CRSP

CRSPAccess Database Format Utilities Guide

For the

CRSP NYSE, AMEX, Nasdaq Daily and Monthly Price and Total Return Database

and

CRSP US Stock, Treasury Indices and Portfolio Assignments Database

Updated Monthly and Annually
1925-1998

Center for Research in Security Prices
The University of Chicago Graduate School of Business

CRSP.com

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Covering over 22,000 Stocks, Updated Monthly and Annually
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DATABASE GUIDES

Additional copies of this database guide are available on the CRSP CD-ROM and on-line through the Database Guide link found at http://www.crsp.com

OVERVIEW

ABOUT THIS GUIDE

This guide will help you to use the CRSPAccess Database Utilities.

Inside

Chapter 1: Introduction provides an overview of CRSP and stock and indices research changes.

Chapter 2: *ts_print* contains a description of *ts_print* and instructions on how to use the application.

Chapter 3: *ts_print* GUI Interface contains a description of *ts_print* and instructions on how to use the GUI interface for the *ts_print* application.

Chapter 4: *stk_print* contains a description of *stk_print* and instructions on how to use the application.

Chapter 5: Supplemental Utilities contain several utilities which supplement *ts_print*, *stk_print* and the database.

Index: provides an alphabetical reference to locate the utilities and options available within them.

Other documentation guides you may want to refer can be downloaded by following our Database Guide link from our web site www.crsp.com.

See the CRSPAccess97 Installation Guide for instructions on installing data and programs on the Getting Started CD-ROM.

See the CRSP Data Definitions and Coding Schemes Guide for variable definitions, coding schemes, data organization, data derivations, and index methodologies.

See the CRSPAccess97 Database Format - Programmers Guide for information on using random access libraries and sample programs.

See the CRSP SFA Database Format Guide for information on using our legacy SFA database format.

Contact us for Technical Support
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CHAPTER 1: INTRODUCTION

OVERVIEW

This chapter provides an overview of CRSP and the CRSPAccess database utility programs.

INSIDE

CHAPTER 1: INTRODUCTION

1.1 About CRSP

Back in 1959, Professor James Lorie fielded a call from Louis Engel, a Vice President at Merrill Lynch, Pierce, Fenner & Smith. The firm wanted to advertise how well people had done investing in common stocks, but Engel needed some solid data. Could the University of Chicago Graduate School of Business help?

That was the start of the Center for Research in Security Prices. Forty years ago, computer technology was in its infancy and no machine-readable data existed.

Professor Lorie and Professor Lawrence Fisher, a colleague on the finance faculty, set out to build a database of historical and current securities data that answered Merrill Lynch's question and, since then, many, many others.

The professors compiled the first machine-readable file. It contained month-end prices and total returns on all stocks listed on the New York Stock Exchange between 1926 and 1960. Over time, CRSP added the American Stock Exchange, the NASDAQ stock exchange, and end-of-day as well as month-end prices. Now CRSP updates US stock data in two frequencies; either once a year or once a month.

In 1999, CRSP is justly considered the best provider by far of US corporate actions information. Specifically, we diligently track name changes and name identifiers, and distributions of shares, cash, rights, spin-offs, mergers and liquidation payments. As a result, the history and quality of CRSP capital return, income return and total return numbers are unsurpassed.

CRSP Working Papers

University of Chicago working papers are available online through www.crsp.com.

Research at the U of C

From its founding, the University of Chicago set the highest standards of research excellence. The Graduate School of Business helped to spawn the modern revolution in finance, and research done here has been incorporated into CRSP Data Files. Among them:

Risk/Return Analysis by Harry Moskowitz
The Sharpe-Lintner Capital Asset Pricing Model
The Efficient Market Hypothesis
Black-Scholes Option Pricing Model
Small Stock Effect

The comprehensiveness and quality of CRSP data has made it the premier source for academic researchers and quantitative analysts for thirty-five years. We have the latest research on a wide variety of finance topics available online.

CRSP Board of Directors

We are fortunate to have the guidance of world-renowned faculty.

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CRSP Historical Data Products

CRSP NYSE, AMEX, Nasdaq Daily and Monthly Price and Total Return Databases

CRSP provides monthly or annual updates of end-of-day and month-end prices on all listed NYSE, AMEX and NASDAQ common stocks with basic market indices. CRSP provides the most comprehensive distribution information available, for the most accurate total return calculations.

Important facts regarding CRSP US Stock Data.

- **Annual Update**: Ready in April.
- **Monthly Updates**: Ready by the 15th day of the following month.
- **Daily and Month-End Data:** NYSE/AMEX**:** High, low, bid, ask, closing price, trading volume, shares outstanding, capital appreciation, income appreciation, total return, year-end capitalization, and year-end capitalization portfolio. NASDAQ data also includes: closing bid, ask, number of trades, historical traits information, market maker count, trading status, and NASD classification**.**
- **History:** NYSE daily data begins July 1962. Monthly data begins December 1925. AMEX daily and monthly data begins July 1962. NASDAQ daily and monthly data begins December, 14 1972.
- **Identifying Information:** Complete Name History for each security; all historical: CUSIPs, exchange codes, ticker symbols, SIC codes, share classes, share codes, and security delisting information. These items may change over time. CRSP has developed a unique permanent issue identification number, `PERMNO`, and a unique permanent company identification number, `PERMCO`. These enable the user to track the issue over time, performing extremely accurate time-series data analysis.
- **Distribution Information:** descriptions of all distributions, dividend amounts, factors to adjust price and shares, declarations, ex-distributions, record and payment dates, and security and company linking information.

CRSP US Stock, Treasury Indices and Portfolio Assignments Database

A companion database, the CRSP US Stock, Treasury Indices and Portfolio Assignments Database**,** provides market indices on a daily, monthly, quarterly and annual frequency. This database provides additional market and security level portfolio statistics and decile portfolio assignment data. Four types of indices provide the following information.

- The **CRSP Stock File Indices** includes Value- and Equal-Weighted Indices, with or without dividends, the S&P 500 Composite Index and returns, NASDAQ Composite Index and return and security data needed to link stocks to the CRSP US Market Cap-Based Portfolios. The indices files also contain the US Government Consumer Price Index, US Government Bond Fixed Term Index Series, and the CRSP Risk-Free Rates File.

- Track micro-, small-, mid- and large-cap stocks with CRSP US Market Cap-Based Portfolios. CRSP ranks all NYSE companies by market capitalization and divides them into 10 equally populated portfolios. AMEX and NASDAQ National Market stocks are then placed into deciles according to their respective capitalizations, determined by the NYSE breakpoints. CRSP Portfolios 1-2 represent large caps, Portfolios 3, 4, 5 represent mid-caps, Portfolios 6, 7, 8 represent small caps, and Portfolios 9-10 benchmark micro-caps.

  Among the monthly data provided are the number of companies in the portfolio at the start of the quarter, portfolio weight at the start of the quarter, total return and index level, capital apprecation return and index level, and income return and index level.

- **CRSP Indices for the S&P 500 Universe** are daily and monthly files which include value- and equal-weighted returns, with and without dividends.

- **CRSP US Treasury and Inflation Series** are monthly files containing returns and index levels on US Treasuries and the US Government Consumer Price Index and index level.

CRSP US Government Bills, Notes and Bonds End-of-Day and Month-End Databases

CRSP provides 1.5 million end-of-day price observations for 3,244 US Treasury bills, notes and bonds since 1961. The monthly database contains 101,986 prices for 5,136 issues since 1925. Monthly supplemental files, developed by Professor Eugene F. Fama, Professor of Finance, are described below. They are updated annually.

Important facts regarding CRSP US Treasury data.

- **Annual Updates:** Ready in April.

- **Daily Data**: Daily quote dates, delivery dates, 1-, 3-, and 6-month CD rates, 30-, 60-, and 90-day commercial paper rates, and Federal funds effective rate. **Monthly Data**: Monthly quote dates and delivery dates. Julian, linear, and other date information to facilitate date arithmetic.

- **History:** Daily data begins on June 14, 1961. Monthly data begins on December, 31 1925.

- **Identifying Information:** CRSP Identifier (`CRSPID`), CUSIP, maturity date, coupon rate, among other items, sorted by `CRSPID`.

- **Quote Data:** Bid, ask, and source. **Performance Data**: Accrued interest, yield, return and duration.

- **Debt Data**: Debt outstanding, total and publicly held.

- **Fixed Term Indices Files:** Performance of single Treasury issues at fixed maturity horizons.

- **Supplemental Files:** The CRSP **US Treasury Securities Month-End Database** contains files designed by Eugene F. Fama, Professor of Finance, The University of Chicago Graduate School of Business. These files extract term structures and risk-free rates. There are four groups of files. The Treasury Bill Term Structure Files, The Fama-Bliss Discount Bond Files, The Risk-Free Rates File and The Maturity Portfolio Returns File. The data in these files begin in 1952 with the exception of the Risk-Free Rates File, where the data begins in 1925.

CRSP Survivor-Bias Free US Mutual Fund Database

based on the Standard & Poor's® Micropal® Database

In estimating the performance on an equal-weighted index of equity mutual funds, Mr. Carhart found that, "Using only surviving funds biases these (performance) measures upward by about one percent per year."

Recently introduced, the **CRSP Survivor-Bias Free US Mutual Fund Database** records each mutual fund's name and organizational history. CRSP tracks monthly returns, monthly total net assets, monthly net asset values and monthly distributions for open-ended mutual funds from January 1, 1962, to December 31, 1997. Updated quarterly, the database uses Microsoft Access 97 database software.

Mark M. Carhart developed this unique database for his 1995 dissertation submitted to the Graduate School of Business entitled, *Survivor Bias and Persistence in Mutual Fund Performance.* In it he noted that the explosion in new mutual funds has been "accompanied by a steady disappearance of many other funds through merger, liquidation and other means. …this data is not reported by mutual fund data services or financial periodicals and in most cases is (electronically) purged from current databases. This imposes a selection bias on the mutual fund data available to researchers: only survivors are included."

Sample Data Sets

Sample data sets for all CRSP products are available on the Getting Started CD-ROM.

1.2 CRSP Browse and Reporting Tools and Database Utilities

CRSPAccess contains several tools that allow users to extract data from the CRSP stock and indices databases and to manipulate them. The reporting tools are *ts_print*, which extracts time series output from CRSPAccess databases, and *stk_print*, which extracts stock event and time series data. The browse utilities include text string header file searches for daily and monthly stock and indices databases. The database utilities include showing and setting database information, adding supplemental or alternate keys to the databases, creating subset databases, alternate content and format of the header files, and a text file conversion to add or remove carriage returns between PC and Unix or OpenVMS systems without ftping. All utilities can be run on a terminal window or command prompt window and are operated by entering instructions at a keyboard. A windows GUI interface is available for *ts_print*. Users can prepare input and in some cases must provide files with security input and specifications.

The following data utilities are available.

- Reporting tools - *ts_print* and *stk_print*
- Namelist data search utilities - *dstksearch*, *mstksearch*, *dindsearch*, and *mindsearch*
- Database information utilities - *crsp_show_db_info*, and *crsp_set_db_info*
- Database Subsetting utilities - *stk_partial*, *ind_partial*, and *crsp_stk_subset*
- Secondary/alternate keys for a database - *crsp_stk_scd_load*
- Header file creation - *crsp_stk_headall* and *crsp_ind_headall*
- Text file conversion between PCs and Unix/OpenVMS Systems - *crsp_crlf2lf* and *crsp_lf2crlf*
- Portfolio building utilities - *dsxport*, and *msxport*

The report writers, *ts_print* and *stk_print*, require securities selected by supported identifiers. The CRSP PERMNO is the primary security identifier and must be used in *ts_print*. *stk_print* supports secondary identifiers including header CUSIP, historical CUSIP, Ticker Symbol, Header, PERMCO, or SIC code. The *mstksearch* and *dstksearch* utilities can be used to find identifiers using company name or other text data.

The CRSP Permanent Index Identification Number (`indno`) is the primary index identifier. Portfolio Type is the primary portfolio and index portfolio group identifier. The *dindsearch* and *mindsearch* utilities can be used to find index identifiers using exchange name or text data in the index header file.

See the CRSP Data Definitions and Coding Schemes Guide for definitions of our stock and index variables codes, and portfolio types.

The CRSPAccess97 Installation Guide contains information on system installation.

You may wish to periodically check the web page, www.crsp.com, for software updates of the browse and reporting tools.

CRSPAccess Utility Programs - Changes and Enhancements

ts_print

ts_print is a command line program that can be used to generate time series reports with raw and derived data using the CRSPAccess stock and indices data. The user creates a request file containing the desired output specifications. This request file is then run from the command line, and extracts the desired data, producing the output report.

The CRSP *ts_print* interface is a front-end application designed to facilitate creation and processing of the *ts_print* request file, used to extract the data.

Several changes and enhancements have been made to the *ts_print* application. CRSPAccess version 211 is documented here. If you have a previous version, you may download updated applications from our Technical Support page from www.crsp.com.

Differences between *ts_print*, command line, vs. *ts_print*, interface

ts_print is a command line report writer that can be used on CRSP supported Unix, Windows, and OpenVMS systems. The interface is a front-end point and click application which can be used on Windows NT and 98/95 systems. When using the GUI, companies may be selected in the find box by PERMNO, company name, CUSIP or ticker.

The `COMPACT` option is available as part of the report formatting specifications (`OPTIONS`) may not be added to the request file using the *ts_print* interface.

Share Code restrictions may be used in the command line program, but due to a truncation of characters, does not work in this version of the interface.

Changes and Enhancements to *ts_print*

- *ts_print* supports comment lines anywhere in the request file beginning with the "#" character. Blank lines are also now supported.
- The user can select output definition for certain data items with the syntax `|FORMAT m.n|`where `m.n` represents the total width, and `n` is the optional number of decimal places in the field for the report (`ITEM`).
- Users may create self-determined portfolios (`ENTITY`).
- The name `ABSOLUTE` was added as a synonym for `RANGE`. `RANGE` is still supported. (`DATE`).
- `ISSUERANGE` (`ENTITY`) may be used to further restrict the date range when the the calendar is set to `RANGE` or `ABSOLUTE` (`DATE`).
- `ENTFORMAT` contains new default security headers for the report. These include CUSIP Identifier, Header, Ticker Symbol, Header and Company Name, Header in addition to PERMNO (`ENTITY`).
- Trade-only data items have been added (`ITEM`).
- Portfolio data items have been added (`ITEM`).
- *ts_print* will run even if unavailable data is queried. A missing value of -100 is inserted for each such item in the output report.
- The `COMPACT` option was added to the application on version 211 of the CRSPAccess Getting Started CD-ROM. (`OUTPUT`) It is not yet available in the interface.

stk_print, dstkprint and *mstkprint*

- Formatting changes in terms of spacing and headers have been made to the *stk_print* application to accommodate Y2K compliance for the 80-character screen output. These modifications primarily affected the `/de` and `/di` output.
- The `/hh` option now includes *Ticker Symbol, Header* and *Company Name, Header* and *Delist Code, Header.*
- Multiple `/dy` portfolio types may now be used with the `/fs` delimited output option.

dstksearch and *mstksearch*

- SIC codes were removed from the 80-character width header files to expand the dates for Y2K compliance. As a workaround, the utility program `crsp_stk_headall` can create a file exceeding 80 characters, or a file truncating the dates, while maintaining SIC codes. This is available on CRSPAccess version 211 from the Technical Support link online at www.crsp.com.

crsp_crlf2lf and *crsp_lf2crlf*

- These have been added to facilitate transferring text files between systems. They add or remove carriage returns in text files to allow non-ftp transfer of data between PCs and Unix or OpenVMS Systems.

crsp_show_db_info, and *crsp_set_db_info*

- Database information utilities have been added to provide and to set database information. Cut date, file creation date, binary type, CRSPAccess version and product code are included. They are displayed in *crsp_show_db_info* and changed in *crsp_set_db_info.*

crsp_stk_subset

- A subset database utility, *crsp_stk_subset,* allows the user to create a subset of the database universe. *crsp_stk_subset* creates a new CRSPAccess database from an existing database by subsetting data using date range, frequency, and identifier screens.

crsp_stk_headall and crsp_ind_headall

- The *crsp_stk_headall* utility creates three formats of the stock header file. The default fits in an 80 character screen and has dates in a Y2K compliant format but no longer contains SIC codes. The second format can create a file exceeding 80 characters with dates in Y2K compliant formats. The third format creates a file in the format previously distributed by truncating the dates with two-digit years. The *crsp_stk_headall* program with all three options is available on Version 211 of CRSPAccess, and can be downloaded from the Technical Support link online at www.crsp.com. *crsp_ind_headall* creates header files for an index database.

crsp_stk_scd_load

- *crsp_stk_scd_load* creates secondary indexes or keys for CRSPAccess stock databases.

CHAPTER 2: *TS_PRINT* TIME SERIES REPORT WRITER

OVERVIEW

This chapter describes how to use the *ts_print* command line utility program.

INSIDE

CHAPTER 2: *ts_print* TIME SERIES REPORT WRITER

ts_print is a report-writer program for CRSPAccess data that generates columnar text report files containing raw and derived data from the US equity and indices databases. It can be used on Unix, Windows, and OpenVMS.

ts_print is designed to facilitate use of CRSP time series data with selected calendars. The input file is a text file that contains the specifications for the output data file or report. The output data file is in a delimited tabular text format, and can be imported into spreadsheet or database programs. *ts_print* is particularly useful for portfolio analysis and event studies. Time series data can be converted to different calendar frequencies, and header and event items can be mapped to a value at each period in a time series.

Time series data is three-dimensional. Each data point refers to one or more issue, index or portfolio (`ENTITY`), a data item value or variable (`ITEM`), and a single date or a date range (`DATE`). *ts_print* allows the user to define these three components and to control the appearance of the output with the fourth component (`OPTIONS`). An input specification file, controlled by the user, determines the input and the output content and format of the report.

ts_print is a command line executable program that enables users to control all of the specifications of reports. A GUI is available for use on Windows systems. See “Chapter 3: ts_print Interface for Windows NT and 98/95” on page 41. To maximize the potential of *ts_print*, the user should have a general familiarity of CRSP data and must know the universe of their product(s). This section contains the following information.

- Detail on creating the request file
- How to run *ts_print*
- Sample *ts_print* request files and output data
- Tables containing the supported daily and monthly data items

ts_print is not designed for use with financial data other than data available through CRSP.

2.1 Creating the *ts_print* Request File

It is necessary to create a request file, a text input file, to run *ts_print*. The request file contains the data specifications and controls the appearance of the report or output data file. Every request file must contain specifications for each of the following four components: `ENTITY`, `ITEM`, `DATE` and `OPTIONS`. See "Sample Reports" on page 29 for sample request of output data files.

`ENTITY` –One or more securities, a precalculated CRSP supported index, or a user-defined portfolio.

`ITEM` – One or more *ts_print* supported CRSP time series variables (data items). These can have possible translations from one periodicity (time period of aggregation) to another.

`DATE` - Dates can be a set of absolute date ranges or a set of relative dates to be matched against event dates supplied with each entity.

`OPTIONS` – controls the appearance and name of the output file.

Request File Rules

Descriptions on the following pages are based upon the request file rules below.

- A request line beginning with a # sign is treated as a comment and is ignored by the application. Blank lines are also ignored.
- Names in uppercase `COURIER` are keywords and must be typed "as is".
- # in the documentation represents an integer to be supplied by the user.
- Z represents an alphanumeric character to be supplied by the user.
- Names in lowercase `courier` are replaced by the user. For example, `filename` is replaced by the name of a user's file.
- Words in Times New Roman font describe options and do not belong in the specifications.
- Anything in brackets is optional. If names in brackets are used, the punctuation in the brackets are required. The brackets do not appear in the request file.
- Two or more keywords on a line must be separated with the `|(pipe)` character. Information specifying a keyword must be on the same line as the keyword. Additional keywords can also be placed on multiple lines; in this case the first line does not end in a pipe character.
- The request file may not contain more than 25,000 rows. (Note that on OpenVMS, the maximum request file size allowed is directly proportional to your paging file quota.)

ts_print is case sensitive. The user must follow the notational conventions, provided in this section, when creating the request file. The request file should be a text file. CRSP recommends creating and editing the specifications file on the same system you intend to run it in. PC text editors insert carriage return characters at the end of lines which may not be readable on UNIX or OpenVMS systems. Users should use the either the `crsp_crlf2lf` and `crsp_lf2crlf` utilities or use ASCII format and FTP the files between systems.

Each component entry, numbered below, is comprised of three parts:

- A heading row which identifies the component,
- The center row(s) which detail(s) the desired function(s) of the component, and
- The END row, which closes the component input information. A basic example follows:

sample.txt

```
1. #Sample request file for price, volume, total return, shares outstanding for
   #a security
2. ENTITY
   LIST|PERMNO 12490|ENTFORMAT 3
   END
3. ITEM
   ITEMID prc
   ITEMID vol
   ITEMID ret
   ITEMID shr
   END
4. DATE
   CALNAME weekly|ABSOLUTE 19950101-19950201|CALFORMAT 4
   END
5. OPTIONS
   X ITEM,YES|Y DATE,YES|Z ENTITY,YES,1|OUTNAME finsamp.out|REPNAME Sample One
   END
```

In *ts_print*, ENTITY, ITEM and DATE identify what your report will contain, and OPTIONS determines how your report will appear. Lines in the request file beginning with a "#" and blank lines are ignored by the *ts_print* program. Comments can be used to make the input file more readable or to make an input line temporarily inactive. Comments can appear anywhere in the request file.

Explanation of Example Request File: sample.txt

1. Comment lines identifying the request file, and its functionality.

2. In the sample layout above the ENTITY contains one issue, PERMNO 12490, with ticker selected as the optional output header (ENTFORMAT 3).

3. Under ITEM, price (prc), volume (vol), return (ret), and shares outstanding (shr) information from the daily stock file for the ENTITY (PERMNO 12490) will be included in the output report. Since no SUBNO is selected, each ITEMID uses the default, SUBNO 0.

4. In this sample, DATE specifies that the report will contain one value each week for each ENTITY and ITEM (CALNAME). Note the source of the ITEMs selected above is the Daily Stock File. Thus, the weekly value for Daily ITEMs is a weekly summary of the selected daily data items. In this case, prc and shr are prices and shares are end of period, vol is the sum of volumes during the week, and ret is the compounded daily return during the week (dividends are reinvested on exdate), reported between January 1, 1995 and February 1, 1995. Each date will be in a MM|DD|YYYY calendar format (CALFORMAT 4).

5. The OPTIONS selected contain X, Y and Z axes. ITEM options will be displayed on the X-axis, the DATE options on the Y axis and the entities will append themselves to the date or Y axis. (This is indicated by the number 1 at the end of the Z options.) The YES in each of the axis groups indicates that the report will contain headers on each axis. finsamp.out (OUTNAME)is the name of the output file and Sample One (REPNAME) is the report title in the output file.

See page 28 to view output results from the sample.txt request file. The following section details each of the four components, ENTITY, ITEM, DATE, and OPTIONS and the keywords available for each.

ENTITY Specifications

There are three ways to describe entities:

- LIST selects one or more issues. These can be specified by individual PERMNOs on one or more rows, with a predefined input file of PERMNOs, or by ALL, which selects all issues available in the CRSP database.
- INDEX selects precalculated index series supported by CRSP, identified by Permanent Index Identification Number (INDNO).
- PORT describes a user-defined portfolio specified in a predefined input file which assigned PERMNOs to user-specified portfolios, or ALL may be selected to include all issues in the portfolio. Each user-defined Portfolio may contain an unlimited number of issues.

The ENTITY component entry is comprised of three parts:

- The ENTITY heading row which identifies the component,
- The center row(s) which details the desired entities and options related to the entities, and
- The END row, which closes the ENTITY information. A basic example follows:

Heading Row

```
ENTITY
```

Center Row(s), primary identification options contain additional and possible ENTITY qualifiers:

```
LIST|PERMNO #|EVDATE #|USERHEAD text|ENTFORMAT #|ISSUERANGE #-#
```

or

```
LIST|FILE filename, format F1PE(#,#)[D1(#,#),D2(#,#)SD (text)] or
F2DLZPE[D1D2SD]|EVDATE #|ISSUERANGE #-#|USERHEAD text|ENTFORMAT #
|EXCHANGE#[,#]|SHARETYPE#,#[,#]|NMSIND#[,#]
```

or

```
LIST|ALL|EVDATE #|ISSUERANGE #-#|ENTFORMAT #
```

or

```
INDEX|INDNO #|ISSUERANGE #-#|ENTFORMAT #|USERHEAD text
```

or

```
PORT|FILE filename F1PE(#,#)[D1(#,#),D2(#,#),WT#,ID#] or
F2DLZPE[D1D2WTID]|WEIGHT weighttype
```

or

```
PORT|ALL|WEIGHT weighttype
```

End Row:

```
END
```

Following are portions of two examples provided earlier in this section, which demonstrate the three primary ways to set up the ENTITY component of your input file. The first pulls data for both a PERMNO and a Permanent Index Identification Number (INDNO). The second pulls data using an input file of desired PERMNOs and specific event dates.

e.g.

```
ENTITY
LIST|PERMNO 43916
INDEX|INDNO 1000080
END
```

e.g. ENTITY
LIST|FILE ts_list.txt,F2DL;PED1
END

sub-input file ts_list.txt contains

```
10107;19900101
12490;19700101
14593;19850101
43916;19800101
```

Note: All entities will have result data for the calendar date range (RANGE or ABSOLUTE) specified in the DATE component of the input file for the data. If dates are selected outside this range in the ENTITY component's D1, D2 or EVDATE Fields, the output data will contain missing value codes rather than values for the ITEMS selected for any periods not within the RANGE or ABSOLUTE of the DATE component.

ENTITY Keywords and Usage

The capitalized words in courier font need to be used as is. Lowercase words and symbols in courier font indicate user-specified information.

Primary Identification Options

LIST – Indicator that for each use, a single PERMNO or file containing PERMNOs will be used to identify an ENTITY.

PERMNO # - one CRSP PERMNO, (permanent and unique 5-digit issue identification number assigned by CRSP) of an issue where # is the PERMNO. For example, the PERMNO for International Business Machs Corp (IBM) is 12490. When IBM is selected for this option, it would be "PERMNO 12490". The *stk_print* utility program and search functions *dstksearch* and *mstksearch* can be used to identify PERMNOs searching by PERMNO, PERMCO, company name, CUSIP, ticker, etc. in the header file. The *ts_print* interface application for windows systems includes a search by company name, PERMNO, ticker, or CUSIP.

ALL - all PERMNOs in relevant databases are used. Relevant databases are determined by the data items (daily or monthly) selected. When this option is used, issues with no data inside the selected date range are ignored.

FILE filename, format – (input PERMNO file) Indicator that a secondary input file containing PERMNOs (required), date(s) (optional), and headers (optional) will be used. Filename, as shown in the above format, is replaced with the actual name of your input file. Specification of the input file is required. Format is a list which contains one or more two-letter codes describing the layout of the input file. The first two-characters of the format determine whether input fields are in fixed positions or are separated by a one-character delimiter, F1 and F2 respectively. The following codes are used.

Fl- Input file data are in fixed positions. Each code is followed by character positions in the form (begpos,endpos). Begpos is the first character position in the input PERMNO file that contains the data for that specification, endpos the last. For example, if your input file named permin.txt contains PERMNOs in the first 5 character spaces, followed by the beginning date (D1) starting in the 7th character position and end date (D2) starting in the 15th character position of data desired for each PERMNO, your ENTITY entry would look like this:

e.g.
```
ENTITY
LIST|FILE permin.txt,F1PE(1,5)D1(7,14)D2(15,22)
END
```

F2 - Input file data fields are delimited by a single defined character. The delimiting character is set with the DL code.

e.g. The same request file with fields delimited by spaces is described below.
```
ENTITY
LIST|FILE permin.txt,F2DLSPED1D2
END
```

DL -A delimiter character is used with F2. *ts_print* supports special delimiters: P for pipe, S for space, C for comma (DLP, DLS, DLC) and any other character can be used by adding a character on after DL (DL; for semi-colon delimited input).

PE -PERMNO of the input security

D1 -Beginning date of a date range or a single event date in YYYYMMDD format. If a relative calendar is used, D1 is the event date for the security. If an absolute calendar range is used, and D1 and D2 are specified, valid data output is the cross-section of the security's trading history, the DATE component date range and the range set by D1 and D2.

D2 - Ending date of a date range, in YYYYMMDD format.

SD -Short Description to supply header text for the security, up to 20-characters long.

INDEX - Indicator that the following ENTITY is one of CRSP's precalculated indices.

INDNO - Permanent Index Identification Number (indno). There are several standard indices included with CRSPAccess Stock databases. Your product mix will determine which indices are available. The index methodologies section has a list of Permanent Index Identification Numbers available in each product. Additional indices, compatible with CRSPAccess, are available in the CRSP US Stock, Treasury Indices and Portfolio Assignments Database and described in the CRSP Data Definitions and Coding Schemes Guide. The index search programs, *dindsearch* and *mindsearch*, can also be used to find available daily or monthly indices and their INDNOs.

PORT - Enables the user to create a self-determined portfolio. Two methods of selecting issues and four weight type options are currently supported. Issues can be specified with an input file or all eligible issues in the database can be selected. The supported weight type options are equal-weighting, value-weighting, constant weights specified by the user, and constant weights determined from shares specified by the user.

ALL - includes all eligible issues in the stock file for the date range specified.

FILE filename, format – - Name and specifications of a user-defined input file used to define one or more portfolios. Filename is replaced with the actual name of your input file. The layout of the input file is specified with one of the format options, F1 or F2, described below.

Multiple portfolios of the same type can be defined in one portfolio entity with a portfolio definition input file. If more than one portfolio is specified in an input file, issues are assigned to the different portfolios with a portfolio identification number in the input. Up to thirty equal-weighted or value-weighted portfolios can defined with numbers 0-29, and up to 200 user-defined weight or shares portfolios can be defined with numbers 0-199.

Each input line for value-weighted and equal-weighted portfolios must contain PERMNO. Portfolio identification numbers are needed if more than one portfolio is included. Input dates are ignored in value-weighted and equal-weighted portfolios and relative dates cannot be used.

Each input line for user-defined weight or shares portfolios must contain PERMNO and weight. Portfolio identification numbers are needed if more than one portfolio is included and event date is needed if the report calendar uses relative dates. Beginning and ending date are optional if the report calendar uses an absolute date range.

The first two characters of the format determine whether input fields are in fixed positions or are separated by a one-character delimiter. The following codes are used.

Fl- Input file data are in fixed positions. Each code is followed by character positions in the form (begpos,endpos). Begpos is the first character position in the input PERMNO file that contains the data for that specification, endpos the last. For example, if your input file named permin.txt contains PERMNOs in the first 5 character spaces, followed by the beginning date (D1) starting in the 7th character position and end date (D2) starting in the 15th character position of data desired for each PERMNO, your ENTITY entry would look like this:

e.g.
```
ENTITY
PORT|FILE permin.txt,F1PE(1,5)D1(7,14)D2(15,22)
END
```

F2 - Input data fields are delimited by a single defined character. The delimiting character is set with the DL code.

e.g. The same request file with fields delimited by spaces is described below.

```
ENTITY
LIST|FILE permin.txt,F2DLSPED1D2
END
```

DL -delimiter character used with F2. *ts_print* supports delimiters: P for pipe, S for space, C for comma, (DLP, DLS, DLC respectively), and any other character can be used by adding a character on after DL.

PE -PERMNO of the input security

D1 -Beginning date or event date in YYYYMMDD format. If a relative calendar is used, D1 is the event date for the security. If an absolute calendar range is used, and D1 and D2 are specified, valid data output is the cross-section of the security's trading history, the DATE component date range and the range set by D1 and D2. The range set by D1 and D2 must fall within the absolute range set in the DATE component, or it is ignored.

D2 - Ending date

WT -Security weight - the number of shares held of the security or the weight of the security in a defined weights portfolio.

ID - Portfolio Identification Number, one input file can be used to define up to thirty portfolios. Portfolios are identified with an integer between one and thirty.

WEIGHT weighttype - weighting for use with portfolios. Four weights are available, equal_weight, value_weight, user_share, and user_weight.

WEIGHT equal_weight - specifies equal-weighted results for the selected portfolio. The same value is invested in each eligible security each holding period. The portfolio is reweighted each input period.

WEIGHT value_weight - specifies valued-weighted results for the selected portfolio. Eligible securities in the portfolio are weighted each input period by their market capitalization at the end of the previous period.

WEIGHT user_share - the user defines the portfolio by weighting issues based on the number of shares specified in the portfolio file. The amount held in each security is maintained each calendar period and the individual holdings may change each period. The user-specified number of shares is multiplied by the closing price at the beginning of the date range for each issue. If daily input is used, it is the first day. If monthly input is used it is the first month-end. The weights remain constant for each security once established at the beginning of the range. User_share does not hold the number of shares constant.

WEIGHT user_weight - the user defines the portfolio by the weight for each security specified in the portfolio input file. The portfolio is reweighted each input calendar period to maintain the weighting of eligible securities.

Additional ENTITY Qualifiers

EVDATE is the event date in YYYYMMDD format for a PERMNO. EVDATE is required for all securities identified with LIST|PERMNO if the calendar type in the DATE component is RELATIVE and is ignored otherwise. See ISSUERANGE below when using DATE RANGE/ABSOLUTE date options.

ISSUERANGE - issue date range is optional and must be followed by beginning and ending dates in YYYYMMDD format, connected with a dash when included. If ISSUERANGE is included for an issue, the valid data output is the cross-section of the security's trading history, the DATE component date range, and the ISSUERANGE date range. See EVDATE above when using the RELATIVE date option.

USERHEAD text - is used to specify alternate output headers (short descriptions) for the ENTITY. The default headers, are PERMNO in LIST, Permanent Index Identification Number (INDNO) in INDEX, or the portfolio identification number prefixed with the word "PORT", in PORT. The USERHEAD string (can be up to 20 characters including spaces). Note that USERHEAD overrides short description (SD) from an input file for supplying headers and will label all entities identically.

ENTFORMAT # - is used to provide standard issue identification options for the output report file's header for security entities. Options include 1 for PERMNO, the default, 2 for CUSIP, header 3 for Ticker symbol, header, and 4 for Company Name, header. These may be up to 20 characters long. `ENTFORMAT` is superceded by `SD` option with a formatted, predefined input file. This option is only available for securities.

For example, `LIST|PERMNO 12490|ENTFORMAT 1` used in the body of the `ENTITY` section would print the PERMNO 12490 as the header in the output report.

DATA ITEM Specification

Data items are selected using a mnemonic name called ITEMID. Optional qualifiers can be used to further define the data item. A complete list of currently supported data items are listed in the *ts_print* Data Items Tables at the end of the section, on page 34. They are organized alphabetically by item name, and contain the following information:

- Item identifier (ITEMID),
- Group identifier (GROUPID),
- SUBNOs, to further define the data item,
- Default header for each ITEM as it appears in the output file,
- Default data item formatting, and
- ENTITY types the data ITEMs are compatible with.

Each ITEMID selected will generate one output for each ENTITY on each DATE.

There are daily and monthly sets of items. Monthly item names are prefixed with an m. A monthly item requires an available CRSPAccess monthly database and a daily item requires an available CRSPAccess daily database. If both databases are available, both daily and monthly items can be included in the same report. A monthly or daily indices-only database can be used with *ts_print*, but only INDEX entities and index-compatible items can be used.

The ITEM specification is comprised of three parts

- the ITEM heading row which identifies the component.
- The center row(s) which detail(s) the desired data items.
- The END row, which closes the item input information.

A summary of the ITEM component specifications follow:

Heading Row:
ITEM

Center Row:
ITEMID text or GROUPID text

One of ITEMID or GROUPID must be chosen. Additional options can be added to each line with the following syntax:

|SUBNO #|SDESC text |FORMAT m.n|DATALEN #
End Row:
A line with END is used after the last item is specified.
END

Following is an example of a sample ITEM section. If you look up each of the data items in the Daily Item Table at the end of this section, you will see that of these data items, only prc (price) has 2 SUBNO choices - 0 last price and 1 last non-missing price. The caldt (calendar date), permno, ret (returns) and vol (volumes) do not have any SUBNOs listed since there is only one available. SUBNO 0 is the default, for all data items. The INDNOs and PORTTYPES included in the CRSP NYSE, AMEX, Nasdaq Daily and Monthly Price and Total Return Databases are listed in the Data Item Keywords and Usage section following this one. Your product mix determines which of these are available. Additional indices and portfolio types are available when using the CRSPAccess stock data in conjunction with the CRSP US Stock, Treasury Indices and Portfolio Assignments Database. port requires a PORTTYPE SUBNO. In this case it is chosen to select the NYSE/AMEX/Nasdaq Capitalization Portfolio assignment.

e.g.
```
ITEM
ITEMID caldt|SUBNO 0
ITEMID permno|SUBNO 0
ITEMID ret|SUBNO 0
ITEMID prc|SUBNO 0
ITEMID vol|SUBNO 0
ITEMID port|SUBNO 1
END
```

Data Item Keywords and Usage

The keywords used to identify items are described below. Additional details for each of the data items can be found in the Daily and Monthly File Item Tables at the end of the chapter. Please refer to these tables when creating your input file.

Item Identifiers

ITEMID - Primary item identification code for the specific data item requested. The ITEMIDs are in some cases directly mapped variables available in the CRSP database, and in other cases are derived from the variables. Items directly mapped are included in the variables definitions in the CRSP Data Definitions and Coding Schemes Guide See "Chapter 4: Data Definitions" on page 55 of the CRSP Data Definitions and Coding Schemes Guide for the database variable definitions.

ITEMID may have multiple variations or may be defined in terms of secondary identifiers. A secondary code refines the data request for specific data ITEMS. There are three secondary types of information; flags to provide alternate data definitions, Permanent Index Identification Numbers (INDNOs) to identify associated index series used for the required data item, and portfolio types to identify the associated portfolio types used with the data request. Each of these categories is identified with the SUBNO item qualifier. The SUBNO column of the Daily and Monthly File Item Tables at the end of this section lists possible secondary codes for each ITEMID.

GROUPID - Code for a grouping of specific data items. These are primarily grouped in accordance with the organization of the CRSP data files. If a group is selected all the items in the group are selected.

SUBNO # is used to select one of multiple variations of an ITEMID. If the table lists a number for SUBNO, that number, when used with the data item selects that variation of the item. SUBNO 0 is the default for all ITEMIDs and does not have to be explicitly included in the input file. For use definition, see the SUBNO column of the Daily and Monthly File Item Tables at the end of this section for the definitions of possible SUBNOs for each ITEMID.

If the table indicates INDNO or PORTTYPE there is only one variation and SUBNO is used to pick a specific index or portfolio type (see indno and portfolio type below to qualify the item).

Item Qualifiers

INDNO index series data items require a single index series used as input when deriving the data items for comparison, such as for an excess return. These items have indno in the SUBNO column of the Daily and Monthly File Item Tables. An item indno requires qualification of the item with the SUBNO option followed by the Permanent Index Identification Number (INDNO) number of an associated index series.

There are four standard indices included with CRSP NYSE, AMEX, Nasdaq Daily and Monthly Price and Total Return Databases. Additional indices, compatible with CRSPAccess stock databases, are available in the CRSP US Stock, Treasury Indices and Portfolio Assignments Database. A search with the *dindsearch* and *mindsearch* utilities can be used to find available daily or monthly indices and their INDNOs.

> Below is a partial list of index series INDNOs. See "3.3 Portfolio Types Defined by CRSP" on page 54 of the CRSP Data Definitions and Coding Schemes Guide for a list of INDNOs available with each product. See "3.2 CRSP Index Series and Groups" on page 51 of the CRSP Data Definitions and Coding Schemes Guide for a complete list of available series.

Index No.	Universe Coverage
1000081	NYSE/AMEX/Nasdaq Equal-Weighted Market Index
1000080	NYSE/AMEX/Nasdaq Value-Weighted Market Index
1000502	S&P 500 Composite Index
1000503	Nasdaq Composite Index

PORTTYPE - portfolio based data items use portfolio type numbers to qualify the data item. The portfolio type identifies a specific portfolio group, where a market segment index divides securities into portfolios based on a defined index methodology. These require qualification of the item in the SUBNO option followed by the portfolio

type number. Porttypes require a SUBNO # between 1-9 for daily items and 1-8 for monthly items to run. These items have porttype in the SUBNO column of the Daily and Monthly File Item Tables.

There is one portfolio type provided with the CRSP NYSE, AMEX, Nasdaq Daily and Monthly Price and Total Return Databases with data for portfolio assignations and statistics, NYSE/AMEX/Nasdaq Stock File Capitalization Deciles (porttype=1). No portfolio index results are available without the index data.

Item Qualifier

SDESC - allows you to modify the header for data items. It is a a short text description for headers to override the default. The defaults are listed in the Daily and Monthly File Item Tables at the end of this section. If items are specified with GROUPID, this will be used for all items in the group. The text may contain up to the maximum number character spaces allocated for the format of each item up to a maximum length of twenty characters.

FORMAT – allows you to modify the output formatting assigned to a data item. There are two ways to specify the format. The first is in the form m.n,where m is the number of spaces allocated to the left of the decimal point in the output, and n is the number of digits to the right of the decimal. The n is optional. It is ignored for integer fields. If n is not specified in the floating point fields, no decimal is printed. The second method of data item formatting uses output specifiers from the C programming language. These are included in the data item tables at the end of the chapter.

DATALEN - (columnar data length) the number of characters needed to store the output data to override the default. This should be at least as large as any field width specified in the format. This field should be modified when you wish to assign the field a header, which does not fit within the default FORMAT for the ITEM.

See the data item tables (end of section) for a complete description of the data items for the input file.

When using a GROUPID, the SUBNOs/INDNOs/PORTTYPEs must be compatible. Use the Data ITEMs table to verify compatibility.

The data length has been set to produce an output file that is easily readable. If you are importing the data into another program for additional data manipulation, you may need to change the DATALEN (data length) field. This is particularly true with the character fields. The non-character fields may add spaces to the total allocated. If this occurs, use the FORMAT field to correct the total spaces for importing. When manipulating the format this way, you are not able to justify the fields. Character fields default to left justification.

DATE Specification

The DATE input specifies dates that will appear in the output file for the ITEMs selected. Either a date range or a relative date may be selected. The calendar may be one of five calendars in the database: daily, weekly, monthly, quarterly, or annual. The ranges can be either the same for all input entities, or be based on an event date for each entity.

ts_print contains a 'smart calendar', which allows the user to select the various calendar options with the various data items. For example, a monthly output calendar with daily data will return a monthly range of data, using an item specific summary of the input daily data points to produce each monthly output monthly data points to produce daily output. Likewise, a daily calendar with a monthly, data item will produce a daily range of data, using an item-specific summary of the input. If data items and calendar are the same frequency, no conversion is made.

The DATE component is comprised of three parts:

- The DATE heading row which identifies the component,
- The DATE center row(s) which detail(s) the desired calendar information, and
- The END row, which closes the DATE input information.

A summary of the DATE component specifications follows:

Heading Row
```
DATE
```

Center Row
```
CALNAME text|RANGE or RELATIVE or ABSOLUTE dates|CALFORMAT #
```

End Row
```
END
```

The calendar name and either an absolute or relative range must be chosen.

Following are two examples. The first example will produce quarterly output for each of the daily or monthly items in the date range between January 1, 1990 and December 31, 1995. The calendar indicates the frequency of the data items selected for the report. The second example will report on a daily basis a total of 4 days, from 2 days before the event date, the event date (EVDATE), and 1 day after the event date. The event date for each entity is specified in the ENTITY specification section of your input file.

e.g.
```
DATE
   CALNAME quarterly|ABSOLUTE 19900101-19951231
   END
```

e.g.
```
DATE
   CALNAME daily|RELATIVE –2,1
   END
```

The date specification keywords are described below.

DATE Specification– Keywords

CALNAME - is the name of an existing calendar to set the frequency of reporting in the output file. *ts_print* supports reporting for Daily, Weekly, Monthly, Quarterly and Annual Calendars. Either daily or monthly file data items can be used with any of the supported calendars. Input data frequency is determined by the data item specified in the ITEM section. The supported calendars must be chosen from the following table.

CALNAME	Calendar Description
daily	CRSP daily stock calendar
weekly	CRSP weekly stock calendar
monthly	CRSP monthly stock calendar
quarterly	CRSP quarterly stock calendar
annual	CRSP annual stock calendar

ABSOLUTE daterange/RANGE daterange - sets the fixed time period, with beginning and end dates, of the selected calendar that *ts_print* reports data. Ranges can be expressed as YYYY, YYYY-YYYY, YYYYMM, YYYYMM-YYYYMM, YYYYMMDD, or YYYYMMDD-YYYYMMDD. If only a month or year is specified, all dates in the calendar belonging to that month or year are included. If the chosen dates are not in the selected calendar, the beginning range uses the next following date in the calendar and the ending range uses the last previous date in the calendar. Output will be produced for all entities for all items for each period in the range. If the entity does not have data during the range or is restricted by the date range in the ENTITY description section, missing values will be included in the output report.

RELATIVE daterange - sets the event time range of a report used to select data for entities based on an entity-specific event date. Ranges are expressed as the first period relative to the event date followed by a comma and the last period relative to the event date. A range before the event date is indicated as a negative number. A range on the event date is indicated as 0.

The RELATIVE date is dependent on the EVDATE or the D1 setting in an input entity file. This option is typically used for event studies, when the data range sought for each security is different. Using this option, RELATIVE –5,6, for example, would return results for the five reporting dates before the event date, the event date period, and the six reporting periods after the event date. Only an event date can be specified with entities if using this option. An entity date range cannot be used. The output data header for a RELATIVE calendar is in terms of event time, not calendar time. This option does not work with a beginning and ending date. It may be useful to include the ITEMID caldt (mcaldt) in the output file to see the actual dates for each entity when using relative dates.

CALFORMAT - # is a numeric code for the formatting of the dates in a range when date headers are chosen in the output options:

— 1 =YYYYMMDD (default)
— 2 =YYMMDD
— 3 =MM|DD|YY
— 4 =MM|DD|YYYY
— 5 =DD-MM-YYYY

OPTIONS and Output Specification

Each data point represents the data ITEM value for one ENTITY on a given DATE. These three points are plotted in a table to produce the output file. The OPTIONS component specifies the appearance of the output file.

Each of the three data dimensions, ITEM, ENTITY and DATE, are assigned by the user to the X, Y, or Z axis. Other options control the output file, data spacing and delimiters, or output data control. The Z axis can be represented in two dimensions in one of the following three ways:

1. X and Y, dates and data items, are repeated for each Z entity.

```
12490
             Prc          Ret          Vol
19980130    98.75000   -0.056153      96558840
19980227   104.43750    0.059753      71176000
19980331   103.87500   -0.005386      80624703
19980430   115.87500    0.115523      87984302

43916
             Prc          Ret          Vol
19980130    56.56250    0.523569      47322102
19980227    56.93750    0.006630      42093701
19980331    52.25000   -0.082327      35424500
19980430    55.75000    0.066986      20778600
```

2. Z data is printed on the X-axis. Columns are sorted by Z items, then X items, and Y items comprise the rows.

```
            12490        12490        12490        43916        43916        43916
             Prc          Ret          Vol          Prc          Ret          Vol
19980130    98.75000   -0.056153      96558840    56.56250    0.523569      47322102
19980227   104.43750    0.059753      71176000    56.93750    0.006630      42093701
19980331   103.87500   -0.005386      80624703    52.25000   -0.082327      35424500
19980430   115.87500    0.115523      87984302    55.75000    0.066986      20778600
```

3. Z data is printed on the Y-Axis. Items comprise the columns and rows are sported by Z items, then Y items.

```
                   Prc          Ret          Vol

12490 19980130    98.75000   -0.056153      96558840
12490 19980227   104.43750    0.059753      71176000
12490 19980331   103.87500   -0.005386      80624703
12490 19980430   115.87500    0.115523      87984302

43916 19980130    56.56250    0.523569      47322102
43916 19980227    56.93750    0.006630      42093701
43916 19980331    52.25000   -0.082327      35424500
43916 19980430    55.75000    0.066986      20778600
```

These three dimension assignments are required under the OPTIONS component.

Each OPTIONS component is comprised of three parts:

1 An OPTIONS heading row which identifies the component

2 The center row(s) which detail(s) the desired output options, and

3 The END row, which closes the OPTIONS component input information.

A summary of the OPTIONS component specification follows:

Heading Row:
```
OPTIONS
```

Center Row:
```
X type[,headers]|Y type[,headers]|Z type[,headers],zflag#
OUTNAME filename|REPNAME text|FIELDDELIM text|BUFSIZE #|NOFILL
CHARDELIM text|ROWDELIM #,#|DEFAULT #|COMPACT
```

End Row:
```
END
```

The following example contains the required X, Y, and Z axes specifications. Output will include columns with data for each ENTITY and rows with ITEMs and DATEs, sorted by ITEM, then DATE. The headers for all axes will be displayed in the report, since they have been omitted in this example, but are the default for each axis specification. *ts_print* will generate an output file named ts_samp3.dat (OUTNAME) into the working directory. The report will have a heading called Sample 6.

e.g.
```
OPTIONS
X ENTITY|Y DATE|Z ITEM,3|OUTNAME ts_samp3.dat|REPNAME Sample6
END
```

Report OPTIONS Keywords and Usage

Row and Column Assignment

X axis, Y axis, and Z axis assignments are mandatory, and must allocate ENTITY, ITEM and DATE to the graphical axes.

```
X type[,headers]|Y type[,headers]|Z type[,headers],zflag#
OUTNAME filename|REPNAME text|FIELDDELIM text|BUFSIZE #|NOFILL
CHARDELIM text|ROWDELIM #,#|DEFAULT #|COMPACT
```

type is used to assign data components to the axes. Type must be one of the keywords ENTITY, DATE, or ITEM. Each component must be assigned to exactly one axis.

headers — determines whether headers are written to the output file for the axis. If included they must be set to YES, to show column and row header, or NO, to hide them Header specification is included with each axis specification. The default is YES. The default header for an ENTITY is the PERMNO for a security and Permanent Index Identification Number (indno) for an index. The default header for a data ITEM is the item header listed in the Data Item Table at the end of the *ts_print* section. The default header for DATE is the YYYYMMDD date for absolute calendar ranges and relative period numbers for relative dates.

Z Flag # — Z-flag # controls how three-dimensional data is printed as two-dimensional output. It is a number, 1, 2, or 3, as described below.

1. X and Y table are repeated for each Z item.

```
12490
             Prc          Ret          Vol
19980130    98.75000   -0.056153      96558840
19980227   104.43750    0.059753      71176000
19980331   103.87500   -0.005386      80624703
19980430   115.87500    0.115523      87984302

43916
             Prc          Ret          Vol
19980130    56.56250    0.523569      47322102
19980227    56.93750    0.006630      42093701
19980331    52.25000   -0.082327      35424500
19980430    55.75000    0.066986      20778600
```

2. Z data is printed on the X-axis. Columns are sorted by Z items, then X items, and Y items comprise the rows.

```
             12490       12490        12490        43916       43916        43916
              Prc         Ret          Vol          Prc         Ret          Vol
19980130    98.75000   -0.056153      96558840    56.56250    0.523569      47322102
19980227   104.43750    0.059753      71176000    56.93750    0.006630      42093701
19980331   103.87500   -0.005386      80624703    52.25000   -0.082327      35424500
19980430   115.87500    0.115523      87984302    55.75000    0.066986      20778600
```

3. Z data is printed on the Y-Axis. Items comprise the columns and rows are sported by Z items, then Y times.

```
                    Prc          Ret          Vol

12490 19980130    98.75000   -0.056153      96558840
12490 19980227   104.43750    0.059753      71176000
12490 19980331   103.87500   -0.005386      80624703
12490 19980430   115.87500    0.115523      87984302

43916 19980130    56.56250    0.523569      47322102
43916 19980227    56.93750    0.006630      42093701
43916 19980331    52.25000   -0.082327      35424500
43916 19980430    55.75000    0.066986      20778600
```

— Performance for large datasets is greatly improved if ITEM is chosen for the X-axis, DATE is chosen for the Y-axis, ENTITY for the Z-axis, and zflag# is set to 1 or 3.

OUTPUT Options

OUTNAME - is the name of the file where the output will be stored. If OUTNAME is not specified, the data will dump to the screen.

REPNAME - is a text description that will be placed at the top of the report.

NOFILL - rows outside an issue's date range or the user's date specification will not print to the output file. NOFILL is only applicable if ITEM is chosen for the X axis, DATE for the Y axis, and ENTITY for the Z axis, and zflag# is 1 or 3, and the DATE specification is RANGE. NOFILL does not work with RELATIVE dates.

FIELDDELIM text -is a specified character string that will be placed as a delimiter between fields in output file rows. The default is to use no field delimiter. Special predefined characters S (for space) or P (for |) and C (for comma) can be used.

BUFSIZE # - is the size of memory that will be allocated by the program. In a large study, the program will save intermediate data in a temporary file, and this can degrade performance severely. If memory is available on your system, you can use the BUFSIZE option to increase the size of the internal buffer. The program will report the necessary buffer size needed if the BUFSIZE option can improve performance. Switching axes can also be used to improve performance for large datasets.

CHARDELIM text- is a character string placed before and after all character string fields in output file rows. The default is no character string delimiter.

ROWDELIM #,#- controls the number of rows between output lines. The first integer is the number blank lines between rows when the z-axis value changes when the z-axis data is printed in rows. The second integer is the number of blank lines between all data rows .

DEFAULT - 1 sets output header options to YES and FIELDDELIM to a space.

COMPACT - creates compact output by removing all spaces and trailing decimal zeros in numbers. The field delimiter is automatically set to "1" if not set with FIELDDELIM, and the row delimiters are set to produce no blank lines if not already set with ROWDELIM. COMPACT is ideal for producing output to be loaded into another program.

Note: The row detailing the functionality of a single option must wrap. Different keywords can be on separate lines, but the last keyword on a line cannot end with a pipe character, and the beginning of a line must be a keyword.

2.2 Running *ts_print* from a command line window

At the command line, type `ts_print filename` where `filename` is your request file name. Make sure that you are in the directory containing the request file from or specify the full path of the request file. The request file is a user-created text file containing the desired specifications for each component and is used to process the *ts_print* application. Note that Unix is case-sensitive and names must be typed exactly as is.

i.e. `ts_print filename`

The output can be controlled in one of three ways:

1 The `OUTNAME` (output file name) option in the `OPTIONS` component of the request file.

2. If an optional third parameter on the command line is present, it is used as a file name. For example, if you typed

   ```
   ts_print sample.txt finsamp.out
   ```

   on the command line, it would write the output to `finsamp.out`.

3. If neither of the above options exist, the output is printed to the terminal (standard output).

When the prompt returns, *ts_print* has generated the specified output. If it returns an error message, revise your input file accordingly. The content of the error message should indicate what component you will need to revise to successfully run *ts_print*. The files default to the current directory that you are working in. If you want them in a specific directory, you will need to either work from that directory, specify file names with full path information, or move the files when you are done. You must have write access to the output directory. For further data manipulation, these files can be edited with a text editor, or imported into a statistical package, a spreadsheet, or a database environment.

The sample below processes a request file named `sample.txt` which extracts prices, volumes, returns, and shares for PERMNO 12490 reported weekly in January 1995 with items on the X-axis, and entity and date on the Y-axis.

```
ENTITY
LIST|PERMNO 12490|ENTFORMAT 3
END
ITEM
ITEMID prc
ITEMID vol
ITEMID ret
ITEMID shr
END
DATE
CALNAME weekly|ABSOLUTE 19950101-19950201|CALFORMAT 4
END
OPTIONS
X ITEM,YES|Y DATE,YES|Z ENTITY,YES,1|OUTNAME finsamp.out|REPNAME Sample One
END
```

Following is the output from **`sample.txt`**.

```
Sample One


IBM
              Prc         Vol         Ret       Shr
01|06|1995   75.12500      8474000   0.022109   587172
01|13|1995   76.37500     11890300   0.016639   587172
01|20|1995   75.37500     11202200  -0.013093   587172
01|27|1995   72.50000     16767301  -0.038143   587172
```

Sample Reports

Four sample request files are provided with the data in the CRSP_LIB directory. These can be run directly, or copied and used as templates for other reports. The examples assume a daily CRSPAccess database is available. Add an "m" before the data items if only a monthly database is available. To run the first example, ts_samp1.txt, use one of the following commands:

ts_print %crsp_lib%ts_samp1.txt (Windows)
ts_print $CRSP_LIB/ts_samp1.txt (Unix)
ts_print CRSP_LIB:ts_samp1.txt (OpenVMS)

Note that the original release of the Getting Started CD included different examples. The versions included here are available for download through our Technical Support page from www.crsp.com.

The request file below, ts_samp1.txt, retrieves prices, returns, and volumes for PERMNOs 12490 (IBM Corporation, Inc.) and 43916 (Digital Equipment Corp.), using the CRSP daily file, reporting results on a monthly basis with a relative date range 2 months before and 1 month after the EVDATEs (event dates) respectively set to January 1, 1970 and January 1, 1980 in the OUTNAME (output report file), ts_samp1.dat. The ENTFORMAT (entity header) is CUSIP, entities are on the X-axis, items and dates on the Y-axis.

The request file **ts_samp1.txt** contains:

```
#  input is two permnos and event dates in this file
#
#  output is monthly result of daily data for the months 2 months before the
#  event to 1 month after the event.  Returns are compounded over the month
#  and volumes are cumulative raw volumes.  Output is columns for the two
#  permnos labeled by CUSIP and a data section for each item.
#-------------------------------------------------------------------------
ENTITY
LIST|PERMNO 12490|EVDATE 19700101|ENTFORMAT 2
LIST|PERMNO 43916|EVDATE 19800101|ENTFORMAT 2
END
ITEM
ITEMID prc
ITEMID ret
ITEMID vol
END
DATE
CALNAME monthly|RELATIVE -2,1
END
OPTIONS
X ENTITY|Y DATE|Z ITEM,3|OUTNAME ts_samp1.dat|REPNAME Sample1|DEFAULT 1
END
```

The following report is **ts_samp1.dat**, the output from the request file above.

```
Sample 1

Prc
     45920010     25384910
-2    357.00000     67.62500
-1    364.50000     68.87500
 0    335.25000     72.87500
 1    340.25000     75.37500

Ret
     45920010     25384910
-2    -0.006962     0.095142
-1     0.021008     0.018484
 0    -0.080247     0.058076
 1     0.018510     0.034305

Vol
       45920010     25384910
-2       417000      1614200
-1       578300      1292700
 0       789600      3798600
 1       615100      2202200
```

The second sample, `ts_samp2.txt`, uses a predefined input file,`ts_list.txt,` of `PERMNOs` and event dates. The request and input files must be copied to the default directory from `CRSP_LIB` before running. The sample produces a pipe-delimited output file named `ts_samp2.dat` in the default directory. It produces daily event output for the issues in the input file, with `ITEMs` across, `DATE` and `ENTITIES` down. Items include the calendar date, PERMNO, returns, prices, volumes and the NYSE/AMEX Nasdaq Value-Weighted Index on event dates specified in the input file.

The request file **ts_samp2.txt** contains

```
#  input file contains permno and event date delimited by semicolon
#
#  output is pipe-delimited data with no headers except the event day,
#  sorted by permno then date with data items across.  Event days
#  with no available data for the security do not appear in the output.
#  Returns for the NYSE/AMEX/Nasdaq Value-Weighted Index on the event
#  dates are added as an additional data item.
# ------------------------------------------------------------------
ENTITY
LIST|FILE ts_list.txt,F2DL;PED1
END
ITEM
ITEMID caldt
ITEMID permno
ITEMID ret
ITEMID prc
ITEMID vol
ITEMID indtret|SUBNO 1000080
END
DATE
CALNAME daily|RELATIVE -2,1
END
OPTIONS
X ITEM,NO|Y DATE,YES|Z ENTITY,NO,3|OUTNAME ts_samp2.dat
FIELDDELIM p|ROWDELIM 0,0|NOFILL
END
```

The input file, **ts_list.txt** contains:

```
12490;19700101
43916;19800101
```

The output file **ts_samp2.dat** contains

```
-2| 19691230|   12490|   0.003489|  359.50000|        19400|   0.004124
-1| 19691231|   12490|   0.013908|  364.50000|        29200|   0.006069
 0| 19700102|   12490|   0.000686|  364.75000|        15800|   0.012138
 1| 19700105|   12490|   0.009596|  368.25000|        21200|   0.006375
-2| 19791228|   43916|   0.001848|   67.75000|        32200|   0.000610
-1| 19791231|   43916|   0.016605|   68.87500|        17200|   0.000983
 0| 19800102|   43916|  -0.047187|   65.62500|        45800|  -0.020096
 1| 19800103|   43916|  -0.009524|   65.00000|       265800|  -0.006510
```

The third sample, `ts_samp3.txt`, prints quarterly capital appreciation returns for a single issue plus returns on the Standard and Poors 500 Composite Index.

Request file **`ts_samp3.txt`** contains

```
Sample 3

Cumaret
           12490     1000502
19960329   0.217510   0.048009
19960628   0.083447   0.088809
19960930   0.362517   0.115922
19961231   0.658003   0.202637
19970331   0.502052   0.229231
19970630   0.975376   0.437079
19970930   1.320109   0.537967
19971231   1.290014   0.575552
19980331   1.273598   0.788759
19980630   1.512996   0.840859
19980930   1.812585   0.651243
19981231   3.035568   0.995730
```

Output file **`ts_samp3.dat`** contains

```
Sample 3

Cumaret
           12490     1000502
19960329   0.217510   0.048009
19960628   0.083447   0.088809
19960930   0.362517   0.115922
19961231   0.658003   0.202637
19970331   0.502052   0.229231
19970630   0.975376   0.437079
19970930   1.320109   0.537967
19971231   1.290014   0.575552
19980331   1.273598   0.788759
19980630   1.512996   0.840859
19980930   1.812585   0.651243
19981231   3.035568   0.995730
```

The fourth sample, `ts_samp4.txt`, prints results of a user-defined portfolio.

Request file **`ts_samp4.txt`** contains

```
#   input is a permlist
#
#   output is the count, weight and value-weighted return of the portfolio
#   for December 1998, with items across and dates down
# ------------------------------------------------------------------------
#
ENTITY
PORT|FILE ts_list4.txt,F2DLSPE|WEIGHT value_weight
END
ITEM
ITEMID cnt|SUBNO 1
ITEMID weight|FORMAT 12
ITEMID ret
END
DATE
CALNAME daily|RANGE 199812
END
OPTIONS
X ITEM,NO|Y DATE,YES|Z ENTITY,NO,3|OUTNAME ts_samp4.dat
FIELDDELIM S|ROWDELIM 0,0
END
```

Sub-input file **`ts_list4.txt`**

```
12490
10107
10401
10104
```

Output file **`ts_samp4.dat`** contains

The four components required to be in the input file, `ENTITY`, `ITEM`, `DATE`, and `OPTIONS`, are each detailed in the following section.

```
19981201      4    601802888    0.042458
19981202      4    627354528   -0.014932
19981203      4    617986632   -0.026945
19981204      4    601334752    0.029170
19981207      4    618875600    0.033239
19981208      4    639446188   -0.003432
19981209      4    637251488    0.024663
19981210      4    652968060   -0.016628
19981211      4    642110418    0.014596
19981214      4    651482952   -0.034807
19981215      4    628806612    0.024428
19981216      4    644167224    0.005842
19981217      4    647930644    0.012263
19981218      4    655876312    0.023917
19981221      4    671562856    0.019197
19981222      4    684454776   -0.000447
19981223      4    684148592    0.029299
19981224      4    704193672   -0.004372
19981228      4    701114840    0.008756
19981229      4    707254052    0.002524
19981230      4    708442752   -0.012362
19981231      4    699685176   -0.007846
```

2.3 *ts_print* Data Items Tables

ts_print Daily Items

Item Name	Item Header	ITEMID	SUBNO	GROUPID	format	Entity Type		
Ask Adjusted, End of Period	Adjask	adjask	0	adjqdata	%11.5f	list		
Ask Adjusted, Last Available Nonmissing	Adjaskprev	adjask	1	adjqdata	%11.5f	list		
Ask, End of Period	Ask	ask	0	qdata	%11.5f	list		
Ask, Last Available Nonmissing	Askprev	ask	1	qdata	%11.5f	list		
Askhi Adjusted, End of Period	Adjaskhi	adjaskhi	0	adjdata	%11.5f	list		
Askhi Adjusted, Last Available Nonmissing	Adjaskhiprev	adjaskhi	1	adjdata	%11.5f	list		
Askhi, End of Period	Askhi	askhi	0	ddata	%11.5f	list		
Askhi, Last Available Nonmissing	Askhiprev	askhi	1	ddata	%11.5f	list		
Associated Index Returns	Indtret	indtret	INDNO	indrets	%11.6f	list	index	
Associated Index Returns on Income	Indiret	indiret	INDNO	indrets	%11.6f	list	index	
Associated Index Returns on Income, Cumulative	Cumindiret	cumindiret	INDNO	cumindrets	%11.6f	list		
Associated Index Returns Without Dividends	Indaret	indaret	INDNO	indrets	%11.6f	list	index	
Associated Index Returns Without Dividends, Cumulative	Cumindaret	cumindaret	INDNO	cumindrets	%11.6f	list		
Associated Index Returns, Cumulative	Cumindtret	cumindtret	INDNO	cumindrets	%11.6f	list		
*Associated Portfolios Returns	Porttret	porttret	PORTTYPE	portrets	%11.6f	list		
*Associated Portfolios Returns on Income	Portiret	portiret	PORTTYPE	portrets	%11.6f	list		
*Associated Portfolios Returns Without Dividends	Portaret	portaret	PORTTYPE	portrets	%11.6f	list		
Bid Adjusted, End of Period	Adjbid	adjbid	0	adjqdata	%11.5f	list		
Bid Adjusted, Last Available Nonmissing	Adjbidprev	adjbid	1	adjqdata	%11.5f	list		
Bid, End of Period	Bid	bid	0	qdata	%11.5f	list		
Bid, Last Available Nonmissing	Bidprev	bid	1	qdata	%11.5f	list		
Bidlo Adjusted, End of Period	Adjbidlo	adjbidlo	0	adjdata	%11.5f	list		
Bidlo Adjusted, Last Available Nonmissing	Adjbidloprev	adjbidlo	1	adjdata	%11.5f	list		
Bidlo, End of Period	Bidlo	bidlo	0	ddata	%11.5f	list		
Bidlo, Last Available Nonmissing	Bidloprev	bidlo	1	ddata	%11.5f	list		
Capitalization, End of Period	Cap	cap	0	inddata	%15.5lf	list	index	
Capitalization, End of Previous Period	Cape	cap	1	inddata	%15.5lf	list	index	
Company Name, End of Period	Company Name	comnam	0	names	%-32.32s	list		
Company Name, End of Previous Period	Effective Name	comnam	1	names	%-32.32s	list		
*CUSIP, End of Period	NCUSIP	ncusip	2	names	%-8.8s	list		
*CUSIP, End of Previous Period	NCUSIPE	ncusip	0	names	%-8.8s	list		
CUSIP, Header	CUSIP	cusip	0	headid	%-8.8s	list		
*CUSIP, Most	NCUSIPL	ncusip	0	names	%-8.8s	list		
Date	Caldt	caldt	1	caldt	%9d	list		
Dividend Amount	Divamt	divamt	0	dists	%11.6f	list		
Dividend Amount, Ordinary	Odivamt	odivamt	2	dists	%11.6f	list		
Excess Returns on Income vs. Associated Portfolios	Portxsiret	portxsiret	0	portxsrets	%11.6f	list	index	
Excess Returns on Income vs. Associated Portfolios, Cumulative	Cumxspiret	cumxspiret	0	cumxsprets	%11.6f	list		
Excess Returns on Income vs. Index Series	Xsiret	xsiret	0	xsrets	%11.6f	list		
Excess Returns on Income vs. Index Series, Cumulative	Cumxsiret	cumxsiret	PORTTYPE	cumxsrets	%11.6f	list		
*Excess Returns on Trade-only Prices vs Associated Portfolios, Cumulative	Cumxstoret	cumxstoret	PORTTYPE	cumxsrets	%11.6f	list		

Item Name	Item Header	ITEMID	SUBNO	GROUPID	format	Entity Type		
*Excess Returns on Trade-only Prices vs. Associated Portfolios	Portxstoret	portxstoret	INDNO	portxsrets	%11.6f	list		
*Excess Returns on Trade-only Prices vs. Index Series	Xstoret	xstoret	INDNO	xsrets	%11.6f	list		
Excess Returns vs. Associated Portfolios	Portxstret	portxstret	INDNO	portxsrets	%11.6f	list		
Excess Returns vs. Associated Portfolios, Cumulative	Cumxsptret	cumxsptret	PORTTYPE	cumxsprets	%11.6f	list		
Excess Returns vs. Index Series	Xstret	xstret	INDNO	xsrets	%11.6f	list		
Excess Returns vs. Index Series, Cumulative	Cumxstret	cumxstret	PORTTYPE	cumxsrets	%11.6f	list		
Excess Returns Without Dividends vs. Associated Portfolios	Portxsaret	portxsaret	0	portxsrets	%11.6f	list		
Excess Returns Without Dividends vs. Associated Portfolios, Cumulative	Cumxsparet	cumxsparet	INDNO	cumxsprets	%11.6f	list		
Excess Returns Without Dividends vs. Index Series	Xsaret	xsaret	INDNO	xsrets	%11.6f	list		
Excess Returns Without Dividends vs. Index Series, Cumulative	Cumxsaret	cumxsaret	PORTTYPE	cumxsrets	%11.6f	list		
Exchange Code, End of Period	EX	exchcd	PORTTYPE	names	%2d	list		
Exchange Code, End of Previous Period	EXE	exchcd	INDNO	names	%2d	list		
Exchange Code, Most Recent	EXL	exchcd	INDNO	names	%2d	list		
Factor to Adjust Price in Period	Facpr	facpr	0	dists	%11.6f	list		
Highest Close	High	high	1	sdata	%11.5f	list		
Index Level of Returns	Tind	tind	2	indres	%11.5f	list		
Index Level of Returns on Income	Iind	iind	0	indres	%11.5f	list		
Index Level of Returns Without Dividends	Aind	aind	0	indres	%11.5f	list		
Lowest Close	Low	low	0	sdata	%11.5f	list	index	port
Member Portfolio Returns on Income, Cumulative	Cumpiret	cumpiret	1	cumprets	%11.6f	list	index	port
Member Portfolio Returns Without Dividends, Cumulative	Cumparet	cumparet	0	cumprets	%11.6f	list	index	
Member Portfolio Returns, Cumulative	Cumptret	cumptret	0	cumprets	%11.6f	list	index	
NASDAQ Company Number	Compno	compno	0	headid	%8d	list	index	
NASDAQ Index Code, End of Period	Nsdinx	nsdinx	0	nasdin	%2d	list		
NASDAQ Index Code, End of Previous Period	Nsdinxe	nsdinx	PORTTYPE	nasdin	%2d	list		
NASDAQ Index Code, Most Recent	Nsdinxl	nsdinx	PORTTYPE	nasdin	%2d	list		
NASDAQ Market Makers, End of Period	Mmcnt	mmcnt	PORTTYPE	nasdin	%4d	list		
NASDAQ Market Makers, End of Previous Period	Mmcnte	mmcnt	0	nasdin	%4d	list		
NASDAQ Market Makers, Most Recent	Mmcntl	mmcnt	0	nasdin	%4d	list		
NASDAQ National Market Indicator, End of Period	Nmsind	nmsind	1	nasdin	%2d	list		
NASDAQ National Market Indicator, End of Previous Period	Nmsinde	nmsind	2	nasdin	%2d	list		
NASDAQ National Market Indicator, Most Recent	Nmsindl	nmsind	0	nasdin	%2d	list		
NASDAQ Status Code, End of Period	Trtscd	trtscd	1	nasdin	%2d	list		
NASDAQ Status Code, End of Previous Period	Trtscde	trtscd	2	nasdin	%2d	list		
NASDAQ Status Code, Most Recent	Trtscdl	trtscd	0	nasdin	%2d	list		
Number of Trades	Numtrd	numtrd	1	qdata	%9d	list		
PERMCO/INDCO	PERMCO	permco	2	headid	%8d	list		
PERMNO/INDNO	PERMNO	permno	0	headid	%8d	list		
Portfolio Assignment	Port	port	1	ports	%4d	list		

Item Name	Item Header	ITEMID	SUBNO	GROUPID	format	Entity Type		
Portfolio Statistic	Portstat	portstat	2	ports	%15.5lf	list		
Price Adjusted, End of Period	Adjprc	adjprc	0	adjdata	%11.5f	list		
Price Adjusted, Last Available Nonmissing	Adjtprcprev	adjprc	0	adjdata	%11.5f	list	index	
Price Adjusted, Last Available Nonmissing	Adjtprcprev	adjprc	0	adjdata	%11.5f	list	index	
Price, End of Period	Prc	prc	PORTTYPE	ddata	%11.5f	list	index	
Price, Last Available Nonmissing	Prcprev	prc	PORTTYPE	ddata	%11.5f	list		
*Price, Trade-only, End of Period	Tprc	tprc	0	ddata	%115f	list		
*Price, Trade-only, Last Available Nonmissing	Tprcprev	tprc	1	ddata	%115f	list		
Returns	Ret	ret	0	ddata	%11.6f	list		
Returns on Income	Reti	reti	1	rdata	%11.6f	list		
Returns on Income, Cumulative	Cumiret	cumiret	0	cumrets	%11.6f	list		
*Returns on Trade-only Prices	Toret	toret	1	ddata	%11.6f	list		
Returns Without Dividends	Retx	retx	0	rdata	%11.6f	list	index	port
Returns Without Dividends, Cumulative	Cumaret	cumaret	0	cumrets	%11.6f	list	index	
*Returns without Dividends, Trade-only Prices	Toretx	toretx	0	ddata	%11.6f	list	index	
Returns, Cumulative	Cumtret	cumtret	0	cumrets	%11.6f	list		
Share Class, End of Period	CL	shrcls	0	names	%-1.1s	list	index	
Share Class, End of Previous Period	CLE	shrcls	0	names	%-1.1s	list	index	
Share Class, Most Recent	CLL	shrcls	0	names	%-1.1s	list		
Share Type Code, End of Period	SC	shrcd	0	names	%3d	list	index	
Share Type Code, End of Previous Period	SCE	shrcd	0	names	%3d	list		
Share Type Code, Most Recent	SCL	shrcd	1	names	%3d	list		
Shares Outstanding	Shr	shr	2	shares	%9d	list		
Shares Outstanding, Adjusted	Adjshr	adjshr	0	adjdata	%9d	list		
Shares Outstanding, Adjusted, Unadjusted for Rights	Adjshrxr	adjshr	1	adjdata	%9d	list		
Shares Outstanding, Unadjusted for Rights	Shrxr	shr	2	shares	%9d	list		
SIC Code, End of Period	SIC	siccd	0	names	%4d	list		
SIC Code, End of Previous Period	SICE	siccd	0	names	%4d	list		
SIC Code, Most Recent	SICL	siccd	1	names	%4d	list		
Ticker, End of Period	Ticker	ticker	1	names	%-5.5s	list		
Ticker, End of Previous Period	Tickere	ticker	0	names	%-5.5s	list		
Ticker, Most Recent	Tickerl	ticker	1	names	%-5.5s	list		
*Trade Only Price Adjusted, End of Period	Adjtprc	adjtprc	2	adjdata	%11.5f	list		
*Trade Only Price Adjusted, Last Available Nonmissing	Adjtprcprev	adjtprc	0	adjdata	%11.5f	list		
*Trade Only Price Adjusted, Last Available Nonmissing	Adjtprcprev	adjtprc	1	adjdata	%11.5f	list		
Volume, Average	Volavg	volavg	2	sdata	%9d	list		
Volume, Median	Volmed	volmed	0	sdata	%9d	list		
Volume, Total	Vol	vol	1	ddata	%11.0f	list		
Volume, Total Adjusted	Adjvol	adjvol	0	adjdata	%9d	list		
*Weight Summation for the Members of a Portfolio	Weight	weight	0	weight	%11.2f	list		

* New Data Item

ts_print Monthly Items

Item Name	Item Header	ITEMID	SUBNO	GROUPID	Format	Entity Type		
Ask Adjusted, End of Period	Adjask	madjask	0	madjqdata	%11.5f	list		
Ask Adjusted, Last Available Nonmissing	Adjaskprev	madjask	1	madjqdata	%11.5f	list		
Ask, End of Period	Ask	mask	0	mqdata	%11.5f	list		
Ask, Last Available Nonmissing	Askprev	mask	1	mqdata	%11.5f	list		
Associated Index Returns	Indtret	mindtret	0	mindrets	%11.6f	list		
Associated Index Returns on Income	Indiret	mindiret	1	mindrets	%11.6f	list		
Associated Index Returns on Income, Cumulative	Cumindiret	mcumindiret	0	mcumindrets	%11.6f	list		
Associated Index Returns Without Dividends	Indaret	mindaret	1	mindrets	%11.6f	list		
Associated Index Returns Without Dividends, Cumulative	Cumindaret	mcumindaret	INDNO	mcumindrets	%11.6f	list		
Associated Index Returns, Cumulative	Cumindtret	mcumindtret	INDNO	mcumindrets	%11.6f	list		
Associated Portfolios Returns	Porttret	mporttret	INDNO	mportrets	%11.6f	list		
Associated Portfolios Returns on Income	Portiret	mportiret	INDNO	mportrets	%11.6f	list		
Associated Portfolios Returns Without Dividends	Portaret	mportaret	INDNO	mportrets	%11.6f	list		
Bid Adjusted, End of Period	Adjbid	madjbid	INDNO	madjqdata	%11.5f	list		
Bid Adjusted, Last Available Nonmissing	Adjbidprev	madjbid	PORTTYPE	madjqdata	%11.5f	list		
Bid, End of Period	Bid	mbid	PORTTYPE	mqdata	%11.5f	list		
Bid, Last Available Nonmissing	Bidprev	mbid	PORTTYPE	mqdata	%11.5f	list		
Capitalization, End of Period	Cap	mcap	0	minddata	%15.5lf	list		
Capitalization, End of Previous Period	Cape	mcap	1	minddata	%15.5lf	list		
Company Name, End of Period	Company Name	mcomnam	0	mnames	%-32.32s	list		
Company Name, End of Previous Period	Effective Name	mcomnam	1	mnames	%-32.32s	list		
Company Name, Most Recent	Last Company Name	mcomnam	0	mnames	%-32.32s	list		
*CUSIP, End of Period	NCUSIP	mncusip	1	mnames	%-8.8s	list		
*CUSIP, End of Previous Period	NCUSIPE	mncusip	0	mnames	%-8.8s	list		
CUSIP, Header	CUSIP	mcusip	1	mheadid	%-8.8s	list		
*CUSIP, Most	NCUSIPL	mncusip	0	mnames	%-8.8s	list	index	
Date	Caldt	mcaldt	1	mcaldt	%9d	list	index	
Dividend Amount	Divamt	mdivamt	0	mdists	%11.6f	list		
Dividend Amount, Ordinary	Odivamt	modivamt	1	mdists	%11.6f	list		
Excess Returns on Income vs. Associated Portfolios	Portxsiret	mportxsiret	2	mportxsrets	%11.6f	list		
Excess Returns on Income vs. Associated Portfolios, Cumulative	Cumxspiret	mcumxspiret	0	mcumxsprets	%11.6f	list		
Excess Returns on Income vs. Index Series	Xsiret	mxsiret	0	mxsrets	%11.6f	list		
Excess Returns on Income vs. Index Series, Cumulative	Cumxsiret	mcumxsiret	0	mcumxsrets	%11.6f	list		
Excess Returns vs. Associated Portfolios	Portxstret	mportxstret	1	mportxsrets	%11.6f	list		
Excess Returns vs. Associated Portfolios, Cumulative	Cumxsptret	mcumxsptret	0	mcumxsprets	%11.6f	list		
Excess Returns vs. Index Series	Xstret	mxstret	2	mxsrets	%11.6f	list		
Excess Returns vs. Index Series, Cumulative	Cumxstret	mcumxstret	0	mcumxsrets	%11.6f	list	index	
Excess Returns Without Dividends vs. Associated Portfolios	Portxsaret	mportxsaret	0	mportxsrets	%11.6f	list		
Excess Returns Without Dividends vs. Associated Portfolios, Cumulative	Cumxsparet	mcumxsparet	0	mcumxsprets	%11.6f	list		

Item Name	Item Header	ITEMID	SUBNO	GROUPID	Format	Entity Type		
Excess Returns Without Dividends vs. Index Series	Xsaret	mxsaret	PORTTYPE	mxsrets	%11.6f	list		
Excess Returns Without Dividends vs. Index Series, Cumulative	Cumxsaret	mcumxsaret	PORTTYPR	mcumxsrets	%11.6f	list		
Exchange Code, End of Period	EX	mexchcd	INDNO	mnames	%2d	list		
Exchange Code, End of Previous Period	EXE	mexchcd	INDNO	mnames	%2d	list	index	
Exchange Code, Most Recent	EXL	mexchcd	PORTTYPE	mnames	%2d	list		
Factor to Adjust Price in Period	Facpr	mfacpr	PORTTYPE	mdists	%11.6f	list		
Highest Close	High	mhigh	INDNO	msdata	%11.5f	list		
Index Level of Returns	Tind	mtind	INDNO	mindres	%11.5f	list	index	
Index Level of Returns on Income	Iind	miind	PORTTYPE	mindres	%11.5f	list		
Index Level of Returns Without Dividends	Aind	maind	PORTTYPE	mindres	%11.5f	list		
Lowest Close	Low	mlow	INDNO	msdata	%11.5f	list		
Member Portfolio Returns on Income, Cumulative	Cumpiret	mcumpiret	INDNO	mcumprets	%11.6f	list	index	
Member Portfolio Returns Without Dividends, Cumulative	Cumparet	mcumparet	0	mcumprets	%11.6f	list		
Member Portfolio Returns, Cumulative	Cumptret	mcumptret	1	mcumprets	%11.6f	list		
NASDAQ Company Number	COMPNO	mcompno	2	mheadid	%8d	list		
NASDAQ Index Code, End of Period	Nsdinx	mnsdinx	0	mnasdin	%2d	list		
NASDAQ Index Code, End of Previous Period	Nsdinxe	mnsdinx	0	mnasdin	%2d	list		
NASDAQ Index Code, Most Recent	Nsdinxl	mnsdinx	0	mnasdin	%2d	list	index	port
NASDAQ Market Makers, End of Period	Mmcnt	mmmcnt	1	mnasdin	%4d	list	index	port
NASDAQ Market Makers, End of Previous Period	Mmcnte	mmmcnt	INDNO	mnasdin	%4d	list	index	
NASDAQ Market Makers, Most Recent	Mmcntl	mmmcnt	0	mnasdin	%4d	list	index	
NASDAQ National Market Indicator, End of Period	Nmsind	mnmsind	0	mnasdin	%2d	list	index	
NASDAQ National Market Indicator, End of Previous Period	Nmsinde	mnmsind	0	mnasdin	%2d	list		
NASDAQ National Market Indicator, Most Recent	Nmsindl	mnmsind	PORTTYPE	mnasdin	%2d	list		
NASDAQ Status Code, End of Period	Trtscd	mtrtscd	PORTTYPE	mnasdin	%2d	list		
NASDAQ Status Code, End of Previous Period	Trtscde	mtrtscd	PORTTYPE	mnasdin	%2d	list		
NASDAQ Status Code, Most Recent	Trtscdl	mtrtscd	0	mnasdin	%2d	list		
PERMCO/INDCO	PERMCO	mpermco	0	mheadid	%8d	list		
PERMNO/INDNO	PERMNO	mpermno	1	mheadid	%8d	list		
Portfolio Assignment	Port	mport	2	mports	%4d	list		
Portfolio Statistic	Portstat	mportstat	0	mports	%15.5lf	list		
Price Adjusted, End of Period	Adjprc	madjprc	1	madjdata	%11.5f	list		
Price Adjusted, Last Available Nonmissing	Adjprcprev	madjprc	2	madjdata	%11.5f	list		
Returns on Income	Reti	mreti	0	mrdata	%11.6f	list		
Returns on Income, Cumulative	Cumiret	mcumiret	1	mcumrets	%11.6f	list		
Returns without Dividends	Retx	mretx	2	mrdata	%11.6f	list		
Returns without Dividends, Cumulative	Cumaret	mcumaret	0	mcumrets	%11.6f	list		
Returns, Cumulative	Cumtret	mcumtret	1	mcumrets	%11.6f	list		
Share Class, End of Period	CL	mshrcls	2	mnames	%-1.1s	list		
Share Class, End of Previous Period	CLE	mshrcls	0	mnames	%-1.1s	list	index	
Share Class, Most Recent	CLL	mshrcls	0	mnames	%-1.1s	list	index	

Item Name	Item Header	ITEMID	SUBNO	GROUPID	Format	Entity Type		
Share Type Code, End of Period	SC	mshrcd	PORTTYPE	mnames	%3d	list	index	
Share Type Code, End of Previous Period	SCE	mshrcd	PORTTYPE	mnames	%3d	list		
Share Type Code, Most Recent	SCL	mshrcd	0	mnames	%3d	list		
Shares Outstanding	Shr	mshr	1	mshares	%9d	list		
Shares Outstanding, Adjusted	Adjshr	madjshr	0	madjdata	%9d	list		
Shares Outstanding, Adjusted, Unadjusted for Rights	Adjshrxr	madjshr	1	madjdata	%9d	list		
Shares Outstanding, Unadjusted for Rights	Shrxr	mshr	0	mshares	%9d	list	index	port
SIC Code, End of Period	SIC	msiccd	0	mnames	%4d	list	index	
SIC Code, End of Previous Period	SICE	msiccd	0	mnames	%4d	list	index	
SIC Code, Most Recent	SICL	msiccd	0	mnames	%4d	list	index	
Ticker, End of Period	Ticker	mticker	0	mnames	%-5.5s	list	index	
Ticker, End of Previous Period	Tickere	mticker	0	mnames	%-5.5s	list	index	
Ticker, Most Recent	Tickerl	mticker	0	mnames	%-5.5s	list		
Volume, Average	Volavg	mvolavg	1	msdata	%9d	list		
Volume, Median	Volmed	mvolmed	2	msdata	%9d	list		
*Weight Summation for the Members of a Portfolio	Mweight	mweight	0	mweight	%11.2f	list		

* New Data Item

CHAPTER 3: *ts_print* INTERFACE FOR WINDOWS NT AND 98/95

OVERVIEW

This chapter contains instructions on how to use the *ts_print* GUI interface for Windows.

INSIDE

CHAPTER 3: *ts_print* INTERFACE FOR WINDOWS NT AND 98/95

ts_print is designed to extract CRSPAccess US equity and indices time series data. The *ts_print* interface creates and processes the request file. The request file is a text file containing specifications for the report or output data file. The output data file is in a delimited tabular text format and can be imported into spreadsheet or database programs for further processing.

The request file is created by completing and adding information in each of the four screens, the Entities screen, the Data Items screen, the Date screen and the Report Format screen.

Time series data is three-dimensional. Each data point refers to one or more issue index, or portfolio (`Entities` screen), a data item variable (`Data Items` screen), and a single date or a date range (`Date` screen). *ts_print* allows the user to define these three components and to control the appearance of the output with the fourth component (`Report Format` screen). The interface has one screen per component and these combined create a request file which specifies the content and format of the report.

ts_print is particularly useful for portfolio analysis and event studies. Time series data can be converted to different calendar frequencies, and header and event items can be mapped to a variable at each period in a time series. Header and event items are described in the CRSP Data Definitions and Coding Schemes Guide, available in Acrobat Adobe® format on line from www.crsp.com through the Database Guide link.

This section contains the following information:

- `Entities` screen specifications
- `Data Items` screen specifications
- `Date` screen specifications
- `Report Format` screen specification
- Process the *ts_print* request file
- Screen functionality
- Sample request files and output reports

3.1 *ts_print* Interface Screens

Screen 1: `Entities`

The `Entities` screen contains four buttons on the left side of the working area under the subheading `Entities`.

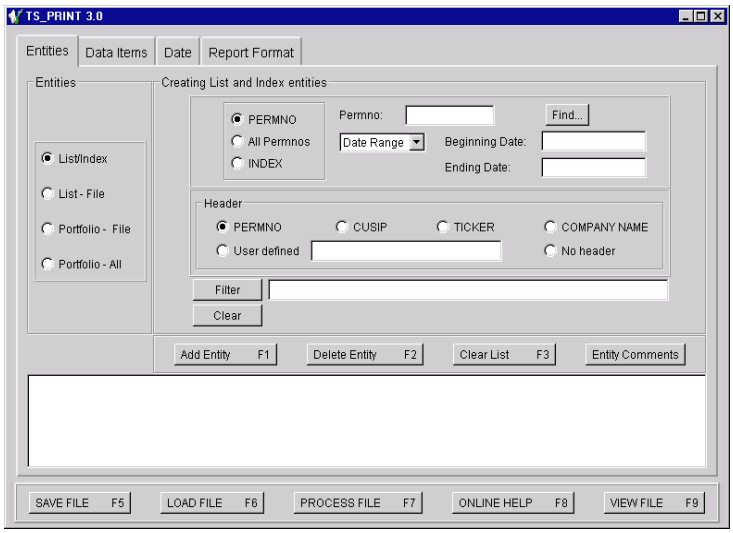
1 **List/Index -** When selecting specific securities or indices.

2 List - File - When using a predefined input file containing PERMNOs, event dates and user-defined headers.

3 Portfolio - File - When using a predefined input file containing specific security's PERMNOs, beginning and ending dates, weight and portfolio ID.

4 Portfolio - All - When using a value or equal weighted portfolio containing all issues in the CRSP database.

The `Entities` portion of the screen remains the same regardless of entity selection, but for each selection, the rest of the screen changes. This section defines the options available with each of the possible entity selections.



1. List/Index

The `List/Index` option, is selected by default. To the right of `Entities`, a section `Creating List and Index entities` contains specifications for each entity selected. Within this, PERMNOs and indices can be selected for the request file. This option with PERMNO is the screen default. One of three radio buttons may be chosen, `PERMNO`, `All PERMNOs` and `INDEX`. For each entity added, one entity type must be selected. Multiple entity types may be added to your request file. Note `list/index`, `All Permnos` and `Portfolios - All` may take a while to process and should not be added in the same request file with other entity selections. The specifications are as follows:

Creating List and Index entities

When `List/Index` is selected, three options, `PERMNO`, `All Permnos`, and `INDEX`, may be selected in Creating List and Index entities. These options are described in order below.

PERMNO

The first `List/Index` Entity option is `PERMNO`. If this button is selected, you are ready to define a list entity by typing the PERMNO in the `PERMNO` text box. If you do not know the desired PERMNO, you can find the PERMNO by clicking the `Find...` button.

Using the Find Button

The `Find...` button allows the user to search the header file for select issues by Company Name, PERMNO, Ticker or CUSIP. Company Name is the default. You may change these using the radio buttons to the right of the display box in the Find screen.

Search criteria, `Contains`, `Starts With`, `Ends With`, and `Exact Match`, may be selected using the dropdown menu in the upper left corner of the Find screen. `Contains` is the default search criteria.

Three default header options are available, `Company Name`, `Ticker`, and `CUSIP`. `Company Name` is the default.

These can be changed using the dropdown menu to the bottom right of the find screen. Click in the ENTITY HEADER check box in the Find screen if no header is desired.

Once you have specified search criteria, the item you wish to search by, and the desired header, enter your search string in the text box at the top of the screen and click on the Locate button. Possible results will show in the display box. Find the desired security in the display box, double click on it and you will be returned to the Entity screen.

Date Range or Event Date

An optional date range or an event date may be included for each entity. It can be either Date Range or Event Date. If Date Range is selected, beginning and ending dates should be entered into the corresponding boxes to the right of the date selection. If Event Date is selected, Beginning Date: should be added. Dates can be entered in YYYYMMDD, YYYYMM, or YYYY formats. This date must be compatible with the date used in the Date screen. Date Range should be used when using Fixed Date Range in the Date screen, and Event Date when using the Relative Date Range option in the Date screen. If the date entered into the Entities screen conflicts or is outside the range selected in the Date screen, the entities option selected here will be ignored.

Entity Header

Default and user-specified header options may be specified for the output file. These are located about 1/2 way down the screen. The header selected here, is the header used in the output report file when Yes is selected for the entity axis header in the Report Format screen. CRSP supports six options for the headers PERMNO, CUSIP, TICKER, COMPANY NAME, User Defined, and No header. More header options are available here than are when selecting the issue using the Find... button. These options may be added for the issue selected using the Find... button by clicking on the desired option prior to adding the entity. The user-defined header allows up to 20 characters and supports spaces. When using this option, type the desired header into the text box just to the right of the user defined radio button.

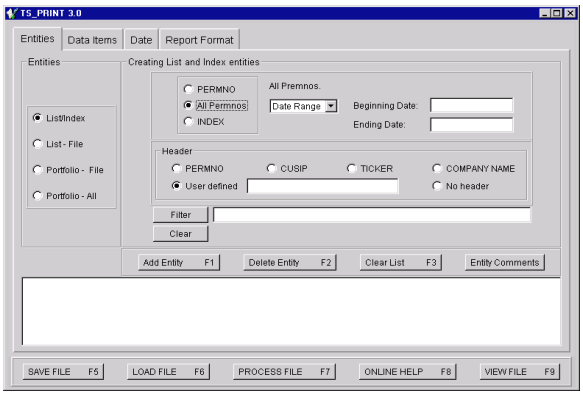
Filters

The filter options are not fully functional.

Add List/Index PERMNO to the Request File

Now that you have selected your security, possibly with entity options like added dates, and specified the desired output header for the issue, you are ready to add the entity to the request file. Click on the Add Entity (F1) to add the entity into the request file. Repeat the PERMNO process to add individual securities to the request file. Once you are finished adding the desired entities, click on either the Data Items, Date, or Report Format screen tabs to complete your request file.

All Permnos



The second `List/Index` Entity options is `All Permnos`. When this button is selected, all the issues in the CRSP stock database are included in your data request. If both daily and monthly stock data are available, data item selection will determine which database is used. This produces a large output file, and utilizes significant system resources to run. We do not recommend using this option by default.

Date Range or Event Date

An optional date range or an event date may be included for the issues. It can be either `Date Range` or `Event Date`. If `Date Range` is selected, beginning and ending dates should be entered into the corresponding boxes to the right of the date selection. If `Event Date` is selected, `Beginning Date:` should be added. Dates can be entered in YYYYMMDD, YYYYMM, or YYYY formats. This date must be compatible with the date used in the `Date` screen. `Date Range` should be used when using `Fixed Date Range` in the `Date` screen, and `Event Date` when using the `Relative Date Range` option in the `Date` screen. If the date entered into the Entities screen conflicts or is outside the range selected in the `Date` screen, the entities option selected here will be ignored. When using all securities in the file, you may wish to reduce unnecessary output by using the `NOFILL` option in the report output format in the `Report Format` screen. The `NOFILL` option ignores missing or unavailable data.

Entity Header

Default and user-specified header options may be included for the output file. These are located about 1/2 way down the `Entity` screen. The header selected here, is the header used in the output report file when Yes is selected for the entity axis header in the `Report Format` screen. CRSP supports six options for the headers `PERMNO`, `CUSIP`, `TICKER`, `COMPANY NAME`, `User Defined`, and `No header`. The user-defined header allows up to 20 characters and supports spaces, but is not recommended for use with the `All Permnos` option, because every issue in the file is then assigned the same output header. When using this option, type the desired header into the text box just to the right of the user defined radio button.

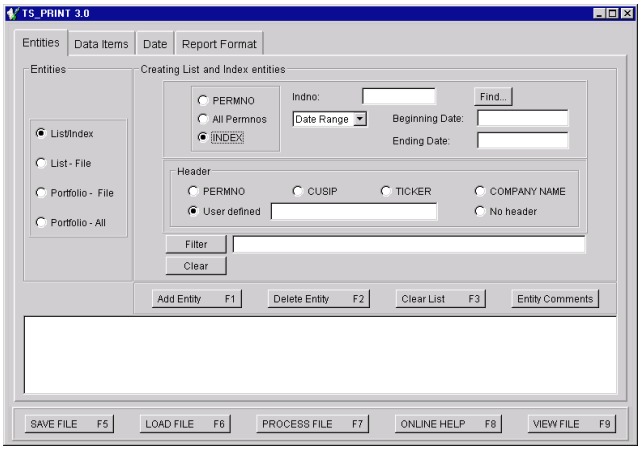
Filters

`Filter` options are not available for use with `All Permnos` in the interface.

Add List/Index ALL Permnos to the Request File

Now that you have selected `All Permnos`, perhaps added dates, and specified the desired output header, you are ready to add the entity to the request file. Click on the `Add Entity (F1)` to add the entity list option into the request file. Once you are finished adding the desired entities, click on either the `Data Items, Date,` or `Report Format` screen tabs to complete your request file to generate your report output file.

INDEX



The final `List/Index` Entity option is `INDEX`. This button lets you select an index entity. Either enter the *Permanent Index Identification Number* (`indno`), or if you do not know it, Click the `Find...` button to find the desired `indno`.

Using the Find Button

Using the `Find...` button allows the user to search the index header file for select issues daily or monthly by Index Name. The dropdown menu in the upper left corner of the screen allows you to select daily or monthly. The buttons on the left side of the `Find...` screen contain index groups. Each index option available for the selected group is listed in the text box on the right half of the `Find...` screen. To select an index, double click on it in the text box, and you will return to the `Entity` screen.

Date Range or Event Date

An optional date range or an event date may be included for each index. It can be either `Date Range` or `Event Date`. If `Date Range` is selected, beginning and ending dates should be entered into the corresponding boxes to the right of the date selection. If `Event Date` is selected, `Beginning Date:` should be added. Dates can be entered in YYYYMMDD, YYYYMM, or YYYY formats. This date must be compatible with the date used in the `Date` screen. `Date Range` should be used when using `Fixed Date Range` in the `Date` screen, and `Event Date` when using the `Relative Date Range` option in the `Date` screen. If the date entered into the `Entities` screen conflicts or is outside the range selected in the `Date` screen, the entities option selected here will be ignored.

Entity Header

Default and user-specified header options may be specified for the output file. These are located about 1/2 way down the screen. The header selected here, is the header used in the output report file when Yes is selected for the entity axis header in the `Report Format` screen. CRSP supports six options for the headers `PERMNO` (`indno` is used when `PERMNO` is selected), `CUSIP`, `TICKER`, `COMPANY NAME`, `User Defined`, and `No header`. The user-defined header allows up to 20 characters and supports spaces. When using this option, type the desired header into the text box just to the right of the user defined radio button.

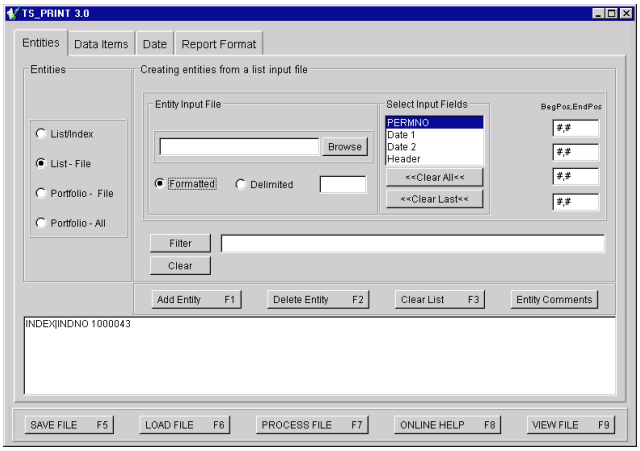
Filters

`Filters` are not available for use with `INDEX` in the interface.

Add List/Index INDEX to the Request File

Now that you have selected your index, perhaps added dates, and specified the desired output header you are ready to add the entity to the request file. Click on the `Add Entity (F1)` to add the entity into the request file. Repeat the process to add individual indices to the request file. Once you are finished adding the desired entities, click on either the `Data Items, Date,` or `Report Format` screen tabs to complete your request file to generate your report output file.

2. List - File



This button allows the user to include a predefined list entity input file for securities or indices.

The list entity input file cannot be created within the interface. You must create this file in a text editor or in another application and and save it as a text file.

Creating Entities from a list input file

The list entity input file must contain either PERMNOs or *Permanent Index Identification Numbers* (`indnos`), may contain an event date or a date range with beginning and ending dates, and an optional entity header or short description (up to 20 characters long) for the output file. Dates must be entered in YYYYMMDD format.

The list entity input file name, including full path must be inserted in the text box under the heading `Entity Input File`. If you are uncertain of the file name or location, use the `Browse` button to select the file. Within the `Browse` box, locate and highlight the desired file and click on `Open` and you will return to the `Entity` screen with the selected file in the text box.

When using the list entity input file, you need to inform the program of what options you have included in the file and where they physically are in the input file. This information is conveyed by using the `Formatted` and `Delimited` radio buttons beneath the text box containing the list entity input file name and path, described below. The PERMNO, event date or beginning and ending dates and header can be placed in any order in the list entity input file, but you must specify either the delimiter (`Delimited`) or the order of the item and identify the order and number of characters in the file (`Formatted`). When selecting entities, you can run the program including individual list entities (PERMNOs or *Permanent Index Identification Numbers* (`indnos`) with a list entity input file. All entities included in the request file are run for all the data items added in the `Data Items` screen.

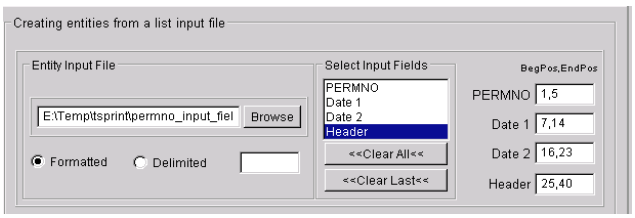
List Input Formatting Options

When `Formatted` is selected, the default option, you need to identify the character position of the options included. With the Formatted option you need to enter the character range in the `#,# Input Field Order` boxes, and then double click on the appropriate `Selection Input Fields` to correspond from top to bottom, with the `BegPos`, `EndPos` (beginning position and ending position) values just entered.

For example, if the first rows of your input file looks like this:

```
12490 19981201 19981231 IBM
10107 19981001 19981031 Microsoft Corp
```

Using the `Formatted` option, Select Input Fields on your screen would look like this:

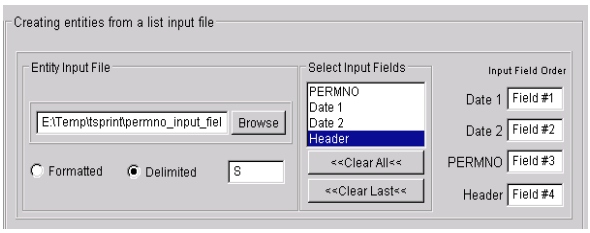


When `Delimited` is selected, you need to identify the delimiting character in the text box to the right of the `Delimited` radio button, and then enter the order of the information in the `input Field Order` boxes, by double clicking on the appropriate `Select Input Fields` to correspond from top to bottom, with the `Input Field Order` values.

Using the `Deliminted` option, the Select Input File looks like this:

```
19981201 19981231 12490 IBM
19981001 19981031 10107 Microsoft Corp
```

The Input Field fields on your screen would look like this:



Filters

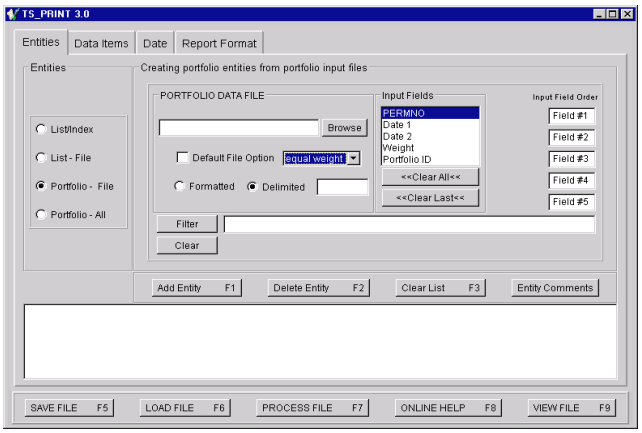
Filter functionality is not yet available.

Add List - File to the Request File

Once you have entered the complete file name and path of your list entity input file, and specified the input file layout with the `Formatted` or `Delimited` options, you are ready to add the entity to your request file. To add the entity Click on the `Add Entity (F1)` action button. When added, it will be visible in the display box of the screen. You may add other entity selections to your request file at this point, or complete the `Data Items`, `Date` and `Report Format` screens to complete your request file and generate your report output file.

3. Portfolio - File

This button allows you to define a portfolio using a predetermined or user created portfolio input file. Each Portfolio may contain an unlimited number of issues.



The portfolio input file cannot be created within the interface. You must create this file in a text editor or in another application and and save it as a text file.

Portfolio Weights

Four weights are supported, `equal weight`, `value weight`, `user weight`, and `user share`. See the Index Methodology section in the CRSP Data Definitions and Coding Schemes Guide for an explanation of the equal and value weighted index methodologies. The portfolio input files for equal and value weighted indices must contain PERMNOs and the portfolio identification numbers, 0-29. An input file for the equal and value weighted portfolios may contain up to 30 portfolios. The issues are allocated to portfolio by the portfolio identification numbers. `User weight` and `user share` portfolio's input files must contain PERMNOs, beginning date, ending date, weight or shares respectively, followed by the portfolio identification number, assuming that `Date Range` is selected in the `Date` screen. The `user weight` and `user share` portfolios may contain issues allocated for up to 200 portfolios (0-199 portfolio identification numbers) within each portfolio input file. In a `user weight` portfolio, the weight is proportional amongst the securities selected. A user share portfolio the user specified number of shares are multiplied by the closing price of the first day or month-end in the date range. If daily data is used, it is the first day. If monthly data is used it is month-end. User share portfolios are not rebalanced, and the same weight is applied every day or month-end. This is not equivalent to purchasing a specified number of shares and holding on to them through the date range. To effectively rebalance, each issue would need to be duplicated in the portfolio input file, and allocated to the same portfolio with date ranges entered for each desired rebalancing period.

The following sample portfolio input files contain the same issues allocated to same 3 portfolios for `equal weight` and `value weight` portfolios and for `user weight` and `user share` portfolios when a date range is used in the `Date` screen. The input file for equal and value weighted portfolios contain the PERMNO and the portfolio identification number, space delimited. The input files for user weight and share contain the PERMNO, beginning date, ending date, weight/shares, and portfolio identification number, space delimited.

Sample `equal weight` or `value weight` portfolio input file

```
12490 0
43916 0
10107 2
13311 1
14218 2
14593 1
63255 2
76597 2
81191 1
```

Sample `user weight` or `user share` portfolio input file

```
12490 19970101 19971231 100 0
43916 19961002 19971126 150 0
10107 19950204 19970910 200 2
13311 19970301 19971225 200 1
14218 19930101 19971231 260 2
14593 19960611 19970610 170 1
63255 19970201 19971121 130 2
76597 19950101 19971110 190 2
81191 19970201 19970517 500 1
```

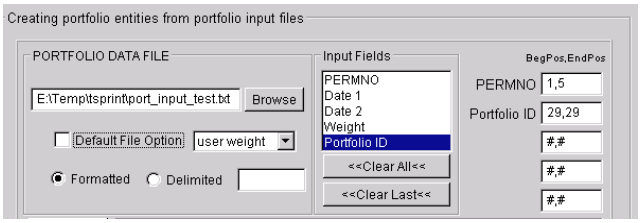
`Equal weight` and `value weight` portfolios support an event date when used with the `Relative Date Range` option. To utilize this, a date should be added to the `equal weight` or `value weight` portfolio input file. The first line of the above file would look like this: `12490 0 19970101`. With the input file in this format, the default option check box can be used with the `Fixed Date Range` option selected in the `Date` screen while formatting, the format specification of input fields, can be used with the `Relative Date Range` option. See `Date` Screen section for explanation of the date options.

In the PORTFOLIO DATA FILE text box, insert the portfolio input file using the full path and file name. If you are uncertain of the name or location, click on the Browse button, to select the file. Within the Browse box, locate and highlight the file and click on Open and you will return to the Entity screen with the selected file in the text box.

Portfolio Input File Formatting Specifications

Once the input file is selected you need to identify the portfolio input file's formatting. If you use the formats identified above, you may click on the Default File Option check box, and a space delimited input file with the above specifications is assumed. If your portfolio input file contains issues for only one portfolio, you do not need to include the portfolio identification number, but in this case you cannot use the Default File Option, and must specify the formatting by character position or by delimiter and identify the order and content of information in the portfolio input file. Formatting of the portfolio input is the same as formatting for the list entity input file. See page 46 for details on how to setup formatting for predetermined input files.

The sample user weight or user share file can be used as the input file for value weight and for equal weight using the formatting specifications, but not vise-versa. For example, the user weight/share weight sample input file can be used for value/equal weight as follows.



Note that when using Formatted with your portfolio input file, both beginning and ending position must be included and comma separated with beginning position listed first and ending position second.

Using the formatting options for your portfolio allows you to include either relative dates or date ranges.

Filters

Filter functionality is not yet available.

Headers

The default portfolio header in the output file is port#-# where the first # is the number of portfolio input files added, and the second # is the number of portfolios defined in each file. If only one portfolio is defined in the input file, the header is port#, without the number of portfolios within the portfolio input file.

Data Items Supported by Portfolio

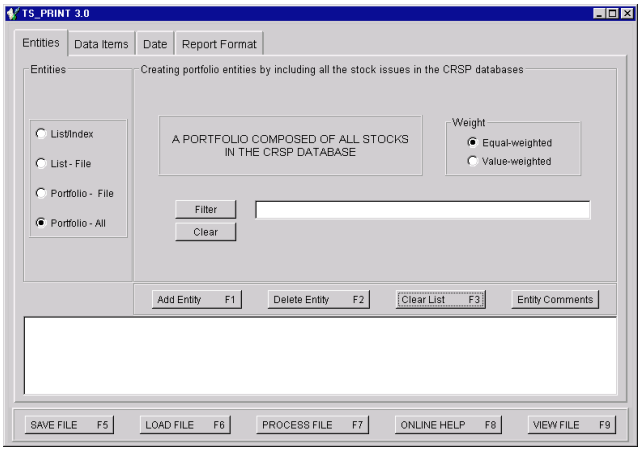
Portfolios support four data item options; Index Count Total, Index Count Used, Weight Summation for the Members of a Portfolio and Returns. The first 3 are located in the Others menu of the daily and monthly item IDs and returns are the first option listed under the Returns menu when using the Find button in the Data Items screen.

Add Portfolio - File to the Request File

To add your portfolio input file and entity options into the request file, click on the Add Entity (F1) action button just above the display box. When added, it will be visible in the display box of the screen. You may add other entity selections to your request file at this point, or complete the Data Items, Date and Report Format screens to complete your request file and generate your report output file.

Individual or list entities should not be run with portfolios due to data item limitations. Data item restrictions are not available.

4. Portfolio - All



When the `Portfolio - All` button is clicked, equal or value weighted portfolios can be run using all stocks in the daily or monthly database.

Filters

Filter functionality is not yet available.

Data Items Supported by Portfolio

Portfolios support four data item options; Index Count Total, Index Count Used, Weight Summation for the Members of a Portfolio and Returns. The first 3 are located in the `Others` menu of the daily and monthly item IDs and returns are the first option listed under the `Returns` menu when using the `Find` button in the `Data Items` screen.

Add Portfolio - All to the Request File

To add your portfolio input file and entity options into the request file, click on the `Add Entity (F1)` action button just above the display box. When added, it will be visible in the display box of the screen. You may add other entity selections to your request file at this point, or complete the `Data Items`, `Date` and `Report Format` screens to complete your request file and generate your report output file.

Note that individual or list entities should not be run with portfolios due to data item limitations. Data item restrictions are not available.

Delete Entity from the Request File

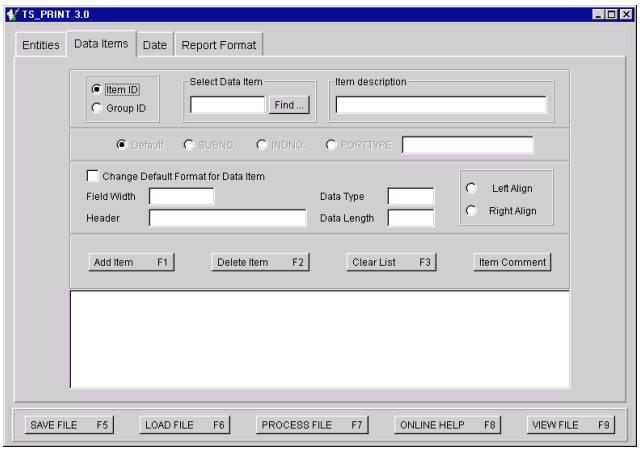
If you wish to remove an entity, you must select it and click on the `Delete Entity (F2)` button. To clear all entities added, click on the `Clear List (F3)` button.

Add an Entity Comment to the Request File

To add a comment in the request file you are building, click on `Entity Comments` and type your comments in the popup dialogue box. Do not include any hard returns in the dialogue box or *ts_print* will not be able to process your request file.

Be sure to completely enter data into all four screens to build your request file before processing the file to run *ts_print*. When entered, the data is visible in the display window of each screen in the *ts_print* interface.

Screen 2: Data Items



The Data Items tab contains the data content of the report. Each data item maps to the CRSP stock and indices variables directly and derived. The CRSP Data Definitions and Coding Schemes Guide includes the data items which are directly mapped in the Data Definition section.

Data items may be selected individually or from preset groups. To add individual data items in your request file, click on the Item ID button in the upper left portion of the working area of your screen. If you know the ITEMID of the *ts_print* data item, you may enter it in the Select Data Item text box. Item IDs can be found in the Data Items tables beginning on page 34. If you do not know the Item ID, click on the Find... action button, to locate the data item by name. Once you have clicked on Find... you will need to select Daily or Monthly, identifying the frequency of your database. If you subscribe to both the daily and monthly databases, select the database you wish to use. If you subscribe to daily-only or monthly-only data, you will need to select the appropriate menu to add data items. The daily and monthly menus each contain submenus, which in turn include the data items alphabetically by name. The submenus are organized by data type. In the following table, the data types are in bold face type, and the associated data items are listed below.

Individual Data Items, Daily and Monthly

Identification	
Company Name, End of Period	Company Name, End of Previous Period
Company Name, Most Recent	CUSIP, End of Period
CUSIP, End of Previous Period	CUSIP, Header
CUSIP, Most Recent	Exchange Code, End of Period
Exchange Code, End of Previous Period	Exchange Code, Most Recent
PERMCO/INDCO	PERMNO/INDNO
Share Class, End of Period	Share Class, End of Previous Period
Share Class, Most Recent	Share Type Code, End of Period
Share Type Code, End of Previous Period	Share Type Code, Most Recent
SIC Code, End of Period	SIC Code, End of Previous Period
SIC Code, Most Recent	Ticker, End of Period
Ticker, End of Previous Period	Ticker, Most Recent
Prices	
Ask Adjusted, End of Period	Ask Adjusted, Last Available Nonmissing
Ask, End of Period	Ask, Last Available Nonmissing
Askhi Adjusted, End of Period	Askhi Adjusted, Last Available Nonmissing
Askhi, End of Period	Askhi, Last Available Nonmissing
Bid Adjusted, End of Period	Bid Adjusted, Last Available Nonmissing
Bid, End of Period	Bid, Last Available Nonmissing
Bidlo Adjusted, End of Period	Bidlo Adjusted, Last Available Nonmissing
Bidlo, End of Period	Bidlo, Last Available Nonmissing
Highest Close	Lowest Close
Price Adjusted, End of Period	Price Adjusted, Last Available Nonmissing
Price, End of Period	Price, Last Available Nonmissing
Price, Trade-only, End of Period*	Price, Trade-only, Last Available Nonmissing*
Trade Only Price Adjusted, End of Period*	Trade Only Price Adjusted, Last Available Nonmissing*

Returns	
Returns	Returns on Income
Returns on Income, Cumulative	Returns on Trade-only Prices*
Returns Without Dividends	Returns Without Dividends, Cumulative
Returns without Dividends, Trade-only Prices*	Returns, Cumulative
Returns Related to an Index	
Associated Index Returns	Associated Index Returns on Income
Associated Index Returns on Income, Cumulative	Associated Index Returns Without Dividends
Associated Index Returns Without Dividends, Cumulative	Associated Index Returns, Cumulative
Excess Returns on Income vs. Index Series	Excess Returns on Income vs. Index Series, Cumulative
Excess Returns on Trade-only Prices vs. Index Series*	Excess Returns vs. Index Series
Excess Returns vs. Index Series, Cumulative	Excess Returns Without Dividends vs. Index Series
Excess Returns Without Dividends vs. Index Series, Cumulative	Excess Returns on Trade-only Prices vs Index Series, Cumulative*
Returns Related to a Portfolio	
Associated Portfolios Returns	Associated Portfolios Returns on Income
Associated Portfolios Returns Without Dividends	Excess Returns on Income vs. Associated Portfolios
Excess Returns on Income vs. Associated Portfolios, Cumulative	Excess Returns on Trade-only Prices vs. Associated Portfolios*
Excess Returns vs. Associated Portfolios	Excess Returns vs. Associated Portfolios, Cumulative
Excess Returns Without Dividends vs. Associated Portfolios	Excess Returns Without Dividends vs. Associated Portfolios, Cumulative
Member Portfolio Returns on Income, Cumulative	Member Portfolio Returns Without Dividends, Cumulative
Member Portfolio Returns, Cumulative	
Capitalization	
Capitalization, End of Period	Capitalization, End of Previous Period
Shares	
Shares Outstanding	Shares Outstanding, Adjusted
Shares Outstanding, Adjusted, Unadjusted for Rights	Shares Outstanding, Unadjusted for Rights
Volume	
Number of Trades*	Volume, Average
Volume, Median	Volume, Total
Volume, Total Adjusted	
Dividends	
Cumulative Factor to Adjust Prices over Range	Cumulative Factor to Adjust Shares over Range
Dividend Amount	Dividend Amount, Ordinary
Factor to Adjust Price in Period	
Index levels	
Index Level of Returns	Index Level of Returns on Income
Index Level of Returns Without Dividends	
Nasdaq	
NASDAQ Company Number	NASDAQ Index Code, End of Period
NASDAQ Index Code, End of Previous Period	NASDAQ Index Code, Most Recent
NASDAQ Market Makers, End of Period	NASDAQ Market Makers, End of Previous Period
NASDAQ Market Makers, Most Recent	NASDAQ National Market Indicator, End of Period
NASDAQ National Market Indicator, End of Previous Period	NASDAQ National Market Indicator, Most Recent
NASDAQ Status Code, End of Period	NASDAQ Status Code, End of Previous Period
NASDAQ Status Code, Most Recent	
Others	
Date	Index Count Total
Index Count Used	Portfolio Assignment
Portfolio Statistic	Weight Summation for the Members of a Portfolio

* Daily only

Data Items Organized by Group

Data items may also be accessed in CRSP defined groups. When groups are selected and added to the request file, all data items included in the group will be included in the report. To add a group to your request file, click on the `Group ID` radio button in the upper left portion of the `Data Items` screen. The groups are organized alphabetically by group name. These are listed below.

Daily Groups	Daily Data Items in Group
Adjusted Closing Price, Trading Volume, and Shares Outstanding	Askhi Adjusted, End of Period
	Askhi Adjusted, Last Available Nonmissing
	Bidlo Adjusted, End of Period
	Bidlo Adjusted, Last Available Nonmissing
	Price Adjusted, End of Period
	Price Adjusted, Last Available Nonmissing
	Trade Only Price Adjusted, End of Period
	Trade Only Price Adjusted, Last Available Nonmissing
	Shares Outstanding, Adjusted
	Shares Outstanding, Adjusted, Unadjusted for Rights
	Volume, Total Adjusted
Adjusted NASDAQ Adjusted Closing Bid, Ask and Number of Trades	Ask Adjusted, End of Period
	Ask Adjusted, Last Available Nonmissing
	Bid Adjusted, End of Period
	Bid Adjusted, Last Available Nonmissing
Associated Index Returns	Associated Index Returns Without Dividends
	Associated Index Returns on Income
	Associated Index Returns
Associated Index Returns, Cumulative	Associated Index Returns Without Dividends, Cumulative
	Associated Index Returns on Income, Cumulative
	Associated Index Returns, Cumulative
Associated Portfolios Returns	Associated Portfolios Returns Without Dividends
	Associated Portfolios Returns on Income
	Associated Portfolios Returns
Associated Portfolios Returns, Cumulative	Member Portfolio Returns Without Dividends, Cumulative
	Member Portfolio Returns on Income, Cumulative
	Member Portfolio Returns, Cumulative
Calendar Date	Date
Capitalization	Capitalization, End of Period
	Capitalization, End of Previous Period
CRSP Permno/Permco or Indno/Indco, Header CUSIP, and NASDAQ Company Number	NASDAQ Company Number
	CUSIP, Header
	PERMCO/INDCO
	PERMNO/INDNO
Cumulative Factors to Adjust over Range	Cumulative Factor to Adjust Prices over Range
	Cumulative Factor to Adjust Shares over Range
Dividend Amount and Cumulative Factor to Adjust Prices	Dividend Amount
	Factor to Adjust Price in Period
	Dividend Amount, Ordinary
Excess Returns vs. Associated Portfolios	Excess Returns Without Dividends vs. Associated Portfolios
	Excess Returns on Income vs. Associated Portfolios
	Excess Returns on Trade-only Prices vs. Associated Portfolios
	Excess Returns vs. Associated Portfolios
Excess Returns vs. Associated Portfolios, Cumulative	Excess Returns Without Dividends vs. Associated Portfolios, Cumulative
	Excess Returns on Income vs. Associated Portfolios, Cumulative
	Excess Returns vs. Associated Portfolios, Cumulative

Daily Groups Cont.	Daily Data Items in Group
Excess Returns vs. Index Series	Excess Returns Without Dividends vs. Index Series
	Excess Returns on Income vs. Index Series
	Excess Returns on Trade-only Prices vs. Index Series
	Excess Returns vs. Index Series
Excess Returns vs. Index Series, Cumulative	Excess Returns Without Dividends vs. Index Series, Cumulative
	Excess Returns on Income vs. Index Series, Cumulative
	Excess Returns on Trade-only Prices vs Associated Portfolios, Cumulative
	Excess Returns vs. Index Series, Cumulative
Index Counts	Index Count Total
	Index Count Used
Index Level Return Data	Index Level of Returns Without Dividends
	Index Level of Returns on Income
	Index Level of Returns
Name Identification and Description Fields	Company Name, End of Period
	Company Name, End of Previous Period
	Company Name, Most Recent
	Exchange Code, End of Period
	Exchange Code, End of Previous Period
	Exchange Code, Most Recent
	CUSIP, End of Period
	CUSIP, End of Previous Period
	CUSIP, Most
	Share Type Code, End of Period
	Share Type Code, End of Previous Period
	Share Type Code, Most Recent
	Share Class, End of Period
	Share Class, End of Previous Period
	Share Class, Most Recent
	SIC Code, End of Period
	SIC Code, End of Previous Period
	SIC Code, Most Recent
	Ticker, End of Period
	Ticker, End of Previous Period
	Ticker, Most Recent
NASDAQ Closing Ask, Closing Bid and Number of Trades	Ask, End of Period
	Ask, Last Available Nonmissing
	Bid, End of Period
	Bid, Last Available Nonmissing
	Number of Trades
NASDAQ Information Fields	NASDAQ Market Makers, End of Period
	NASDAQ Market Makers, End of Previous Period
	NASDAQ Market Makers, Most Recent
	NASDAQ National Market Indicator, End of Period
	NASDAQ National Market Indicator, End of Previous Period
	NASDAQ National Market Indicator, Most Recent
	NASDAQ Index Code, End of Period
	NASDAQ Index Code, End of Previous Period
	NASDAQ Index Code, Most Recent
	NASDAQ Status Code, End of Period
	NASDAQ Status Code, End of Previous Period
	NASDAQ Status Code, Most Recent
Portfolio Assignment and Statistic	Portfolio Assignment
	Portfolio Statistic

Daily Groups Cont.	Daily Data Items in Group
Prices, Volume, and Returns	Askhi, End of Period
	Askhi, Last Available Nonmissing
	Bidlo, End of Period
	Bidlo, Last Available Nonmissing
	Price, End of Period
	Price, Last Available Nonmissing
	Returns
	Returns on Trade-only Prices
	Returns without Dividends, Trade-only Prices
	Price, Trade-only, End of Period
	Price, Trade-only, Last Available Nonmissing
	Volume, Total
Returns without Dividends and Income Returns	Returns on Income
	Returns Without Dividends
Returns, Cumulative	Returns Without Dividends, Cumulative
	Returns on Income, Cumulative
	Returns, Cumulative
Shares Outstanding	Shares Outstanding
	Shares Outstanding, Unadjusted for Rights
Summary Price Data, Highest Price, Lowest Price, Average Volume, and Median Volume	Highest Close
	Lowest Close
	Volume, Average
	Volume, Median
Weight Summation for the Members of a Portfolio	Weight Summation for the Members of a Portfolio
Monthly Groups	**Monthly Data Items in Group**
Adjusted Closing Price, Trading Volume, and Shares Outstanding	Price Adjusted, End of Period
	Price Adjusted, Last Available Nonmissing
	Shares Outstanding, Adjusted
	Shares Outstanding, Adjusted, Unadjusted for Rights
Adjusted NASDAQ Adjusted Closing Bid, Ask and Number of Trades	Ask Adjusted, End of Period
	Ask Adjusted, Last Available Nonmissing
	Bid Adjusted, End of Period
	Bid Adjusted, Last Available Nonmissing
Associated Index Returns	Associated Index Returns Without Dividends
	Associated Index Returns on Income
	Associated Index Returns
Associated Index Returns, Cumulative	Associated Index Returns Without Dividends, Cumulative
	Associated Index Returns on Income, Cumulative
	Associated Index Returns, Cumulative
Associated Portfolios Returns	Associated Portfolios Returns Without Dividends
	Associated Portfolios Returns on Income
	Associated Portfolios Returns
Associated Portfolios Returns, Cumulative	Member Portfolio Returns Without Dividends, Cumulative
	Member Portfolio Returns on Income, Cumulative
	Member Portfolio Returns, Cumulative
Calendar Date	Date
Capitalization	Capitalization, End of Period
	Capitalization, End of Previous Period
CRSP Permno/Permco or Indno/Indco, Header CUSIP, and NASDAQ Company Number	NASDAQ Company Number
	CUSIP, Header
	PERMCO/INDCO
	PERMNO/INDNO
Dividend Amount and Cumulative Factor to Adjust Prices	Dividend Amount
	Factor to Adjust Price in Period
Dividend Amount and Cumulative Factor to Adjust Prices	Dividend Amount, Ordinary

Monthly Groups Cont.	Monthly Data Items in Group
Excess Returns vs. Associated Portfolios	Excess Returns Without Dividends vs. Associated Portfolios
	Excess Returns on Income vs. Associated Portfolios
	Excess Returns vs. Associated Portfolios
Excess Returns vs. Associated Portfolios, Cumulative	Excess Returns Without Dividends vs. Associated Portfolios, Cumulative
	Excess Returns on Income vs. Associated Portfolios, Cumulative
	Excess Returns vs. Associated Portfolios, Cumulative
Excess Returns vs. Index Series	Excess Returns Without Dividends vs. Index Series
	Excess Returns on Income vs. Index Series
	Excess Returns vs. Index Series
Excess Returns vs. Index Series, Cumulative	Excess Returns Without Dividends vs. Index Series, Cumulative
	Excess Returns on Income vs. Index Series, Cumulative
	Excess Returns vs. Index Series, Cumulative
Index Counts	Index Count Total
	Index Count Used
Index Level Return Data	Index Level of Returns Without Dividends
	Index Level of Returns on Income
	Index Level of Returns
Name Identification and Description Fields	Company Name, End of Period
	Company Name, End of Previous Period
	Company Name, Most Recent
	Exchange Code, End of Period
	Exchange Code, End of Previous Period
	Exchange Code, Most Recent
	CUSIP, End of Period
	CUSIP, End of Previous Period
	CUSIP, Most
	Share Type Code, End of Period
	Share Type Code, End of Previous Period
	Share Type Code, Most Recent
	Share Class, End of Period
	Share Class, End of Previous Period
	Share Class, Most Recent
	SIC Code, End of Period
	SIC Code, End of Previous Period
	SIC Code, Most Recent
	Ticker, End of Period
	Ticker, End of Previous Period
	Ticker, Most Recent
NASDAQ Closing Ask, Closing Bid and Number of Trades	Ask, End of Period
	Ask, Last Available Nonmissing
	Bid, End of Period
	Bid, Last Available Nonmissing
NASDAQ Information Fields	NASDAQ Market Makers, End of Period
	NASDAQ Market Makers, End of Previous Period
	NASDAQ Market Makers, Most Recent
	NASDAQ National Market Indicator, End of Period
	NASDAQ National Market Indicator, End of Previous Period
	NASDAQ National Market Indicator, Most Recent
	NASDAQ Index Code, End of Period
	NASDAQ Index Code, End of Previous Period
	NASDAQ Index Code, Most Recent
	NASDAQ Status Code, End of Period
	NASDAQ Status Code, End of Previous Period
	NASDAQ Status Code, Most Recent
Portfolio Assignment and Statistic	Portfolio Assignment
	Portfolio Statistic

Monthly Groups Cont.	Monthly Data Items in Group
Returns without Dividends and Income Returns	Returns on Income
	Returns Without Dividends
Returns, Cumulative	Returns Without Dividends, Cumulative
	Returns on Income, Cumulative
	Returns, Cumulative
Shares Outstanding	Shares Outstanding
	Shares Outstanding, Unadjusted for Rights
Summary Price Data, Highest Price, Lowest Price, Average Volume, and Median Volume	Highest Close
	Lowest Close
	Volume, Average
	Volume, Median
Weight Summation for the Members of a Portfolio	Weight Summation for the Members of a Portfolio

Item ID Formatting

The default report formatting for each `Item ID` may be changed. These changes affect the way each data item appears in the output report file. You may change the `Field Width`, `Header`, `Data Type`, `Data Length` and `Left align` or `Right Align` the item. The default formatting is based on the stored format of the variables in the database. If you expand the default formatting, you will not gain precision. To change the formatting before adding it to the request file, click on the `Change Default Format for Data Item` check box. You may not modify the formatting of `Group ID`s.

For example, *Company Name, Most Recent* is a text field allocated 32 characters, is left aligned and has 2 spaces padding the data item to keep the text from running into data items selected, one on either side of the field. To select this item, you may use the `Find...` button, select the appropriate file `Daily` or `Monthly`, then select `Identification` and then the data item, or type the `Item ID`, `comnam` in the `Data Item` text box. If you wanted to truncate this field, and allocate it 20 characters in your output report, you would select the number 32 displayed in the `Field Width` text box, and type 20 over it, repeat this process with the `Data Length` box, replacing 34 with 22. If you were creating a delimited output report to export to another program, you might want to remove the additional two spaces or padding from the `Data Length` text box, and assign it the same number you gave `Field Width`. It would not make sense to change the data type from character to integer, for example, or to make the field 64 characters long, because no name exceeds 32 characters.

Add Item ID/Group ID to the Request File

Once you have selected the `Item ID` or the `Group ID`, click on the `Add Item (F1)` screen action button to add the `Item ID` or `Group ID` to your request file. Once added, it will visible in the display box of the screen. Repeat this process until you have added all desired items.

Delete Item ID/Group ID from the Request File

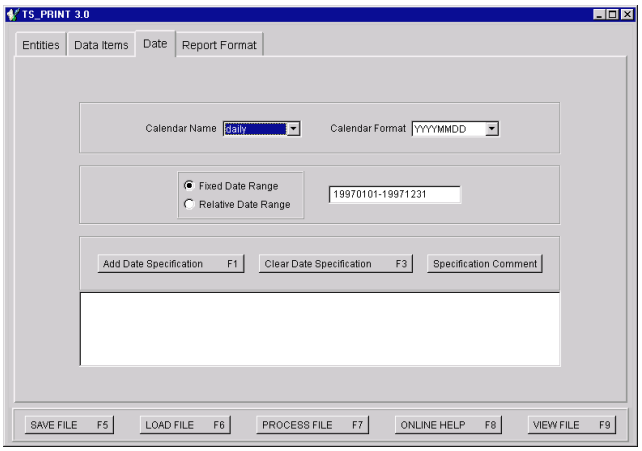
If you wish to remove a data item, you must select it and click on the `Delete Item (F2)` button. To clear all selected data items, click on the `Clear List (F3)` button.

Add a Data Item Comment to the Request File

To add a comment in the request file you are building, click on `Item Comments` and type your comments in the popup dialogue box. Do not include any hard returns in the dialogue box or *ts_print* will not be able to process your request file.

Be sure to completely enter data into all four screens to build your request file before processing the file to run *ts_print*. When entered, the data is visible in the display window of each screen in the *ts_print* interface.

Screen 3: Date



The Date screen sets the dates that will be used for the data items selected for each entity in the output report. Either a date range or a relative date may be used. One or the other must be selected for the request file. *ts_print* does not support a combination of event dates (relative dates) and date ranges.

Date usage is linked to any date information entered in the `Entity` screen. If an event date is assigned to an issue, either in the screen, or included in the list entity input file and identified through formatting, `Relative Date Range` should be selected. If beginning and ending dates are identified in the `Entity` screen, `Fixed Date Range` should be selected in the `Date` screen. Note that `Fixed Date Range` acts as an umbrella to the beginning and ending dates selected and identified in the Entity screen, and must cover all dates requested. For example, if you used the following list entity input file, the `Fixed Date Range` set in the `Date` screen would need to span 19751230-19961231.

```
12490 19751230 19861001 IBM
10107 19900930 19961231 Microsoft
```

If you do not select an appropriate range in the `Date` screen, the request file will process, but will have no or missing values for dates outside the range set in the `Date` screen.

In the Date screen, the user may select the frequency of reporting (`Calendar Name`), type of date (`Fixed Date Range` or `Relative Date Range`) and the appearance of the date in the output report (`Calendar Format`).

Calendar Name

The `Calendar Name` option, in the upper left portion of the working area of the screen allows the user to select the frequency of reporting in the output file. Options include `daily`, `weekly`, `monthly`, `quarterly`, and `annual`. This option is not related to the frequency of the database you are using (daily or monthly). It identifies how often each entity has a value for the data items selected in the output report. The default `Calendar Name` is `daily`. The following example uses daily data reported with a weekly `Calendar Name`, the `Calendar Format` `MM|DD|YYYY`, requesting prices, returns, and volume for entity 12490 for the month of January, 1997.

```
Weekly Date/Daily Data

IBM
                Prc          Ret          Vol
01|03|1997   159.12500    0.025786     10234500
01|10|1997   163.00000    0.024352     17902701
01|17|1997   165.25000    0.013804     16978700
01|24|1997   150.50000   -0.089259     35355000
01|31|1997   156.87500    0.042359     26134101
```

Calendar Format

You may select one of five formats for dates in the output report.

- YYYYMMDD
- YYMMDD
- MM|DD|YY
- MM|DD|YYYY
- DD-MM-YYYY

The example in Calendar Name utilizes the MM|DD|YYYY format. YYYYMMDD, calendar format 1, is the default Calendar Format.

Fixed Date Range

Fixed Date Range allows the user to set a fixed date range for report. When this radio button is selected, the beginning and ending dates of the date range must be entered in the text box to the right of the button. Dates can be entered in YYYY-YYYY, YYYYMM-YYYYMM, or YYYYMMDD-YYYYMMDD formats. Fixed Date Range is the default date format in the interface. The default date range is set to 19970101-19971231.

The Entity screen's Date Range can be used in conjunction with the Fixed Date Range option. In this case, the Date Range set within the Entity screen should fall within the Fixed Date Range added to the Date Screen.

Relative Date Range

Relative Date Range is linked to an Event Date identified in the Entity screen. The Relative Date Range identifies x number of calendar periods before and y after the event to report. These are entered as -x,y in the text box to the right of the selected Relative Date Range radio button. The range, -x,y may have any integer value for both x and y. They can be the same, or different. To report only the event date selected in the Entity screen, enter -0,0 in the text box. To report the event date and one calendar period after, enter -0,1 in the text box.

Relative Date Range must be selected manually by clicking in the radio button. When selected, Relative Date Range is set to -10,10 by default.

When Relative Date Range is used, you may wish to include Date (caldt) in the Data Item screen. The output report lists Relative Date Ranges as integers, not calendar dates. For example, the following two samples both contain prices, volumes and returns for entity 12490 using a weekly calendar (Calendar Name) in the format MM|DD|YYYY (Calendar Format) with a Relative Date Range of -0,2. The sample on the right also includes *Date* as a data item option.

```
Weekly Date/Daily Data

IBM
     Prc        Ret         Vol
0  105.62500   0.038722     11236800
1  100.06250  -0.052663     24123001
2  105.00000   0.049344     24611402
```

```
Weekly Date/Daily Data

IBM
     Prc        Ret         Vol       Caldt
0  105.62500   0.038722     11236800 19980102
1  100.06250  -0.052663     24123001 19980109
2  105.00000   0.049344     24611402 19980116
```

Add Date Specification to the Request File

To add the date to your request file, click on the Add Date Specification (F1) screen action button.

Delete Date Specification from the Request File

The Clear Date Specification (F3) option clears the entry from the Display window.

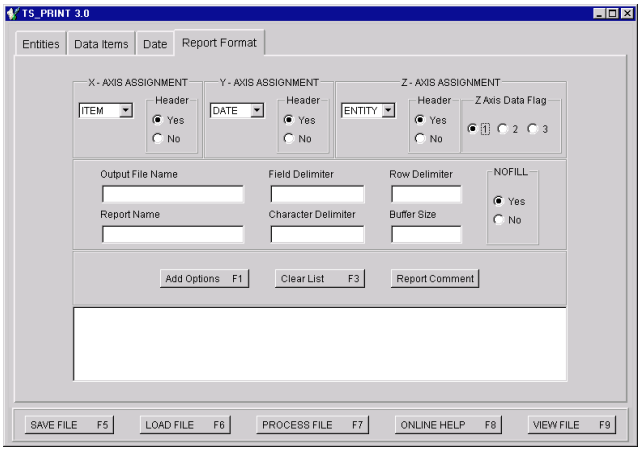
Add a Date Comment to the Request File

To add a comment in the request file you are building, click on the Date Comments button and type your comments in the popup dialogue box. Do not include any hard returns in the dialogue box or *ts_print* will not be able to process your request file.

Be sure to completely enter data into all four screens to build your request file before processing the file to run *ts_print*. When entered, the data is visible in the display window of each screen in the *ts_print* interface.

Screen 4: Report Format

Report format contains the specifications for the output reports physical layout. X, Y, and Z correlate to the Entity, Data Item and Date information added to the request file. X, Y, and Z axis are plotted in a table to produce the report.



Axis Assignments, Output File Name, Z Axis Data Flag, and NOFILL options are required fields. Report Name, Field Delimiter (column), Row Delimiter, Character Delimiter, and Buffer Size are optional fields.

Axis Assignments

Each of the three data dimensions, ITEM, ENTITY, and DATE, are assigned by the user to the X, Y, or Z Axis.

To select axis assignments, click on each drop down menu and select the desired component for each axis and it's associated Header options just to the right of each drop down box. Headers for entity may be selected in the Entity screen. Data Item headers are default headers and can be found in the daily and monthly data item tables starting on page 34. Date headers are selected using the Calendar Format option in the Date screen. Z-Axis Data Flag must also be selected.

The Z Axis can be graphically represented in two dimensions in one of the following three ways using the Z Axis Data Flag. For example, suppose ITEM is selected for the X-Axis Assignment, DATE for the Y-Axis Assignment, and ENTITY for the Z-Axis Assignment. A simple report with two Entities, PERMNOs 12490 and 43916, two Data Items, *Price, End of Period* (prc) and *Returns* (ret), and three Dates, 19971031, 19971128, and 19971231 with the different Z-Flag options would appear in the following ways.

Z Flag 1

```
12490
            Prc         Ret
19971031   98.50000  -0.070755
19971128  109.50000   0.113875
19971231  104.62500  -0.044521

43916
            Prc         Ret
19971031   50.06250   0.155844
19971128   49.25000  -0.016230
19971231   37.12500  -0.246193
```

Z Flag 2

```
           12490       12490       43916       43916
            Prc         Ret         Prc         Ret
19971031   98.50000  -0.070755   50.06250   0.155844
19971128  109.50000   0.113875   49.25000  -0.016230
19971231  104.62500  -0.044521   37.12500  -0.246193
```

Z Flag 3

```
                 Prc        Ret

12490 19971031   98.50000  -0.070755
12490 19971128  109.50000   0.113875
12490 19971231  104.62500  -0.044521

43916 19971031   50.06250   0.155844
43916 19971128   49.25000  -0.016230
43916 19971231   37.12500  -0.246193
```

The default axis assignments are: `X-ITEM`, Header, `Yes`, `Y-DATE`, Header, `Yes`, `Z-ENTITY`, Header, Yes, `Z Axis Data Flag`, 1.

NOFILL

The `NOFILL` option will not produce output when no data is available for the entity within the specified date range or a portion thereof. The `NOFILL` default is `Yes`. `NOFILL` is only available if the date specification is set to `Date Range` and when `X-Axis Assignment` is `ITEM`, `Y-DATE` and `Z-ENTITY` when `Z-Axis Data Flag` is 1 or 3.

Report Format Optional Fields

`Report Name`, `Field Delimiter` (column), `Row Delimiter`, `Character Delimiter`, and `Buffer Size` are optional fields in the `Report Format` screen.

Buffer Size

`Buffer Size` is the size of memory allocated by the program. When extracting a large quantity of data, you may wish to increase the `Buffer Size` to improve your system performance. The program saves intermediate data to a temporary file, which can degrade your system's performance when large datasets are run. The program will report necessary `Buffer Size` if increasing this can improve the program's performance.

Character Delimiter

`Character Delimiter` allows you to place a character before and after all character fields like *Company Name* or *Ticker* in the output report. The default is no character strings. This option does not affect any non-character fields.

Field Delimiter

`Field Delimiter` allows you to place a user-specified character string between columns in the output. Special predefined characters, `s`-space, `p`-Pipe (`|`), `c`-comma. These characters are not recognized as alphabetical delimiters by the application.

Report Name

`Report Name` is a text description that will be placed at the top of the output report file. To enter a `Report Name`, click in the `Report Name` text box and type the desired text. Text up to 80 characters is supported.

Row Delimiter

`Row Delimiter` must be entered into the text box in a `#,#` format, where both #s are integers between 0 and 9. The first # is the number of spaces before the row and the second # is the number of spaces after the row.

Add Report Format to Request File

Complete the `Report Format` screen then enter the selected options to the input specification file by selecting the `Add Options (F1)` button.

Delete Report Format from Request File

Use the `Clear List (F3)` button to change the values. To modify, reenter the information you wish to have in the work area then add again. (If you do not clear the list, the former option will be overwritten when you add the new one).

Add Report Format Comment to Request File

Add comments in your request file by clicking on the `Report Comment` button and typing your comments into the box. Do not include hard returns in the comment box.

3.2 Processing the *ts_print* Request File

Once each screen has information added, your request file is complete. You may save the file or run it from the information contained in the display box of each screen.

File Options

Save File

`SAVE FILE (5)`: `SAVE FILE` is used to save selected specifications into a file that can be reloaded and modified or used at the time it is created.

Load File

`LOAD FILE (F6)` is used to load a *ts_print* request file previously created . The file, unless it was the last file created and the interface has not been closed, will only display the content in the display boxes at the bottom of each screen when loaded. In other words, the user selected content within the working area is not cleared and is not affected by loading a file, and loading a file is not affected by the content in the working area. Any similarity is coincidental.

Process File

`PROCESS FILE (F7)` is used when each of the four screens are completed with data added, `PROCESS FILE` will use the data that has been added for a request file to run *ts_print*. When `PROCESS FILE` is selected, the user will be asked if the data to process is the screen data (data currently in the display window of each screen) or a saved file, not loaded. The file does not need to be loaded in order to be processed. The output file will be, by default, written to the directory that you are using to access the *ts_print* interface program. If you wish to have it save to an alternative directory, either specify the full path in the `Output File Name` box in the `Report Format` screen, or un-install the existing application and re-install it so it is physically located in the desired working directory.

Online Help

`ONLINE HELP (F8)` provides html help files for each of the screens. The help file is designed to help use the interface, not learn about *ts_print*. The application's browser does not support printing the individual help screens. If you wish to print the help files, you may open them directly in Netscape®, Microsoft Internet Explorer®, or in any other standard browser. These files are located in the `%crsp_root%\tsprt\tsplib` directory.

View File

`VIEW FILE (F9)` allows the user to view the output report, or any selected text file using the Open File button. View file will display the most recent results processed using the *ts_print* interface. If no input file has been processed since opening the application, or if you wish to view another text file, click on the `Open File` button in the lower right corner of the view window, select the desired file, click open and you will be return to the view window. The files are displayed in a true-type rather than a constant-width font. If you wish to view the *ts_print* output file, the formatting may therefore appear to be slightly off. You may not edit, copy or print files in the view window. To view it in proper alignment, print it, or edit it, you may wish to open it in Notepad, DOS Editor or another application which can edit and print text files using a constant-width font.

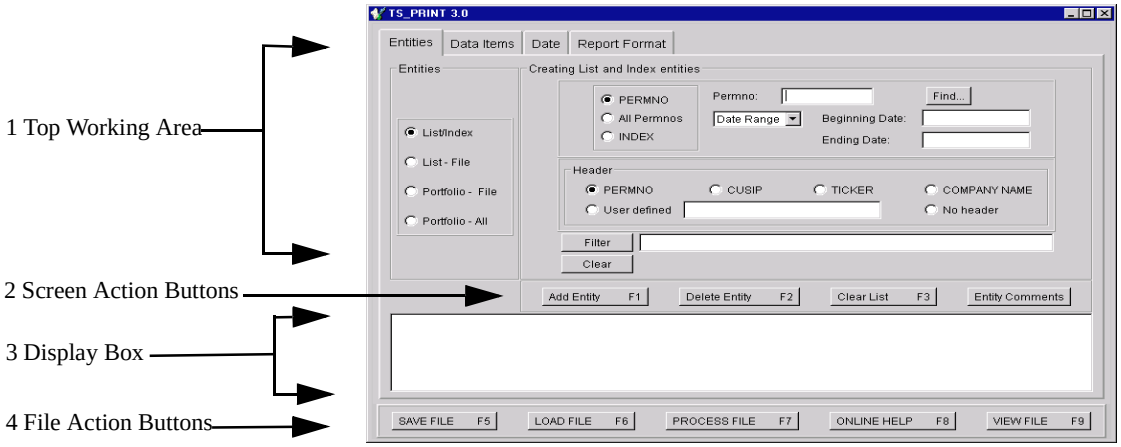
Screen Functionality

The interface has four screens. You can switch between the screens by clicking on the corresponding tabs at the top of the *ts_print* interface window. Information can be entered in any order, as long as complete information is added for the four screens. These screens build the request file that, when processed, runs the *ts_print* application. The same file can be created by the user in a text editor. See "Chapter 2: ts_print Time Series Report Writer" on page 9.

Each screen consists of four horizontal sections from top to bottom.

1. The first section, the top working area, is where the user enters the desired specifications prior to adding them to the request file. This area begins just below the tab at the top of the screen and continues down to just above a horizontal row of screen action or command buttons. The screen's top working areas do not clear once data has been added. Verify added request file information by checking the display box.
2. The second section contains the screen action buttons. These vary slightly between screens, but they all include add, clear and comment options. The Entity and Data Items screens also have a delete option which can be used to remove individual entities or data items added in the respective screen. These action buttons apply to each screen individually.
3. The display box shows the parameters and options which have been selected and added for the request file. Files loaded with the `LOAD FILE (F8)` option will also display the parameters and options for each window in this display area. Loading existing files to process does not clear the first section, the top working space.
4. The fourth section of each screen contains file action buttons which allow the user to perform an action on the request file. The request file combines the options added for each screen. These include the five action buttons: `SAVE FILE (F5)`, `LOAD FILE (F6)`, `PROCESS FILE (F7)`, `ONLINE HELP (F8)`, and `VIEW FILE (F9)`.

When the Interface is first opened, the Entities screen is displayed.



3.3 Sample Files

Sample Reports

This section contains sample *ts_print* request and output report files. There are four examples of request files that are provided with the data in the CRSP_LIB directory. These can be loaded into the interface directly and used as templates to create additional request files. The data items usage of the examples assume a daily CRSPAccess database is available. For monthly-only databases, modify the data items for the monthly data file.

Open the *ts_print* interface. The program takes several minutes to load. Once loaded, click on the LOAD FILE (F8) file action button at the bottom of the screen, and load the sample file from the CRSP_LIB directory. Once loaded, check the display box in each screen to look at the options that will be run, making any modifications needed, like changing the output file directory in the Report Format screen to a local directory, prior to running. Note that modifications like this require that the user recreate the desired options within the working area and add them prior to running the file. The top working area options can be loaded to the display area, but the display options can not be loaded into the top working area.

The following examples were not included on the original Getting Started CD. If you would like electronic copies of these examples, please download them through the CRSP Technical Support page from www.crsp.com.

The four components required for the request file, Entities, Data Items, Date, and Report Format, are each detailed in the section following the samples.

The request file below, ts_samp1.txt, retrieves prices, returns, and volumes for PERMNOs 12490 (IBM Corporation, Inc.) and 43916 (Digital Equipment Corp.), using the CRSP daily file, reporting results on a monthly basis with a relative date range 2 months before and 1 month after the event dates respectively set to January 1, 1970 and January 1, 1980 in the output report file, ts_samp1.dat. The entity header is CUSIP, entities are on the X-axis, items and dates on the Y-axis.

Request file **ts_samp1.txt** contains:

```
#  input is two permnos and event dates in this file
#
#  output is monthly result of daily data for the months 2 months before the
#  event to 1 month after the event.  Returns are compounded over the month
#  and volumes are cumulative raw volumes.  Output is columns for the two
#  permnos labeled by CUSIP and a data section for each item.
#-----------------------------------------------------------------------
ENTITY
LIST|PERMNO 12490|EVDATE 19700101|ENTFORMAT 2
LIST|PERMNO 43916|EVDATE 19800101|ENTFORMAT 2
END
ITEM
ITEMID prc
ITEMID ret
ITEMID vol
END
DATE
CALNAME monthly|RELATIVE -2,1
END
OPTIONS
X ENTITY|Y DATE|Z ITEM,3|OUTNAME ts_samp1.dat|REPNAME Sample1|DEFAULT 1
END
```

Output file **ts_samp1.dat** contains:

```
Sample 1

Prc
     45920010     25384910
-2    357.00000     67.62500
-1    364.50000     68.87500
0     335.25000     72.87500
1     340.25000     75.37500

Ret
     45920010     25384910
-2    -0.006962     0.095142
-1     0.021008     0.018484
0     -0.080247     0.058076
1      0.018510     0.034305

Vol
     45920010     25384910
-2       417000       1614200
-1       578300       1292700
0        789600       3798600
1        615100       2202200
```

The second sample, `ts_samp2.txt`, uses a predefined input file, `ts_list.txt,` containing `PERMNOs` and event dates. The request and input files should be copied to the default directory from `CRSP_LIB` before running. The sample produces a pipe-delimited output file named `ts_samp2.dat` in the default directory with daily event output for the issues in the input file, with items across, dates and `PERMNOs` down. Items include the Calendar Trading Date, the PERMNO, returns, prices, volumes and the NYSE/AMEX Nasdaq Value-Weighted Index on event dates specified in the input file.

The request file **ts_samp2.txt** contains:

```
#  input file contains permno and event date delimited by semicolon
#
#  output is pipe-delimited data with no headers except the event day,
#  sorted by permno then date with data items across.  Event days
#  with no available data for the security do not appear in the output.
#  Returns for the NYSE/AMEX/Nasdaq Value-Weighted Index on the event
#  dates are added as an additional data item.
# ------------------------------------------------------------------------
ENTITY
LIST|FILE ts_list.txt,F2DL;PED1
END
ITEM
ITEMID caldt
ITEMID permno
ITEMID ret
ITEMID prc
ITEMID vol
ITEMID indtret|SUBNO 1000080
END
DATE
CALNAME daily|RELATIVE -2,1
END
OPTIONS
X ITEM,NO|Y DATE,YES|Z ENTITY,NO,3|OUTNAME ts_samp2.dat
FIELDDELIM p|ROWDELIM 0,0|NOFILL
END
```

The predefined input file, **ts_list.txt** contains:

```
12490;19700101
43916;19800101
```

The output file **ts_samp2.dat** contains:

```
-2| 19691230|   12490|   0.003489|  359.50000|        19400|   0.004124
-1| 19691231|   12490|   0.013908|  364.50000|        29200|   0.006069
0 | 19700102|   12490|   0.000686|  364.75000|        15800|   0.012138
1 | 19700105|   12490|   0.009596|  368.25000|        21200|   0.006375
-2| 19791228|   43916|   0.001848|   67.75000|        32200|   0.000610
-1| 19791231|   43916|   0.016605|   68.87500|        17200|   0.000983
0 | 19800102|   43916|  -0.047187|   65.62500|        45800|  -0.020096
1 | 19800103|   43916|  -0.009524|   65.00000|       265800|  -0.006510
```

The third sample, ts_samp3.txt, prints quarterly capital appreciation returns for a single issue plus returns on the Standard and Poor's 500 Composite. Entities are on the X-axis and data items and dates on the Y-axis.

Request file **ts_samp3.txt** contains:

```
Sample 3

#  input is a permno (IBM) and indno (S&P 500 Composite) in this file.
#
#  Output is the cumulative capital appreciation for the permno and the
#  index reported on a quarterly basis from 1996 to 1998
#-------------------------------------------------------------------------
#
ENTITY
LIST|PERMNO 12490
INDEX|INDNO 1000502
END
ITEM
ITEMID cumaret
END
DATE
CALNAME quarterly|RANGE 19960101-19981231
END
OPTIONS
X ENTITY,YES|Y DATE,YES|Z ITEM,NO,3|OUTNAME ts_samp3.dat|REPNAME Sample3
END
```

Output file **ts_samp3.dat** contains:

```
Sample 3

Cumaret
           12490     1000502
19960329   0.217510   0.048009
19960628   0.083447   0.088809
19960930   0.362517   0.115922
19961231   0.658003   0.202637
19970331   0.502052   0.229231
19970630   0.975376   0.437079
19970930   1.320109   0.537967
19971231   1.290014   0.575552
19980331   1.273598   0.788759
19980630   1.512996   0.840859
19980930   1.812585   0.651243
19981231   3.035568   0.995730
```

The fourth sample, `ts_samp4.txt`, generates results of a user-defined portfolio containing 4 securities, pulling data items, Index Count Used, Weight Summation for the Members of a Portfolio and Returns reported daily for the month of December 1998. No headers are included in the output report, data items are on the X-axis, dates and entities on the Y-axis.

Request file **`ts_samp4.txt`** contains:

```
#   input is a permlist
#
#   output is the count, weight and value-weighted return of the portfolio
#   for December 1998, with items across and dates down
# ------------------------------------------------------------------------
#
ENTITY
PORT|FILE ts_list4.txt,F2DLSPE|WEIGHT value_weight
END
ITEM
ITEMID cnt|SUBNO 1
ITEMID weight|FORMAT 12
ITEMID ret
END
DATE
CALNAME daily|RANGE 199812
END
OPTIONS
X ITEM,NO|Y DATE,YES|Z ENTITY,NO,3|OUTNAME ts_samp4.dat
FIELDDELIM S|ROWDELIM 0,0
END
```

Input file **`ts_list4.txt`** contains:

```
12490
10107
10401
10104
```

Output file **`ts_samp4.dat`** contains:

```
19981201      4    601802888    0.042458
19981202      4    627354528   -0.014932
19981203      4    617986632   -0.026945
19981204      4    601334752    0.029170
19981207      4    618875600    0.033239
19981208      4    639446188   -0.003432
19981209      4    637251488    0.024663
19981210      4    652968060   -0.016628
19981211      4    642110418    0.014596
19981214      4    651482952   -0.034807
19981215      4    628806612    0.024428
19981216      4    644167224    0.005842
19981217      4    647930644    0.012263
19981218      4    655876312    0.023917
19981221      4    671562856    0.019197
19981222      4    684454776   -0.000447
19981223      4    684148592    0.029299
19981224      4    704193672   -0.004372
19981228      4    701114840    0.008756
19981229      4    707254052    0.002524
19981230      4    708442752   -0.012362
19981231      4    699685176   -0.007846
```

CHAPTER 4: *stk_print* STOCK DATABASE REPORT WRITER

OVERVIEW

This chapter contains an overview of the *stk_print* utility.

INSIDE

CHAPTER 4: *stk_print* STOCK DATABASE REPORT WRITER

stk_print can be used to print CRSPAccess stock data on Unix, Windows and OpenVMS. It is useful for browsing data formatted for a terminal or extracting data formatted for program input. It supports CRSP stock header, event, and time series data items and supports input typed at a terminal, securities in an input file or all securities in the database. The user selects input and output options on the command line. If security identifiers are typed at the terminal, input or output options can be switched between each entry. Output can be printed to a terminal or saved in a file.

Use one of two commands to run *stk_print.*

`dstkprint` – to read the daily CRSP database

`mstkprint` – to read the monthly CRSP database

Normal usage is to type identifiers at the command line once the program is started. The enter key registers the input and triggers the program to report the desired data. Entering a blank line ends the program. Options can be added at the command line or after the program is started to select different identifiers, data, date ranges, or output options. A database can also be processed sequentially or from an input file with *stk_print.*

4.1 *stk_print* Options

Options are preceded with a forward slash. Multiple options can be placed on a single line. If an option does not require an additional description, another option can follow without a second slash. Options separated by a dash must be separated by spaces. If the option requires additional information, there must be a space and another slash before another option is described. For example,
`/hrndy 1 /fs` and `/hr /n /dy 1 /fs` are possible ways to select the `/hr, /n, /dy`, and `/fs` options. If there is any white space between the options, a front slash must be included. i.e. `/nif stkprt.txt /of names.out.` In this example, `/n` is requesting name information for each of the `permno's` in input file (`/if`) `stkprt.txt` to dump to an output file (`/of`) named `names.out`.

Following is a list of current *stk_print* options, grouped by option category, listing the options, the variables included in each option followed by an output sample for each option. The samples are run from the daily file using PERMNO 12490 or 10107. PERMNO usage is indicated in parenthesis at the end of the item description. If monthly data is used instead, it is noted after the PERMNO. If the values are `0`, `-88.0` or `99.0`, there is no data in the file for the selected issue.

***stk_print* Data Items and Options**

— Header Information

/hh Header file issue identification information (`12490`)

i.e.
```
PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 12490 45920010  20990      0      0   1 3573    3   154  146      1     0

  BegDate/EndDate HTick  DEL Latest Company Name
19620702-19981231 IBM    100 INTERNATIONAL BUSINESS MACHS COR
```

/hr Header file issue identifiers with available data date ranges in YYYYMMDD format (12490)

i.e.
```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 12490 45920010  20990      0      0   1 3573    3   154  146      1     0

  BegDat/EndDat           Bidlo               Prices            Spreads
19620702-19981231   19620702-19981231   19620702-19981231          0-       0

       Returns          Ret w/o Div           Trades            Askhi
19620702-19981231   19620702-19981231          0-       0   19620702-19981231

       Volume             Bids               Asks             Open
19620702-19981231          0-       0         0-       0

                    Portfolio types available

1 - NYSE/AMEX/Nasdaq Cap Assignments                              1962 - 1999
2 - NYSE/AMEX Cap Assignment                                      1962 - 1999
4 - NYSE Cap Assignment                                           1962 - 1999
6 - NYSE/AMEX Betas                                               1962 - 1999
7 - NYSE/AMEX Standard Deviations                                 1962 - 1999
```

/hrl Header identifiers with ranges in terms of calendar day numbers (`/l` is used in conjunction with `/hr` in the following example) The `/l` option includes all of the options `/hr` does, with the corresponding CRSP file calendar indexes in Calendar Trading Date, instead of dates in YYYYMMDD format. (12490)

i.e.
```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 12490 45920010  20990      0      0   1 3573    3   154  146      1     0

  BegDat/EndDat           Bidlo               Prices            Spreads
19620702-19981231          1-    9191          1-    9191          0-       0

       Returns          Ret w/o Div           Trades            Askhi
       1-    9191          1-    9191          0-       0          1-    9191

       Volume             Bids               Asks             Open
       1-    9191          0-       0         0-       0

                    Portfolio types available

1 - NYSE/AMEX/Nasdaq Cap Assignments                              1962 - 1999
2 - NYSE/AMEX Cap Assignment                                      1962 - 1999
4 - NYSE Cap Assignment                                           1962 - 1999
6 - NYSE/AMEX Betas                                               1962 - 1999
7 - NYSE/AMEX Standard Deviations                                 1962 - 1999
```

— Event Information

/n Name event history information (12490)

i.e.
```
Namedt     CUSIP    Ticker  Company Name                          CL Cd Exch  SIC
19251231                    INTERNATIONAL BUSINESS MACHS COR       11   1  3570
19620702            IBM     INTERNATIONAL BUSINESS MACHS COR       11   1  3573
19680102 45920010   IBM     INTERNATIONAL BUSINESS MACHS COR       11   1  3573
```

/di Distribution event history information (12490)

i.e.
```
Code    Divamt    Facpr   Facshr   Dclrdt     Exdt   Rcrddt    Paydt Aperm Acomp
1232   0.22000   0.0000   0.0000 19980728 19980806 19980810 19980910     0     0
1232   0.22000   0.0000   0.0000 19981027 19981106 19981110 19981210     0     0
```

/sh Raw shares observation event histories (10107) (`mstkprint`)

i.e.
```
      Shares       Date     Enddate          Flag
     1207000    19971231    19980222           0
     1232036    19980331    19980629           0
     1242318    19980630    19980929           0
     1244000    19980930    19981029           0
```

/sa Shares event histories adjusted for distributions (10107) (mstkprint)

i.e.

Shares	Date	Enddate	Flag
1207000	19971231	19980222	0
1207000	19980223	19980330	1
1232036	19980331	19980629	0
1242318	19980630	19980929	0

/de Delisting event histories (12490)

i.e.

Dlstdt	Cd	Nperm	Ncomp	Nextdt	Dlprc	Dlpdt	Dlamt	Dlret	Dlretx
19981231	100	0	0	0	0.000	0	0.000	-88.00000	-88.00000

/q Nasdaq event information histories (10107)

i.e.

Date	Last Date	Status	NMS ind	MM count	Index
19980930	19981008	1	2	56	0
19981009	19981020	1	2	55	0
19981021	19981105	1	2	56	0
19981106	19981122	1	2	57	0

— Time Series Groups; only one of dd, ds, dr, dx can be used at the same time. These four cannot be used at the same time as one of the single time series.

/dd Trading data including close, high/ask, low/bid, volume, and total return (12490)

i.e.

date	prc	high	low	vol	ret
19981001	125.37500	126.43750	123.37500	6268701	-0.024319
19981002	124.81250	125.25000	118.93750	7302600	-0.004487
19981005	120.25000	123.75000	117.31250	6721000	-0.036555
19981006	119.25000	124.00000	118.75000	7183700	-0.008316

/dr Returns and returns without dividends (12490)

i.e.

date	prc	ret	retx
19981001	125.37500	-0.024319	-0.024319
19981002	124.81250	-0.004487	-0.004487
19981005	120.25000	-0.036555	-0.036555
19981006	119.25000	-0.008316	-0.008316

/dx Price, shares, and returns. Shares outstanding are mapped to calendar of price and returns (12490)

i.e.

date	price	shares	returns
19981001	125.37500	933063	-0.024319
19981002	124.81250	933063	-0.004487
19981005	120.25000	933063	-0.036555
19981006	119.25000	933063	-0.008316

/ds "YYYYMMDD|base.amt|"

Price, total returns index level, capital appreciation index level. Levels are set to base.amt on YYYYMMDD. The quotes are necessary on Unix or Windows NT systems. (12490)

i.e.

```
/ds "19981002|100.0|
  levels set to 100.000000 on 19981002
```

date	prc	ind_tot	ind_apr
19981001	125.37500	100.45068	100.45068
19981002	124.81250	100.00000	100.00000
19981005	120.25000	96.34452	96.34452
19981006	119.25000	95.54332	95.54332

— Portfolio Information for one or more Portfolio Types

/dy#-# Portfolio assignments and statistics for portfolio type #. `Porttype` numbers are required. `Porttype` numbers can be a single number, a range separated by dashes, or a list separated by commas. For possible `porttype`s for this security, run the `/hr` option. (`12490`)

i.e.
```
Selected portfolios: 1-2
1 - NYSE/AMEX/Nasdaq Cap Assignments
2 - NYSE/AMEX Cap Assignment

  DATE            PORTFOLIO TYPE 1          PORTFOLIO TYPE 2
                  PORT#     STAT             PORT#     STAT
  1998            10   170150832.00000      10   170150832.00000
```

— Single Time Series; any of these active at the same time will be printed across, up to a limit of five, then down.

/pp Prices (`10107`) (`mstkprint`)

i.e.
```
    Date       Prices
19980130     149.18750
19980227      84.75000
19980331      89.50000
19980430      90.12500
```

/pr Returns (`12490`) (`mstkprint`)

i.e.
```
    Date       Returns
19980930      0.140954
19981030      0.155642
19981130      0.113434
19981231      0.116578
```

/px Returns without dividends (`12490`) (`mstkprint`)

i.e.
```
    Date       Ret w/o Div
19980930      0.140954
19981030      0.155642
19981130      0.111953
19981231      0.116578
```

/pv Volumes (`12490`) (`mstkprint`)

i.e.
```
    Date       Volumes
19980930      95656205
19981030     124145208
19981130      68837401
19981231      71013201
```

/**pl** Bidlo (`12490`)

i.e.
```
    Date       Bidlow
19981001     123.37500
19981002     118.93750
19981005     117.31250
19981006     118.75000
```

/**ph** Askhi (`12490`)

i.e.
```
    Date       Askhigh
19981001     126.43750
19981002     125.25000
19981005     123.75000
19981006     124.00000
```

/pb Bid (`10107`)

i.e.
```
    Date       Bids
19981001    104.062500
19981002    104.062500
19981005    101.187500
19981006     97.562500
```

/pa Ask (10107)

i.e.

```
  Date       Asks
19981001    104.125000
19981002    104.125000
19981005    101.125000
19981006     97.625000
```

/pn Number of trades (10107)

i.e.

```
  Date         Trades
19981001     19861
19981002     20087
19981005     30079
19981006     21620
```

/**ps** Shares. (Shares outstanding are mapped to the calendar of prices) (12490)

i.e.

```
  Date       Shares
19981001      933063
19981002      933063
19981005      933063
19981006      933063
```

—**use adjusted or raw values for price, volume or shares items. The default is unadjusted**.

/djYYYYMMDDn

Toggle to use adjusted values instead of raw values for any price, volume, or shares items above. n is the adjustment type code and YYYYMMDD is the date to use as the unadjusted base. Use n = 0 if only using stock splits and stock dividends to adjust, and n = 1 if all price factors are used to adjust. If YYYYMMDD precedes the range of the issue, the first day will be used for that issue. If YYYYMMDD follows the range of the issue, the last day will be used for that issue.

Adjustments with price data. In the example, the security split on February 23, 1998.(10107) (mstkprint)

i.e.

```
 mstkprint /dt19980101-19980401 /pp /dj199812311
 Date       Prices
19980130      74.59375
19980227      84.75000
19980331      89.50000
19980430      90.12500
```

/du Toggle back to unadjusted prices. (10107)

i.e.

```
 mstkprint /dt1998 /dj199612311 /pp /du
  Date       Prices
19980130      149.18750
19980227      84.75000
19980331      89.50000
19980430      90.12500
```

—set date ranges. The default is the last three months before the end of the calendar if date range is not set.

`/dt range1[-range2]`

Date Ranges can be `YYYY, YYYYMM, or, YYYYMMDD`, in any combination. If only one range is given, and year only or month only is used. The first period of the year or month is used for the beginning of the range and the last period of the year of month is used for the end of the range. Date ranges will be applied to all data selections except header, names, and delistings. If an issue does not trade the entire range, only the intersection of the issue range and the date range will be printed. Date `range1` must precede date `range2` if both are supplied. Date ranges relate to the event and time series data and do not alter the header information.

The output format options `/fr` and `/fs` alter the interpretation of date range. If the default `/fr` format option is used, names and delists are not restricted by date range, and the first shares observation or distribution event before and after the range, if any, are displayed. If the `/fs` format option is used, only names, delists, and distributions events in the range are displayed.

i.e.
```
/dt 199609-199612  all data from the beginning of September through December of 1996
/dt 1990           all data in the year 1990
/dt 1994-19940615  all data from the beginning of 1994 until June 15, 1994
/dt 19961231       data only on the date December 31, 1996
```

—set input method. The default is to allow the user to type in identifiers at the terminal. These options are only supported at the command line and only one can be used.

`/sq` Reads all issues in database sequentially

For example, to display name history for all the issues in the monthly database,

i.e. `mstkprint /n /sq`

`/if filename.inp`

Selects data for all identifiers in `filename.inp`. Any of the options may be selected to run with the input file. This input file should be a text file containing one column of identifiers, beginning in the first character space.

For example, to display name history for all PERMNOs in an input file in the default directory named `perms.inp`,

i.e. `mstkprint /n /if perms.inp`

—set output method. The default is for output to be printed on the terminal. This option is only supported at the command line.

`/of filename.out`

Data is placed in `filename.out` instead of the terminal.

For example, to save name history of selected securities to the file `filename.out` in the current directory,

i.e. `dstkprint /n /of filename.out`

—set output format. Default is for 80-character width output with headers

/fr Toggle for 80-character formatted output with headers. This is the most readable when browsing data and supports multiple data items.

i.e. /hh /fr

```
PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 12490 45920010  20990      0      0   1 3573    3   154  146      1     0

  BegDate/EndDate HTick  DEL Latest Company Name
19620702-19981231 IBM    100 INTERNATIONAL BUSINESS MACHS COR
```

/fs Toggle for pipe-delimited output, intended for input to another program. The permno is output on each line with this option. The /fs option is most useful when one data item (or multiple /p* data items) is used with sequential or file input, and file output.

i.e. /fs /hh

```
 12490|45920010| 20990|     0|     0| 1|3573|  3|154|146|  1|  0|19620702|199812
31|IBM   |100|INTERNATIONAL BUSINESS MACHS COR
```

—set database. The default is the CRSP_DSTK database and daily data. These options are only supported on the command line at the initial program call, and cannot be switched. These commands can only be used with the *stk_print* command, since the database is automatically set with the dstkprint or mstkprint commands.

/d1 dbdirectory
Selects an alternate database with a path of dbdirectory

i.e. stk_print /d1 mydirectory

/fm Indicates that the database is monthly

i.e. stk_print /fm /d1 mymonthdir

—set key. The default is PERMNO. All input in the input file or at the terminal will be interpreted as this identifier. Sequential access will be in the order of this key. If a key is not unique such as PERMCO, direct access will always find the first security with the identifier. Other securities can be found with the next id (n) option.

/ky permno
This option may be used to set input key to PERMNO. This is the default if no /ky option is used.

i.e. dstkprint /ky permno (10107)

```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

/ky permco
This option sets the input key to PERMCO

i.e. /ky permco (8048)

```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

/ky cusip

This option sets the input key to the CRSP header CUSIP. Header CUSIPs are unique for each security

i.e. `/ky cusip` (59491810)

```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

/ky hcusip

This option sets the input key to CRSP historical CUSIP**.** Historical CUSIPs are the list of any CUSIPs in the name history plus the header CUSIP if no names exist in the name history. Each security will have one or more historical CUSIPs, and no historical CUSIP will appear in more than one security.

i.e. `/ky hcusip (59491810)`

```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

/ky ticker

This option sets the input key to header ticker. Header ticker is the latest ticker and is only set for securities active on the last date covered in the database. NYSE/AMEX securities with nonblank share class have a period and the share class appended to the ticker (`TICKER.A`). Header ticker is unique, but not all securities can be accessed by it.

i.e. `/ky ticker (MSFT) - Cap Specific`

```
 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

/ky siccd

This option sets the input key to CRSP historical SIC code**.** A security can be accessed by any SIC classification in its history. More than one `siccd` can be used to access a security, and multiple securities can share the same `siccd`.

i.e.
```
/ky siccd (7370)
...n (until issue of interest is located)

 PERMNO CUSIP  PERMCO  Compno Issuno EXCH SIC Name  Dist Share Delist Nasd
 10107 59491810   8048   8048   9942   3 7370    1     7   60      1   637

  BegDate/EndDate HTick  DEL Latest Company Name
19860313-19981231 MSFT   100 MICROSOFT CORP
```

The following codes can be used instead of a specified identifier at the command line or in an input file. These access securities by position relative to the current key set with the `/ky` option. These are input and not options and therefore do not require the forward slash line.

- **s** same identifier
- **n** next identifier
- **p** previous identifier
- **f** first identifier
- **l** last identifier

4.2 *stk_print* Usage and Examples

stk_print is run at the command prompt with the form:

`dstkprint /options [/options] -` run off daily database `CRSP_DSTK`

`mstkprint /options [/options] -` use monthly database `CRSP_MSTK`

```
stk_print /options [/options]
```

stk_print defaults to the daily file. The `/d1` and `/fm` options can be used to select a user's daily or monthly database.

An on-screen help menu is available with *stk_print*. Within *stk_print*, type "?" which provides a listing and brief description of all of the `/options`.

Examples

```
dstkprint /hrnddt1995
```

- Selects header including ranges, names, all 1995 daily price, high, low, volume, and returns. User will type in PERMNOs and output will be printed on the screen in a readable format.

```
dstkprint /ppprpv
```

- Selects prices, returns, and volumes for the default date range of the file for PERMNO 10107.

```
mstkprint /di /fs /dt1994-1995 /if perms.inp /of dists.out
```

- Uses monthly database `CRSP_MSTK` and print delimited 1994 and 1995 distribution histories for all `permnos` in the file `perms.inp` (one PERMNO per line) to the new file `dists.out`. `Perms.inp` must already exist in the default directory.

CHAPTER 5: CRSPACCESS SUPPLEMENTAL UTILITIES

OVERVIEW

This chapter contains descriptions of utilities available to process CRSP stock and indices data. They include additional data utilities and database maintenance utilities.

INSIDE

CHAPTER 5: CRSPACCESS SUPPLEMENTAL UTILITIES

The CRSPAccess data is provided with several utility programs in addition to *ts_print* and *stk_print*. These include supporting data retrieval programs and data adminstration programs.

The utilities in this section include.

- Namelist Data Search Utilities, *dstksearch*, *mstksearch*, *dindsearch*, and *mindsearch*
- Portfolio Building Utilities, *dsxport*, and *msxport*
- Database Information Utilities, *crsp_show_db_info*, and *crsp_set_db_info*
- Subset Database Utility, *stk_partial, ind_partial,* and *crsp_stk_subset*
- Database maintenance utilities, *crsp_stk_scd_load*
- Header File Options, *crsp_stk_headall* and *crsp_ind_headall*
- Text File Conversion between PCs and Unix/OpenVMS Systems, *crsp_crlf2lf* and *crsp_lf2crlf*

5.1 Namelist Data and Search Utilities

CRSP provides header files for each CRSPAccess database. These name lists are useful for finding identifiers and name histories of securities when only partial information is known. The identifiers can then be used as input to other CRSP reporting utilities or programs. The files are fixed format text files and be accessed with system utilities or other tools. CRSP provides search utilities for header files.

Every stock database contains four files:

`cheadfile.dat` - header list, one line per issue, sorted by PERMNO, with the fields PERMNO, PERMCO, CUSIP, Header, Company Name, Header, Ticker Symbol, Header, CRSP Exchange Code, Header, SIC code, Header, and price data range.

`headfile.dat` - historical header list, one line per historical name, sorted by `permno` and effective name date, with the fields PERMNO, PERMCO, CUSIP, Company Name, Ticker, CRSP Exchange Code, SIC code and effective range of name information.

`psortbyp.dat` - `permlist` of issues in the database; one PERMNO per line sorted by PERMNO.

`headind.dat` - index description, `setid`, and Permanent Index Identification Number (`indno`) of all index series and groups in the database.

Namelist Search Utilities

There are two stock header search utilities,

dstksearch for historical header list in daily database

mstksearch for historical header list in monthly database

There are two index header search utilities,

dindsearch for index header list in daily database

mindsearch for index header list in monthly database

The utility uses a search string as input and finds program will ask for a search string. It will print the full list of header rows satisfying the simple search.

Operating System Specific Search Instructions

Windows NT

The command and the string, enclosed in double quotes, are entered at the command line at a command prompt window. For example,

```
> dstksearch “ibm”
>echo off
                        Daily Stock Headers
              Exchange Codes 1=NYSE, 2=AMEX, 3=Nasdaq
Perm# permco CUSIP             Company Name         Tick   EX SIC  date range

---------- N:\DATA\IEEELIT\DX9612\HEADFILE.DAT
 12490 20990          INTERNATIONAL BUSINESS MACHS C IBM    1 3573 620702-680101
 12490 20990 45920010 INTERNATIONAL BUSINESS MACHS C IBM    1 3573 680102-961231
 75139 22064 03093810 AMERICUS TR FOR IBM SHS        BZP    2 6799 870720-920630
 75140 22064 03093820 AMERICUS TR FOR IBM SHS        BZS    2 6799 870720-920610
 75141 22064 03093830 AMERICUS TR FOR IBM SHS        BZU    2 6799 870720-920629
```

Unix or OpenVMS

Type the name of the search function. You will be prompted for the search string. No quotes are needed and case is ignored. For example,

```
$dstksearch

Enter search string: ibm

       Exchange Codes 1=NYSE, 2=AMEX, 3=Nasdaq

Perm# Permco CUSIP            Company Name           Tick  EX SIC date range

 12490 20990          INTERNATIONAL BUSINESS MACHS C IBM    1 3573 620702-680101
 12490 20990 45920010 INTERNATIONAL BUSINESS MACHS C IBM    1 3573 680102-961231
 75139 22064 03093810 AMERICUS TR FOR IBM SHS        BZP    2 6799 870720-920630
 75140 22064 03093820 AMERICUS TR FOR IBM SHS        BZS    2 6799 870720-920610
 75141 22064 03093830 AMERICUS TR FOR IBM SHS        BZU    2 6799 870720-920629

Try another string [y] ? n
```

5.2 Portfolio Building Programs

There are two interactive programs available that can be used to easily calculate returns on stock portfolios. Portfolios can be created interactively, at the terminal, in a file, or randomly. Market indices can also be used as portfolios.

The user sets the parameters that the program will use to create the portfolios.

- Chose an identifier: PERMNO, historical CUSIP, or CUSIP Identifier, Header.
- Enter beginning and ending dates of the portfolios. Dates can be entered in one of three formats, YYYYMMDD, YYYYMM, or YYYY. Beginning dates assume the first trading date of a month or year and ending dates assume the last trading date of the month or year.
- Choose the returns series.
- Enter the output filename
- These parameters are then set for all portfolios entered in this session. The program must be rerun if any of the parameters need to be changed.

Once the portfolio parameters have been entered, portfolios are entered one at a time. There are four methods for entering portfolios.

- Terminal input allows identifiers and weights of each stock in the portfolio to be entered interactively. Stock identifiers needed should be known before running a portfolio program. Unmatched identifiers generate a warning message and are ignored. Weights can be entered for each security, or the program can be directed to calculate weights one of three ways, equally-weighted by share, value-weighted, or equal-weighted by price.
- File input assumes that an input file already exists in your directory. This input file can be created with a text editor. Each line should have one security, with `CUSIPs` in columns 2-9 or perm numbers in columns 5-9, and weights in columns 11-20. Unmatched identifiers generate a warning message and are ignored by the portfolio. The program can override the weights provided and instead calculate weights equally by share or price, or by value.
- Random input causes the program to create a portfolio randomly. The number of securities and a random number seed are entered by a user. Random securities are chosen from the securities trading on exchanges. Only securities that traded the entire trading range chosen will be selected. Weighting can be done equally by share or price, or by value.
- Market indices are returns on portfolios of all or a significant part of the entire market that have already been calculated. These indices include value-weighted or equally-weighted returns with or without dividends on five different combinations of exchanges: NYSE/AMEX, Nasdaq, NYSE/AMEX/Nasdaq, NYSE only and AMEX only. Other indices such as the returns on certain decile portfolios or other types of performance data are also available. You must subscribe to the indices product to access indices other than the equal and value-weighted market indices for your stock product, or the S&P 500 Composite.

When the last portfolio has been entered, a results file and a log file are created in your current directory. The log file is an ASCII text file that can be typed to the terminal or printed. It describes the parameters used and lists the contents of each portfolio selected, including the securities used, their weights, a compounded portfolio return, and the corresponding column in the results file.

The results file is an ASCII text file. The first column is the date. Other columns are returns on portfolios. Each row contains the return of selected portfolios on one date.

dsxport

dsxport is an interactive program that allows for the easy creation of daily portfolios. *dsxport* uses total returns to create its portfolios. The market indices available include equivalent value-weighted returns on entire individual and combinations of exchanges, returns or decile portfolios based on yearly betas, standard deviations, or year-end capitalizations, and returns on the S&P composite index with dividends. Returns on the S&P composite index without dividends are also available.

msxport

msxport is an interactive program that allows for the easy creation of monthly portfolio returns. *msxport* can use monthly holding period with and without dividends to create its portfolios. The market indices available include equal and value weighted returns on entire individual or combinations of exchanges, returns on decile portfolios based on year-end capitalizations, and returns on the S&P composite index without dividends. In addition to the stock indices, returns on a range of US government bond and bill maturities, and the rate of change on the Consumer Price Index are also available.

5.3 Database Information Utilities

There are two utility programs that can be used to show or set information about a CRSPAcces97 database.

crsp_show_db_info

This program generates a listing of information about a CRSPAccess database. Information generated includes creation date, last modification date, data cut date, binary type, CRSPAccess version, product code, product name, data version, a list of data sets available, and a list of calendars available. It takes a parameter of the database location and an optional parameter for an output file. If no output file is given the information is printed to the terminal. To run the program, type the name of the program followed by parameter options at a command prompt. The parameters follow.

Usage: `crsp_show_db_info directory path [outfile]`

Parameter	Values
CRSPDB directory path	The directory where the database is stored. Standard environment names can be used such as `$CRSP_DSTK` or `CRSP_MSTK` on UNIX, `%crsp_dstk%` or `%crsp_mstk%` on Windows NT, or `crsp_dstk:` or `crsp_mstk:` on OpenVMS.
Output file (optional)	The file where the output will be written. If this option is not included, the output will be printed to the terminal.

Examples

On Windows NT, this command will summarize the monthly database.

```
crsp_show_db_info %crsp_mstk%

Create date  : Sat Nov 14 17:48:30 1998

Mod date     : Sat Nov 14 18:07:36 1998
Cut date     : 19981030
Binary type  : L (IEEE little endian)
Code Version : CA97_2.1
Product code : MAZ
Product name : CRSP NYSE/AMEX/NASDAQ Monthly History
Data Version : 1

Settypes     Setids
 1(STK)       20(monthly stocks)
 3(IND)      400(monthly indices groups)
 3(IND)      420(monthly indices series)

Calid(Types)
  101( 3)    Monthly Calendar
  300( 3)    Annual Calendar
  310( 3)    Quarterly Calend
  100( 3)    Daily Calendar
  500( 3)    Weekly Calendar
```

crsp_set_db_info

This program allows a user with write permission to a CRSPAccess database to change database information fields. The fields that can be modified are data cut date, binary type, CRSPAccess version, product code, product name, and data version. It takes a parameter of the database location and a list of parameters for the other information fields. The parameters follow.

Usage: `crsp_set_db_info path cutdate bintype version prodname prodcode data version`

Parameter	Values
CRSPDB directory path	The directory where the database is stored. Standard environment names can be used such as `$CRSP_DSTK` or `CRSP_MSTK` on UNIX, `%crsp_dstk%` or `%crsp_mstk%` on Windows NT, or `crsp_dstk:` or `crsp_mstk:` on OpenVMS.
Cut Date	25-character string used to store the last date of updated data in the database. Can be `KEEP` to leave the current value.
Binary Type	1-character string indicating type. Only the first character of the parameter is loaded. It is set to B for IEEE big-endian and L for IEEE little-endian numeric fields. `KEEP` can be used to leave the current value.
Code Version	19-character string initially loaded with the version of the CRSPAccess library used to create the database. `KEEP` can be used to leave the current value.
Product Name	47-character string with a description of the database. `KEEP` can be used to leave the current value.
Product Code	11-character string with a short name of the database. `KEEP` can be used to leave the current value.
Data Version Number	Integer number containing the version of the data in the database. `KEEP` can be used to leave the current value intact. `+1` can be used to increment the current value.

Examples

On Windows NT, this command will change the database name and description for a personal database created with the `stk_partial` utility in the `C:\mydata` directory.

```
crsp_set_db_info c:\mydata\ keep keep keep SAMP1 “Subset database”
```

5.4 Database Subsetting Utilities

These utilities, *crsp_stk_partial*, *crsp_ind_partial,* and *crsp_stk_subset*, can be used to create copies of CRSP databases, restricted for example on the basis of exchange and share codes, or a select group of PERMNOs.

stk_partial

This program creates a new CRSPAccess `CRSPDB` stock database from an existing database or appends securities from one database to another. It can use a `permlist` or a data type restriction to subset the original database. It takes parameters on input and output databases, input and output set types, data wanted in the new database, and optionally a file containing `PERMNOs` to copy to the new database.

Parameter	Values
Input `CRSPDB` directory path	The directory where the database is stored. Standard environment names can be used such as `$CRSP_DSTK` on UNIX, `crsp_dstk:` on OpenVMS, or `%crsp_dstk%` for Windows NT.
Output `CRSPDB` directory path	The directory where the new database will be stored. This can be an empty directory or an existing directory. If it is an empty directory, a new database will be created. If there is already a `CRSPDB` in that directory, the selected `PERMNO`s will be added to that database.
Input Stock `Setid`	The database type. Use one of 10 if a daily stock database 20 if a monthly stock database
Output Stock `Setid`	The database type. Input and output stock `setid`s should be the same.
Set Wanted	A binary flag to determine the modules that will be supported in the new database. Use 32767 to support all current modules. A module that is not loaded at this time cannot be added later to that database.

Data Wanted	A binary flag to determine which modules will be copied to the new database. Use 32767 to copy all data to the new database. Data wanted must be a subset of set wanted. Individual wanted codes can be summed to load multiple modules. Individual modules codes are:
	`1 = headers`
	`2 = events (names, distributions, shares, delists, Nasdaq info)`
	`4 = lows`
	`8 = highs`
	`16 = prices`
	`32 = total returns`
	`64 = volumes`
	`128 = portfolios`
	`256 = Nasdaq bids`
	`512 = Nasdaq asks`
	`1024 = Returns without dividends`
	`2048 = spread`
	`4096 = Nasdaq number of trades or alternate price dates`
	`8192 = alternate prices`
	`16384 = groups`

Permlist file	The name of a file with a list of `PERMNOs`, one to a line. This parameter is optional. If it is used, only the `PERMNO`s in the input file will have data copied to the new database. If the parameter is not used, all `PERMNO`s in the input database will be copied.

ind_partial

This program creates a new CRSPAccess CRSPDB index database from an existing database or appends indices from one existing database to another. It can use an indno list or a data type restriction to subset the original database. It takes parameters on input and output databases, input and output set identifiers, data wanted in the new database, and optionally a file containing INDNOs to copy to the new database. Standard stock databases contain stock and indices sets.

Parameter	Values
Input CRSPDB directory path	The directory where the database is stored. Standard environment names can be used such as $CRSP_DSTK on UNIX, crsp_dstk: on OpenVMS, or %crsp_dstk% for Windows NT.
Output CRSPDB directory path	The directory where the new database will be stored. This can be an empty directory or an existing directory. If it is an empty directory, a new database will be created. If there is already a CRSPDB in that directory, the selected INDNOs will be added to that database.
Input Index Setid	The database set type. Use one of 400 if a monthly series 420 if monthly groups 440 if daily series 460 if daily groups
Output Index Setid	The database set type. Input and output index setids should be the same.
Set Wanted	A binary flag to determine the index modules that will be supported in the new database. Use 8191 to support all current modules. A module that is not loaded at this time cannot be added later to that database.
Data Wanted	A binary flag to determine which modules will be copied to the new database. Use 8191 to copy all data to the new database. Data wanted must be a subset of set wanted. Individual wanted codes can be summed to load multiple modules. Individual modules codes are: 1 = headers 2 = rebalancing information for index groups 4 = issue lists 8 = portfolio used counts 16 = portfolio total eligible counts 32 = portfolio used weights 64 = portfolio eligible weights 128 = total returns 256 = capital appreciation returns 512 = income returns 1024 = total return index levels 2048 = capital appreciation index levels 4096 = income return index levels
Indno list file	The name of a file with a list of INDNOs, one to a line. This parameter is optional. If it is used, only the INDNOs in the input file will have data copied to the new database. If the parameter is not used, all INDNOs in the input database will be copied.

crsp_stk_subset

crsp_stk_subset creates a new CRSPAccess database from an existing database by subsetting data using date range, frequency, and identifier screens. The program allows screening by date range, exchange, share type, Nasdaq National Market inclusion, and when-issued status, and can convert the frequency of time series data. Command line usage is

```
crsp_stk_subset in_dbpath out_dbpath insetid outsetid paramfile logfile [permfile]
```

The parameters are:

Parameter	Values
`in_dbpath`	Directory path where the input CRSPAccess database is stored. Standard environment names can be used such as `$CRSP_DSTK` or `CRSP_MSTK` on UNIX, `%crsp_dstk%` or `%crsp_mstk%` on Windows NT, or `crsp_dstk:` or `crsp_mstk:` on OpenVMS.
`out_dbpath`	Directory where the new output CRSPAccess will be created. The directory must not include existing CRSPAccess data and the user must have permission and enough disk space to create the resultant database.
`insetid`	The database type of the input database. Use 10 for daily stock data 20 for monthly stock data
`outsetid`	The database type of the output database. The same codes as for `insetid` are used. `Outsetid` should be the same as `insetid` unless the frequency of the standard time series is changing from daily to monthly or less frequent calendar.
`paramfile`	The name of a text file containing specifications of the subsetting to be done in converting the input database to the output database. See the following table for the subsetting options and the specifications of this file.
`logfile`	The name of an output file to be created with logging information about the input securities. Each line in the log file will contain a PERMNO and a two-letter code on the status of the input PERMNO in the output database. The codes are `OK` – the security is kept in the output database with no changes to header information. `O#` - if the security is kept, but header information is changed because the most recent information changed after removing some part of the history. Add 1 to # if header CUSIP changed, 2 if header exchange code changed, and 4 if header SIC code changed. `DT` – if the security is excluded due to date range `EX` – if the security is excluded due to exchange `SH` – if the security is excluded due to share type `WI` – if the security is excluded due to when-issued screening `NM` – if the security is excluded due to Nasdaq National Market screening
`permfile`	An optional file containing a list of PERMNOs, one to a line, of the securities in the input database to be subsetted. If this option is not given, all the securities in the database will be used.

Parameter Options Specifications

The *crsp_stk_subset* program uses an input text file to select subsetting options. The input file consists of one or more lines, each with a keyword and a value. The keywords, definitions, and rules for use are as follows

.

Keyword	Definition
bdate	The first date of valid data, in YYYYMMDD format, if a date restriction is made. If bdate is used it must be a trading date in the price calendar of the input database. edate must also be used and must be after bdate. If bdate is not used, there is no restriction by date.
edate	The last date of valid data, in YYYYMMDD format, if a date restriction is made. If edate is used it must be a trading date in the price calendar of the input database. bdate must also be used and must precede edate. If edate is not used, there is no restriction by date.
want_exch	A binary flag indicating which exchanges are kept in the output database. The following codes are used to indicate the exchanges to keep. 1 = NYSE 2 = AMEX 4 = Nasdaq If want_exch is not specified no exchange restriction is made.
shrcode	A code that determines which share types are kept in the result database. The possible values are: 1 = restrict based on CRSP NYSE and AMEX file restrictions, including share codes with a first digit of 1,2,3, 4 and 7, and any second digit. 2 = restrict based on CRSP Nasdaq file restrictions, including the same restrictions as 1, but also excluding foreign-incorporated issues. 3 = restrict based on CRSP Cap-Based Portfolios, including the same restrictions are 1, but also excluding ADRs, foreign-incorporated issues, REITs, and closed end investment funds. 4 = restrict based on CRSP Total Return Indices, including the same restrictions as 1, but also including share codes with a first digit of 9, including units including non-common components. 5 = restrict based on specific digits of the CRSP share code. If this option is chosen, shrcodel and shrcoder must be specified.
shrcodel	A string indicating which 1st digit CRSP of share codes are valid. The string is a 10-character string, with each character a 0 or 1. If the nth character in the string is a 0, securities where the first digit of the share code is n are excluded. If the nth character in the string is 1, securities where the first digit of the share code is n are kept. For example, the line shrcodel 0101000000 would be used to keep only ordinary common shares and ADRs, with CRSP share codes with a first digit of 1 or 3. Shrcodel can only be used if shrcode and shrcoder are specified.
shrcoder	A string indicating which 2nd digit CRSP of share codes are valid. The string is a 10-character string, with each character a 0 or 1. If the nth character in the string is a 0, securities where the second digit of the share code is n are excluded. If the nth character in the string is 1, securities where the second digit of the share code is n are kept. For example, the line shrcoder 1101101111 would be used to keep all secondary share types except foreign-incorporated securities and closed-end funds incorporated outside the U.S. (share codes ending in 2 or 5) Shrcoder can only be used if shrcode and shrcodel are specified.
nmscode	A numeric code that can further restrict issues trading on Nasdaq. The codes are 1 = keep National Market only 2 = keep Small-Cap only 3 = keep National Market and Small-Cap with closes reported 4 = keep Small-Cap with no closes reported only.

Keyword	Definition
wicode	A three character code used to restrict types of when-issued trading. When-issued trading is trading supported by an exchange of an issue that does not officially exist but is expected to exist in the future. The program supports three types of when-issued trading: 1 = initial – an anticipated new issue is traded before its trading status becomes official, or goes regular way. 2 = ex-distributed – a post-split or post-reorganization version of a security is traded before the ex-date, simultaneously with the regular issue, with prices independent of the regular issue. 3 = reorganization – a security undergoing a reorganization, such as a Chapter 11, trades with the expectation of returning under a plan of reorganization. CRSP subscriber databases currently include only reorganization when-issued trading. The default is to make no further restrictions. Each of the three characters in `wicode` refers to the restrictions made for that type of when-issued trading. 1st Digit = 0 to make no restrictions, 1 to erase when-issued price range and erase name information, 2 to erase when-issued price range but keep name information. 2nd digit = 0 to make no restrictions, 1 to delete ex-distributed issues 3rd digit = 0 to make no restrictions, 1 to erase reorganization when-issued price ranges but keep name information, 2 to keep reorganization when-issued price ranges but delete name information, and 3 to erase price ranges and name information
nameflag	A numeric code determining how name structures are restricted when restrictions are made using `bdate` and `edate`. The values are: 0 = keep entire name history, 1 = delete names no longer valid before range starts 2 = delete names beginning after range ends. 3 = delete names before and after ranges.
shareflag	A numeric code determining how shares observations are restricted when price ranges are restricted. The values are: 0 = erase raw shares observations out of range 1 = keep raw shares observations outside of valid price range if they are used to derive shares outstanding for any time within the kept price range. 2 = keep the last raw shares observation that predates the first trading on NYSE, AMEX, or Nasdaq if there are no valid raw shares observations once trading starts and the first exchange is valid according to exchange restrictions.
pct	Can be used to summarize Nasdaq information structures by number of market makers. If 0 or unspecified, then all Nasdaq information structures are kept. Otherwise `pct` is treated as a percentage change. If the only change in a Nasdaq information event is a market maker change from the last kept Nasdaq information structure less than `pct`, that structure is not copied to the new database.
adjdt	Base date if price, volume, or share values are adjusted. Values will be as is on this date, and adjusted in the source data using splits or other events before or after the adjustment date. The date must be in YYYYMMDD format. `adjdt` can be 0 to adjust each period so the last date in the period is used for the base date. This can be used to adjust data to the same basis before summarizing when changing the base frequency of the database.
factype	Type of adjustments made for prices. Possible values are: -1 = no adjustments will be made, cancels `adjdt` 0 = prices are adjusted for all distributions with nonzero price factors 1 = prices are adjusted only for stock splits and stock dividends
sum_code	Set to 0 if no frequency conversion will be done to create the new database and set to 1 if frequency conversion will be done. Currently only conversion from daily to monthly is supported.
sum_prc	Sets rules for loading the closing price time series when changing the base frequency of the database. Possible values are: 0 = the source price on the last day of the target period 1 = the average of the absolute values of source prices during the target period 2 = the median of the source prices during the target period. Absolute values of prices are used for ranking. Finding medians has a high cost in time and resources. 3 = no prices are loaded to the target database 4 = the nonmissing price from the source prices closest to the end of the period. The program will look in the previous and next target periods up to one hundred source periods in either direction if the last price is missing. If there is a price equally distant forward and backward, the earlier price is used. If a price is used that is not the last day of the period it is adjusted for all price factors between the last day of the period and the actual date of that price.

Keyword	Definition
sum_sp	Sets rules for loading the Bid or Low Price and Ask or High Price time series when changing the base frequency of the database. Possible values are: 0 = the last source Bid or Low Price and Ask or High Price are loaded to the target Bid or Low Price and Ask or High Price time series. 1 = the highest askhi in the source time series within the target range is loaded to askhi, and the lowest bidlo in the source time series within the target range is loaded to bidlo 2 = the highest price in the source time series within the target range is loaded to askhi, and the lowest bidlo in the source time series within the target range is loaded to bidlo. If bid/ask averages marked as negative prices are present, the absolute value of them are used for ranking, but if chosen the negative sign is kept. 3 = no Bid or Low Price or Ask or High Price data is loaded to the target database
sum_vol	Sets rules for loading the volume time series when changing the base frequency of the database. Possible values are: 0 = the sum of all volumes in the target period are loaded to the target volume time series 1 = the average of source nonmissing volumes in the target range is loaded to the target volume time series 2 = median of source nonmissing volumes in the target range is loaded to the target volume time series 3 = no volume data is loaded to the target database
sum_ret	Sets rules for loading the returns time series when changing the frequency of the database. Possible values are: 0 = no returns data is loaded to the target database 1 = source returns in the target range are compounded and loaded to the target returns time series 2 = source returns and returns without dividends are compounded and loaded to the target returns time series 3 = Holding Period Total Returns and returns without dividends are recalculated from the price time series (sum_prc cannot be 3)
sum_aux	Sets rules for loading auxiliary time series, including Bid, Ask, Number of Trades, Price Alternate, and Spread between Bid and Ask, when changing the frequency of the database. Possible values are: 0 = load the last spread in each source price range to the target database. Only the Bids and Asks stored in the Bid or Low Price and Ask or High Price time series are used. 1 = Bid, Ask, Number of Trades, Price Alternate, and Spread between Bid and Ask time series are not loaded in the target database 2 = Bid, Ask, Number of Trades, Price Alternate, and Spread between Bid and Ask time series are loaded with the following rules: The last nonmissing Price or Bid/Ask Average from the source within the target range is loaded to the Price Alternate time series. The Number of Trades time series is loaded with the corresponding dates within the source where the last nonmissing Price or Bid/Ask Average was found. Bid and Ask are loaded with the corresponding value in the last target period of the source bid and ask time series. Spread between Bid and Ask is loaded as in option 0.

Examples

The parameter file is an ASCII file where users can specify the various parameters. Here is an example of a parameter file:

```
bdate           19940103
edate           19950131
want_exch       2
shrcode         5
shrcodel        0100000000
shrcoder        0100000000
nmscode         0
wicode          0
nameflag        0
shareflag       1
pct             25
adjdt           0
factype         -1
sum_code        0
sum_prc         0
sum_sp          2
sum_vol         1
sum_ret         0
sum_spread      2
```

This file will result in a database with AMEX data for securities with a share code of 11 with data from January 3, 1994 until January 31, 1995.

5.5 Setting Secondary or Alternate Keys for a Database

crsp_stk_scd_load

This program creates secondary indexes or keys for a database. It should be used any time a new subset database is created or edits are made to an existing database. The program can create indexes on multiple keys. The program automatically erases any keys previously stored in the database.

Parameters are an input database and `setid` and a code representing the keys wanted.

Parameter	Values
Input `CRSPDB` directory path	The directory where the database is stored. Standard environment names can be used such as `$CRSP_DSTK` on UNIX, `crsp_dstk:` on OpenVMS, or `%crsp_dstk%` for Windows NT.
Input Stock Setid	The database type. Use one of 10 if a daily stock database 20 if a monthly stock database
Input wanted flag	The data required to build the index. 1 if only header data are needed to build index 3 if header data and events data are needed to build index
Index wanted flag	A binary flag to select the indices to build. 1 = `PERMCO` (only header needed) 2 = header CUSIP (only header needed) 4 = historical CUSIP (header and names needed) 8 = historical SIC (header and names needed) 16 = header ticker; active securities at the cut date of the file (only header needed) Use 31 to build all secondary indices or add the flags for one or more types.
Name of permlist file (optional)	If this parameter is supplied, it must be the name of a text file containing `PERMNO`s, one per line. If the parameter is not used, all securities in the database will be used to create the secondary indexes. If the parameter is supplied, the indexes will only be based on the securities in the permlist and other securities will be unavailable using a secondary index read.

5.6 Header File Options

crsp_stk_headall, crsp_ind_headall

This program creates header files for a stock database. It is useful primarily for a subset database. If the files are created in the same directory as the database, and the CRSP_MSTK or CRSP_DSTK environment points to the database, the search utilities will function with that database.

Parameters are an input database and setid and four output files. The output files include header information, name history information, header PERMNO/CUSIP cross-reference, and historical PERMNO/CUSIP cross-reference.

crsp_stk_headall

Parameter	Values
Input CRSPDB directory path	The directory where the database is stored. Standard environment names can be used such as $CRSP_DSTK on UNIX, crsp_dstk: on OpenVMS, or %crsp_dstk% for Windows NT.
Input Stock Setid	The database type. Use one of: 10 if a daily stock database 20 if a monthly stock database
Name history header file	A file name for the name history header file. A file with this name will be created with one line per name history event for each PERMNO. Each line contains PERMNO, PERMCO, name CUSIP, company name, ticker, exchange code, SIC code, and effective range of that name information. If the file is named headfile.dat in the database directory, the dstksearch or mstksearch utility can be used to search the file to find identifiers.
Header file	A file name for the name header file. A file with this name will be created with one line per PERMNO. Each line contains PERMNO, PERMCO, header CUSIP, latest company name, latest ticker, latest exchange code, latest SIC code, and date range.
PERMNO / CUSIP cross-reference file	A file name for a PERMNO/CUSIP historical cross-reference file. A file with this name will be created containing a row with CUSIP and PERMNO for every unique historical CUSIP assignment in the CRSP name history in the database.
PERMNO / header CUSIP cross-reference file	A file name for a PERMNO/CUSIP header file. A file with this name will be created containing a row with header CUSIP and PERMNO for every security in the database.
Date format/SIC code inclusion	Optional last parameters of 132 or yy may be selected. 132 results in a row wider than 80-characters, retaining both SIC code and four-digit years in the output. yy results in an 80-character row with two-digit years. This latter option is compatible with the format previously distributed. If *crsp_stk_headall* is run without the optional last parameter, it will not contain SIC Codes.

In the original release of the 1998 Getting Started CD, version 210, the stock header file did not contain SIC Codes. These were removed to maintain 80-characters per row with four-digit years for Y2K compliance. *crsp_stk_headall* allows the user to create the header file, including SIC Codes, in two other ways. One way exceeds 80-characters per row and is Y2K complaint. The other fits within the confines of an 80-character row but is not Y2K complaint.

For example:

```
>crsp_stk_headall mydir/10 mydir/headfile.dat mydir/cheadfile.dat mydir/
permcusip.dat mydir/cpermcusip.dat 132
```

crsp_ind_headall

crsp_ind_headall creates header files for an index database. It is useful primarily for a subset database. If the files are created in the same directory as the database, and the `CRSP_MSTK` or `CRSP_DSTK` environment points to the database, the index search utilities will function with that database.

Parameters are an input database and `setid` and one output file. The output file includes `indno`, `setid`, and index description.

Parameter	Values
Input `CRSPDB` directory path	The directory where the database is stored. Standard environment names can be used such as `$CRSP_DSTK` on UNIX, `crsp_dstk:` on OpenVMS, or `%crsp_dstk%` for Windows NT.
Input Stock Setid	The database set type. Use one of 400 if a monthly series 420 if monthly groups 440 if daily series 460 if daily groups
Index header file	A file name for the index header file. A file with this name will be created with one line per index, with `INDNO`, `SETID`, and index description. If the file is named `headind.dat` in the database directory, the `dindsearch` or `mindsearch` utility can be used to search the file to find identifiers.

5.7 Text Files Conversion between the PC and Unix or OpenVMS

Native text files on Windows use carraige return and line feed characters to mark the end of a line. Unix and OpenVMS text files use only a line feed character. This may cause problems when accessing a file on a different system than the one it was created on. CD-ROM fukes ir fuke ib BFS (Network File System) shared disks may need to be converted before using the files on a new system.

CRSP provides ASCII text files on CD-ROM with the unix conventions, excepting files only meant to be used on Windows systems. There are two utiltieis provided that can be used to convert files.

`crsp_crlf2lf` - removes carriage returns created on files created on Windows so the files can be used on Unix systems or OpenVMS systems.

`crsp_lf2crlf` - adds carriage returns at the end of lines so files created on our system can be used on Windows.

`crsp_crlf2lf` and `crsp_lf2crlf` are command line programs which take two parameters, an input file and an output file. A new file is created. For example, at the command line you would type the following,

```
>crsp_crlf2lf filename1 filename2
```

where `filename1` is the name of the file you are converting, and `filename2` is the file that you are creating with the change.

Symbols

B

C

D

H

I

M

S

T

ts_print