



CENTER FOR RESEARCH IN SECURITY PRICES

*A Research Center at Chicago Booth*

CRSP US STOCK & INDICES DATABASES

# **CRSPAccess 3.1**

# **RELEASE NOTES**

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# CHAPTER 1: CRSPACCESS 3.1

## CRSPACCESS 3.1

CRSP is pleased to release CRSPAccess 3.1. This release is designed to support the new re-engineered CRSP\Compustat Merged database. If you wish to access Compustat Xpressfeed data, this is a required release. For details about the new CCM database, please refer to the CCM Release Notes.

The single CD for this version of the CRSPAccess tools has the volume label CUPL (CRSPAccess Utilities and Programming Libraries). This represents a change from prior versions where two versions of the CDs existed; one for Stock/Stock& Indices subscribers, and one for CCM subscribers.

### SHOULD YOU INSTALL THIS RELEASE?

#### If you subscribe to the CRSP\Compustat Merged database:

- and wish to access it in the new CCM format with CRSPAccess utilities, this release is mandatory.
- and wish to access the legacy CST format with CRSPAccess utilities, this release is optional.
- and wish to program with C or Fortran:
  - ♦ C Sample programs for CCM and CST databases are provided and supported.
  - ♦ Fortran programs are not supported at this time and Fortran-95 programmers should retain CRSPAccess 2.97 and use the CST databases.

#### If you subscribe to the CRSP US Stock or Stock & Indices Databases only:

- and use CRSPAccess utilities, this release is unnecessary.

#### If you are a Windows subscriber:

- and require FORTRAN-95 program files and sample programs, continue using CRSPAccess 2.97.
- and require C program files and sample programs, this release is optional. C is supported with and without Compustat.
- Ts\_print interface for Windows was discontinued after the release of CRSPAccess 2.97. If you are relying on ts\_print or any of the other command line utilities, CRSP strongly urges you to install CRSPSift version 2.1. It contains all functionality of the CRSPAccess utilities and more.

### NOTICE TO ALL CRSP/COMPUSTAT MERGED DATABASE SUBSCRIBERS

Changes to the CCM database and CRSPSift and CRSPAccess tools used to access the new data are extensive. The intent of this release is for our subscribers to begin to explore the expanded CCM database and to understand data access with our tools. A maintenance release of the CRSP tools is planned for early 2009 that will address known issues that remain with the database and tools. We encourage and welcome your constructive comments and questions.

The following table identifies what access methods are available within each software version. The appropriate executable that is available and required for each access method is listed. A blank space indicates that a tool does not exist and no support is available at this time.

DESCRIPTION	CAGS 2.97	CMGS 2.97	CUPL 3.1			CRSPSIFT 2.1
			STK/IND ONLY	CCM	CST LEGACY	
Ts_print -CST	ts_print				ts_print_cst	X
Ts_print -CCM			ts_print			X
cst_print(legacy)	n/a	cst_print			cst_print	X
ccm_print				ccm_print		X
stk_print (legacy)	stk_print					
stk_print with ref			stk_print			X
ind_print (legacy)	ind_print					
ind_print with ref			ind_print			X
C Programs	stk_samp*.c	cst_samp*.c	stk_samp*.c	ccm_samp*.c	cst_samp*.c	
Fortran-95	stk_samp*.f90	cst_fsamp*.f90				

## SOFTWARE CHANGES

### KEYSETS 3.1

With this release of CRSPAccess we introduce the concept of **keysets**. With the CRSP Stock and Stock & Indices Databases, keysets can replace SUBNOs to identify portfolios and groups. With the CCM database, keysets are a numeric representation of secondary keys that are grouped together to distinguish series of the same items by such criteria as data format, industry format, consolidation level, and population source.

For example, Compustat's Xpressfeed language for keyset 1 is "where indfmt = 'INDL' and datafmt = 'STD' and consol = 'C', and popsrc = 'D'". CRSP has translated Compustat's language into descriptions that are found in the following table:

KEYSET	TAG	KEYSET COMPONENTS	KEYSET DESCRIPTION
			All Keysets use a Domestic POPSRC and use some form of standardized data in their DATAFMT presentation
0		Null Keyset, no variations using secondary keys	Indices
1	STD	DATAFMT = STD INDfmt = INDL CONSOL = C POPSRC = D	Industrial Format, Consolidated Information, Standardized Presentation
2	SUMM	DATAFMT = SUMM_STD INDfmt = INDL CONSOL = C POPSRC = D	Industrial Format, Consolidated Information, Standardized Summary Data from the Latest Annual Filing
3	PRES	DATAFMT = PRE_AMENDSS INDfmt = INDL CONSOL = C POPSRC = D	Industrial Format, Consolidated Information, Standardized Summary Data Collected prior to Company Amendment
4	FS	DATAFMT = STD INDfmt = FS CONSOL = C POPSRC = D	Financial Services Format, Consolidated Information, Standardized Presentation
5	PFO	DATAFMT = STD INDfmt = INDL CONSOL = R POPSRC = D	Industrial Format, Pro Forma Reporting, Standardized Presentation
6	PFAS	CONSOL = P POPSRC = D	Pre FASB Reporting
7	SFAS	DATAFMT = STD INDfmt = INDL CONSOL = P POPSRC = D	Industrial Format, Pre-FASB Reporting, Standardized Presentation
8	PRE	DATAFMT = PRE_AMENDS INDfmt = INDL CONSOL = C POPSRC = D	Industrial Format, Consolidated Information, Standardized Data Collected from the Latest Annual Filing
10	PDIV	DATAFMT = STD INDfmt = INDL CONSOL = D POPSRC = D	Industrial Format, Pre-Divestiture Reporting, Standardized Presentation
11	DOM	POPSRC = D	Domestic
12	SUPF	DATAFMT = SUMM_STD INDfmt = INDL CONSOL = P POPSRC = D	Industrial Format, Pre-FASB Reporting, Standardized Summary Data from the Latest Annual Filing
14	STD1	DATAFMT = STD INDfmt = INDL CONSOL = C POPSRC = D RANK = 1	Industrial Format, Consolidated Information, Standardized Presentation, Rank 1
15	FSFO	DATAFMT = STD INDfmt = FS CONSOL = R POPSRC = D	Financial Services Format, Pro-Forma Reporting, Standardized Presentation
16	FS1	DATAFMT = STD INDfmt = FS CONSOL = C POPSRC = D RANK = 1	Financial Services Format, Consolidated Information, Standardized Presentation, Rank 1
17	FS2	DATAFMT = STD INDfmt = FS CONSOL = C POPSRC = D RANK = 2	Financial Services Format, Consolidated Information, Standardized Presentation, Rank 2
18	SUFS	DATAFMT = SUMM_STD INDfmt = INDL CONSOL = R POPSRC = D	Industrial Format, Pro-Forma Reporting, Standardized Summary Data from the Latest Annual Filing
19	PDI1	DATAFMT = STD INDfmt = INDL CONSOL = D POPSRC = D RANK = 1	Industrial Format, Pre-Divestiture Reporting, Standardized Presentation, Rank 1
20	PFA1	DATAFMT = STD INDfmt = INDL CONSOL = P POPSRC = D RANK = 1	Industrial Format, Pre-FASB Reporting, Standardized Presentation, Rank 1
21	SUPD	DATAFMT = SUMM_STD INDfmt = INDL CONSOL = D POPSRC = D	Industrial Format, Pre-Divestiture Reporting, Standardized Summary Data from the Latest Annual Filing

KEYSET	TAG	KEYSET COMPONENTS	KEYSET DESCRIPTION
22	FS3	DATAFMT = STD INDFMT = FS CONSOL = C POPSRC = D RANK = 3	Financial Services Format, Consolidated Information, Standardized Presentation, Rank 3
23	PDI2	DATAFMT = STD INDFMT = INDL CONSOL = D POPSRC = D RANK = 2	Industrial Format, Consolidated Information, Standardized Presentation, Rank 2
24	CONS	CONSOL = C POPSRC = D	Consolidated Information
25	STD2	DATAFMT = STD INDFMT = INDL CONSOL = C POPSRC = D RANK = 2	Industrial Format, Consolidated Information, Standardized Presentation, Rank 2
26	STD3	DATAFMT = STD INDFMT = INDL CONSOL = C POPSRC = D RANK = 3	Industrial Format, Consolidated Information, Standardized Presentation, Rank 3
27	STD4	DATAFMT = STD INDFMT = INDL CONSOL = C POPSRC = D RANK = 4	Industrial Format, Consolidated Information, Standardized Presentation, Rank 4
28	STD5	DATAFMT = STD INDFMT = INDL CONSOL = C POPSRC = D RANK = 5	Industrial Format, Consolidated Information, Standardized Presentation, Rank 5
29	PFA2	DATAFMT = STD INDFMT = INDL CONSOL = P POPSRC = D RANK = 2	Industrial Format, Pre-FASB Reporting, Standardized Presentation, Rank 2
30	PFA3	DATAFMT = STD INDFMT = INDL CONSOL = P POPSRC = D RANK = 3	Industrial Format, Pre-FASB Reporting, Standardized Presentation, Rank 3
31	CUSD	CFFLAG = C POPSRC = D MKT_CURCD = USD	Calendar Based Reporting in US Dollars
32	FUSD	CFFLAG = F POPSRC = D MKT_CURCD = USD	Fiscal Based Reporting in US Dollars
33	CCAD	CFFLAG = C POPSRC = D MKT_CURCD = CAD	Calendar Based Reporting in Canadian Dollars
34	FCAD	CFFLAG = F POPSRC = D MKT_CURCD = CAD	Fiscal Based Reporting in Canadian Dollars
35	PFA4	DATAFMT = STD INDFMT = INDL CONSOL = P POPSRC = D RANK = 4	Industrial Format, Pre-FASB Reporting, Standardized Presentation, Rank 4
36	PFO2	DATAFMT = STD INDFMT = INDL CONSOL = R POPSRC = D RANK = 2	Industrial Format, Pro-Forma Reporting, Standardized Presentation, Rank 2
37	PFO1	DATAFMT = STD INDFMT = INDL CONSOL = R POPSRC = D RANK = 1	Industrial Format, Pro-Forma Reporting, Standardized Presentation, Rank 1
38	PRE1	DATAFMT = PRE_AMENDS INDFMT = INDL CONSOL = C POPSRC = D RANK = 1	Industrial Format, Consolidated Information, Standardized Data Collected before Company Amendment, Rank 1
39	FFO1	DATAFMT = STD INDFMT = FS CONSOL = R POPSRC = D RANK = 1	Financial Services Format, Pro-Forma Reporting, Standardized Presentation, Rank 1
41	GICS	INDTYPE = GICS	Industry Code Type GICS
43	FORD	CONSOL = R POPSRC = D	Pro-Forma Reporting
44	BSTD	DATAFMT = STD INDFMT = BANK CONSOL = C POPSRC = D	Bank Format, Consolidated Information, Standardized Presentation
45	BSUMM	DATAFMT = SUMM_STD INDFMT = BANK CONSOL = C POPSRC = D	Bank Format, Consolidated Information, Standardized Summary Data from the Latest Annual Filing
46	BPFO	DATAFMT = STD INDFMT = BANK CONSOL = R POPSRC = D	Bank Format, Pro-Forma Reporting, Standard Presentation
47	BASTD	DATAFMT = AVG_STD INDFMT = BANK CONSOL = C POPSRC = D	Bank Format, Consolidated Information, Average Standardized Presentation
48	BASUMM	DATAFMT = AVG_SUMM_STD INDFMT = BANK CONSOL = C POPSRC = D	Bank Format, Consolidated Information, Average Standardized Summary Presentation from the Latest Annual Filing
49	BAPFO	DATAFMT = AVG_STD INDFMT = BANK CONSOL = R POPSRC = D	Bank Format, Pro-Forma Reporting, Average Standardized Presentation

Utility-specific usage and examples of keysets are within each of their respective sections.

## MARKET CAPITALIZATION CLARIFICATION

In CRSPSift versions 2.0 and earlier, and CRSPAccess 2.97 and earlier, market capitalization is presented in the following manner:

	DAILY	MONTHLY
End of Period Market Cap	capISUBNO 0	mcapISUBNO 0
End of Previous Period Market Cap	capISUBNO 1	mcapISUBNO 1

In CRSPSift version 2.1 and CRSPAccess 3.1, market capitalization is presented slightly differently, now using different itemids rather than SUBNOS:

	DAILY	MONTHLY
End of Period Market Cap	tcapISUBNO 0	mtcapISUBNO 0
End of Previous Period Market Cap	capISUBNO 0	mcapISUBNO 0

Note that if you are using a query or request file that was created under a version other than the newest, it is necessary to modify your itemid for market capitalization in order to return correct data.

## NEW CURRENCY OPTION

Compustat has changed the way that it handles currency reporting and exchange rate translations. Compustat Xpressfeed monetary values are reported in the company's native currency and not in US dollars as in the US FTP files that were used in the legacy CST format database. Several global currency exchange rate series are provided in Xpressfeed to allow the user to convert results to other currencies based on reported currency and data type.

CRSP tools provide two currency reporting options. The default is to report Compustat data unchanged from the Xpressfeed files. A second option to force monetary values to US dollars is also provided. Data are categorized by filing statement or market data category, which match to daily, 12-month average, or 1-month average exchange rate time series to perform the translations.

Xpressfeed global exchange rate series begin January 31, 1982. While Canadian quarterly data do not appear before that date, Canadian annual data appear as early as 1957. CRSP tools report missing values if reporting Canadian data in US dollars prior to 1982.

Compustat provides an annual period description data item, CURUSCN, with a longer range showing a US Canadian exchange rate tied to each period. It is not a moving average or quite as precise as what is available in the global exchange rate data, but can be selected by CRSP tools to allow users to perform their own conversions.

## Important Note about CURRENCY:

Because underlying exchange rate data used in the currency translation are calendar-based, CURRENCY will be supported only for calendar-based output in this version of CRSPAccess. A future release of CRSPAccess may support fiscal-based output.

## LINK CHANGES

In the FTP versions of Compustat, only a company level identifier was available, and any security data came from the most representative issue of the company. The CRSP CCM database now links CRSP PERMNO to both GVKEY and Compustat's new security identifier, IID. By doing so, additional Compustat issues are identified and a CRSP PERMNO can link to Compustat data even when it is not the primary security.

Consider the following in order to access the new security level link data.

- Additional security links allow multiple PERMNOs of the same company to link to the same company level data. Users must be aware that the same company data can be retrieved in multiple ways.
- The PERMCO link is no longer needed since a secondary security can link directly between CRSP and Compustat. PERMCO can still be used to find other securities when no direct link is found.
- Security level links are available only during the range of Compustat security data. In some cases, Compustat security data are not available as far back as company data. In others, there may be gaps of security data within a company range. CRSP fills in the available Compustat company data range so that at least one link record covers all time periods in the range. If no securities are available during a range, a dummy security is generated for purposes of the link. These dummy securities always have an IID ending with X.

- CRSP assigns a LINKPRIM marker to all link records, based on the Compustat PRIMISS marker, which is used to identify the primary security for a company at any given time. LINKPRIM values are
  - ♦ P if marked by Compustat as the primary issue
  - ♦ C if marked by CRSP as the primary issue at a time when Compustat marks no securities or multiple securities.
- CRSP supports an access option to primary PERMNO, or ppermno, which restricts links to only those marked primary.
- The legacy CST format databases remain based on the old company-based links, thus using only the rows marked as primary.

### Status of Security Level Links in the CCM Database

Expanding the link to the security level requires that CRSP rebuild the link history using the new security data, CUSIPS, and ranges, and apply the existing company level link data. This process is research-intensive and is not yet complete.

#### Note to subscribers of the CCM database:

CRSP defers all documentation of Compustat data items and methodology to S&P Compustat. Please refer to Compustat's Xpressfeed documentation and support that may be found at <https://www.compustatresources.com/support/index.html>

## CRSP SOFTWARE AND DATABASE COMPATIBILITY

Below is a summary table of compatibility between software versions and either old or new databases. New databases are those with expanded daily calendars.

CRSPACCESS VERSION	FORTRAN-95	TS_PRINT, CRSP UTILITIES	C PROGRAMS
2.94/2.95 - Not officially supported	Works with databases with either original or extended calendars.	Works with databases with either original or extended calendars.	Works with databases with either original or extended calendars.
2.97	Supports all but new CCM data		
3.10	Not supported	Supported	Supported

## CRSPACCESS SUPPORTED SYSTEMS

CRSP has tested programs and libraries on these supported operating systems and compilers. More recent versions of these systems and compilers or others may be compatible, but are not fully supported.

	Operating System	CPU	FORTRAN Compiler	C Compiler	Binary	CRSPAccess Version
PC	Windows XP	Intel x86	Intel FORTRAN 9.1 and higher	MS Visual C++ 2005	IEEE - Little-Endian	2.94 or higher
SunSparc (Unix)	Sun Solaris 10	Sun Ultra	Sun FORTRAN-95 8.2 2005/10/13	Sun C 5.8 2005/10/13	IEEE - Big-Endian	2.94 or higher
Linux	Red Hat Enterprise Unix 3.0	Intel x86	FORTRAN-77- g77 3.2.3	gcc 3.2.3	IEEE - Little-Endian	2.94 or higher
			FORTRAN-95- Lahey/Fujitsu FORTRAN-95 6.20 g95 v3.5.0			2.95 or higher

Subscribers may be using several versions of CRSPAccess. Take note of the following versions and their current status:

- CRSPAccess 2.94/2.95 is marginally supported, but does not support the newly added NYSE Arca securities. No bug fixes are done. CRSP urges subscribers to move to a supported tool.
- CRSPAccess 2.97 is fully supported on all platforms, but provides no access to the new CCM data.

### SASECRSP ENGINE USERS

Note compatibility between SAS versions and CRSPAccess Version 2.97 and higher.

- SAS Version 9.1.3 – Service Pack Three is required for the SASECRSP engine to work at its best. Increased functionality includes access to Indices data and to Compustat for those who subscribe to those products. Service Pack Three or higher may be downloaded from the SAS website at:
  - ♦ [http://ftp.sas.com/techsup/download/hotfix/d9\\_sbcs\\_prod\\_list.html](http://ftp.sas.com/techsup/download/hotfix/d9_sbcs_prod_list.html) CRSPAccess Libraries and Software

### CRSPACCESS LIBRARIES & SOFTWARE FOR C

CRSPAccess tools contain the software, sample programs and libraries, and precompiled utility software needed to access the CRSP stock, indices and CCM databases using C language. Features include:

- CRSPAccess database format featuring binary data and programming libraries with sample C programs for supported platforms. (FORTRAN-95 will be supported in forthcoming releases.)
- Installation process which loads program files and sets up environment variables needed to use the programming libraries and utility software
- Precompiled utility software designed to dump data and perform name list searches without programming
- Supported C programs and libraries. C access

supports direct access and extended data utility functions

### CRSP GUIDES

All CRSP User Guides and Manuals are available on our website at:

[www.crsp.ChicagoBooth.edu/documentation](http://www.crsp.ChicagoBooth.edu/documentation)

## CHAPTER 2: TS\_PRINT CHANGES

### TS\_PRINT CHANGES

Substantial changes were made to the 3.1 version of ts\_print. Changes were made to support the new CRSP\Compustat Merged Database created from Compustat's Xpressfeed data delivery system. This new version of ts\_print includes changes affecting access of CRSP Stock and Indices databases.

**Important note:** This version does not support the legacy CST format of the CRSP\Compustat Merged Database. Support for the legacy version will continue under the executable named ts\_print\_cst. That program is a renamed version of the ts\_print executable and except for its name, remains unchanged.

### GROUPID

Support for the GROUPID selection names is no longer supported. Items are now selected by their individual names only.

### ITEMID NAME CHANGES

#### KEYSET USAGE FOR STOCK IN TS\_PRINT

The porttype and grouptype values for Portfolios and Groups may be accessed as either porttype and grouptype values or keyset offsets.

- Daily porttype values 1-9 equate to keyset values 101- 109
- Monthly porttype values 1-8 equate to keyset values 201- 208
- Grouptype values 1-50 equate to keyset value 301-350.
  - ♦ Note that S&P 500 Constituents is the only valid group, represented by grouptype 16 or keyset 316.

The advantage to using keyset offsets is that they provide unique values across all frequencies of databases.

#### Example:

ITEMID porttret | keyset 101

is equivalent to

ITEMID porttret | subno 1

### Stock Items

In order to eliminate confusion that existed in prior versions of CRSPAccess caused by using the same name for different fields in both distribution events and time series items, two stock items have been renamed.

ITEM NAME	DESCRIPTION	OLD TS_PRINT ITEMID	NEW TS_PRINT ITEMID
Factor to Adjust Price	Ratio of old shares to new	(M)FACPR	(M)FACPRC
Dividend Amount	Total dividend amount paid in the period	(M)DIVAMT	(M)TDIVAMT

### *Count, Cap, Weight Items Reorganized*

ITEM NAME	OLD ITEMID	NEW STOCK ITEMID* (TS_PRINT)	NEW INDEX ITEMID (IND_PRINT)	NEW PORTFOLIO ITEMID (STK_PRINT)
Total Count	(M)CNT subno 0	(M)TCNT	(M)TOTCNT	(M)TPCNT
Used Count	(M)CNT subno 1	(M)CNT	(M)USDCNT	(M)PCNT
Capitalization, End of Period	(M)CAP subno 0	(M)TCAP	(M)TOTVAL	n/m
Capitalization, End of Previous Period	(M)CAP subno 1	(M)CAP	(M)USDVAL	(M)WEIGHT

\*Stock ITEMID names are used for securities, indices, and portfolios in ts\_print.

Note: Old ITEMID, (M)WEIGHT, is no longer available for Portfolio entities. Portfolios would use (M)CAP, Capitalization, End of Previous Period.

### Index Level and Portfolio Items

Index level and portfolio statistic items have new ITEMID names:

ITEM NAME	OLD ITEMID	NEW ITEMID
Index Level of Total Returns	(M)IIND	(M)TLVL
Index Level of Returns without Dividends	(M)AIND	(M)ALVL
Index Level of Returns on Income	(M)IIND	(M)ILVL
Portfolio Statistic	(M)PORTSTAT	(M)STAT

## Derived Volume Item Changed

In order to provide an ITEMID for derived volume found in ts\_print that does not duplicate the new stk\_print mnemonic for the native version of volume, the ts\_print ITEMID has been changed.

ITEM NAME	OLD ITEMID	NEW ITEMID
Total Volume	(M)VOL	(M)TVOL

## PROGRAMMING CHANGE TO CRSPLIB.LIB

A change was made to the crsp\_trans\_median function in the crsplib.lib file. It is used for calculating median values for volume. In previous version of CRSPAccess, values were rounded down when averaging two middle values. In this version, we round up. This change impacts the volmed itemid in both new and legacy versions of ts\_print.

## CCM CHANGES IN TS\_PRINT

### **ITEM ACCESS CHANGE**

All Compustat items in the CCM database, except for Operating Segment items and those only available for indices, are available in ts\_print by itm\_name and keyset. The item numbers used in CST versions are not longer supported.

For example, ITEMID iaitem|subno 12 is now ITEMID SALE|KEYSET 1

## NEW CCM OPTIONS IN TS\_PRINT

### **CURRENCY**

CURRENCY - forces all output for any monetary item to a given currency. It is followed by codes:

- ♦ USD - US dollars
- ♦ REP - as reported by Compustat. This is the default.

In the OPTIONS section of a ts print request file, CURRENCY is used in the following way:

### OPTIONS

```
X ITEM,NO|Y DATE,YES|Z ENTITY,YES,3|OUTNAME
ts_ccm_all.out|NOFILL FIELDDELIM
p|COMPACT|CURRENCY USD
```

### **PRIMARY**

The PRIMARY option determines the links that will be used when linking Compustat data to CRSP PERMNOs. If PRIMARY is present, then only primary links are included based on the LINKPRIM qualifier of the link history. All other links are discarded. This will ensure that a company with multiple issues is only included once in the output.

### OPTIONS

```
X ITEM,NO|Y DATE,YES|Z ENTITY,YES,3|OUTNAME
ts_ccm_all.out|NOFILL FIELDDELIM
p|COMPACT|CURRENCY USD|PRIMARY
```

### **NEW CCM SEMI-ANNUAL CALENDAR**

A new semi-annual output calendar is provided that can be used in any request. The CALNAME used is semiann.

```
CALNAME semiann|RANGE1980-2008|OUTNAME
semiann.out
```

Compustat now includes semi-annual data items and CRSP provides these items as semi-annual time series. Be aware that Compustat provides one value per year at the midpoint between fiscal year-ends. Annual or quarterly items must be used to fill in the second half of the fiscal year.

CRSP software first looks for the daily stock calendar, then the monthly stock calendar, then the CCM calendar. Because the semi-annual calendar resides only in the CCM database, its use requires an override of the CRSP daily and monthly calendars.

To invoke ts\_print and override the calendar, use the following:

```
ts_print.exe filename.rqt output.out "CRSP_
CAL=CRSP_CCM"
```

## CHAPTER 3: STK\_PRINT CHANGES

### STK\_PRINT CHANGES

#### CHANGES TO STK\_PRINT ITEM NAMES

Changes have been made to the item codes as well as how they are used. Codes can no longer be merged with a single slash. They must be separated, and each item code must be preceded by a slash (/).

For example, a valid command in previous versions of CRSPAccess, `/hrdd`, would now be written `/hr /dd`.

Single-character item codes in `stk_print` have all been replaced with new two-character codes.

ITEM NAME	OLD SINGLE-CHARACTER ITEM CODE	NEW TWO CHARACTER ITEM CODE
Name Histories	/n	/nm
NASDAQ Trait Histories	/q	/qi
Group Information	/g	/gp

Raw data item names, formerly two-character codes, have been changed and are now mnemonics. Data item mnemonics for monthly data items differ from daily in that monthly all begin with "m." Mnemonics are not case sensitive.

ITEM NAME	OLD TWO-CHARACTER CODE	NEW DAILY MNEMONIC	NEW MONTHLY MNEMONIC
Closing Price	/pp	prc	mprc
Total Return	/pr	ret	mret
Return without Dividends	/px	retx	metx
Shares Outstanding	/ps	shr	mshr
Bid or Low Price	/pl	bidlo	mbidlo
Ask or High Price	/ph	askhi	askhi
Volume	/pv	vol	mvol
Bid	/pb	bid	mbid
Ask	/pa	ask	mask
Number of Trades	/pn	numtrd	
Alternate Price Date	/pn		maltprcdt
Open Price	/po	openprc	
Alternate Price	/po		maltprc

ITEM NAME	OLD TWO-CHARACTER CODE	NEW DAILY MNEMONIC	NEW MONTHLY MNEMONIC
Exchange Price	/p2	exchprc	
Spread	/p2		mspread

#### STK\_PRINT NEW SYNTAX FOR ITEM ACCESS

In addition to changing the above itemids from the two character codes to item mnemonics, new codes `/ml` - mnemonic list items, or `/mf` - mnemonic file, precede the mnemonics or filename.

- `/ml` is used to access a list of items entered on the command-line.  
`/ml prc;vol;ret;retx`
- `/mf` is used to access an existing user-created text file that contains a single column of mnemonics.  
`/mf item.file`

Group ids in `stk_print` continue to work. These include

- ♦ `/dd` - askhi, bidlo, closing prices, volume, and returns
- ♦ `/dr` - closing prices, total returns, returns without dividends
- ♦ `/dx` - closing prices, shares, and returns

#### KEYSET USAGE FOR STOCK IN STK\_PRINT

The portype and grouptype values for Portfolios (`/dy`) and Groups (`/gp`) may be accessed as either portype and grouptype values or keyset offsets.

- Daily portype values 1-9 equate to keyset values 101- 109
- Monthly portype values 1-8 equate to keyset values 201- 208
- Grouptype values 1-50 equate to keyset value 301-350.
  - ♦ Note that S&P 500 Constituents is the only valid

group, represented by grouptype 16 or keyset 316.

The advantage to using keyset offsets is that they provide unique values across all frequencies of databases. Stk\_print maintains an offset for each group so the user can specify the porttype or grouptype or the actual keyset. If the value is nonzero and less than 100, the offset is applied, so either the value or keyset notation selects the same series.

Keysets are supplied as a period followed by a \* for all, or a list for specific selections. If there is no period, then the default is used.

For example, /dy or /dy.1 or /dy.101 will return portfolio type 1 (daily keyset 101) and /dy.\* will return all portfolios.

### STANDARDIZED PARAMETERS FOR DERIVED ITEMS

CRSP has standardized options with multiple parameters. Two items are affected, /ds used to adjust

base dates and amounts for indexing values, and /dy, the toggle used to adjust price, volume, and shares values for splits or all price factors.

COMMAND	OLD SYNTAX	NEW SYNTAX
/ds	/ds YYYYMMDDI###.###I	/ds YYYYMMDD;###.###
/dj	/dj YYYYMMDD#	/dj YYYYMMDD;#

### NEW WIDTH OPTION AVAILABLE FOR STANDARD OUTPUT

A new option, /wi#, may be used with the /fr (standard report output) command to allow control over the output width. Blocks are created to fit available fields within the width that the user has specified. The width must be at least large enough to fit the keys needed for each group. Width selection must be between 40 and 2048 characters. The default width is 80 characters, that which has been used in previous CRSPAccess versions.

### STK\_PRINT OPTION BEHAVIOR CHANGES

COMMAND	DESCRIPTION	BEHAVIOR CHANGE
/hh	Header Information	No longer includes the number of names, distributions, delists and nasdins. Header ticker is now ordered third after CUSIP and the ranges are on the first line.
/hr	Header Information w/ Date Ranges	Formatting of headers is different. In delimited output, the available portfolios and available groups are now included in the output. All other fields are included and in the same order as they previously were.
/hrl	Header with Calendar Date Number Ranges	Replaced with /hl. Only one of /hr or /hl may be used in one report.
/nm	Name Histories	Formerly /n. Name history output in the delimited output pads fields for CUSIP, ticker, and company name to occupy all available spaces. The order of the fields is unchanged.
/de	Delisting Information	Delisting information now wraps to a second line with the default formatting. Output spacing is slightly different, but fields and order remain unchanged.
/di	Distribution Information	Spacing is slightly different. Fields and order of fields is unchanged.
/xn	Extended Name Information	In both delimited and standard formatted outputs, all standard and extended names fields are included. Previously formatted only had extended fields and didn't match with the delimited output.
/an	Additional Name Information	In both delimited and standard formatted outputs, all names fields are included. Previously, formatted only had the additional names fields not found in /nm and /xn. Only one of /nm, /xn, or /an should be used in one report to avoid redundant output.
/ds	Set Based Date	The formatted output is now printed with only two decimal places.

# CHAPTER 4: IND\_PRINT CHANGES

## IND\_PRINT CHANGES

### NEW DEFINED INDEX TYPES

Ind\_print supports preset defined index types. Logical groups of data are accessed using the following commands:

/lv includes the equivalent of  
TIND;AIND;USDCNT;USDVAL

/re includes the equivalent of  
TRET;ARET;IRET;USDCNT;USDVAL

/cv includes the equivalent of  
USDCNT;USDVAL;TOTCNT;TOTVAL

When using with index groups, all three index types can be followed by “.\*, or .#.#,# to extract all portfolios or to specify a list of portfolios.

### NEW ITEM OPTION SPECIFICATIONS AND SYNTAX

Like stk\_print, ind\_print uses the new /m\* option to extract data items. The /m\* precedes either a list of item mnemonics or a file:

- /ml is used to access a list of items entered on the command-line.

```
/ml tind;totval
```

- /mf is used to access an existing user-created text file that contains a single column of mnemonics.

```
/mf item.file
```

New item mnemonics are listed in the following table. Mnemonics are listed for single series data. If group data are requested, the mnemonics are followed by a “G”.

For example, use TRETG for daily Total Return data for a group. For monthly Total Return data for a group, use MTRETG.

ITEM NAME	OLD TWO-CHARACTER CODE	NEW DAILY MNEMONIC	NEW MONTHLY MNEMONIC
Total Return on Index	/tr	TRET	MTRET
Total Return Index level with Dividends	/ti	TIND	MTIND
Portfolio Return without Dividends	/ar	ARET	MARET
Portfolio Index Level without Dividends	/ai	AIND	MAIND
Income Return on Index	/ir	IRET	MIRET
Income Return Index Level	/ii	IIND	MIIND
Used Count	/uc	USDCNT	MUSDCNT
Used Value	/uv	USDVAL	MUSDVAL
Total Count	/tc	TOTCNT	MTOTCNT
Total Value	/tv	TOTVAL	MTOTVAL

### USING KEYSSETS WITH INDEX DATA GROUPS

Keysets are now used to identify the portfolio numbers for index groups. Keyset numbers are assigned to make keysets unique across all products. A user can select specific or sets of portfolios using keyset qualifiers. A full discussion and examples of usage are available in the [CRSP Utilities Guide](#).

#### **/pf Discontinued**

The /pf option, used to extract portfolios from index groups, is no longer supported. Portfolios are now attached to each specified item.

#### **/rb Syntax**

The syntax has changed for Rebalancing information commands.

Old syntax was /rb [# , #-#]

New syntax is /rb.[# , #-#]

Example /rb.1, 9-10

The output fields are in a different order and the format is slightly different.

## OUTPUT FORMAT CHANGES

### NEW WIDTH OPTION AVAILABLE FOR STANDARD OUTPUT

As with `stk_print`, a new option, `/wi#`, may be used with the `/fr` (standard report output) command to allow control over the output width. Blocks are created to fit available fields within the width that the user has specified. The width must be at least large enough to fit the keys needed for each group. Width selection must be between 40 and 2048 characters. The default width is 80 characters, that which has been used in previous CRSPAccess versions.

### STANDARD REPORT FORMAT

Formats are fixed and set based on reference data instead of pre-defined fixed formats. For some types of data such as headers, the same items may not fit the same way on 80-character windows, and the formatted headers could have different text and width.

### PIPE-DELIMITED FORMAT

Pipe-formatted output has not changed, so programs expecting delimited input require no changes.

### PORTFOLIO SERIES FOR INDEX GROUPS

In formatted output mode, previous versions of `ind_print` allowed multiple portfolios on a line if there was enough room. In this version of `ind_print`, multiple portfolio series for index groups will always report one portfolio at a time with headers set apart.

### INDEX SERIES TIME SERIES

Time series output in delimited mode for index series no longer includes a field for portfolio number. This number was always "1" in previous versions of `ind_print` and carried no relevant meaning.

## OTHER IND\_PRINT BEHAVIOR CHANGES

COMMAND	DESCRIPTION	BEHAVIOR CHANGE
<code>/hh</code>	Indices Header Information	Slightly different formats. Ind name and Group name are reported with normal header formats. Using <code>/fs</code> to return delimited output, the name lengths are slightly larger.
<code>/hr</code>	Extended Indices Header Information	Formats are different. Each item has its own header and no separate sections for different types of index descriptions.

# CHAPTER 5: NEW CCM\_PRINT

## NEW CCM PRINT

New documentation has been written for ccm\_print. Please refer to the Utilities Guide for Stock and Compustat subscribers on the CRSP website for full explanations of usage and new features.

[http://www.crsp.ChicagoBooth.edu/documentation/software/ccm/reporting/ccm\\_print/](http://www.crsp.ChicagoBooth.edu/documentation/software/ccm/reporting/ccm_print/).

### IMPORTANT NOTE

ccm\_print.exe is used to access data from the new CCM-format database, created using Compustat's Expressfeed delivery. Subscribers wishing to continue using the old CST-format database will continue using the cst\_print executable. CRSP expects to continue support for cst\_print for another year.

CCM fiscal year data presentation differs from that which is used to present the legacy CST data. In the new CCM\_PRINT, the CRSP default is CAL, the calendar year in which fiscal year ends. The default for the CST databases is Data Year - the year in which most activity occurred. When using CCM\_PRINT, retrieving data in its Data Year is represented by FYR, and achieved by toggling /dd fyr. The command, /dd cal, will toggle back to calendar.

CST_PRINT (LEGACY)			
/ia 12			
	Default cst_print		
Data	Fiscal	Item 12	
Year	Yearend	SalesNet	
2000	5	10859.67	
2001	5	9673	
2002	5	9475	
<b>2003</b>	<b>5</b>	<b>10156</b>	
2004	5	11799	
2005	5	14380	
2006	5	17996	
/dd			
Cal	Fiscal	Item12	
Year	Yearend	SalesNet	
2000	5	10130.13	
2001	5	10859.67	
2002	5	9673	
2003	5	9475	
<b>2004</b>	<b>5</b>	<b>10156</b>	
2005	5	11799	
2006	5	14380	
2007	5	17996	

CCM_PRINT			
/ml sale			
	Default ccm_print (/dd cal)		
	DATADATE	SALE	
	20000531	10130.13	
	20010531	10859.67	
	20020531	9673	
	20030530	9475	
	<b>20040528</b>	<b>10156</b>	
	20050531	11799	
	20060531	14380	
	/dd fyr		
	Year	FYRA	SALE
	1999	5	10130.128
	2000	5	10859.672
	2001	5	9673
	2002	5	9475
	<b>2003</b>	<b>5</b>	<b>10156</b>
	2004	5	11799
	2005	5	14380
	2006	5	17996

## DATA GROUP ACCESS CHANGES

Several codes used to access groups of Compustat data have been modified in the new CCMXpressfeed version of the merged database. The following table includes old and new codes:

ITEM NAME	GROUP NAME	OLD CST CODE	NEW CCM CODE
Company Header	COMPANY	/h	/co
Company Link History	LINK	/l	/li
Link Used History	LINKUSED	/ul	/lu
CST Header History	CSTHIST	/h	/nh

Ccm\_print includes new groups of data that may be accessed using the two-character CCM codes preceded with a slash “/”. These items are found in the following table:

NEW ITEM GROUP NAME	GROUP NAME	CCM CODE
Company Header History	COMPHIST	/ch
Company Summary	COMPsumm	/cs
Company Link Range History	LINKRNG	/lr
Officer Title	OFFTITL	/ot
Company Master	MASTER	/ma
Operating Segment Currency	CCM_SEGcUR	/sr
Operating Segment Customer	CCM_SEGcUST	/sc
Operating Segment Detail	CCM_SEGDTL	/sd
Operating Segment Geographic Area Codes	CCM_SEGGEO	/sg
Operating Segment Item	CCM_SEGITM	/sm
Operating Segment NAICS	CCM_SEGNAICS	/sy
Operating Segment Product	CCM_SEGPRD	/sp
Operating Segment Source	CCM_SEGSRC	/ss
Company Filing Date Data	CCM_FILEDATE	/fd
Company Audit Data - Annual	CCM_AAUDIT	/ua
Company Audit Data – Quarterly	CCM_IAUDIT	/ia
Company Adjustment Factor Event History	ADJFACT	/aj

NEW ITEM GROUP NAME	GROUP NAME	CCM CODE
Company Industry Presentation Code	CCM_IPCD	/ip
Company Fortune 500 Ranking Data	FORTUNE	/fo
Company Market Data - Annual	AMKT	/am
Company Market Data - Quarterly	IMKT	/qm
GICS History	HGIC	/gh
Security Header List	SECLIST	/sl
Security Header	SECURITY	/se
Security Header History	SECHIST	/sn
Security Monthly Stock Split Events	SEC_MTHSPT	/tx
Security Monthly Stock Split Events Footnotes	SEC_MSPTFN	/tf
Security Monthly Stock Dividend Events Footnotes	SEC_MDIVFN	/td
Constituent Mapping	IDXCST_HIS	/im
Security S&P Index Old Format Change Events	SEC_SPIND	/is
S&P Index Constituent Descriptor Change Events	SPIDX_CST	/ix
Index Header	IDX_INDEX	/in
Index Header Pre-GICS	SPIND	/ih
Annual Index Period Descriptor	IDXADES	/xa
Quarterly Index Period Descriptor	IDXQDES	/xq

## PROGRAMMING CHANGES

### FORTRAN 95

Programmers using Fortran-95 will need to continue working with the CST legacy database and should continue using their current working version of CRSPAccess. Support for Fortran-95 use with the new CCM databases will be forthcoming.

### C PROGRAMMERS

Numerous item handling and usage changes have been made in CRSPAccess 3.1. The Programming pages of The CRSP\Compustat Merged Database Guide detail handling changes and provide a structure table, item usage and examples.

## CRSP\_DLL.LIB

crsp\_dll.lib is not available in this release of CRSPAccess. It will be available in subsequent releases. If you require this before it is again included in the software, contact Client Services at support@crsp.ChicagoBooth.edu or 312.263.6400, option 2.

## NEW C SAMPLE PROGRAMS

Five new sample programs are provided in the Sample folder of the CRSPAccess software that may be used to access data from the new CCM database. A make file has also been created.

- ccm\_samp1.c - Read full CCM database sequentially by GVKEY and GVKEYX
- ccm\_samp1a.c - Read full CCM database sequentially by GVKEY and GVKEYX showing security-level headers.
- ssm\_samp2.c - Read an input file of GVKEYs and output various types of Sales data
- ccm\_samp3.c - Demonstrates the use of securities data by reading an input file of GVKEYs and IIDs.
- ccm\_samp4.c - Reads full CCM database sequentially by CRSP PERMNO, using the link history to build a composite GVKEY history of all Compustat data.

CST sample programs are still provided and supported for use with the legacy CST databases.

# CHAPTER 6: INSTALLATION

---

## INSTALLATION

### INSTALLSHIELD

CRSP utilizes the InstallShield wizard-driven installation process that is used for both CRSPAccess software and accompanying data. Data are compressed on DVD. Data files are not directly accessible from the DVD and must first be installed.

A single CD with CRSPAccess software (Volume label CUPL) is available to both Compustat/Merged and Stock and Indices database subscribers.

### **PLEASE NOTE:**

- *Installation over a previous version of CRSPAccess software:* CRSP strongly recommends executing one of the following two actions before installing CRSPAccess 3.1 directly into a location that contains a prior version of the software. This will insure a clean installation. Either:
  1. Uninstall the older version before installing CRSPAccess 3.1, using either the uninstall command from the CRSPAccess menu, or using Add/Remove programs through the Control Panel, or
  2. First rename the old folder containing the CRSPAccess software then install CRSPAccess 3.1 into a folder with the name you wish to use. For example, if you have CRSPAccess 2.97 on your computer in a folder named CRSP, first rename this folder to something such as CRSP297 or CRSP\_old. When installing CRSPAccess 3.1, it may now be installed into a new folder named CRSP.
- *Windows Command Prompt:* The new InstallShield<sup>®</sup> bypasses the need for users to set path variables. A shortcut labeled CRSP Command Prompt is available in CRSPAccess from the start menu. To run the command line utilities, this shortcut will set the environment variables and open a DOS window. To use the command prompt from Accessories or by running cmd.exe, you will need to manually set your path in the command window

with the following:

```
set path=%crsp_bin%;%path%
```

- *Uninstall for Windows:* You will find Uninstall programs in your CRSPAccess folder. Uninstall CRSPAccess 3.1 will uninstall the software only. It will not touch the data. The Uninstall “Data Product Name” will uninstall data only and not touch the software. To do a complete uninstall of both software and data, you will need to run all relevant uninstalls.
- *New Client Environment:* The client\_environment.exe is used to set the environment variables needed to run CRSPAccess for multiple or single users. This can set variables at either the user or system level. A new client\_environment.exe is included in the 3.1 release of CRSPAccess. It provides space to add an additional environment variable needed for the new CCM database and retaining access to the legacy CST version of the database. Stock or Stock & Indices- only subscribers should leave the areas for the CRSP\Compustat Merged Databases blank. Client\_environment.exe is located in the accbin folder of CRSPAccess.

### INSTALLATION

The following screen shots and instructions were written from the InstallShield<sup>®</sup> procedures for Windows systems. The installation is very similar for all supported operating systems, so these systems are all served by this one set of instructions. Differences between systems lie primarily in accessing the CD and how the paths are defined. Where there are differences, they are clearly noted.

**NOTE TO SUN SOLARIS USERS:**

On Sun Solaris, the CD-ROM / DVD drive must be mounted with HSFS format in order to execute the Setup program. To switch to HSFS, there may be several options to mount. One such option is to use the command:

```
mount -F hsfs (or udfs) mount_
entry mount_point
```

For example:

```
mount -F hsfs /vol/cdrom /cdrom/
cupl_ver295
```

Some users wish to install remotely from a copy of the disk. To do this, the CDROM/ DVD drive must be mounted with the UDFS format. Once the disk is copied to the hard drive, in order to execute the Setup program, the permissions may be changed with the following command:

```
find . -exec chmod 755 {} \;
```

**Windows:**

To install the CRSP Access software, insert your CD and from Start, select **Run**. Browse the CD and click on `setupwin32.exe`. Click **OK**. The Install Splash screen will pop up on your screen and disappear. A few moments may follow before the install process begins. Once the installation initiates, you will be guided by the InstallShieldC Wizard.

**Sun Solaris:**

Upon insertion of the CD, a terminal will open with the file, `setup_solaris.bin`. Double click on this setup file to begin the installation process.

**Linux:**

Upon insertion of the CD, a terminal will open with the file, `setup_linux.bin`. Double click on this setup file to begin the installation process.

After you have clicked **Next** on the Welcome screen, scroll through and read the CRSP Data and Utilities Agreement. Click to accept the terms of the license agreement, and assuming you do, click **Next**.

**Windows:**

The default directory for the software installation is `c:\crsp`. You may accept or modify it. We recommend creating a folder that reflects the version of the software that you will be using. In this case, modify the directory to `c:\crsp`. This is your CRSP root directory. Click **Next**.

**Sun Solaris & Linux:**

The default directory for the software installation is `/crsproot`. You may create your own root folder, for example, `/home/username/crsp310`.

While you will see both Typical and Custom setup options for CRSPAccess installation, at this time, there is not a difference between the two. The default option is Typical. Click **Next**.

**Windows:**

Summary information is displayed: Location, software features, and the amount of space that will be used. Click **Install**.

Sun Solaris & Linux:

The root directory that will appear on the screen, based on the previous suggestion would read

`/home/username/crsp310`. Click on **Install** to

proceed.

### Windows:

The status of your installation will appear.

Sun Solaris & Linux:

The root folder that will appear will be `/home/username/crsp297/accbin`.

ENVIRONMENT VARIABLE	USAGE
CRSP_MSTK	CRSP Monthly Database directory (if available)
CRSP_DSTK	CRSP Daily Database directory (if available)
CRSP_CST	CRSP/COMPSTAT Merged Database directory (if available) - Legacy CST version
CRSP_CCM	CRSP/Compustat Merged Database directory (if available) - New CCM version
CRSP_INCLUDE	Programming header files; include subfolder of root
CRSP_SAMPLE	Sample programs; sample subfolder of root
CRSP_LIB	Object libraries; acclib subfolder of root (control files)
CRSP_BIN	Executables and scripts; accbin subfolder of root
CRSP_ENV_ULOG	Usage logs produced by users; =CRSP_LOG
CRSP_ENV_ELOG	Error logs produced by users; =CRSP_LOG
CRSP_ENV_ROOT	Variable must point to the most recent CRSPAccess database installed on your system
CRSP_WORK	Directory used to store user-generated files

## PC NETWORK INSTALLATION OF CRSPACCESS

A message indicating the success of the installation appears when the process is complete. Click **Finish**.

### Sun Solaris & Linux:

After clicking Finish, a file, `crsp.kshrc` must be run if you are setting the environment variables locally. At the prompt, type:

```
>. ./crsp.kshrc <enter>
```

## CRSPACCESS ENVIRONMENT VARIABLES

ENVIRONMENT VARIABLE	USAGE
CRSP_ROOT	Top level program directory. Most other CRSP environment variables are set based on CRSP_ROOT
CRSP_LOG	Log directory used for user

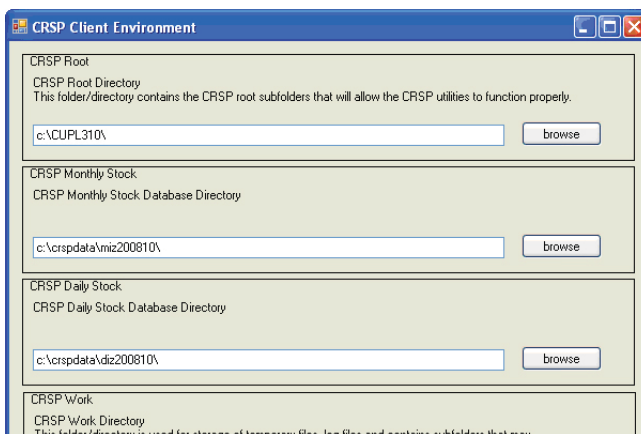
CRSPAccess can be installed on a Windows network with Windows XP clients. Data, programs and libraries are loaded to a server machine that can be accessed by clients with access to the data. A separate client installation program is provided to configure the clients. Configuring a client involves installing program shortcuts to CRSP programs and setting environment variables on the client workstation. The executable, `client_environment.exe` is located in the `crsproot\accbin` folder and may be set to run on the user or system level.

- `client_environment.exe` run on the user level sets the environment variables on a computer for the current user.
- `client_environment.exe` on the system level sets the environment variables on a computer for all users of that machine and requires administrator privileges to run.
- The environment variable `CRSP_WORK` is defined. The directory defined by `CRSP_WORK` must have write permission established for the intended users. This directory is used as storage for temporary files, log files and is a recommended location for user created folders and files. The `ts_print` interface File

Browse dialog boxes default to this directory.

**The following steps will configure a client:**

1. Run software and data installs first on the server machine. The program and data disks must be accessible and mapped on the client workstation. The client installer must know the path of the CRSP root folder and monthly and/or daily data folders in terms of the client disk mappings.
2. From the client workstation, execute the desired client install. `client_environment.exe` is located in the `crsproot\accbin` folder and should be run from this location.
3. Select whether the environment variables are to be set at the user or system level. Identify file locations for the programs and databases.
4. File locations will default to what is currently set on the system. If new databases or software are replacing existing versions and if the same data locations are used, it is not necessary to reset the environment variables.
5. Once locations are defined, click DO. DONE will appear in the lower left hand corner of the screen once the environment variables and shortcuts are set. The `client_environment` tool will be included with the Start Menu shortcuts in case future changes are needed.
6. The Remove option is useful for moving settings from user to system or vice versa. The Remove option erases all CRSP environment variables and shortcuts, thus should be used with caution. CRSP recommends making note of the variables and locations before running this option.



## LINUX AND SUN SOLARIS ENVIRONMENT VARIABLES

CRSP Environment variables must be set for the CRSPAccess programs to work properly on any of the Unix platforms. The installation setup shell script creates a `ksh` initialization script that can be executed for an account to set CRSP environment variables. CRSP also provides stand-alone `ksh` and `csh` shell scripts that prompt for directories and create initialization scripts. If directory locations change, the setup scripts can be used to recreate the installation files, or the installation files can be edited directly.

The `ksh` initialization script created by the installation is named `crsp.kshrc`. The new script can be incorporated into all accounts by the system administrator, sourced into initialization files directly by individual users, or executed as needed.

To use a stand-alone script for generating an initialization script file, follow these steps:

1. `cd` to the root directory where program files have been loaded.  
`cd accbin`
2. If you are running `csh` shell, enter  
`source crsp_setup.csh`  
If you are running `ksh` or `bash` shell, enter  
`crsp_setup.sh`
3. The script will prompt for data, root, and log directories. Follow the instructions on the prompts in terms of trailing slashes in directory names.
4. The script will create new scripts, `crsp.cshrc` in `csh` or `crsp.kshrc` in `ksh`.

One method of incorporating CRSP initializations for `csh` users is:

Move the file `crsp.cshrc` to the `/local/bin` or other common directory.

Add `source /local/bin/crsp.cshrc` to the `.cshrc` file of each account using CRSP.

One method of incorporating CRSP initialization for `ksh` users is:

Move the file `crsp.kshrc` to the `/local/bin` or other common directory.

Add `. /local/bin/crsp.kshrc` to the `.kshrc` file of each account.

Add the line `ENV=$HOME/.kshrc` to the `/etc/.login` file.

One method of incorporating CRSP initialization for bash users is:

Move the file `crsp.kshrc` to `/etc`, or another common directory readable by all.

Add `/etc/crsp.kshrc` to the `.bashrc` file of each account that will use CRSP

`env | grep CRSP` can be used to check the CRSP environment variables set.

The script produced by the CRSP setup script also adds the `$CRSP_BIN` directory to the users' path.

# CHAPTER 7: C ACCESS ON SUPPORTED SYSTEMS

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## C ACCESS ON SUPPORTED SYSTEMS

### WINDOWS SYSTEMS

CRSP supports Windows XP. All C libraries and sample programs were compiled and tested using the Microsoft Visual Studio 2005.

CRSP access relies on environment variables set during installation. The environment variables can also be set through the client\_environment tool or Control Panel/System/Advanced/Environment menu on Windows XP. Environment variables can be used in command prompt windows with the name enclosed in percent (%) characters. The `set` command can be used in a command prompt window to show available environment variables. (e.g. `>set crsp`). See Installation Procedures (Page 9) for information on installing the CRSPAccess data and programs.

Important CRSP files and directories have the following names.

**%crsp\_bin%** - folder containing executable sample programs and batch files. This folder should be in the PATH so programs can be run from any folder.

**%crsp\_lib%** - folder containing CRSP object library and internal files.

**%crsp\_lib%\crsp\_lib.lib** - CRSP object library.

**%crsp\_include%** - location of CRSP C Header Files referred to by INCLUDE statements.

**%crsp\_sample%** - folder containing CRSP sample programs.

**%crsp\_mstk%** - folder containing monthly CRSP stock and indices databases.

**%crsp\_dstk%** - folder containing daily CRSP stock and indices databases.

**%crsp\_cst%** - folder containing CCM database.

**%crsp\_work%** - folder identified for user containing log, temporary and other user-generated files.

### C Compiler Instructions

Following is an example of compiling a sample C program using Microsoft Visual Studio 2005, which CRSP supports for compiling C programs in a Windows environment.

#### STEP 1:

To begin, **Start**→**Programs**→**Microsoft Visual Studio 2005**. Click on the **Create: Project** button on the left of your screen, or from the Menu bar select **File**→**New**→**Project**.

#### STEP 2:

To create a new project, highlight the **Visual C++** folder in the Project Types box on the left and the **Win32 Console Application** in the right Templates box on the right. Enter the name of the project you are creating in the Name box below as "stk\_samp1". Move the cursor to Location and overwrite as `C:\crsp310\work`, or the directory in which you wish to work. Click **OK**.

#### STEP 3:

The Win32 Application Wizard will open. Click on **Application Settings**. Within this screen, confirm that Console application is turned on. Check **Empty project** and Click **Finish**.

#### STEP 4:

You are ready to add items to the `stk_samp1` project that you are creating. On the right side of the screen, in the Solution Explorer box, below `stk_samp1`, right click on **Source Files** and follow **Add→Existing Item**. Browse for the sample program, `stk_samp1.c` from your `c:\crsp310\sample\` directory. Double click to add it. Click on the “plus” sign next to **Source Files** for `stk_samp1.c` to appear. Double click on `stk_samp1.c` to display the program.

#### STEP 5:

Right click on **Resource Files** and follow **Add→Existing Item**. Browse, using `*.lib` for your file name, for the file “`crsp_lib.lib`” in the `c:\crsp310\acclib\` directory. Double click to add it.

#### STEP 6:

Right click on the `stk_samp1` project on the right hand side of the screen and click **Properties**. The following screen appears and in Step 7, you will provide properties to several folders.

#### STEP 7:

Under the **Configuration Properties**, click on the **Debugging** folder.

**Command Arguments:** `C:\database path\  
10 460 1000080 samp1.out`

In this example, `C:\database path\` is the location of the data, `10 460 1000080` are parameters defined within the program, and `samp1.out` is the name given to the output file. Note that, in general, the command

arguments include the full database path, inputs and output. For any particular sample program that CRSP provides, the expected arguments are remarked within the programs.

**Working Directory:** `C:\crsp310\work`

The working directory is the location of the C project that you are creating. Input and output files in this directory do not have to be specified with full path names.

#### STEP 8:

Click on the **C/C++ folder→General**, highlight **Additional Include Directories** and enter the location of your include files. This will be in your `c:\crsp310\include` directory.

#### STEP 9:

Still within the **C/C++ folder**, click on **Preprocessor**. Highlight **Preprocessor Definitions** and add ; “`WINNT=2`” as shown. Optional: Also adding “`!_CRT_SECURE_NO_DEPRECATED`” can reduce warning messages related to use of standard string functions.

#### STEP 10:

Go next to the **Linker** folder, click on **Command Line** and in the **Additional Options** box, enter: `/nodefaultlib:libcmt`. Click **Apply** and **OK**.

**STEP 11:**

You will return to the design screen where the `stk_samp1` program is displayed. You are now ready to build your project. You may build and run the program in either **Debug** or **Release** mode. In the center, top of your screen, select the mode by using the pull-down menu. Either will work, though for this example, select **Debug**. From the Menu bar, click on **Build**→**Build `stk_samp1`**. In the Output dialog box at the bottom of your screen, you will see the following message: Build: 1 succeeded, 0 failed, 0 skipped – meaning that the build was successful!

**STEP 12:**

To run the program that you have just built, from the Menu bar, click on: **Debug**→**Start Without Debugging**. The program will commence and work sequentially through the CRSP PERMNOs.

**STEP 13:**

The output that you created by running the `stksamp1` program is stored in the folder where you initially created the project: `c:\crsp310\work\stk_samp1`. The output file is a text file called `samp1`.

out. Note that your output may differ from what you view below depending on the end date of the database that you are using.

68391610	10000	OPTIMUM MANUFACTURING INC	3	3990	19860107- 19870611
29274A10	10001	ENERGY WEST INC	3	4920	19860109- 20060630
05978R10	10002	BANCTRUST FINANCIAL GROUP INC	3	6020	19860110- 20060630
39031810	10003	GREAT COUNTRY BK ASONIA CT	3	6020	19860114- 19951215
18906310	10004	CLOSE OUTS PLUS INC	3	5330	19860115- 19860117
95815510	10005	WESTERN ENERGY RESOURCES INC	3	1310	19860115- 19910711
00080010	10006	A C F INDUSTRIES INC	1	3743	19620702- 19840628
81949130	10007	SHAREDATA INC	3	7370	19860116- 19901016
36547310	10008	GARDENAMERICA CORP	3	3430	19860116- 19881121
46334710	10009	IROQUOIS BANCORP INC	3	6030	19860117- 20001103
12709510	10010	CABOT MEDICAL CORP	3	3840	9860117- 19950828
00206710	10011	A T C GROUP SERVICES INC	3	7390	19880608- 19980206
23326910	10012	D P A C TECHNOLOGIES CORP	3	3670	19860122- 20060630
04045810	10013	ARIZONA APPETITOS STORES INC	3	5810	19860122- 19870616
00147610	10014	A J INDUSTRIES INC	1	3714	19620702- 19770407
00016510	10015	A & M FOOD SERVICES INC	3	5812	19830920- 19860708
81002230	10016	SCOTT TECHNOLOGIES INC	3	3812	19860124- 20010503
20670910	10017	CONCURRENT COMPUTER CORP	3	3570	19860124- 19880927
24750910	10018	DELTA COMPUTEC INC	3	7370	19860124- 19951110
44950710	10019	I F R SYSTEMS INC	3	3610	19860124- 20020618
49307510	10020	KEY CENTURION BANCSHARES	3	6710	19860127- 19930430
10488210	10021	BRAINERD INTERNATIONAL INC	3	7940	19860127- 19951229

The programs can also be compiled, linked, and run from a command prompt window. In order to do so, the environment variables for Microsoft Visual Studio 2005 must be set.

To set the environment to the Visual Studio 2005 click on **Start→All Programs→Microsoft Visual Studio 2005→Visual Studio Tools→Visual Studio 2005 Command Prompt**. When you do this you will open a prompt like below and then go to your directory using the appropriate DOS command:

A DOS window will open ready for you to run your C++ programs.

Copy the sample program to a local directory using the Explorer utility or the command prompt copy command, or use the Developer Studio to open the file and save to a new location with Save As.

Sample programs can be found in the `%crsp_sample%` directory. The command prompt command, `echo %crsp_sample%` can be used to get the explicit directory needed. The explicit paths for `%crsp_include%` and `%crsp_lib%` will be needed to set up projects in the Microsoft Visual Studio 2005. These too can be identified using the echo command.

```
> copy %crsp_sample%\stk_samp1.c .
> cl /D WINNT=2 /I%crsp_include%
  stk_samp1.c %crsp_lib%\crsp_lib.
  lib
> .\stk_samp1 %crsp_dstk% 10 460
  1000080 myfile.out
  to run the program
```

Sample programs can also be compiled and linked

using the `nmake` utility. The file `c_samp.mak` in the `%crsp_sample%` directory is a description file to maintain the two stock sample programs. To run, copy the file to your program directory and run the utility with the command:

```
> nmake /f c_samp.mak stk_samp1.exe
  to compile a specific sample program
> nmake /f c_samp.mak
  to compile all sample programs
> .\stk_samp1 %crsp_dstk% 10 460
  1000080 myfile.out
  to run the program
```

## SUN SOLARIS SYSTEMS

CRSP currently supports Sun Sparc Solaris 2.9 with the Forte Developer 7 C 5.4.

CRSP access relies on environment variables set during installation. Environment variables can be used on Unix with the name preceded by `$`. All file names and environment variable names are case-sensitive on Unix systems. The `env` command can be used in a terminal window to find available environment variables.

Important CRSP files or directories can be found with the following names.

**`$CRSP_BIN`** - directory containing Executable Sample Programs and Batch Files. This directory is in the PATH so programs can be run from any directory.

**`$CRSP_LIB`** - directory containing CRSP object library and internal files.

**`$CRSP_LIB/crsplib.a`** - CRSP object library.

**`$CRSP_INCLUDE`** - directory containing CRSP Header Files referred to by `#INCLUDE` statements.

**`$CRSP_SAMPLE`** - directory containing CRSP sample programs.

**`$CRSP_MSTK`** - directory containing monthly CRSP stock and indices databases.

**\$CRSP\_DSTK** - directory containing daily CRSP stock and indices databases.

**\$CRSP\_CST** - directory containing CCM database.

Following is an example of how to modify and to run a sample C program with Sun Solaris.

### SUN - SPARCCOMPILER C 5.1

#### Command line:

- > cp \$CRSP\_SAMPLE/stk\_samp1.c .
- > chmod 660 stk\_samp1.c
- > *Use an available text editor to make desired code changes.*
- > cc -DUNIX=1 -DSOLARIS -I\$CRSP\_INCLUDE -xarch=v9 -w -KPIC -o stk\_samp1 stk\_samp1.c \$CRSP\_LIB/crsplib.a -lm
- > ./stk\_samp1 \$CRSP\_DSTK 10 460 1000080 myfile.out  
to run the program

Sample programs can also be compiled and linked using the make utility. The directory \$CRSP\_SAMPLE contains sample make description files for Sun Solaris named *c\_samp.mk*. To use make, copy the relevant description file to your program directory, edit it to support the program(s) of interest and create local executables, and run with the command:

#### Make file:

- > make -f c\_samp.mk stk\_samp1  
to compile a specific sample program
- > make -f c\_samp.mk  
to compile all sample programs
- > ./stk\_samp1 \$CRSP\_DSTK 10 460 1000080 myfile.out  
to run the program

## LINUX SYSTEMS

CRSP supports C programming for Linux Red Hat Enterprise Linux 3.0 on Intel x86 machines. C functions were compiled and tested using the gcc 3.2.3 compiler.

CRSP access depends on environment variables set during installation. Environment variables can be used on Linux with the name preceded by \$. All file names and environment variable names are case-sensitive on Linux systems. The `env` command can be used in a terminal window to find available environment variables.

Important CRSP files or directories can be found with the following names.

**\$CRSP\_BIN** - directory containing Executable Sample Programs and Batch Files. This directory is in the PATH so programs can be run from any directory.

**\$CRSP\_LIB** - directory containing CRSP object library and internal files.

**\$CRSP\_LIB/crsplib.a** - CRSP object library.

**\$CRSP\_INCLUDE** - directory containing CRSP header files referred to by #INCLUDE statements.

**\$CRSP\_SAMPLE** - directory containing CRSP sample programs.

**\$CRSP\_MSTK** - directory containing monthly CRSP stock and indices databases.

**\$CRSP\_DSTK** - directory containing daily CRSP stock and indices databases.

**\$CRSP\_CST** - directory containing CCM database.

Following is an example of how to modify and to run a sample C program with Linux - gcc 3.2.3:

#### Command line:

- > cp \$CRSP\_SAMPLE/stk\_samp1.c .
- > chmod 660 stk\_samp1.c
- > *Use an available text editor to make desired code changes.*

```
> gcc -DUNIX=1 -DUNIX2=1 -I$CRSP_
INCLUDE -w -fPIC stk_samp.c -o
stk_samp1 $CRSP_LIB/crsplib.a -lm

> ./stk_samp1 $CRSP_DSTK 10 460
1000080 myfile.out
to run the program
```

Sample programs can also be compiled and linked using the make utility. The directory \$CRSP\_SAMPLE contains sample make description files for Linux, named *c\_samp\_stk.mk*. If you have both the CAGS and CMGS Tools and Installation CDs installed, you will use the *c\_samp.mk* make file. To use the make file, copy the relevant description file to your program directory, edit it to support the program(s) of interest and create local executables, and run with the commands:

**Make file:**

```
> make -f c_samp.mk stk_samp1
to compile a specific sample program

> make -f c_samp.mk
to compile all sample programs

> ./stk_samp1 $CRSP_DSTK 10 460
1000080 myfile.out
to run the program
```