



Global Historical Data Solutions

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About Tick Data

In 1984, Tick Data was founded by a futures broker and a programmer as the first company in the world to offer historical tick-by-tick prices on the futures and cash index markets. Despite the inherent limitations in computer hardware technology at that time, the company developed a collection and compression system capable of capturing and storing every tick in the major US futures markets. The data set extends back as far as 1974, making it the largest of its kind.

In June 1999, Thomas “Neal” Falkenberry, a Chartered Financial Analyst (CFA) and Tick Data client, bought the company which enabled him to launch his new asset management firm and hedge fund. Furthermore, he saw the potential in furnishing other institutional clients with data that meets their stringent requirements.

Neal and his partner, Scott Mayster, sold Tick Data to Penson Worldwide, Inc. in January 2005. Penson (NASDAQ: PNSN) made Tick Data a division of their technology subsidiary, Nexa Technologies, Inc., a provider of online brokerage technology, and direct access trading platforms, and electronic order routing solutions. Neal and Scott continue to manage Tick Data with a team of sales, support, and development experts who specialize in market data.

Today Tick Data’s product line includes even more equity, options, futures, cash index, and market indicator data, as well as tools for building time series data. Our customer base includes the largest financial institutions, universities, and more than 10,000 individual traders and system developers. Tick Data has always leveled the playing field by making research-quality data available to all traders.

As always, Tick Data remains committed to being the premier provider of global historical data solutions.

Table of Contents

About Tick Data	2
Table of Contents.....	3
Overview of Tick Data	4
Tick Data’s “Value-Add” to Historical Data	6
US Equity Data	10
US Options (OPRA) Data.....	11
Toronto Equity Data	12
London Equity Data	13
Deutsche Boerse Equity Data	14
Borsa Italiana Equity Data.....	15
Euronext Equity Data	16
Madrid Equity Data	17
Japan Equity Data.....	18
Futures Data	19
Cash Index Data	21
Market Indicator Data.....	22
Time Series Tools	23
Keeping Your Data Updated	24
Pricing.....	25
Further Reading	26
Appendix A: Available Equity & Options Data	27
Appendix B: Available Futures Data	28
Appendix C: Available Cash Index Data	31
Appendix D: Available Market Indicator Data.....	33

Overview of Tick Data

Tick Data provides robust, ready-to-use historical intraday time series data for the world's equities, futures and options markets. We obtain the raw data (in most cases directly from the exchange), normalize all of the data to ASCII, filter the trade data for bad ticks, and in the case of equities and options apply all corporate actions (e.g. splits, dividends) and Ticker Mappingsm information (e.g. symbol changes, exchange hops, etc.) to the data. The result is structured, validated tick-by-tick data that is ready-to-use upon delivery.

HISTORICAL TICK DATA

- US Equities – all listed equities from NYSE, AMEX, NASDAQ, and all other Consolidated Tape Association (CTA) participants from January 1, 1993.
- US Equity Options – all equity options reported by the Options Price Reporting Authority (OPRA) from July 2, 2004.
- Toronto Equities – all listed equities on the Toronto Stock Exchange from January 1, 2001.
- London Equities – all listed equities on the London Stock Exchange from January 1, 2000.
- Deutsche Boerse Equities – all listed equities on the Deutsche Boerse from January 1, 2003.
- Borsa Italiana Equities – all listed equities on the Borsa Italiana from January 1, 2004.
- Euronext Equities – all listed equities on Euronext from April 1, 2002¹.
- Madrid Equities – all listed equities on the Bolsa de Madrid from December 1, 2004.
- Japan Equities – all listed equities on the Tokyo Stock Exchange, Osaka Stock Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, Sapporo Stock Exchange and Hercules Market from January 6, 2003.
- Futures – trade data for ninety-seven (97) futures symbols from exchanges in the USA and the Americas, Europe, and Asia as far back as 1974.
- Cash Indices – data for fifty-five (55) cash indices as far back as 1983.
- Market Indicators – data for sixteen (16) equity market internal indicators as far back as 2003.
- Data Update Subscription – keep your data sets up-to-date by download.

DATA TOOLS

In addition to our historical data sets, we also provide software tools to help you manage the data, and more easily build time series to be used for analysis and research. These tools include:

¹ Includes Euronext trade data from April 1, 2002 for Amsterdam, Brussels, and Pairs (from January 1, 2004 for Lisbon), and level I quotes with volume from July 1, 2004 for Amsterdam, Brussels, Pairs, and Lisbon.

- TickWrite 7 – Included with all futures, cash index, market indicator and equity data orders, this Microsoft Windows[®] or Linux[®] application enables you to convert as-traded data to time series data of any granularity in ASCII format based on your own preferences.
- Time Series Builder – Included with all options data orders, the Time Series Builder (TSB) allows you to construct time intervals for options data of any granularity (e.g. x-ticks per bar, y-minutes per bar, etc.), and extract options data into custom ASCII (text) files, converting as-traded data into mapped, adjusted research-ready time series data. Microsoft Windows[®] or Linux[®] versions available.
- Survivorship Bias-Free Database – An added value when you order all available symbols for our US Equities and US Options products, our proprietary Survivorship Bias-Free data sets contain all US stocks that were components of the Russell 3000 at some point since January 1, 1993, but are no longer traded due to corporate actions and/or bankruptcies. So you receive both active and inactive (“dead”) companies, thus eliminating Survivorship Bias from your analysis.
- **NEW!** Time Series Tools – now you may order Tick Data’s proprietary corporate actions and Ticker Mapping information as stand-alone data sets. So if you have equity or options data from various sources (e.g. from Tick Data, or another source) from which you want to build a time series, we can help. We offer two (2) ways you may access the information:
 - Security Master Library – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database. You may choose a Microsoft Windows[®] or Linux[®] version.
 - Corporate Actions & Ticker Mapping – If you prefer, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.

Tick Data's "Value-Add" to Historical Data

Why should you order historical tick data from Tick Data? Because we provide quality, robust, ready-to-use historical data sets in a fraction of the time or cost it would take you to build and maintain a comparable data set. Our value-add to raw exchange data is that we make the data ready-to-use through the application of our proprietary data validation, Ticker Mapping and filtering processes. That's why hedge funds and investment banks all over the world rely on Tick Data for historical intraday data.

Our historical equity and options data sets include structured, mapped, and validated trade and quote data time series built directly from exchange-archive data² – not collected ticker plant data. In addition, our trade data for equities³, futures, and cash indices are filtered for bad ticks using our proprietary tick filtering process. We developed our tick data sets for quantitative investment professionals who require institutional-quality, research-ready historical data to develop and back-test trading strategies, risk management tools and order execution models, and to conduct post-trade analysis.

OUR DATA COLLECTION PROCESS

We strongly believe that one cannot rely on any single real-time data vendor to supply a continuous, error-free transmission of data. There are many fine real-time data vendors in the market, and we have relationships with several of them. Nevertheless, systems fail and back-up routines do not always ensure an uninterrupted data stream. Likewise, transmission platforms, such as the Internet or dedicated digital lines, are not 100% reliable.

Therefore, whenever possible we enter into agreements with the exchanges and obtain our data directly from the exchange after the close (i.e. we do not collect the data via a real-time feed). For example, we base our US equity data on the NYSE's TAQ (Trade And Quote) database, which includes level 1 quote and trade data from all Consolidated Tape Association (CTA) participants⁴.

For most futures, cash indices and market indicators, we collect data from multiple data vendors using post-market API downloads. This means real-time data transmission errors are not a factor in our data collection. Our proprietary data collection system uses multiple feeds to create a single, robust data series for each symbol, ensuring that any problems that may occur in one data series do not make their way into our data sets.

HOW WE FILTER THE DATA

Even though we obtain most of our data directly from the exchanges, this raw data is not research-ready. Errors persist even in exchange-sourced data. The files sent by exchanges can have gaps and omissions, and once the data is complete, the symbols are still not mapped for any corporate actions that may have occurred in the past.

² Japan Equity Data is sourced directly from the Nikkei. See section on "Japan Equity Data" for more details.

³ Euronext trade data is not filtered for bad ticks.

⁴ At press time CTA participants include the American Stock Exchange (AMEX), Boston Stock Exchange (BSE), Chicago Board Options Exchange (CBOE), Chicago Stock Exchange (CHX), Financial Industry Regulatory Authority (FINRA), International Securities Exchange (ISE), Nasdaq Stock Market (NASDAQ), National Stock Exchange (NSX), New York Stock Exchange (NYSE), NYSE Arca, Philadelphia Stock Exchange (PHLX) and Bats Exchange (BATS).

Therefore, we have developed several processes for adding significant value to our trade data for equities⁵, futures, and cash indices to make it truly ready-to-use:

- *Ticker Mapping* – a proprietary process that adjusts historical data for corporate actions, including symbol and identifier (e.g. CUSIP, ISIN) changes, mergers & acquisitions, exchange listing changes, divestitures, etc. For example, the symbol ‘C’ for Citigroup is actually C+CCI+TRV+PA.
- *Condition Code Filtering* – trade and quote data is filtered for various condition codes that denote out of sequence trades & quotes, cancelled trades, and other conditions that require data points to be removed prior to use by a trader.
- *Price Filtering* – a series of algorithmic filters that flag trades which appear to be non-representative of market conditions (bad ticks) and suggest corrected values⁶.
- *Data Validation* – For US equity trade data and all futures and cash index data, daily bars are built from the underlying tick data for each symbol in the universe and then compared against third party end-of-day data sources to ensure accuracy of Ticker Mapping, stock splits, and prices.
- *Custom Symbol Sets and File Configurations* – we allow our clients to choose the entire universe of symbols, or specify a custom symbol list⁷ and custom date range. We also offer clients flexibility in the data’s final format by allowing them to choose data granularity (tick or 1-minute bars), include/exclude regional trades, include/exclude pre- or post-market trades, etc.
- *Stock Splits, Stock and Cash Dividends* – we utilize our comprehensive corporate actions database to automatically adjust historical prices for stock splits and dividends.

MAPPED VS. AS-TRADED

All of our equity and options data sets are offered in two formats, (i) mapped or (ii) unmapped (“as-traded”). Deciding which format is right for you depends on the level of corporate action support you need from Tick Data⁸.

Mapped data refers to a company whose history has been linked for various corporate action events, namely mergers and symbol changes. For example, today’s Citigroup (ticker: C) consists of symbols C, CCI, TRV, and PA. Mapped data for Citigroup would consist of a single file adjusted for all merger terms and would include data from 1993 to the present. No reference data is provided to reveal what events were linked to map symbols. Mapped data is delivered in zipped ASCII files named by symbol or Tick Data’s Internal ID, one file per equity symbol or option contract, mapped as of the order date.

As-traded (unmapped) data for Citigroup would include separate files for C, CCI, TRV, and PA. As-traded data is delivered in zipped ASCII files by symbol, one file per symbol or option contract

⁵ Euronext trade data is not filtered for bad ticks.

⁶ Applies to equity, futures and cash index data only. Euronext equity, US options and market indicator data is not filtered for bad ticks, nor is any equity quote data. It is important to note that while we filter out ticks we deem to be bad (indeed, exchange data contains bad ticks), we make no other alterations to exchange data. When you order equity data, we include both the raw, unfiltered data along with our filtered data. Futures and cash index data include the filtered data only.

⁷ Custom symbol lists are not available for Deutsche Boerse or Japan Equities.

⁸ To receive a FREE copy of the white paper, “Mapped” vs. As-Traded Data - A Guide to Choosing the Right Format”, please send an email to Tom Myers at tmyers@tickdata.com.

per day. If you choose to receive as-traded data and order data for all available symbols, we offer the Time Series Builder (TSB), a powerful, new software tool that allows you to extract equity and options data into custom ASCII files, converting as-traded data into mapped, adjusted research-ready data. The TSB can be used via its Graphical User Interface (GUI) or its command line interface and gives you unprecedented ease-of-access to even our largest data sets. The TSB fully integrates Tick Data's proprietary symbol & identifier maps, and other related corporate action databases. The TSB is not compatible with mapped data. The use of as-traded data without the TSB requires you have a third party or existing internal corporate action database to assemble as-traded symbols into time series.

CORPORATE ACTIONS

As anyone who has ever worked with equity or options data will tell you, the devil lies in the details – especially when it comes to corporate actions. Tick Data dedicates a great deal of its resources to ensure we get corporate actions right for all of our equity and options data sets. When you order equity or options data from us, you receive the following corporate action files:

- *CompanyInfo.asc* – Includes the fields symbol, company name, exchange, identifier (e.g. CUSIP), first date of data, last date of data, and Tick Data Internal ID. Tick Data assigns each unique entity (CUSIP/ISIN-based) an internal ID #. We then map symbols to those ID #'s. So, Tick Data ID #8347 (Exxon Mobil) consists of:

*XON from 01/04/1993 to 11/30/1999, and
XOM from 12/01/1999 to 02/27/2004*

As such, we are able to deliver Chrysler (ticker = C, ID # = 1208) as well as Citigroup (ticker = C, ID # = 1335). The CompanyInfo.csv file associates ID #8347 with the entity currently known as Exxon Mobil trading under ticker XOM.

- *Events.csv* – Includes our proprietary Ticker Mapping information, such as symbol changes. For example, JPM = CHL+CMB+JPM with changes on the following dates:

*CHL changed to CMB on 4/1/1996
CMB changed to JPM on 1/2/2001*

This file is provided to subscribers of our daily update service with start of next day information. You may also license our Ticker Mapping information as a stand-alone data set as part of our Time Series Tools.

- *StockSplits.csv* – Includes corporate actions information for stock splits, stock dividends, and cash dividends.
- *OTC_BB_Dates.csv* – For US equity data, the exchanges do not archive OTC Bulletin Board or Pink Sheet data. So we issue a “placeholder” for the date range that a symbol trades OTC. For example, JOYG moved from the NYSE to OTC_BB on 12/9/1999. It returned to NASDAQ on 7/31/2001. Price data is not available during the period specified by the placeholder.

ONE-MINUTE VS. TICK-BY-TICK DATA

For traders and analysts who measure frequency in minutes or hours rather than seconds or fractions of seconds, our One-Minute Equity Data (OMED) and One-Minute Options Data (OMOD) are gigabyte solutions to the terabyte problem of archiving historical intraday data.

OMED and OMOD include trade data only, and each one-minute interval includes Date, Time, Open, High, Low, Close, and Volume. OMED is not currently available for Japan Equities.

DATA MANAGEMENT SOFTWARE

With each order for futures, cash index, market indicator or equity data, we include our data management software, **TickWrite 7**, which enables users to create ASCII files custom-tailored to their needs. TickWrite 7 can construct time intervals of any granularity, generate continuous contracts files, and adjust for rollover gaps. It outputs data to ASCII format, readable by virtually any analysis software, including Microsoft Excel[®]. TickWrite 7 also allows users to schedule update downloads and kick off output jobs. The software even emails you when the downloads are done.

Clients who order options data receive our **Time Series Builder** software. The Time Series Builder (TSB) allows users to extract options data into custom ASCII files, converting as-traded data into time series data. The TSB also enables users to build time series of any granularity (e.g. x-ticks per bar, y-minutes per bar, daily, weekly).

To receive a demo of either TickWrite 7 or the Time Series Builder, please send an email to tmyers@tickdata.com.

US Equity Data

US Equity Data	
Start Date	January 1, 1993
Source of Data	<p>We obtain ALL of our US equity data directly from the NYSE's Trade And Quote (TAQ) market data set via an end-of-day download (i.e. we do not collect the data via a real-time feed). Our US equity data set includes level 1 quote and trade data from all Consolidated Tape Association (CTA) participants, which at press time includes:</p> <ul style="list-style-type: none"> • American Stock Exchange (AMEX) • Boston Stock Exchange (BSE) • Chicago Board Options Exchange (CBOE) • Chicago Stock Exchange (CHX) • Financial Industry Regulatory Authority (FINRA) • International Securities Exchange (ISE) • Nasdaq Stock Market (NASDAQ) • National Stock Exchange (NSX) • New York Stock Exchange (NYSE) • NYSE Arca (ARCA) • Philadelphia Stock Exchange (PHLX) • Bats Exchange (BATS)
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Included	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	<p>Daily download via TickWrite 7 software.</p> <ul style="list-style-type: none"> • Collected Trade and Quote Data – approx. 8:00 p.m. New York Time • Exchange-Sourced Trade Data – approx. 10:00 p.m. New York Time • Exchange-Sourced Quote Data – approx. 2:30 a.m. New York Time
Available Add-Ons	<p><i>Survivorship Bias-Free Database</i> – An added value when you order all available symbols for our US Equities and US Options products, our proprietary Survivorship Bias-Free data set contain all US stocks that were components of the Russell 3000 at some point since January 1, 1993, but are no longer traded due to corporate actions and/or bankruptcies. So you receive both active and inactive (“dead”) companies, thus eliminating Survivorship Bias from your analysis.</p> <p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

US Options (OPRA) Data

US Options (OPRA) Data	
Start Date	July 2, 2004
Source of Data	<p>We obtain ALL of our US equity options data directly from the CBOE via an end-of-day download (i.e. we do not collect the data via a real-time feed) and include data from all of the US options exchanges that contribute to the Options Price Reporting Authority (OPRA), participants, which at press time includes:</p> <ul style="list-style-type: none"> • American Stock Exchange (AMEX) • Boston Stock Exchange (BSE) • Chicago Board Options Exchange (CBOE) • International Securities Exchange (ISE) • Nasdaq Stock Market (NASDAQ) • NYSE Arca (ARCA) • Philadelphia Stock Exchange (PHLX)
Validation & Filtering	Data is validated and mapped using our internal process. All exchange time stamps are in Eastern (New York) Time. No tick filtering is done to options data.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Options Data (TOD) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Options Data (TOD) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Options Data (OMOD) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	Time Series Builder (TSB) included with data orders for all available symbols.
Updates Available	<ul style="list-style-type: none"> • Daily via FTP download for Trades Only – approx. 2:00 p.m. New York Time (T+1). • Monthly via external hard drive for Quotes.
Available Add-Ons	<i>Survivorship Bias-Free Database</i> – An added value when you order all available symbols for our US Equities and US Options products, our proprietary Survivorship Bias-Free data sets contain all US stocks that were components of the Russell 3000 at some point since January 1, 1993, but are no longer traded due to corporate actions and/or bankruptcies. So you receive both active and inactive (“dead”) companies, thus eliminating Survivorship Bias from your analysis.

Toronto Equity Data

Toronto Equity Data	
Start Date	January 1, 2001
Source of Data	We obtain ALL of our Toronto equity data directly from the Toronto Stock Exchange via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes ⁹	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. 2:00 a.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

⁹ Toronto Equity Data does not include TSX Venture data.

London Equity Data

Tick Data's London Stock Exchange (LSE) data is very unique. Our data includes trades, best bid & ask (BBA) quotes, and Level 1+ quotes all the way back to 2000. Level 1+ quotes include BBA with sizes, whereas BBA only include price without size. The LSE only offers Level 1+ back to 2003. However, we worked with the LSE to rebuild top of book from raw Rebuild Order Book data from 2000 to 2002.

London Equity Data	
Start Date	January 1, 2000 for BBA quote and trade data June 1, 2000 for BBA with Size quote data
Source of Data	We obtain ALL of our London equity data directly from the London Stock Exchange via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. 11:30 p.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

Deutsche Boerse Equity Data

Deutsche Boerse Equity Data	
Start Date	January 1, 2003
Source of Data	We obtain ALL of our Deutsche Boerse equity data (Xetra & Frankfurt) directly from the Deutsche Boerse via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available ¹⁰	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. 11:00 p.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

¹⁰ Custom symbol lists are not available for Deutsche Boerse Equity Data.

Borsa Italiana Equity Data

Borsa Italiana Equity Data	
Start Date	January 1, 2004
Source of Data	We obtain ALL of our Borsa Italiana equity data directly from the Borsa Italiana via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. 8:00 p.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

Euronext Equity Data

Euronext Equity Data	
Start Date	April 1, 2002 for trade data from Amsterdam, Brussels, and Pairs. January 1, 2004 for trade data from Lisbon. July 1, 2004 for level 1 quote data from Amsterdam, Brussels, Pairs, and Lisbon.
Source of Data	We obtain ALL of our Euronext equity data (Amsterdam, Brussels, Paris and Lisbon) directly from Euronext via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade Data – approx. 4:00 a.m. New York Time • Exchange-Sourced Quote Data – approx. 5:00 a.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

Madrid Equity Data

Madrid Equity Data	
Start Date	December 1, 2004
Source of Data	We obtain ALL of our Madrid equity data directly from the Bolsa de Madrid via an end-of-day download (i.e. we do not collect the data via a feed).
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Monthly download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. the 12th business day of the month
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

Japan Equity Data

Japan Equity Data	
Start Date	January 6, 2003 ¹¹
Source of Data	We obtain ALL of our Japan equity data directly from Nikkei via an end-of-day download (i.e. we do not collect the data via a feed). It includes data from the Tokyo Stock Exchange, Osaka Stock Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, Sapporo Stock Exchange and Hercules Market.
Validation & Filtering	Data is validated and mapped using our internal process. Trade data is filtered by our proprietary process.
Data Includes	<ul style="list-style-type: none"> • Level 1 Quote Data • Trade Data • Corporate Actions • Ticker Mapping information
Versions Available ¹²	<ul style="list-style-type: none"> • Tick Equity Data (TED) with Quotes & Trades: includes level 1 quotes (bid/ask with size) and trades on a tick-by-tick basis. • Tick Equity Data (TED) with Trades Only: includes trades only on a tick-by-tick basis. • One-Minute Equity Data (TED) with Trades Only: includes trades only in 1-minute intervals (OHLC with volume).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • Exchange-Sourced Trade and Quote Data – approx. 7:00 a.m. New York Time
Available Add-Ons	<p><i>Security Master Library</i> – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database.</p> <p><i>Corporate Actions & Ticker Mapping</i> – If you choose, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file.</p>

¹¹ Exchange time stamps before January 1, 2010 are to the minute. Exchange time stamps after January 1, 2010 are to the second.

¹² Custom symbol lists are not available for Japan Equity Data.

Futures Data

Tick Data's data set of historical intraday futures data is one of the largest of its kind. We currently offer trade data on ninety-seven (97) futures symbols from exchanges in the US and the Americas, Europe, and Asia, with more symbols to be released in the future. The data is presented tick-by-tick and delivered in our compressed, proprietary format which minimizes storage requirements, maximizes versatility, and allows for faster processing.

Futures Data	
Start Date	Varies by symbol, but some start as early as 1974.
Source of Data	We obtain much of our futures data by combining multiple data feeds provided by different vendors after the close over different transmission platforms. We do not collect any of our data in real-time. In the case of EUREX data, we obtain our data directly from the exchange's time and sales records.
Validation & Filtering	All of our futures ticks are passed through our Data Manager, a suite of filtering, verification, and compression programs developed in-house for the sole purpose of producing accurate, robust data.
Data Includes	Trade Data
Versions Available	Tick-by-Tick Trades Only (the included TickWrite software enables you to build custom intervals, including x-ticks per bar, y-minutes per bar, daily bars, weekly bars, and monthly bars).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> All Trade Data – approx. 11:00 p.m. New York Time
Available Symbols	See Appendix A

COLLECTING FUTURES DATA

Tick Data strongly believes that one cannot rely on any single data vendor to supply a continuous, error-free transmission of data. There are many fine data vendors in the market. We have relationships with several of them. Nevertheless, systems fail and back-up routines do not always ensure an uninterrupted data stream. Transmission platforms, such as the Internet or dedicated digital lines, are not 100% reliable. So we believe in combining multiple data feeds provided by different vendors over different transmission platforms. We do not collect any data in real-time.

Tick Data takes numerous steps to ensure the accuracy of its ongoing data collection process beginning at the source. To ensure continuity, we collect data after the close from two geographical locations. We have developed technology that enables us to identify empty time intervals in our primary data feed and paste in those missing values from a second or third data feed. This methodology ensures a complete, continuous time series.

One exception to this is our data on German futures symbols. In the case of EUREX data, we found an insufficient number of vendors to ensure proper implementation of our converging process. So under agreement with the exchange, we obtain our data directly from the exchange's time and sales records. It is worth noting that while we filter out ticks we deem to be

bad (indeed, exchange data contains bad ticks), we make no other alterations to exchange data. We are aware that EUREX time and sales data varies in some ways from the data it transmits to real-time vendors.

HOW WE FILTER FUTURES DATA

Despite all of the care we take in collecting our tick data, it does not ensure that the time series is free of errors. In fact, errors persist even in data sourced directly from the exchange. Therefore, all of our ticks are passed through our Data Manager, a suite of filtering, verification, and compression programs developed in-house for the sole purpose of producing accurate, robust data.

Tick Data adds significant value to the data through extensive data filtering and verification. Multiple, single-function data filters are employed to identify bad prints, decimal errors, transposition errors, and other data irregularities. These filters take advantage of the fact that since we are not a real-time vendor, we have the luxury of looking at the tick following a suspected bad tick before we have to make a decision concerning its accuracy. We have developed a number of filters that identify a suspect tick and hold it until the following tick confirms its validity. The filters are proprietary but are based upon recent tick volatility, moving standard deviation windows, and time of day.

Our filtering algorithms are highly effective. Nevertheless, we take additional steps to ensure accurate, reliable data. For example, we regularly obtain end-of-day data from a quality provider and compare daily bars built from our data to theirs. If we find a discrepancy, we verify and fix the problem.

TRADING SESSIONS: DAY VS. NIGHT, PIT VS. ELECTRONIC

Beginning on the first trading day of July 2003, markets that have electronic trading sessions include all sessions: pit and electronic, day and overnight (when applicable). Prior to July 2003, all markets include the day-sessions only. E-mini data contains pre-market trading as well.

Cash Index Data

Tick Data's data set of historical cash index data contains fifty-five (55) equity indices. The data is presented tick-by-tick, and delivered in our compressed, proprietary format, which minimizes storage requirements, maximizes versatility, and allows for faster processing.

Cash Index Data	
Start Date	Varies by symbol, but some start as early as 1983.
Source of Data	We obtain our cash index data by combining multiple data feeds provided by different vendors after the close over different transmission platforms. We do not collect any of our data in real-time.
Validation & Filtering	All of our cash index ticks are passed through our Data Manager, a suite of filtering, verification, and compression programs developed in-house for the sole purpose of producing accurate, robust data.
Data Includes	Trade Data
Versions Available	Tick-by-Tick (the included TickWrite software enables you to build custom intervals, including x-ticks per bar, y-minutes per bar, daily bars, weekly bars, and monthly bars).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • All Trade Data – approx. 11:00 p.m. New York Time
Available Symbols	See Appendix B

Market Indicator Data

Our market indicator data set contains sixteen (16) market internal indicators. We collect our market indicator data from multiple sources and combine them into a single, robust time series. The data is presented tick-by-tick in the frequency broadcast by the exchange. It is important to note that each indicator is different. Some indicators update only once per minute, while others are disseminated every few seconds. While all indicator data is visually verified, due to the nature of the data, we cannot employ our proprietary, automated techniques to filter the data algorithmically.

Market Indicator Data	
Start Date	July 2003
Source of Data	We obtain our market indicator data by converging multiple data feeds provided by different vendors after the close over different transmission platforms. We do not collect any of our data in real-time.
Validation & Filtering	While all of our market indicator data is visually verified, due to the nature of the data, we cannot employ our proprietary, automated techniques to filter the data algorithmically.
Data Includes	Trade Data
Versions Available	Tick-by-Tick (the included TickWrite software enables you to build custom intervals, including x-ticks per bar, y-minutes per bar, daily bars, weekly bars, and monthly bars).
Software Included	TickWrite 7 software included with all orders.
Updates Available	Daily download via TickWrite 7 software. <ul style="list-style-type: none"> • All Trade Data – approx. 11:00 p.m. New York Time
Available Symbols	See Appendix C

Time Series Tools

Over the years Tick Data has built up a very broad and deep database of events (e.g. stock splits, stock dividends, cash dividends, symbol changes, CUSIP/ISIN changes, exchange hops) that are critical when attempting to build an accurate time series. For many years we held this proprietary information, and only now can you license this vital information as a stand-alone data set.

So if you have equity or options data from various sources (e.g. from Tick Data, or another source) from which you want to build a time series, we can help. We offer two (2) ways you may access the information:

- *Security Master Library* – The Security Master Library (SML) is a tool designed to help clients map historical symbols and identifiers (e.g. CUSIPs, ISINs) to current symbol identifiers. You can input a symbol, Tick Data ID or CUSIP/ISIN and a date, and the SML will return the symbol or Tick Data ID as of that date. The SML includes both GUI and Command Line access to our proprietary Ticker Mapping database. You may choose a Microsoft Windows[®] or Linux[®] version.
- *Corporate Actions & Ticker Mapping* – If you prefer, you may receive our proprietary time series corporate actions (e.g. stock splits, stock dividends) and Ticker Mapping (e.g. symbol changes, exchange hops, etc.) in a .CSV file. You can specify a symbol list and date range for historical information, or receive daily updates via FTP download.

Keeping Your Data Updated

Once you have ordered your equity, options, futures, cash index, or market indicator data, you can keep your data sets up-to-date by signing up for a Data Update Subscription. Our Data Update Subscription offers you the ability to download data via TickWrite 7 (via FTP for options data)¹³. Update files are structured identically to existing data files that have been provided to you in your initial order. Equity, futures, cash index, or market indicator data updates are available daily¹⁴. Options data is updated on a daily basis for trade data, and on a monthly basis for quote and trade data sent on external media.

EQUITY & OPTIONS UPDATES INCLUDE TICKER MAPPING & CORPORATE ACTIONS

Each equity and options update includes our Ticker Mapping information, as well as corporate actions. Corporate actions are provided on a start of next day basis, and the files are named in the format YYYY_MM_DD_CorpAction.zip and contain the following:

- *CompanyInfo.asc* – maps files named by Tick Data’s internal ID number to current symbol, company name, and current CUSIP.
- *StockSplits.csv* – contains stock splits and stock dividends by ID.
- *Dividends.csv* – contains cash dividends by ID.
- *Events.csv* – discloses symbol changes. For example, assume CSCO (ID #1900) changed its symbol to XXX. The data file would be continued to be called 1900.zip and the CompanyInfo.asc file would map 1900 to XXX rather than CSCO. The file Events.csv would disclose the event in the form of “1900, CSCO, XXX, [effective data of symbol change]”.

¹³ If data set is too large for download, updates will be provided on DVD or external hard drive.

¹⁴ Madrid Equities are updated monthly.

Pricing

Tick Data has a very flexible pricing schedule that allows you to order our data sets in their entirety, or order custom symbol lists and date ranges.

A good rule of thumb to remember when you order data from Tick Data is the more ticks you order, the less you pay per tick.

To receive a price quote, please email Tom Myers (tmyers@tickdata.com) the following information about the data you want:

1. For which asset type(s) (e.g. equities, options, futures, indices, market indicators).
2. For which exchange(s).
3. For which symbol(s).
4. For which date range(s).
5. Whether you need tick-by-tick or one-minute data.
6. If you need tick-by-tick equity or options data, whether you want quotes & trades, or trades only.
7. Do you wish to receive updates to this data going forward, or do you just need a static date range of data?
8. Finally, will you be importing this data into a database to conduct your analysis, or will you be accessing the flat data files directly?

Of course if you have any questions, please contact us.

Further Reading

The following white papers are available free-of-charge from Tick Data:

- **Survivorship Bias in the Development of Equity Trading Systems** – A report on the Survivorship Bias inherent in current practices of defining research universes for testing equity trading systems.
- **High Frequency Data Filtering** – A review of the issues associated with maintaining and filtering a high frequency financial data set.
- **File Storage Requirements for High Frequency Data** – An analysis of the file storage requirements for high-frequency US equity and US options quote and trades data.
- **Mapped vs. As-Traded Data: A Guide to Choosing the Right Format** – Discusses the differences between receiving As-Traded vs. Mapped tick equity and/or options data.

To receive any of these white papers, please email Tom Myers at tmyers@tickdata.com.

Appendix A: Available Equity & Options Data

	Equity Data	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
1	US Equities	1/1993	Present	NYSE, AMEX, NASDAQ, and all regional exchanges (all Consolidated Tape Association (CTA) participants)
2	Toronto Equities	1/2001	Present	Toronto Stock Exchange
3	London Equities	1/2000 ¹⁵	Present	London Stock Exchange
4	Deutsche Boerse Equities	1/2003	Present	Deutsche Boerse
5	Borsa Italiana Equities	1/2004	Present	Borsa Italiana
6	Euronext Equities	4/2002 ¹⁶	Present	Euronext (Amsterdam, Brussels, Lisbon & Paris)
7	Madrid Equities	12/2004	Present	Bolsa de Madrid
8	Japan Equities	1/2003	Present	Tokyo Stock Exchange, Osaka Stock Exchange, Nagoya Stock Exchange, Fukuoka Stock Exchange, Sapporo Stock Exchange and Hercules Market
	Options Data	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
9	US Options	7/2004	Present	All equity options reported by the Options Price Reporting Authority (OPRA)

¹⁵ Includes LSE trade data and BBA quote data from January 1, 2000, and BBA with Size quote data from June 1, 2000.

¹⁶ Includes NYSE Euronext trade data from April 1, 2002 for Amsterdam, Brussels, and Pairs (from January 1, 2004 for Lisbon), and level 1 quotes with volume from July 1, 2004 for Amsterdam, Brussels, Pairs, and Lisbon.

Appendix B: Available Futures Data

	Currency Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
1	Australian Dollar Futures	AD	Jan-87	Present	CME
2	British Pound Futures	BP	Sep-77	Present	CME
3	Canadian Dollar Futures	CD	Jan-77	Present	CME
4	Deutsche Mark Futures	DM	Dec-74	Dec-99	CME
5	US Dollar Index Futures	DX	Jul-89	Present	NYBOT / ICE
6	Euro FX Futures	EC	Jan-99	Present	CME
7	E-mini Euro FX Futures	EE	Jan-06	Present	CME
8	Japanese Yen Futures	JY	Mar-77	Present	CME
9	E-mini Japanese Yen Futures	JE	Jan-06	Present	CME
10	Mexican Peso Futures	ME	Apr-02	Present	CME
11	Swiss Franc Futures	SF	Dec-74	Present	CME
	Equity Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
12	BIG Dow (\$25) Futures	BD	Mar-06	Present	CBOT / CME
13	DJIA (\$10) Futures	DJ	Oct-97	Present	CBOT / CME
14	E-mini DJIA (\$5) Futures	YM	May-02	Present	CBOT / CME
15	NASDAQ 100 Index Futures	ND	Apr-96	Present	CME
16	E-Mini NASDAQ 100 Index Futures	NQ	Jul-99	Present	CME
17	Russell 2000 Index Futures	RL	Feb-93	Dec-08	CME
18	E-Mini Russell 2000 Index Futures	ER	Jan-02	Present	CME
19	S&P 500 Index Futures	SP	Apr-82	Present	CME
20	E-Mini S&P 500 Index Futures	ES	Sep-97	Present	CME
21	S&P 400 MidCap Index Futures	MD	Jan-93	Present	CME
22	E-mini S&P 400 Index Futures	MI	Apr-05	Present	CME
23	E-mini Russell 1000 Index Futures	RN	Jan-06	Oct-07	CME
24	NYSE Composite Index Futures	YX	Jan-84	May-03	NYBOT / ICE
25	S&P Canada 60 Index Futures - Montreal	PT	Oct-99	Present	MSE
26	AEX Index Futures	EO	Jan-08	Present	LIFFE Amsterdam
27	CAC 40 Index Futures	CF	May-00	Present	MNP
28	DAX Index Futures	DA	Jan-97	Present	EUREX
29	DJ Stoxx 50 Index Futures	VH	Jul-03	Present	EUREX
30	DJ Euro Stoxx 50 Index Futures	XX	Jul-98	Present	EUREX
31	FTSE 100 Index Futures	FT	Jul-98	Present	LIFFE
32	FTSE/MIB Index Futures	II	Oct-04	Present	Borsa Italiana
33	IBEX 35 Index Futures	IB	Jul-03	Present	MFM
34	Swiss Market Index Futures - EUREX	SW	Oct-98	Present	EUREX
35	ASX SPI 200 Index Futures	XP	Jul-01	Present	SFE
36	Hang Seng Index Futures	HI	Feb-01	Present	HFE
37	KOSPI 200 Index Futures - KSE	KM	Oct-03	Present	KSE
38	MSCI Taiwan Index Futures - SIMEX	TW	Apr-97	Present	SIMEX
39	Tokyo Price Index (TOPIX) Futures	TP	Jul-03	Present	TSE
40	Nikkei 225 Index Futures - CME	NK	Sep-90	Present	CME
41	Nikkei 225 Index Futures - SIMEX	EN	Apr-97	Present	SIMEX
42	Nikkei 225 Index Futures - OSE	NE	Feb-08	Present	OSE
43	S&P Asia 50 Index Futures	SA	Feb-06	Oct-07	CME
44	E-mini MSCI EAFE Futures	MG	Mar-06	Present	CME

	Meat Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
45	Feeder Cattle Futures	FC	Jan-78	Present	CME
46	Live Cattle Futures	LC	Dec-74	Present	CME
47	Live/Lean Hogs Futures	LH	Dec-74	Present	CME
48	Pork Bellies Futures	PB	Dec-74	Present	CME
	Metal Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
49	Copper Futures - COMEX	HG	Dec-89	Present	COMEX
50	Gold Futures - COMEX	GC	Jan-84	Present	COMEX
51	E-mini Gold Futures - COMEX	XG	Jan-06	Present	CBOT
52	TOCOM Gold Futures	JG	Jul-03	Present	TOCOM
53	Palladium Futures - NYMEX	PA	Jan-94	Present	NYMEX
54	Platinum Futures - NYMEX	PL	Oct-07	Present	NYMEX
55	TOCOM Platinum Futures	JA	Jul-03	Present	TOCOM
56	Silver Futures - COMEX	SV	Dec-83	Present	COMEX
57	E-mini Silver Futures - CBOT	YS	Jan-06	Present	CBOT
	Interest Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
58	Australian 10-year Futures - SFE	AX	Jul-01	Present	SFE
59	Australian 3-year Futures - SFE	AY	Jul-01	Present	SFE
60	Australian 90-day Futures - SFE	AU	Jul-01	Present	SFE
61	Euro Schatz 2-year Futures	BZ	Mar-97	Present	EUREX
62	Euro Bobl 5-year Futures	BL	Jan-97	Present	EUREX
63	Euro Bund 10-year Futures	BN	Jan-97	Present	EUREX
64	Canadian Govt Bond Futures	CB	Apr-90	Present	MSE
65	Euro Euribor 3-month Futures - LIFFE	UR	Jan-99	Present	LIFFE
66	Eurodollar Futures	ED	Dec-81	Present	CME
67	Gilt Futures - LIFFE	GL	Jul-98	Present	LIFFE
68	Japanese 10-year Bond Futures - TSE	JB	Jul-03	Present	TSE
69	LIBOR 1-month Futures	EM	Sep-90	Dec-01	CME
70	Municipal Bonds Futures	MB	Jun-85	Mar-06	CBOT
71	Sterling 3-month Futures - LIFFE	ST	Jul-98	Present	LIFFE
72	T-Bills Futures	TB	Jan-82	Sep-03	CME
73	T-Bond 30-year Futures	US	Oct-82	Present	CBOT
74	T-Notes 10-year Futures	TY	Jan-83	Present	CBOT
75	T-Notes 5-year Futures	FV	Jul-88	Present	CBOT
76	T-Notes 2-year Futures	TU	Jan-91	Present	CBOT
	Energy Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
77	Brent Crude Oil Futures - ICE	CO	Aug-03	Present	ICE
78	NY Natural Gas Futures	NG	Jan-93	Present	NYMEX
79	E-mini Natural Gas Futures	QG	Jul-02	Present	NYMEX
80	NY Heating Oil #2 Futures	HO	Jan-84	Present	NYMEX
81	E-mini Heating Oil Futures	QX	Jan-06	Present	NYMEX
82	NY Light Sweet Crude Oil Futures	CL	Jan-87	Present	NYMEX
83	miNY Light Sweet Crude Oil Futures	QM	Jul-02	Present	NYMEX
84	Unleaded Gasoline Futures	HU	Sep-87	Dec-06	NYMEX
85	Unleaded Gasoline (RBOB) Futures	XB	Oct-06	Present	NYMEX

	Food & Fiber Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
86	Cocoa Futures	CC	Jul-86	Present	NYBOT / ICE
87	Coffee Futures	KC	Jan-87	Present	NYBOT / ICE
88	Cotton Futures	CT	Jan-87	Present	NYBOT / ICE
89	Lumber Futures	LB	Dec-74	Present	CME
90	Orange Juice Futures	JO	Jul-87	Present	NYBOT / ICE
91	Sugar Futures	SB	Jul-86	Present	NYBOT / ICE
	Grain Futures	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
92	Corn Futures	CN	Jul-82	Present	CBOT / CME
93	Oats Futures	OA	Jul-82	Present	CBOT / CME
94	Soybean Meal Futures	SM	Jul-82	Present	CBOT / CME
95	Soybean Oil Futures	BO	Jul-82	Present	CBOT / CME
96	Soybeans Futures	SY	Jul-82	Present	CBOT / CME
97	Wheat Futures - CBOT	WC	Jul-82	Present	CBOT / CME

Appendix C: Available Cash Index Data

	North America	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Location</i>
1	Dow Jones Industrial Average Index	DJ	Apr-93	Present	USA
2	OEX (S&P 100) Index	SX	Jan-87	Present	USA
3	S&P 500 Index	SP	Feb-83	Present	USA
4	S&P 400 MidCap Index	MD	Jan-98	Present	USA
5	NYSE Composite Index	YX	Jan-87	Present	USA
6	NASDAQ Composite Index	NC	Jul-03	Present	USA
7	NASDAQ 100 Index	ND	Jan-97	Present	USA
8	Russell 1000 Index	RK	Jul-03	Present	USA
9	Russell 2000 Index	RL	Jan-97	Present	USA
10	Russell 3000 Index	RM	Jul-03	Present	USA
11	S&P Canada 60 Index	SC	Jul-03	Present	Canada
12	S&P/TSX Composite Index	TS	Jul-03	Present	Canada
	Europe	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Location</i>
13	ASE General Index	GR	Jan-08	Present	Athens
14	Amsterdam AEX Index	AE	Jan-08	Present	Amsterdam
15	DAX Index	DA	Jul-03	Present	Berlin
16	DJ Euro Stoxx 50 Index	XX	Jul-03	Present	Berlin
17	DJ Stoxx 50 Index	VH	Jul-03	Present	Berlin
18	BEL 20 Index	BE	Jan-08	Present	Brussels
19	Bucharest BET Index	BU	Jan-08	Present	Bucharest
20	Budapest Index	UO	Jul-03	Present	Budapest
21	KFX OMX Copenhagen 20 Index	KX	Jan-08	Present	Copenhagen
22	OMX Copenhagen Index	KA	Jan-08	Present	Copenhagen
23	OMX Helsinki 25 Index	HE	Jan-08	Present	Helsinki
24	ISE Industrials Index	XU	Jan-08	Present	Istanbul
25	ISE National 100 Index	TU	Jan-08	Present	Istanbul
26	PSI 20 Index	PP	Jan-08	Present	Lisbon
27	FTSE 100 Index	FT	Jul-03	Present	London
28	FTSEurofirst 100 Index	FE	Jan-08	Present	London
29	IBEX 35 Index	IB	Jul-03	Present	Madrid
30	Madrid Stock Exchange General Index	MA	Feb-08	Present	Madrid
31	OSE All Share Index	OL	Jan-08	Present	Oslo
32	OSE Benchmark Index	OS	Jan-08	Present	Oslo
33	CAC 40 Index	CF	Jul-03	Present	Paris
34	Prague Stock Exchange Index	PS	Jan-08	Present	Prague
35	OMX Riga Index	RI	Jan-08	Present	Riga
36	MIB 30 Index	II	Jul-03	Present	Rome
37	OMX Stockholm Price Index	SM	Jan-08	Present	Stockholm
38	OMX Tallinn Index	TA	Jan-08	Present	Tallinn
39	Austrian Traded ATX Index	AT	Jan-08	Present	Vienna
40	OMX Vilnius Index	VI	Jan-08	Present	Vilnius
41	WIG 20 Index	WI	Jan-08	Present	Warsaw
42	Swiss Market Index	SW	Jul-03	Present	Zurich

	Asia	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Location</i>
43	Thailand MAI Index	TH	Jan-08	Present	Bangkok
44	Hang Seng Index	HI	Dec-06	Present	Hong Kong
45	Jakarta Composite Index	JC	Jan-08	Present	Jakarta
46	Karachi 100 Index	KS	Jan-08	Present	Karachi
47	Kuala Lumpur Comp Index	KL	Jan-08	Present	Kuala Lumpur
48	KOSPI 200 Index	KM	Jan-04	Present	Seoul
49	Shanghai SE Composite Index	SH	Jan-08	Present	Shanghai
50	CSI 300 Index	SZ	Jan-08	Present	Shanghai
51	Shenzhen SE Composite Index	SO	Jan-08	Present	Shenzhen
52	Straits Times Index	ST	Jan-08	Present	Singapore
53	Nikkei 225 Index	NE	July-03	Present	Tokyo
54	TOPIX Index	TP	July-03	Present	Tokyo
	Africa	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Location</i>
55	FTSE/JSE Africa Top 40 Index	TO	Jan-08	Present	Johannesburg

Note: The Dow Jones Industrial Average prints approximately 20 times per minute. The other indices refresh about every 15 seconds.

Appendix D: Available Market Indicator Data

	<i>Description</i>	<i>Symbol</i>	<i>Start Date</i>	<i>End Date</i>	<i>Exchange</i>
1	CBOE Volatility (VIX)	IAP	7/2003	Present	CBOE
2	NASDAQ Adv Issues	IAL	7/2003	Present	NASDAQ
3	NASDAQ Dec Issues	IAM	7/2003	Present	NASDAQ
4	NASDAQ Down Volume	IAK	7/2003	Present	NASDAQ
5	NASDAQ TICK	IAN	7/2003	Present	NASDAQ
6	NASDAQ Up Volume	IAJ	7/2003	Present	NASDAQ
7	NASDAQ Volatility	IAQ	7/2003	Present	NASDAQ
8	NASDAQ Volume	IAO	7/2003	Present	NASDAQ
9	Dow Jones Down Volume	IAI	7/2003	Present	NYSE
10	Dow Jones TICK	IAH	7/2003	Present	NYSE
11	NYSE Adv Issues	IAB	7/2003	Present	NYSE
12	NYSE Dec Issues	IAC	7/2003	Present	NYSE
13	NYSE TICK	IAD	7/2003	Present	NYSE
14	NYSE TRIN	IAE	7/2003	Present	NYSE
15	NYSE Up Volume	IAA	7/2003	Present	NYSE
16	NYSE Volume	IAF	7/2003	Present	NYSE