HEWLETT-PACKARD GENERAL SYSTEMS USERS GROUP

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FINANCIAL APPLICATIONS SERIES

SEVERAL FINANCIAL ANALYSIS SYSTEMS

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PHILLIP BROTHERS

INTRODUCTION ============

THIS PAPER DESCRIBES THREE SYSTEMS THAT HAVE BEEN DEVELOPED OR ARE
PRESENTLY UNDER DEVELOPMENT AT PHILIPP BROTHERS. BEFORE DISCUSSING
THESE SYSTEMS, LET ME BRIEFLY DESCRIBE PHILIPP BROTHERS, ITS BUSINESS,
AND ITS DATA PROCESSING RESOURCES.

PHILIPP BROTHERS IS A WORLDWIDE COMMODITIES TRADING ORGANIZATION
DEALING ACTIVELY IN OVER 150 COMMODITIES. AS WITH MOST COMMODITY
TRADING FIRMS THEY DETERMINE THE NEED THAT EXISTS IN THE MARKETPLACE
FOR GOODS AND SERVICES, AND, IN TURN, THEY ATTEMPT TO FILL THIS NEED.
AS A RESULT THE MOST IMPORTANT DATA REQUIRED FOR THE CONDUCT OF SUCH
BUSINESS IS THAT RELATING TO SUPPLIER, I.E., AVAILABLE GOODS, PRICE,
AND INVENTORY LOCATION, AS WELL AS DATA RELATING TO CUSTOMER, I.E.,
GOODS NEEDED, PRICE, AND DELIVERY PLACE. IN ADDITION TO THE TRADING
ACTIVITY PHILIPP BROTHERS IS INVOLVED IN CORPORATE ACQUISITIONS. THE
TWO SYSTEMS THAT WILL BE DISCUSSED WERE DEVELOPED TO SUPPORT THESE TWO
MAJOR FACETS OF PHILIPP BROTHERS' BUSINESS.

PRIOR TO FEBRUARY, 1978 DATA PROCESSING AT PHILIPP BROTHERS WAS
LIMITED TO BATCH MODE ACCOUNTING SYSTEMS RUNNING ON AN IBM S360/50.
AT THAT TIME IT WAS DETERMINED THAT SYSTEMS SHOULD BE DEVELOPED TO
SUPPORT THE TRADING AND TRAFFIC ACTIVITIES OF THE COMPANY. IT WAS ALSO
DECIDED THAT THESE APPLICATIONS SHOULD OPERATE IN AN ON-LINE, REAL
TIME MODE IN ORDER TO PROVIDE THE TRADING AND TRAFFIC AREAS WITH UP TO
DATE TRADE-RELATED INFORMATION. THE HEWLETT-PACKARD 3000 WAS SELECTED
AS THE MOST SUITABLE INSTRUMENT UPON WHICH TO IMPLEMENT THESE SYSTEMS
BECAUSE IT OFFERED RELIABLE HARDWARE AND SOPHISTICATED SOFTWARE WHICH
SUPPORTED THE TIMELY DEVELOPMENT OF USER APPLICATIONS.

APPLICATION 1: CASH FLOW ANALYSIS/BALANCE SHEET REPORTING
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BOTH THE CASH FLOW ANALYSIS AND BALANCE SHEET REPORTING FUNCTIONS
WHICH OPERATE IN AN ON-LINE, REAL TIME INTERACTIVE MODE, WERE
DEVELOPED USING BASIC AND THE IMAGE DATA BASE MANAGEMENT SYSTEM. THE
CASH FLOW ANALYSIS APPLICATION WILL BE DESCRIBED FIRST SINCE IT WAS
THE FIRST TO BE DEVELOPED AND BECAUSE IT FORMS THE BASIS FOR THE
PRODUCTION OF THE BALANCE SHEET.

PRIOR TO INITIATING THE INTERACTIVE FINANCIAL SESSION, THE USER IS
PROMPTED FOR INFORMATION CONCERNING PASSWORD, REPORT TITLE, ANALYSIS
PERIOD IN YEARS, DOLLAR FACTOR (THOUSANDS OR MILLIONS), AND ADDITIONAL
REMARKS. THE FORMAT OF THE INPUT FOR THESE PRELIMINARY ITEMS IS MORE
OR LESS FREE-FORM.

NORMALLY THE CASH FLOW ANALYSIS PROGRAM ACCEPTS DATA FOR VARIOUS
CATEGORIES OF FINANCIAL INPUT, AND CALCULATES FROM THEM OTHER
CATEGORIES UPON WHICH THEY ARE FUNCTIONALLY DEPENDENT. IN ADDITION THE
SYSTEM HANDLES THREE TYPES OF DATA; THAT WHICH MUST BE ENTERED BY THE
USER; THAT WHICH IS EITHER CALCULATED FROM THE PREVIOUS INPUT OR
ENTERED DIRECTLY; AND THAT WHICH IS CALCULATED ONLY. THE FORMAT OF THE
INPUT DEPENDS UPON THE TYPE OF DATA BEING ENTERED, BUT, IN GENERAL, IT
FOLLOWS THE FORMAT - $ VALUE, START YEAR, END YEAR. CONSEQUENTLY BY
ENTERING ONLY THREE PARAMETERS THE COMPLETE REPORT ANALYSIS MATRIX CAN
BE DESCRIBED.

FURTHER THE SYSTEM WILL REQUEST MORE DETAILED DATA FOR SPECIFIC
CATEGORIES SUCH AS INTEREST RATES, DEPRECIATION PERIOD, DEPRECIATION
BASIS EITHER STRAIGHT LINE, DOUBLE DECLINING, OR SUM OF THE YEARS
DIGITS, LOAN REPAYMENT CRITERION, TAX TIMING DIFFERENCE METHOD, AND
THE LIKE.

EXAMPLES OF INFORMATION THAT MUST BE ENTERED ARE THE FOLLOWING: 1. NET
 PLANT - EXISTING, 2. NET PLANT - NEW, 3. ROUTINE ADDITIONS, 4.
 WORKING CAPITAL - INVENTORY, 5. WORKING CAPITAL -
 RECEIVABLES/PAYABLES, 6. GROSS FINANCING, 7. REPAYMENTS, FOR WHICH A
 STRAIGHT LINE OR COMPOUNDED INTEREST (MORTGAGE) SCHEDULE, WITH ANY
 RATE, PERIOD, AND STARTING YEAR, IS APPLICABLE, 8. NET LOAN, 9.
 REVENUES, INTO WHICH ANY INFLATION RATE CAN BE FACTORED FOR ANY
 PERIOD AND INTERVAL OF TIME, 10. MATERIAL COST, 11. OPERATING
 EXPENSES, FOR WHICH 5 ADDITIONAL ARE PERMITTED, 12. MISCELLANEOUS
 EXPENSES, AND 13. GENERAL AND ADMINISTRATIVE COSTS. ITEMS 10 THROUGH
 13 CAN BE ENTERED AS FIXED AMOUNTS OR AS FIXED- RATE ESCALATED
 AMOUNTS FOR ANY TIME INTERVAL.

EXAMPLES OF INFORMATION THAT CAN EITHER BE CALCULATED FROM PRIOR
INPUT OR ENTERED DIRECTLY ARE: 1. TOTAL GROSS INVESTMENT, 2. TOTAL
INVESTMENT, 3. DEPRECIATION, WHICH CAN BE CALCULATED FROM ANY ONE OF
THESE BASES: STRAIGHT LINE, DOUBLE DECLINING, OR SUM OF THE YEARS
DIGITS, AND CAN BE APPLIED FOR ANY TIME PERIOD, 4. INTEREST, FOR
WHICH ANY RATE MAY BE ENTERED, 5. PRE-TAX EARNINGS, 6. TAX ON
EARNINGS, FOR WHICH ANY RATE CAN BE INPUT, 7. INVESTMENT TAX CREDIT,
FOR WHICH ANY RATE CAN BE ENTERED AND FOR WHICH AN ANNUAL TAX CREDIT
CARRYOVER (DIFFERENTIAL) IS APPLIED, 8. TAX PROVISION, 9. NET
EARNINGS, 10. NON-CASH CHARGES, 11. TAX TIMING DIFFERENCES, AND 12.
CASH FROM OPERATIONS.

AS A RESULT OF THE DATA ENTRY, THE SYSTEM CALCULATES THE FOLLOWING
ITEMS OF IMPORTANCE TO THE FINANCIAL ANALYST: 1. NET CASH - ANNUAL, 2.
NET CASH - CUMULATIVE, 3. PAYBACK, 4. DISCOUNTED CASH FLOW, 5.
CUMULATIVE INVESTMENT, 6. NET EARNINGS - ANNUAL, AND 7. PERCENT RETURN
ON INVESTMENT. UPON COMPLETION OF THE INTERACTIVE SESSION, THE REPORT
WILL BE STORED ON THE IMAGE DATA BASE FOR SUBSEQUENT RETRIEVAL AND
MODIFICATION AS REQUESTED BY THE USER.

SOME OF THE MORE SIGNIFICANT ALGORITHMS THAT HAVE BEEN INCORPORATED
INTO THIS SYSTEM ARE AS FOLLOWS:

1. REPAYMENT SCHEDULE (MORTGAGE) ===============================
   R=S*(M/1-(1+M)**-N) WHERE   R IS THE PAYMENT (PRINCIPAL PLUS
   INTEREST), S IS THE AMOUNT OF THE LOAN, M IS THE INTEREST RATE, AND
   N IS THE NUMBER OF PAYMENT PERIODS (GENERALLY YEARS).

       YR=C(X,L)= R-(S*M) WHERE YR IS THE YEARLY REPAYMENT OF THE
       PRINCIPAL.

2. DEPRECIATION ============= CASE 1: STRAIGHT LINE $C(X,L) =$
   $SUM(C(M,L)/N) + C(X,L-1)$ WHERE $C(X,L)$ IS THE MATRIX VALUE FOR
   DEPRECIATION, X IS THE ROW NUMBER, L IS THE COLUMN NUMBER, N IS THE
   NUMBER OF YEARS FOR THE DEPRECIATION, AND $C(M,L)$ ARE THE MATRIX
   VALUES FOR DEPRECIATED INVESTMENTS.

CASE 2: SUM OF THE YEARS DIGITS $C(X,L) = (N-(L-1)/SUM\ I)*TINV$ WHERE
        TINV IS THE TOTAL INVESTMENT= $SUM\ C(M,L)$, AND $I= SUM\ N$.

CASE 3: DOUBLE DECLINING BALANCE $C(X,L) = (TINV-C(X,L-1))*2/N$

3. RETURN ON INVESTMENT (ROI) ============================
   $ROI=-C(X,1)+SUM(C(X,L)/(1+D)**(L-1))$ WHERE $-C(X,1)$ IS THE FIRST
   YEAR'S CASH EXPENDITURE, L VARIES FROM 2 TO N, THE NUMBER OF YEARS,
   AND D IS THE DISCOUNTED CASH FLOW RATE.

4. DISCOUNTED CASH FLOW (DCF) =========================== THE DCF IS
   CALCULATED EMPIRICALLY FROM THE ROI BY TESTING VALUES FOR THE DCF
   THAT MINIMIZE TO ZERO OR CLOSE TO ZERO THE ROI. AS EACH VALUE FOR
   THE DCF IS TRIED, THE ROI IS RECALCULATED AND COMPARED TO ZERO.
   DEPENDING UPON THE RESULTANT VALUE FOR THE ROI, A NEW VALUE, EITHER
   LARGER OR SMALLER THAN THE PREVIOUS ONE, IS ENTERED FOR THE DCF.
   THIS REITERATIVE PROCESS CONTINUES UNTIL THE ROI FALLS BETWEEN -5
   AND +5. OBVIOUSLY ANY ARBITRARY BOUNDS COULD BE CHOSEN FOR THE ROI,
   BUT THE MORE STRINGENT THE LIMITS THE MORE CALCULATIONS THAT ARE
   PERFORMED. THE DCF IS CALCULATED TO THREE DECIMAL PLACES BUT IS
   DISPLAYED TO ONE DECIMAL PLACE.

5. INVESTMENT TAX CREDIT ===================== THE INVESTMENT TAX
   CREDIT (ITC) IS CALCULATED BY APPLYING A SPECIFIED TAX CREDIT RATE
   TO THE TOTAL OF ANY NEW STARTUP COSTS ASSOCIATED WITH THE BUSINESS
   VENTURE, SUCH AS NEW PLANTS, NEW EQUIPMENT, AND ANY OTHER ROUTINE
   ADDITIONS. HOWEVER AN INVESTMENT TAX CARRYOVER MAY EXIST, DEPENDING
   UPON A COMPARISON OF THE INVESTMENT TAX CREDIT AS PREVIOSLY DEFINED
   AND THE RESULTANT VALUE ARISING FROM TAKING 50% OF THE TAX ON
   EARNINGS WHICH WILL BE CALLED THE PRE-TAX CREDIT OR PTC.

IF PTC IS LESS THAN ITC THEN THE DIFFERENCE IS THE CARRYOVER TAX
CREDIT WHICH IS APPLIED TO THE SUBSEQUENT YEAR'S TAX CALCULATION.
THIS PROCESS HAS A CUMULATIVE EFFECT FOR THOSE YEARS PRIOR TO THE
START OF OPERATIONS AND BECOMES APPLICABLE AT THIS STARTUP TIME. FOR
EACH SUBSEQUENT YEAR OF OPERATION THE INVESTMENT TAX CREDIT (ITC) AND
THE PRE-TAX CREDIT (PTC) CALCULATIONS AND COMPARISONS ARE MADE IN
ORDER TO DETERMINE WHETHER ANY TAX CARRYOVER EXISTS FOR THE YEAR IN
QUESTION. ALL CARRYOVERS CONTINUE TO BE APPLIED UNTIL SUCH TIME THAT
THE PTC IS GREATER THAN OR EQUAL TO THE ITC AT WHICH TIME ONLY THE ITC
IS TAKEN AS THE INVESTMENT TAX CREDIT.

6. TAX TIMING DIFFERENCES ====================== TAX TIMING DIFFERENCE
   IS A CONCEPT THAT ARISES FROM THE FACT THAT COMPANIES ARE PERMITTED
   TO ACCELERATE DEPRECIATION PER TAX RETURN IN ORDER TO GAIN TAX
   CREDIT. THE NORMAL SCHEDULE UPON WHICH DEPRECIATION IS BASED IS
   STRAIGHT-LINE, HOWEVER ONE HAS THE OPTION OF SELECTING EITHER
   DOUBLE DECLINING BALANCE OR SUM-OF-THE-YEARS DIGITS AS THE
   DEPRECIATION CALCULATION METHOD. IN THE EVENT THAT ONE OF THESE
   OTHER METHODS IS CHOSEN, THEN THE DIFFERENCE BETWEEN THE
   DEPRECIATION AS CALCULATED USING THE STRAIGHT-LINE PER BOOKS VERSUS
   THE CHOSEN TAX OPTION BECOMES THE TAX TIMING DIFFERENCE AND RESULTS
   IN A CREDIT FOR THOSE YEARS WHERE A DIFFERENTIAL DOES EXIST. THE
   SYSTEM INCORPORATES THIS FEATURE INTO ITS FACILITIES.

7. PAYBACK ======== THE PAYBACK IS DEFINED AS THE TIME PERIOD REQUIRED
   FOR THE CUMULATIVE CASH FLOW TO EQUAL ZERO AND IS CALCULATED FROM
   THE FOLLOWING: CCF(X,L)=CCF(X,L-1)+CF(X,L) WHERE   CCF IS THE
   CUMULATIVE CASH FLOW THROUGH YEAR L, AND CF IS THE DIFFERENCE
   BETWEEN THE GROSS INVESTMENT AND THE CASH FROM OPERATIONS (CASH
   FLOW OR NET CASH-ANNUAL).   THEREFORE BY SETTING CCF(X,L)=0, L, THE
   PAYBACK, CAN BE FOUND.

THE BALANCE SHEET REPORTING PROGRAM OPERATES QUITE SIMILARLY TO CASH
FLOW ANALYSIS WITH RESPECT TO THE TYPE OF DATA PROCESSED AND THE
METHOD BY WHICH IT IS ENTERED. THE DIFFERENCES LIE IN THE CATEGORIES
THAT ARE RELAVENT TO BALANCE SHEET REPORTING AS CONTRASTED FROM THOSE
THAT ARE RELAVENT TO CASH FLOW ANALYSIS. THE BALANCE SHEET APPLICATION
CAN BE RUN AS A STAND-ALONE PROGRAM, WHEREIN MOST OF THE PERTINENT
INFORMATION IS ENTERED BY THE USER. ON THE OTHER HAND, IT CAN BE RUN
IN CONJUNCTION WITH A PREVIOUSLY INPUT CASH FLOW ANALYSIS REPORT. IN
THIS CIRCUMSTANCE IT FOLLOWS THAT MANY OF THE BALANCE SHEET ENTRIES,
SUCH AS RECEIVABLES/PAYABLES, INVENTORIES, GROSS FINANCING,
DEPRECIATION, AND THE LIKE, ARE DERIVED FROM THE APPROPRIATE CASH FLOW
CATEGORIES. IN LIKE MANNER EACH BALANCE SHEET REPORT IS MAINTAINED ON
THE IMAGE DATA BASE AND IS AVAILABLE FOR SUBSEQUENT RETRIEVAL AND
MODIFICATION.

THE FINANCIAL CATEGORIES INCORPORATED INTO THE BALANCE SHEET REPORT ARE AS FOLLOWS: 1. CASH/MARKET SECURITIES, WHICH IS A CALCULATION BASED UPON CERTAIN ITEMS IN BOTH THE CASH FLOW AND BALANCE SHEET REPORTS, SUCH AS WORKING CAPITAL, ACCOUNTS RECEIVABLE, NOTES AND OTHER RECEIVABLES, INVENTORY, OTHER CURRENT, TOTAL CURRENT LIABILITIES, AND CASH FROM OPERATIONS, 2. RECEIVABLES- FRACTION OF THE REVENUES, 3. NOTES AND OTHER RECEIVABLES, 4. INVENTORIES- FRACTION OF THE MATERIAL COST PLUS A FRACTION OF THE OPERATING COST, 5. OTHER CURRENT, 6. TOTAL CURRENT ASSETS, 7. INVESTMENTS AND ADVANCES, 8. GROSS INVESTMENT IN PROPERTY, PLANT, AND EQUIPMENT- THE SUM OF THE NET PLANT PLUS ROUTINE ADDITIONS, 9. DEPRECIATION, WHICH MAY STEM FROM THE CASH FLOW REPORT, 10. NET PROPERTY, PLANT, AND EQUIPMENT, 11. OTHER ASSETS, 12. TOTAL ASSETS, 13. SHORT TERM BORROWING- PAYMENT ON THE DEBT, 14. ACCOUNTS PAYABLE- FRACTION OF THE MATERIAL COST, 15. ACCRUED LIABILITIES- FRACTION OF THE OPERATING COST, 16. ACCRUED TAXES/NET OF DEFERRAL, WHICH MAY BE THE TAX ACCRUAL FROM THE CASH FLOW REPORT, 17. TOTAL CURRENT LIABILITIES, 18. LONG TERM DEBT- GROSS FINANCING MINUS SHORT TERM BORROWINGS, 19. STOCKHOLDER'S EQUITY- COMMON STOCK, 20. PAID IN CAPITAL, 21. RETAINED EARNINGS- NET EARNINGS, 22. TOTAL EQUITY, AND 23. TOTAL LIABILITIES.

IN THOSE CATEGORIES WHERE AN EXPLANATION IS INCLUDED, THE EXPLANATORY ITEM STEMS FROM THE CASH FLOW ANALYSIS REPORT.

ALTHOUGH BOTH OF THESE APPLICATIONS HAVE BEEN IMPLEMENTED AND ARE IN OPERATION, FURTHER REFINEMENTS AND ENHANCEMENTS ARE BEING INCORPORATED AS REQUESTED BY THE USER.

APPLICATION 2: INTEGRATED TRADING, TRAFFIC, AND ACCOUNTING SYSTEM
==

THE SECOND SYSTEM THAT WILL BE DISCUSSED IS ONE THAT ENCOMPASSES ALL
OF PHILIPP BROTHER'S FRONT AND BACK OFFICE ACTIVITIES AND INTEGRATES
THE TRADING, TRAFFIC, AND ACCOUNTING FUNCTIONS OF THE ORGANIZATION.
THIS APPLICATION IS CURRENTLY UNDER DEVELOPMENT ALTHOUGH SOME TRADING
AND TRAFFIC COMPONENTS HAVE BEEN COMPLETED FOR A NUMBER OF
COMMODITIES, NAMELY GOLD AND SILVER, OIL, GRAINS, COPPER METAL,
MOLYBEDNUM, AND NON-FERROUS SCRAP. THIS PROJECT IS BEING IMPLEMENTED
USING COBOL, IMAGE, AND DATA ENTRY LANGUAGE (DEL) SINCE WE HAVE BEEN
ABLE TO ACHIEVE SIGNIFICANT SUCCESS WITH THESE SUBSYSTEMS IN THE PAST.

THE CONFIGURATION OF THIS SYSTEM IS COMPOSED OF SEVERAL HP-3000'S THAT
PERFORM TRADING AND TRAFFIC RELATED TASKS INTERFACED VIA DS-3000 TO
ONE HP-3000 DEDICATED PRIMARILY TO PROCESSING ACCOUNTING INFORMATION
AS WELL AS TRADING AND TRAFFIC DATA. THE HARDWARE IS CONFIGURED IN
THIS WAY IN ORDER TO OFF-LOAD THE BULK OF TRADING AND TRAFFIC
FUNCTIONS ONTO MACHINES DEDICATED TO SUCH PROCESSING.

IT WAS FELT THAT THE VOLUME OF BUSINESS FOR CERTAIN HEAVILY-TRADED
COMMODITIES WOULD SIGNIFICANTLY DEGRADE OVERALL SYSTEM PERFORMANCE IF
THE TOTAL IMPLEMENTATION OF THE SYSTEM WAS ACHIEVED ON A SINGLE
PROCESSOR. FURTHER THERE IS A LOGICAL SEPARATION OF OPERATIONAL
RESPONSIBILITY AND INFORMATION AMONG THE TRADING, TRAFFIC, AND
ACCOUNTING DEPARTMENTS EVEN THOUGH SUBSTANTIAL OVERLAP DOES OCCUR.
THE USERS' INTERFACE TO THE SYSTEM IS VIA 2645A VIDEO DISPLAY
TERMINALS ATTACHED TO THE FRONT-END AND BACK-END PROCESSORS.

THE SYSTEM IS AN ON-LINE, REAL TIME MENU-DRIVEN SYSTEM THAT PROVIDES
THE USER WITH A VARIETY OF DATA ENTRY, DATA RETRIEVAL, DATA
MODIFICATION, AND FILE MAINTENANCE FUNCTIONS. CONSEQUENTLY THE SYSTEM
IS COMPLETELY SELF-CONTAINED AND CAN BE MAINTAINED BY THE USER WITH
MINIMAL INTERVENTION BY THE DATA PROCESSING STAFF. ALL INPUT IS
VALIDATED AT EDIT-CHECKED AT THE TIME OF ENTRY IN ORDER TO ELIMINATE
THE OCCURRENCE OF SUSPENSE (UNRESOLVED) ITEMS.

ALL INFORMATION ENTERED INTO THE SYSTEM MUST FIRST BE APPROVED BY A
PREDESIGNATED AUTHORITY PRIOR TO THE UPDATE OF AFFECTED FILES. ONCE
THE APPROVAL CYCLE IS COMPLETED, ALL FILE UPDATES ARE PERFORMED IN
REAL TIME, SO THAT THOSE REPORTS WHICH FLOW FROM THIS DATA WILL
REFLECT THE CURRENT TRADING SITUATION. UP-TO-DATE INFORMATION IS OF
PARAMOUNT IMPORTANCE TO THE TRADER AND HIS SUPPORT STAFF.

THE FRONT-END SYSTEMS WILL CAPTURE PERTINENT TRADING INFORMATION FOR THE PURPOSE OF ASSISTING BOTH TRADERS AND TRAFFIC PERSONNEL IN MAINTAINING TRADING POSITION, TRADING COMMITMENT, AND INVENTORY QUANTITY/INVENTORY LOCATION FOR A SPECIFIC COMMODITY OR GROUP OF COMMODITIES. THIS DATA CONSISTS OF THE FOLLOWING: 1. CONTRACTS, BOTH SPOT AND FORWARD, 2. INVOICES, 3. TERMINAL MARKET TRANSACTIONS (FUTURES), 4. TERMINAL MARKET PRICES, 5. CONTRACT PRICINGS, 6. CONTRACT APPLICATIONS, 7. CUSTOMER/SUPPLIER, AND 8. SPECIAL TERMS/REMARKS.

THE BACK-END ACCOUNTING SYSTEM PROCESSES THE FOLLOWING TYPES OF DATA: 1. CONTRACTS, BOTH SPOT AND FORWARD, 2. INVOICES, 3. ACCOUNTS PAYABLE, 4. ACCOUNTS RECEIVABLE, 5. GENERAL LEDGER, 6. TRADING ANALYSIS, 7. CUSTOMER, AND 8. TREASURY TRANSACTIONS. AS WITH THE FRONT-END PROCESSORS THE UPDATE OF THE INFORMATION MAINTAINED BY THE BACK-END IS ACCOMPLISHED IN REAL TIME MODE.

SEVERAL OF THE MORE IMPORTANT DOCUMENTS AND REPORTS PRODUCED BY THE SYSTEM ARE: 1. CONTRACTS, 2. INVOICES, 3. TRADING, SUCH AS PHYSICAL POSITION BY COMMODITY AND LOCATION, 4. TERMINAL MARKET, SUCH AS THE COMMODITY FUTURES TRADING COMMISSION (CFTC) REPORTS, 5. GENERAL LEDGER, 6. CONSOLIDATED ACCOUNTING, 7. TRAFFIC, 8. TREASURY, 9. CHECKS, 10. BANK RECONCILIATION, 11. MANGEMENT CONTROL, 12. CUSTOMER RISK POSITION, 13. UNREALIZED PROFIT AND LOSS, 14. REALIZED PROFIT AND LOSS, AND 15. PHYSICAL/QUOTATIONAL POSITION. AS MENTIONED PREVIOUSLY THESE ARE BUT A SAMPLING OF THE REPORTS THAT ARE PRODUCED BY THE SYSTEM.

APPLICATION 3: COMMODITY PRICE TRENDING AND SIMULATION
==

THE THIRD SYSTEM THAT WILL BE DISCUSSED IS ONE THAT RESULTS FROM
APPLICATION 2, WHEREIN COMMODITY PRICE AND TRADING ACTIVITY DATA
MAINTAINED IN THAT SYSTEM (APPLICATION 2) IS USED TO FORMULATE THE
FOLLOWING: 1. "BEST FIT" RELATIONSHIPS - TRENDS, 2. MULTIVARIATE
LINEAR REGRESSION ANALYSIS, 3. POINT AND FIGURE CHARTS, AND 4. MOVING
AVERAGE COMPARISONS. THE REASON FOR THIS SYSTEM IS TO SUPPORT THE
ACTIVITIES OF THE TECHNICAL TRADERS WHO BASE MANY OF THEIR DECISIONS
ON HISTORICAL MOVEMENTS OF VARIOUS TRADING FACTORS, SUCH AS PRICE,
VOLUME, ETC.

CONCERNING ITEM 1 THE TWO VARIABLE PROBLEM HAS BEEN ANALYZED USING
SOLUTIONS TO THE LINEAR, CURVILINEAR, EXPONENTIAL, AND LOGARITHMIC
FUNCTIONS AND DETERMINING THE "BEST FIT" SOLUTION.

THE LINEAR, CURVILINEAR, EXPONENTIAL, AND LOGARITHMIC FUNCTIONS ARE
RESPECTIVELY:

$$Y = A + BX$$

$$Y = A + BX + C(X*X)$$

$$Y = A*EXP(B*X)$$

$$LN(Y) = LN(A) + B*LN(X)$$

WHERE A, B, AND C ARE COEFFICIENTS CALCULATED USING THE LEAST SQUARES
METHOD. THE DETERMINATION IS BASED ON THE WEIGHTED MEAN-SQUARE ERROR
BETWEEN RESULTS OBTAINED FROM THE FUNCTIONAL RELATIONSHIPS AGAINST
THOSE ACTUALLY OCCURRING.

THE TIME PERIOD OVER WHICH THE ANALYSIS IS PERFORMED IS VARIABLE.
ONCE THE CURVE REPRESENTING PAST ACTIVITY HAS BEEN DETERMINED, THEN IT
IS POSSIBLE TO EXTEND THE ANALYSIS AND PREDICT FUTURE PRICE AND
TRADING MOVEMENTS. IT MUST BE REMEMBERED THAT THE BEST FIT CURVE MAY
BE TIME-DEPENDENT WHEREIN, FOR CERTAIN PERIODS, A DIFFERENT SOLUTION
MAY BE BEST. IN ADDITION, SINCE THE ANALYSIS CAN BE PERFORMED OVER ANY
TIME RANGES, DIFFERING INTERVALS MAY GIVE RISE TO DIFFERING SOLUTIONS.

ITEM 2 REPRESENTS A MORE AMBITIOUS ANALYSIS THAT HAS BEEN UNDERTAKEN
BASED UPON SOLUTIONS TO THE MULTIVARIATE PROBLEM, USING GENERALIZED
LINEAR REGRESSION TECHNIQUES. THIS EFFORT HAS RESULTED IN THE IN THE
ESTABLISHMENT OF A GENERALIZED RELATIONAL MODEL WHEREIN ANY VARIABLE
CAN BE ANALYZED WITH RESPECT TO ANY COMBINATION OF OTHER VARIABLES, SO
LONG AS HISTORICAL INFORMATION CONCERNING THESE VARIABLES IS
AVAILABLE. EXAMPLES OF SIGNIFICANT PARAMETERS ARE: 1. INFLATION RATE,
2. GROSS NATIONAL PRODUCT, 3. AVAILABLE COMMODITY RESERVES, 4.
COMMODITY PRICES, 5. COMMODITY SHIPMENTS, 6. CURRENCY FLUCTUATIONS, 7.
UNEMPLOYMENT STATISTICS, 8. RETAIL SALES FIGIRES, 9. STOCK MARKET
INDICATORS, 10. CONSUMER CREDIT, 11. COMMERCIAL CREDIT, AND 12.
FINANCIAL INSTRUMENTS STATISTICS. THE CHOICE OF VARIABLES IS LEFT TO
THE DISCRETION OF THE USER SINCE THE SYSTEM PLACES NO CONSTRAINTS UPON
THE DATA THAT CAN BE ANALYZED.

THE THIRD ITEM OF INTEREST TO THE TECHNICAL TRADER IS POINT AND FIGURE
CHARTING OF PRICE FLUCTUATIONS OCCURRING IN COMMODITIES, FOR SUCH
CHARTS ARE USED TO INTERPRET PRICE TRENDS AND SIGNAL PRICE MOVEMENTS,
EITHER UPWARD OR DOWNWARD. WITH RESPECT TO POINT AND FIGURE CHARTING
THERE ARE TWO OPPOSING FACTORS THAT MUST BE CONSIDERED, SENSITIVITY
AND RISK. SENSITIVITY DETERMINES BOTH THE NUMBER AND IMMEDIACY OF
BUY/SELL SIGNALS. THE RISK IS THE RESULT OF ACTION BASED UPON THE
BUY/SELL SIGNALS INDICATED BY THE POINT AND FIGURE CHART. IN GENERAL,
THE HIGHER THE SENSITIVITY, THE GREATER THE NUMBER OF BUY/SELL SIGNALS
FOR THE DATA CONSIDERED, AND CONSEQUENTLY THE GREATER THE RISK OF
ACTING UPON FALSE SIGNALS. THE SYSTEM ALLOWS THE USER TO VARY THE
SENSITIVITY IN ORDER TO OPTIMIZE THE PREDICTIVE CAPABILITY OF THE
RESULTANT CHART.

THE FINAL ITEM CONCERNS THE PLOTTING AND COMPARISON OF VARIOUS MOVING
AVERAGES OF COMMODITY PRICES. THIS TECHNIQUE IS ALSO USED TO INDICATE
BUY/SELL SIGNALS, BUT UNLIKE POINT AND FIGURE CHARTING, IT FORMS A
BASIS FOR TRADING PHILOSOPHY RATHER THAN BEING ANOTHER INPUT IN THE
DECISION-MAKING PROCESS. TRADING ON A MOVING AVERAGE REQUIRES THE
DEVELOPMENT OF A "FEEL" FOR ITS RESULTS. FAST MOVING AVERAGES INDICATE
VOLATILE PRICE FLUCTUATIONS; SLOWER MOVING AVERAGES IDENTIFY LONGER
TRENDS. NO MATTER WHAT SPEED OR HOW WELL TIMED, A MOVING AVERAGE CAN
NEVER BE PRECISE; CONSEQUENTLY, THUS WATCHING COMMODITY PRICES WITH
RESPECT TO THE MOVING AVERAGE WILL BE AGGRAVATING. THE MOVING AVERAGE
WILL RARELY ENTER OR CLOSE

OUT A POSITION AT JUST THE RIGHT PLACE. IT IS INTENDED TO EXTRACT
PROFITS FROM THE MIDDLE OF THE TREND AND HOLD LOSSES TO A MINIMUM. AS
A RESULT, PROFESSIONAL TRADERS LEAN TOWARDS THE FASTER MOVING AVERAGES
AND PORTFOLIO MANAGERS LEAN TOWARDS THE SLOWER. THE SYSTEM ALLOWS THE
USER TO GENERATE AND COMPARE ANY MOVING AVERAGES THAT HE CHOOSES.

THE UTILIZATION OF THE VARIOUS TRADING TOOLS AND THE SUBSEQUENT
FORMULATION OF A TRADING STRATEGY IS DEPENDENT UPON THE BIAS OF EACH
INDIVIDUAL TRADER. THE SYSTEM IS FLEXIBLE ENOUGH TO ALLOW THE TRADER
TO USE ITS RESOURCES AS HE SEES FIT AND THUS SERVES AS ANOTHER
INGREDIENT TO THE ESTABLISHMENT OF A TRADING PHILOSOPHY.