(\text{Overrun})/\text{Underrun}}{\text{Planned Total Costs}} \times 100$$

PROGRAM/PROJECT STATUS REPORT

The primary purpose of the Program Project Status Report (Figure 3) is to back up the Management Summary Report. The two reports contain similar information -- this is highlighted in the Management Summary Report for managers and is presented in detail in the Program Project Status Report for analysts. The former report is divided for distribution and the latter remains intact as reference material for the entire portion of the program for which reports are prepared. The Program Project Status Report serves as the tie to the networks, since it contains the beginning and ending event number for every summary item and the end event which appears on the most critical path. With this information, the analyst can go directly to the proper portion of the network, and the PERT TIME Reports for additional information.

Time Data

The Program/Project Status Report shows the first and last event for each charge/summary number appearing on this report. It also shows the actual, scheduled, earliest, and latest completion dates, and the slack for each of the charge/summary numbers. These schedule values are summed upward through the work breakdown structure.

The first and last event numbers represent those events whose occurrence dates mark the start and end of the corresponding charge/summary number.

The scheduled or actual completion date represents the scheduled (T_S) or actual dates (A) associated with the last event number shown in the preceding column.

The earliest/latest completion dates represent the S_E and S_L, respectively, of the last event number (shown previously).

The most critical slack represents the lowest algebraic slack value that occurs among the activities associated with the corresponding charge/summary number.

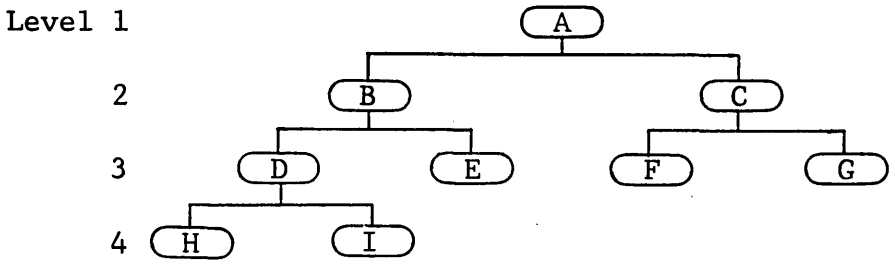
Figure 3

Program/Project Status Report (To Be Supplied)

Total Costs

This report presents total costs in the form of planned and latest revised estimates. These costs are shown by charge/summary number for any level of the work breakdown structure.

These costs are summed upward through the work breakdown structure. When a specific level is selected, this report will show all of the charge/summary numbers connected to those numbers on the desired level. For example, a Program/Project Status Report is requested for Level 2 on the work breakdown structure below:



This report would show the total costs for the charge/summary numbers in the sequence that follows:

	First Page	Second Page
Level/Summary Item	2/B	2/C
Charge Number	D	F
	E	G
	H	
	I	

The value of work performed to date and the latest revised estimate are computed for each charge/summary number appearing on this report. They are computed in the same manner previously described for the Management Summary Report.

ORGANIZATION STATUS REPORT

Several options of the Organization Status Report are available; these are broken down by Responsible Organization, Resource Code, Performing Organization, and Charge Number. (See Figures 4, 5, 6, and 7.) The report is a shredout of the data base from which the Management Summary Report is developed.

Time Data

This report presents the most critical slack and the scheduled or completion date for each charge/summary number appearing on this report. The most critical slack represents the slack with lowest algebraic value, derived from the activities associated with the corresponding charge/summary number. If this event has a scheduled date (T_S) associated with it, this date will appear in this column. If this event has been completed, an actual date (A) will appear in this column.

Man-Hours

This report also displays man-hours in the form of actual hours, planned hours, and latest revised estimates. The latest revised estimate is computed for each charge/summary number-performing organization-resource code combination appearing in this report. For those combinations not yet in progress, this value represents the total number of estimated man-hours. For those combinations in progress, this value represents the actual man-hours expended to date plus the total number of man-hours estimated for completion. For those combinations that are completed, this value represents the actual number of man-hours that were expended.

The projected (overrun)/underrun is also computed for each combination. This value represents the planned man-hours minus the latest revised estimate. An underrun condition exists when:

Latest Revised Estimate - Planned Man-Hours < 0

An overrun condition exists when:

Latest Revised Estimate - Planned Man-Hours > 0

On this report man-hours are not summed upward through the work breakdown structure. For example, an Organization Status Report is requested for Level 2 of the work breakdown structure shown below:

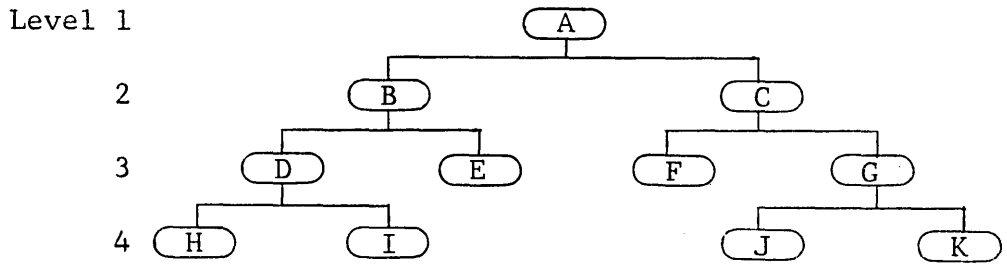


Figure 4

Organization Status Report #1 (To Be Supplied)

Figure 5

Organization Status Report #2 (To Be Supplied)

Figure 6

Organization Status Report #3 (To Be Supplied)

Figure 7

Organization Status Report #4 (To Be Supplied)

The report would show Item B as the summary item at the top of the page. The body of the report would then show man-hours associated with each of the performing organization-resource code combinations tied to charge or summary numbers B, D, E, H, and I. The sequence in which the charge number-performing organization-resource code combinations appear in the body of this report is controlled by the user.

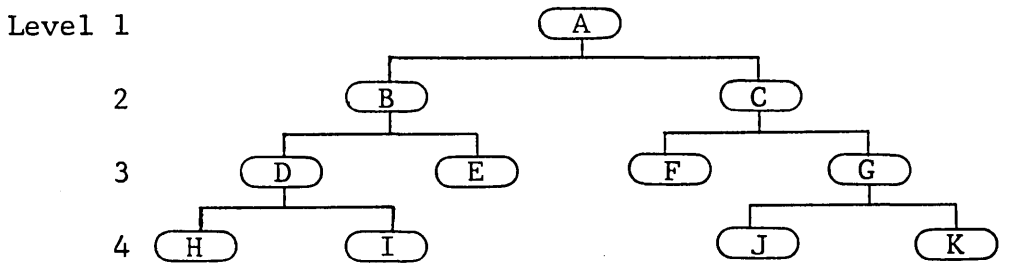
After all man-hours related to Items B, D, E, H, and I are listed, the report would then show Item C as the summary item at the top of the next page. The body of the report would then show the man-hours associated with each of the performing organization-resource code combinations tied to charge or summary numbers C, F, G, J, and K.

To obtain man-hours for each of the combinations in the entire system, only one level of this report must be selected. This is the top level at which man-hours are entered in the system.

Direct Costs

The Organization Status Report displays direct costs in the form of actual costs, planned costs, and latest revised estimates. These costs are displayed by level for each charge/summary number-performing organization-resource code combination that contains direct costs.

These costs are not summed upward through the work breakdown structure. For example, an Organization Status Report is requested for Level 2 of the work breakdown structure shown below:



The report would show Item B as the summary item at the top of the page. The body of the report would then show the direct costs associated with each of the performing organization-resource code combinations tied to charge or summary numbers B, D, E, H, and I. It would also show the total direct costs for each of these numbers.

The sequence in which the charge number-performing organization-resource code combinations appear in the body of the report is controlled by the user.

After all direct costs related to Items B, D, E, H, and I have been listed, the report would then show Item C as the summary item at the top of the next page. The body of the report would show the direct costs associated with each of the performing organization-resource code combinations that are related to charge or summary numbers C, F, G, J, and K. It would also show the total direct costs for each of these numbers.

To obtain the direct costs for each of the combinations in the entire system, only one level of this report must be selected. This is the top level at which direct costs are entered in the system.

The latest revised estimate is computed for each charge/summary number-performing organization-resource code combination appearing in this report. For those combinations not yet in progress, this value represents the total amount of estimated direct costs. For those combinations in progress, this value represents the actual direct costs incurred to date plus the amount of direct costs estimated for completion. For those combinations that are completed, this value represents the actual amount of direct costs that were incurred.

The projected (overrun)/underrun is also computed for each combination. This value represents the planned direct costs minus the latest revised estimate. An underrun condition exists when:

Latest Revised Estimate - Planned Direct Costs < 0

An overrun condition exists when:

Latest Revised Estimate - Planned Direct Costs > 0

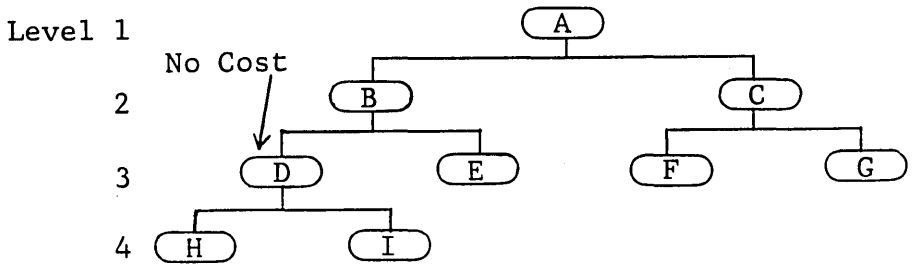
FINANCIAL PLAN AND STATUS REPORT

The Financial Plan and Status Report (Figure 8) provides data for a monthly comparison (at any given level) of actual costs and/or latest revised estimates against planned costs, and, thus, serves as a tool for monitoring the financial plans. It shows historical (prior month) cumulative costs and both incremental and cumulative costs for each future month within the time period identified in the Report Dates.

Total Costs

The total costs shown on this report have not been summed up through the work breakdown structure. They are costs that are associated directly with the corresponding charge/summary numbers appearing on this report.

This report is generated in two formats. The first format shows each charge/summary on the chosen level as the summary item at the top of the page. The body of the report contains the total costs for each charge/summary number connected to the summary through all of the lower levels of the work breakdown structure. Costs are displayed by month under the heading "Incremental Costs" and cumulatively under the heading "Cumulative Costs." For example, on the work breakdown structure shown below, Level 2 is selected and there are no costs directly associated with charge/summary number D.



This report would then show the total costs in the following sequence:

	First Page	Second Page
Summary/Level	B/2	C/2
Charge Number	E	F
	H	G
	I	

The other format in which this report is generated shows total costs by month for each of the summary items on the chosen level. Other charge/summary numbers do not appear in the body of this format. Costs are displayed by month under the heading "Incremental Costs" and cumulatively under the heading "Cumulative Costs."

The latest revised estimate is computed both incrementally and cumulatively by month for each summary item at a chosen level by summing all of the monthly cost estimates for that item.

(Over) under plan is also computed both incrementally and cumulatively. This figure represents the planned total costs minus that latest revised estimate. An underplan condition exists when:

Latest Revised Estimate - Planned Total Costs < 0

An overplan condition exists when:

Latest Revised Estimate - Planned Total Costs > 0

Figure 8

Financial Plan and Status Report (To Be Supplied)

MANPOWER LOADING REPORT

The Manpower Loading Report shows manpower loading for various summary levels within the program. (See Figures 9 and 10.) The Manpower Loading Report lists actual, planned, and latest estimated monthly man-hours by type of manpower. This provides data which depicts man-hours utilization by month for each labor skill and/or performing organization.

Time Data

The Manpower Loading Report shows the most critical slack with respect to all of the activities associated with the corresponding charge/summary number.

Man-Hours

The Manpower Loading Report presents man-hours by level and month for each charge/summary number-performing organization-resource code combination. Only those combinations bearing man-hours or man-months appear on this report.

Actual, planned, and latest revised estimates are shown for each combination. Total man-hours are shown for each month for each charge or summary number.

The latest revised estimate is computed by month for each combination at a chosen level by summing all of the monthly manpower estimates for that item. Planned man-hours are computed in the same manner.

The (overplan)/underplan is also computed for each combination. This value represents the planned man-hours minus the latest revised estimate. An underplan condition exists when:

Latest Revised Estimate - Planned Man-hours < 0

An overplan condition exists when:

Latest Revised Estimate - Planned Man-hours > 0

COST CATEGORY STATUS REPORTS

The Cost Category Status Reports present a grouping of functional, hardware, or other significant cost elements in specified categories for reporting purposes.

Figure 9

Manpower Loading Report #1 (To Be Supplied)

Figure 10

Manpower Loading Report #2 (To Be Supplied)

Three separate reports are provided allowing category groupings by charge or summary number (Figure 11), performing organization (Figure 12), or resource code (Figure 13). Thus, no distortion of the work breakdown structure is required to segregate these data.

The Cost Category Status Reports provide for each cost category a manpower and total dollar comparison of:

Planned versus actual expenditure to date

Planned versus latest revised estimate at completion

Man-Hours

The Cost Category Status Reports present man-hours in the form of actual, planned, and latest revised estimates. These values are displayed by cost category for any level of the work breakdown structure. The report is a shredout of all the cost information applicable to the summary item for which the report is being prepared. The association of man-hours to cost categories is accomplished by relating charge or summary numbers, performing organizations, or resource codes to multiple cost categories.

These relationships are established through the Charge or Summary Number, Performing Organization, and Resource Code Category input cards (card types 6, 7, and 8). The planned work to date is computed on the chosen level by cost category. This value represents the amount of planned man-hours from the start of the cost category to the cutoff date. Planned man-hours at completion are computed by summing all planned man-hours associated with the cost category.

The latest revised estimate is computed for each cost category. For those cost categories whose combinations are not yet in progress, this value represents the total number of estimated man-hours. For those categories whose combinations are in progress, this value represents the actual man-hours expended to date plus the total number of man-hours estimated for completion. For those categories whose combinations are completed, this value represents the actual number of man-hours that were expended.

The projected (overrun)/underrun is also computed for each category. This value represents the planned man-hours minus the latest revised estimate. An underrun condition exists when:

Latest Revised Estimate - Planned Man-hours < 0

An overrun condition exists when:

Latest Revised Estimate - Planned Man-hours > 0

Figure 11

Charge or Summary Number Status Report (To Be Supplied)

Figure 12

Performing Organization Status Report (To Be Supplied)

Figure 13

Resource Code Status Report (To Be Supplied)

(Overrun)/underrun is also computed as a percentage of the planned man-hours. This value is computed as follows:

$$\text{Percent (Overrun)/Underrun} = \frac{\text{(Overrun)/Underrun}}{\text{Planned Total Costs}} \text{ X } 100$$

Total Costs

The Cost Category Status Reports present total costs in the form of actual, planned, and latest revised estimates. These values are displayed by cost category for any level of the work breakdown structure.

The total costs shown on this report are accumulated and displayed in the same manner as man-hours described above.

5. DECK SETUP

The GE-PERT/COST deck sequence is as follows: (See Figure 14)

1. System control cards (beginning)

   a. $ IDENT
   b. $ COMMENT

   } With user's identification as required by his installation.

2. PERT/COST binary deck

3. $ EXECUTE

4. File control cards:

   a. $ DISC

      (Definition of files to be supplied.)

   b. $ TAPE

      (Definition of files to be supplied.)

5. Input data. The entire package of data will be sorted and may be in any order.

6. System control cards (ending):

   a. $ENDJOB
   b. ***EOF

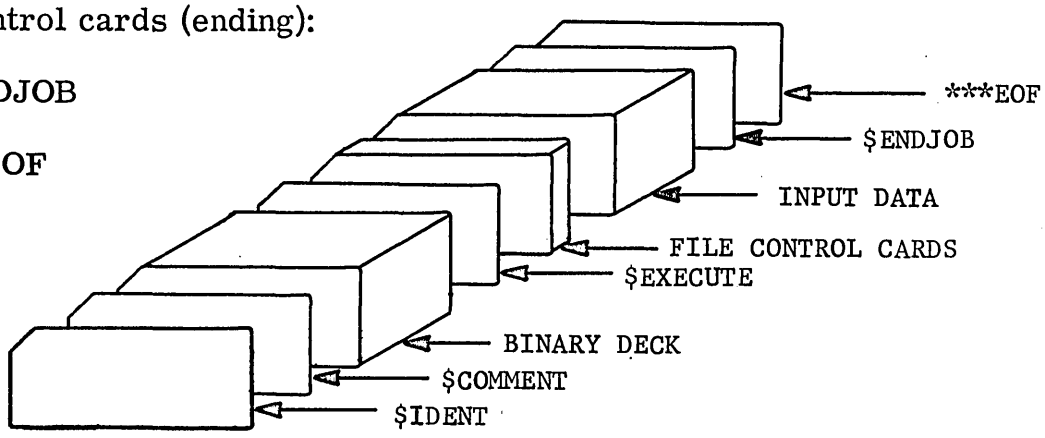
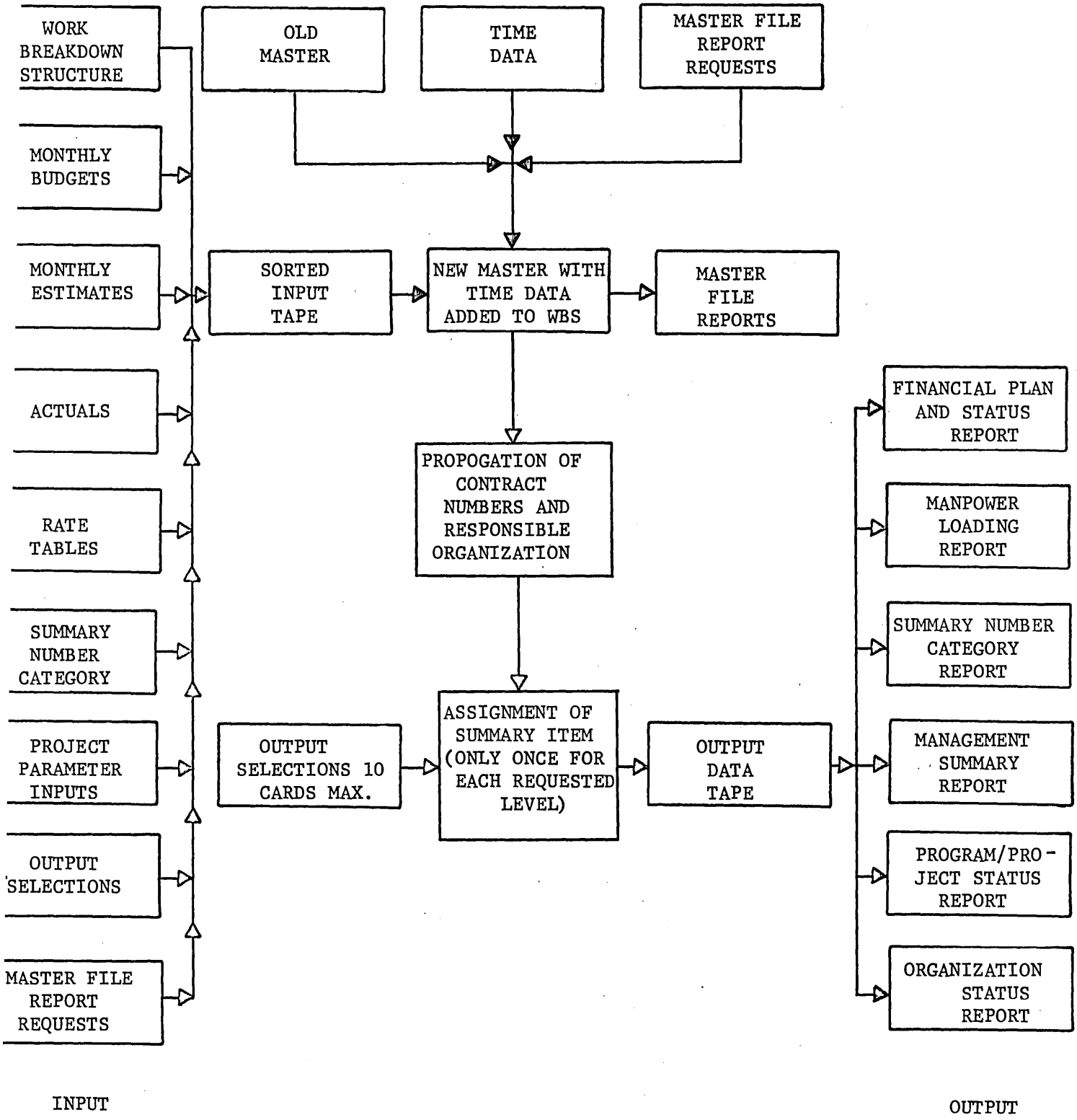


Figure 14. Deck Setup

6. NORMAL LOGIC FLOW



Please cut along this line

DOCUMENT REVIEW SHEET

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X CPB #: 1090A

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Position: _____

Address: _____

_____

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☐ Additional information would be helpful on following subjects.

☐ Errors indicated and pages where errors occur.

☐ Usefulness of manual could be improved as noted.

My comments are: _____

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GENERAL ELECTRIC INFORMATION SYSTEMS DIVISION COMPUTER EQUIPMENT DEPARTMENT	GE-600 SERIES TECHNICAL INFORMATION BULLETIN	DATE Sept. 1967
		NO. 600-177
SUBJECT: GE-625/635 PERT/COST Binary Deck Setup		REF. CPB-1384X

Remove the following pages from the GE-625/635 PERT/COST manual, replacing them with the attached pages.

Remove:	Insert:
11/12	11/12
81/82	81-82.2

It is suggested that this cover sheet be placed in the front of the manual at the time the attached pages are inserted in the manual so that it may serve as a quick check to indicate that the changes made by this TIB have been incorporated into the manual.

WORK BREAKDOWN STRUCTURE CARD 1

The first work breakdown structure card is used to indicate the level, parent, and description of a particular charge or summary number. There must be one of these cards for each charge or summary number when building the file or when adding a new charge or summary number.

DATA	COLUMNS	DESCRIPTION
File control	1	The column 1 file control field is restricted to the following characters: D = deletion; a deletion prevents the old master file card identified by this card type, control field, and sequence column from appearing on the new master. The remainder of this card is not used. blank or A = addition to the master file; C = changes to cards already on the master file. In addition to the card type, the control field, and the sequence column, the only information necessary on a card headed by a C is that which has changed. Ignored fields are updated with the information which appears on the old master file.
Card type	2	This column contains a W for work breakdown structure card.
Charge or summary number	3-20	This field contains a unique designation of the particular item or element of the work breakdown structure being defined.
Sequence	21	An A indicates that this is the first work breakdown structure card for this charge or summary number.
Level	22-23	This field contains the number of the tier or level on the work breakdown structure at which this charge or summary number appears.

DATA	COLUMNS	DESCRIPTION
Parent	24-41	Enter the summary number of the higher item on the program breakdown into which the time and cost data for this item are summarized. If the parent is not at the next higher level, a precautionary diagnostic will be produced and normal processing will continue. This field is left blank for a level one entry.
Charge or summary number description	42-80	This field contains an alphanumeric description of the summary item being defined.

WORK BREAKDOWN STRUCTURE CARD 2

The second work breakdown structure card is used to indicate the start and end dates and start and end events that correspond to the TIME network. It also includes the responsible organization and the contract number for this charge or summary number. This card must be present when using budget or estimate cards; otherwise it is optional.

DATA	COLUMNS	DESCRIPTION
File control	1	See work breakdown structure card 1.
Card type	2	This column contains a W for work breakdown structure card.
Charge or summary number	3-20	This is the same as work breakdown structure card 1.
Sequence	21	This column contains a B for second work breakdown structure card for this charge or summary number.
Start date	22-28	Enter the scheduled start date for this charge or summary number in day, month, year order (01JUN67). This date indicates when the monthly type costs (card types 4 and 5) applicable to this charge or summary number are to be applied.
End date	29-35	Enter the scheduled finish date for this charge or summary number in day, month, year order (03JUN67).
Start event	36-43	This field contains the network event corresponding to the start of this charge or summary number.

5. OPERATING PROCEDURES

All of the cards necessary to operate PERT/COST are included in the card deck sent to the user. The user only needs to supply an identification as required by his installation on the $ IDENT card and his input data which must follow the formats described in Chapter 3. The input data may be in any order since the entire package of data will be sorted in the PERT/COST program. For improved efficiency it is suggested that an H* file be saved and used in place of the binary deck.

DECK SETUP

Figure 23 shows the PERT/COST deck sequence. Shaded cards indicate those added to or supplied by the user.

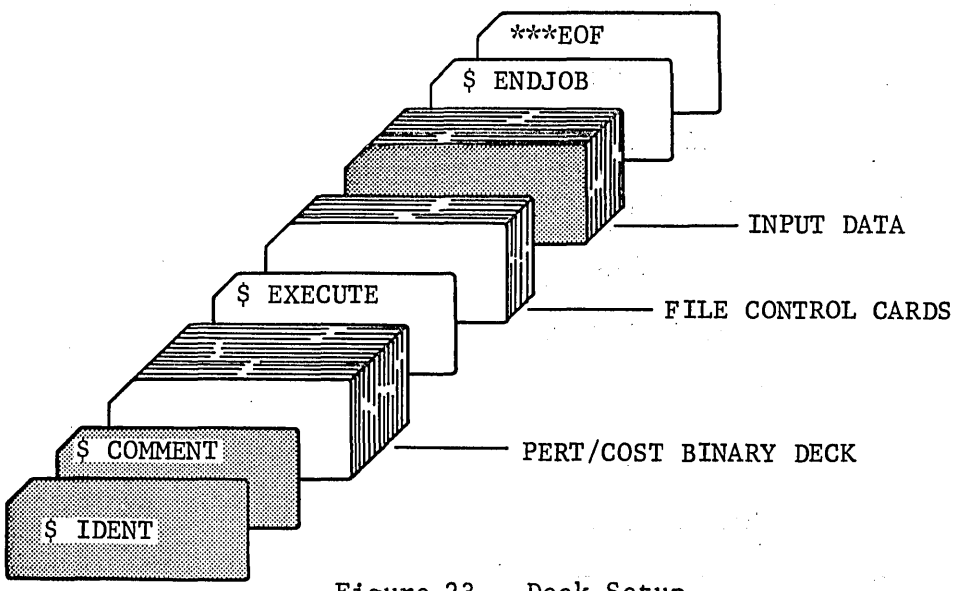

Figure 23. Deck Setup

The file control cards may be varied according to the rules listed under File Requirements in this chapter.

The cards used in the binary deck setup are as follows:

```
$          LOWLOAD
$          USE        .CSORT
$          USE        .SGET
$          USE        .SPUT
$          OPTION     ERCNT/500/

                      MAINCT PROGRAM

$          LINK         L00F01

                      SORTIN PROGRAM

$          LINK         L00F02,L00F01

                      MFROUT PROGRAM

$          LINK         L00F03,L00F02

                      UPPPIN PROGRAM

$          LINK         L00F04,L00F03

                      UPTIME PROGRAM

$          LINK         L00F05,L00F04

                      UPCATG PROGRAM

$          LINK         L00F06,L00F05

                      UPRATE PROGRAM

$          LINK         L00F07,L00F06

                      UPWB1 PROGRAM

$          LINK         L00F08,L00F07

                      UPWB2 PROGRAM

$          LINK         L00F09,L00F08

                      UPWB3 PROGRAM

$          LINK         L00F11,L00F09

                      UPBUD PROGRAM
```

```
$          LINK       L00R08,L00R07

                      MLD1 PROGRAM

$          LINK       L00R09,L00R08

                      MLD2 PROGRAM

$          LINK       L00R10,L00R09

                      MLD3 PROGRAM

$          LINK       L00R12,L00R10

                      RATERR PROGRAM

$          EXECUTE
$          LIMITS     50,45000,,10000
```

The following is a list of the control cards used in running the sample problem.

```
$      TAPE    R*,X5D,,,,R*-EE
$      DISC    T2,X5,4L          OLD MASTER
$      DISC    T3,X6,10L                 NEW  MASTER
$      TAPE    T4,X7D,,1509,,TIMECOSTDATA          TIME DATA
$      NTAPE   S1,A,3                    SORT COLLATION
$      DISC    D1,X10,10L                AUXILIARY TIME
$      DISC    T1,X11,10L                SORT 1, SORTED INPUT, MODIFIED MASTER
$      TAPE    T6,X12S           SORT 3,MODIFIED OUTPUT
$      DISC    T5,X13,4L         SORT 2, MODIFIED MASTER
$      DISC    T7,X14,10L                SORT 4, REPORT SCRATCH
$      DISC    D2,X15,2L         RATE FILE
$      DISC    D3,X16,3L         CATEGORY FILE
$      DISC    D4,X17,2L         TITLE FILE
$      DISC    D5,X18,2L         ERROR FILE
$      DISC    H*,X19,75R
$      SYSOUT  RF
$      DATA    IN

$      ENDJOB
***EOF
```

```
$          LINK      L00F12,L00F11
                     UPEST PROGRAM
$          LINK      L00F13,L00F12
                     UPACTU PROGRAM
$          LINK      L00P00,L00F13
                     PROP PROGRAM
$          LINK      L00000,L00P00
                     OPCT PROGRAM
$          LINK      L00A00
                     ASIG PROGRAM
$          LINK      L00S00,L00A00
                     SRTER PROGRAM
$          LINK      L00R01,L00S00
                     PRJSTS PROGRAM
$          LINK      L00R02,L00R01
                     OSRA PROGRAM
$          LINK      L00R03,L00R02
                     OSRB ORIGRAN
$          LINK      L00R04,L00R03
                     OSRC PROGRAM
$          LINK      L00R05,L00R04
                     OSRD PROGRAM
$          LINK      L00R06,L00R05
                     FP1 PROGRAM
$          LINK      L00R07,L00R06
                     FP2 PROGRAM
```