



*exchange data international*

Worldwide Adjustment Factors –  
User Guide

V. 3.2



## Helping the global financial community make informed decisions through the provision of fast, accurate, timely and affordable reference data services

With more than 20 years of experience, we offer comprehensive and complete securities reference data for equities and fixed income instruments around the globe.

Our customers can rely on our successful track record to efficiently deliver high quality data sets including:

- Worldwide Corporate Actions
- Worldwide Fixed Income
- Security Reference File
- Worldwide End-of-Day Prices

Exchange Data International has recently expanded its data coverage to include economic data. Currently it has three products:

- African Economic Data [www.africadata.com](http://www.africadata.com)
- Economic Indicator Service (EIS)
- Global Economic Data

Our professional sales, support and data/research teams deliver the lowest cost of ownership whilst at the same time being the most responsive to client requests.

As a result of our on-going commitment to providing cost effective and innovative data solutions, whilst at the same time ensuring the highest standards, we have been awarded the internationally recognized symbol of quality ISO 9001.

Headquartered in United Kingdom, we have staff in Canada, India, Morocco, South Africa and United States.



EDI (Exchange Data International) & EIS (Electronic Information Solutions)

Adjustment factors are generated using price data and corporate action data supplied by EDI and foreign exchange data supplied by EIS & EDI.

Used in conjunction with FeedFormat\_AF2\_yyyymmdd.xls, which contains the specifications and references.

## Overview

One of the principal uses of adjustment factors is to back adjust EOD (end of day) per-share price data so that the price series can be graphed with the effect of any events (bonus, rights, consolidation, etc) “factored” into the earlier prices. Once adjusted meaningful comparisons can be made between a recent price and an earlier price, e.g. comparing a recent price of 15 against an earlier price of 20 it would appear that the security has lost 25% of its value however, after adjusting the earlier price for the 2 for 1 split (factor = 0.5), that happened between the two prices, you can see that security has actually increased in value by 50%.

All “per-share” series, including prices, earnings per share, dividends per share, assets per share, cash flow per share, etc. need to be adjusted before meaningful conclusions can be drawn about growth rates, trends, etc.

The feed has all necessary fields so that you can identify the country, security, event & factor. Further the feed has been designed for you to database the records or apply directly to price series data.

The advantage of this feed over competitor feeds is that it can be fully automated allowing the handling of messy cancellations and corporate action changes to happen seamlessly in the background.

## Version Differences

Other than additional fields like dates, exchange codes, etc. the three major differences between this version of the feed and the previous version of the feed –

1. Inclusion of Bloomberg codes
2. The fields that were sub-fields in the Detail field of the previous version now have their own fields. For example DivType was in the Detail field (event description) as DIVPERIOD=???.
3. The Reason codes are different, expanded to 3 characters enabling higher-level groupings of reasons. For example all dividend reasons begin with "01", with the 3rd character depending on whether it is cash, script or both. This allows greater granularity when deciding to apply or not.

Users upgrading from the previous version will need to ensure the above differences are handled.

## FeedFormat\_AF2\_yyyymmdd.xls

The companion XLS file contains both the specifications and the references at time of writing. Most references are available via EDI's 902 feed and are simply included in this companion spreadsheet as a matter of convenience.

## Development Checklist

The best way to develop a system is to start with this user guide and some sample files. Once the system is working with sample files, organise a trial and get your system working with live data.

1. Create basic system to handle active adjustment records (status = "A").
2. Modify system to handle rescinded adjustment records (status = "R"), which occur when event cancelled or a core field changes after publication date (see Rescinding Adjustments).
3. Modify system to handle incremental update files; specifically records that have been removed from earlier update files of same date (see Tracking the Adjustments).
4. Modify system to handle different OPTION flags, which occur when shareholders are given a different choice, for example taking the dividend in cash or script alternatively taking the dividend in a different currency, etc. (see Option Flag).
5. Modify system to handle multiple adjustment records for same event each from a different exchange (specifically for USCOMP ~ see Tracking the Adjustments).
6. Ensure system can handle new fields added to the end of each record, any new fields should be ignored until method of handling is added.
7. Ensure the Detail field (text) is trimmed to the desired size before loading into database.
8. Modify system to enable complete replacement of all adjustment records for a particular exchange ~ do this by saving into your database the filename prefix of the adjustment file that the record was loaded from (see Reissuing adjustments).

## File Name Convention

Adjustment files follow a similar naming convention to EDI's price files. Basically the country code followed by an underscore, then the MIC followed by an underscore, then "AF" followed by the six character date, yymmdd, followed by sequence number, if more than one file, then ".txt". For example, LSE adjustment files, for 1<sup>st</sup> Apr 2010, would be named

–

GB\_XLON\_AF100401.txt

GB\_XLON\_AF100401\_02.txt

GB\_XLON\_AF100401\_03.txt

GB\_XLON\_AF100401\_04.txt

In the above example the "\_04" file is the most recent file and completely replaces all previous files. Each time an adjustment file is created it uses the most recent price file information and most recent corporate action information making earlier adjustment files obsolete.

Adjustment file updates happen regularly, for many reasons, including receipt of unconfirmed price file the receipt of confirmed price file, for yesterday, today and tomorrow, etc.

The last adjustment file update for today will happen when the first price file for tomorrow (business day) is received, therefore when downloading adjustment files always download yesterday's adjustment file with today's adjustment file.

Brief explanation -

1. On receipt of today's unconfirmed price file, the last adjustment file update for yesterday (last business day) will be generated, an interim update for today's adjustment file will be generated and the first adjustment file for tomorrow (next business day) will be generated.
2. On receipt of today's confirmed price file, an interim update for today's adjustment file will be generated and an interim update for tomorrow's (next business day) adjustment file will be generated. NOTE: no update for yesterday's (last business day) adjustment file will be generated.
3. On receipt of tomorrow's unconfirmed price file, the last update for today's adjustment file will be generated, an interim update for tomorrow's adjustment file will be generated and the first adjustment file, for the next day, will be generated.

Adjustment file updates will be discarded if nothing changed between recent update file and previous update file.

## Record format

- Each adjustment record consists of the following fields, in a tab-separated format –
  - Country: 2- character ISO country code, same as in filename.
  - Exchange MIC: 4- character MIC code, same as in filename.
  - ExchgCD: EDI's exchange code for this exchange, see EXCHANGE table.
  - Market MIC: 4-character MIC code designating the market the security trades in.
  - PrimeExchgCD: EDI's exchange code designating the primary exchange for this security, can be different to ExchgCD where this is not the primary exchange.
  - BBExchID: Bloomberg's exchange code.
  - BBTickID: Bloomberg's ticker code.
  - BBCompID: Bloomberg's composite code.
  - Local: Local/Ticker code as used in EDI price files
  - Secid: Security identifier as used in both EDI's price files ("secid") and corporate actions ("SecID"). This field can be used to link the adjustment record to the price file record and the corporate action record.
  - Sedol: SEDOL code (sourced from corporate action)
  - ISIN: ISIN Code (sourced from corporate action)
  - USCode: US Code (sourced from corporate action)
  - SecType: EDI's code for security type, see SECTYPE table.
  - Trading Currency: 3-character ISO currency code, security trades in.
  - IssuerName: Name of issuer for the security being adjusted (sourced from corporate action).
  - TypeName: EDI's name for security type
  - EventID: EDI Unique identifier for this event (sourced from corporate action)
  - Action: EDI Corporate action reference number
  - Event: code for type of event (sourced from corporate action ~ specifically the code for the type of corporate action) –
    - BON: Bonus
    - CALL: Call
    - CAPRD: Capital Reduction
    - CONSD: Consolidation
    - DMRGR: De-merger
    - DIST: Distribution
    - DIV: Dividend
    - ENT: Entitlement
    - RCAP: Return of Capital
    - RTS: Rights
    - SCSWP: Security Swap
    - SD: Subdivision
    - SECRC: Security Reclassification
- DivType: EDI's dividend type code, see DIVPERIOD table
- Reason: 3 byte reason code –
  - 025: Bonus (same)
  - 026: Bonus (diff)
  - 053: Capital Call
  - 051: Capital Reduction
  - 054: Capital Return
  - 062: Consolidation
  - 086: Distribution
  - 014: Cash Dividend
  - 015: Script Dividend (same)
  - 016: Script Dividend (diff)
  - 017: Both Dividend
  - 076: De-merger
  - 045: Offer (same)

- 046: Offer (diff)
  - 035: Rights (same)
  - 036: Rights (diff)
  - 066: Security Swap, only when ratio not 1:1
  - 067: Security Reclassification, only when ratio not 1:1
  - 061: Subdivision
- Event Currency: 3-character ISO currency code, depicting the currency the issue is distributed in (can be different to trading currency).
- Choice: Indicates a choice where multiple choice required, e.g. dividend distributed in USD or GBP, user needs to choose one.
- Status: Adjustment record status –
  - “A”: Apply
  - “P”: Pending, indicates that this adjustment will be finalised when additional information comes available.
  - “R”: Rescind (remove/reverse), indicates that this adjustment was been cancelled or re-issued after an adjustment record has already been published. Note this can happen years after the ex-date. For further information refer “Rescinding the Adjustment” section.
- AnnDate: Dividend’s announcement date, in format `yyyymmdd`.
- ExDate: Event ex-date/effective date of the event in the format of `yyyymmdd`
- RecDate: Event record date, in format `yyyymmdd`.
- PayDate: Event payment date, in format `yyyymmdd`.
- PayType: Character depicting event payment type, see PAYTYPE table.
- Text: Textual description of the event
- Cash: Cash amount in event, e.g. dividend amount or call amount, etc.
- Ratio: Ratio values in event in format `new:old` (new for old), e.g. “1:4”
- Factor: Adjustment factor
- Close: Security close price used to calculate factor, where applicable.
- ResSecType: Resultant security type, e.g. “EQS”
- ResLocal: Reserved
- ResSecID: Resultant SecID
- ResSedol: resultant SEDOL (sourced from corporate action)
- ResISIN: resultant ISIN (sourced from corporate action)
- Notes: structured notes in format comma separated name=value pairs, e.g. `AE=12345,BC=34567,etc.` Can be up to any length, with any number of pairs. New pairs can be added anytime. Pairs will be in alphanumeric order based on name.
- Sentiment: market sentiment ~ the markets reaction to the event. Simply the previous close divided by today’s open.
- Errors: hexadecimal value indicating any errors encountered in calculating the factor (when any of the following happen the factor is set to “1”. This is a bit flag where each bit has the following meanings –
  - \$0000: No errors detected.
  - \$0001: No recent (within 6 months) close price found. If processing primary exchange and no recent (within 6 months) price available then code set to \$0001 and defaults to using older, more stale, close price. If not primary exchange then will attempt to get recent close from primary exchange, if available then will set error code \$0020 else will set error code \$0001 and use stale price if available.
  - \$0002: No open price found.
  - \$0004: Currency mismatch and unable to convert.
  - \$0008: Issue price was equal to or greater than the stock price.
  - \$0010: Issue was in the class of an option and therefore impact of little significance and/or difficult to determine.
  - \$0020: Last price from PrimeEx used
  - \$0040: Open price from PrimeEx used
  - \$0080: Factor from PrimeEx used

For further information see `FeedFormat_AF2_yyyyymmdd.xls` specifications.

## Timing

Adjustment factors are provided on the ex-date, of the event, except –

1. When the corporate action is incomplete (missing core fields like “Ratio New”, etc.) in which case the factor will be provided as soon as the corporate action becomes complete after the ex-date or
2. The factor calculation requires the open price of a security that has not traded yet in which case it will generate a factor as soon as the security trades.

The first generation of factors for a particular ex-date will happen close of market the day before the ex-date and the last generation of factors, for a particular ex-date, will happen close of market the day after the ex-date. Every time a price file is received, confirmed or unconfirmed, during this period, an adjustment factor file will be generated.

Each time an adjustment factor file is generated it is compared to the previous file, of same date, and if different it is published (filename incremented and loaded up to EDI’s servers) if it is not different it is not published.

For example –

Exdate-1	CC_MIC_AFyymmdd.txt
Exdate+0	CC_MIC_AFyymmdd_02.txt (if different to previous file)
Exdate+1	CC_MIC_AFyymmdd_03.txt (if different to previous file)

## Choice field

Often the shareholder is given the choice of taking the event in a few different ways, for example a dividend might be paid in USD or GBP and the shareholder needs to choose how they wish to receive it, alternatively it might be paid as cash or script or a combination of both, again the shareholder needs to choose how they wish to receive the dividend. Also de-mergers and distributions might have different options for the shareholder to consider.

In all these cases a choice field, e.g. “1” or “2” etc. details that this is choice 1 or choice 2 or choice 3, etc. Where there are multiple choices you will need to choose one of the choices and use that one.

If unsure, which option to use, then use the lowest choice (which could be blank where no choice available).

RULE: Never apply multiple adjustments with same ex-date, EventID and different choices.

## Relationship

Generally, there is a one to one relationship to the underlying corporate action however in a few circumstances this is not true –

1. When a dividend delivers both cash and script the corporate action specifies this as a DivType of “Both”. This is split into two separate adjustment records, one for the cash component and the other for the script component, which can be recombined later as desired. When this happens the Choice field will be set to the same in each case. RULE: Where you see a script dividend adjustments and a cash dividend adjustment with the same EventID, ExDate & Choice you can optionally recombine the two by multiplying the two factors together.
2. When an event is linked to a previous event they will be combined into a single adjustment record. For example, in Stockholm they often return cash to shareholders in the form of free redemption rights (RDR) followed by a return of capital on those redemption rights. When this happens only one adjustment record will be generated for both corporate actions.

## Applying the adjustments

Decide which type of adjustments you want to apply (DIV, BNS, etc) then use the Reason field to access only those adjustments and ignore the others.

Prior to using any adjustment factor check that no other adjustment record has the same EventID and ExDate, if it has then check the Choice ~ you should only use one of the choice for the same EventID and ExDate. This is common when a shareholder has the choice of taking a dividend in multiple currencies and cash or script selection.

Refer description on Choice field for further information.

WARNING: USCOMP adjustments are a special case where the same event can come in from multiple exchanges, therefore, in addition to the above, you will need to select one exchange’s events. For example, a composite security might be listed on the AMEX, NASD & NYSE, when it does a subdivision, you will have 3 subdivisions adjustment records ~ you will need to choose one.

Compare the factor to the sentiment value, if available, they should be roughly the same if they are significantly different then the factor should be used with caution or even modified to bring it closer to sentiment (this is purely your prerogative).

**Multiply** all historical prices, up to but not including the ex-date, by the factor.

Optionally **divide** all historical volumes, up to but not including the ex-date, by the factor for consolidations and subdivisions only. For an example of this see Appendix 1 – Applying the adjustments example.

Be prepared for corrections to come through, at a later date, in the form of rescinded adjustment records, in which case you need to reverse or remove the original adjustment.

## Databasing/Tracking the adjustments

When applying the adjustments, you need to be able to identify a specific adjustment in a database or which adjustments have been applied to the price data, when applying directly. Using the date by itself is not sufficient because there might be multiple adjustments for same security on same date (ex-date). In each case a key is required to uniquely identify the event.

For a database of events, for specific exchange, the key would comprise of Country + Exchange MIC + Code (Local) + Date (ex-date) + Reason + DivType (dividends ONLY) + Choice. An alternative key would be ExchgCD + EventID + SecID + Reason + Choice. Therefore when deleting, inserting or replacing, you would use the key to see if a corresponding event already exists then insert, replace or delete as required.

When adjusting price data directly and there is a need to ensure that any particular event is not applied multiple times, it is necessary to track which events have been applied. Usually this would only be necessary on the most recent date and previous days can be ignored. Either way the key, in this case, would comprise of Code (ticker code or SecID) + Date (ex-date) + Reason + Status + DIVPERIOD (dividends ONLY) + OPTIONID. Status is necessary because you need to know that a rescinded event has been applied or not (rescinded events, like active events, should not be applied more than once).

Tracking adjustments is especially important when using the interim adjustment files, rather than just the last published interim file, which is the “official” file for that day. Adjustment records, in interim files, can change significantly, including being in earlier interim files and gone in later ones (event cancelled during the day).

Suggested methodology -

1. Download latest incremental file and save to disk.
2. Compare recently downloaded file to previously downloaded file, of same date, and ascertain what is missing and handle accordingly. You can either update your database directly, at this point, or copy the missing record into the recently downloaded file and change the status to "R".
3. Use recently downloaded file to update database.

If your database loader is not able to extract the above key from the adjustment file then after downloading an adjustment file and before loading into a database (especially when using an inflexible loader) you will need to use a process or program that modifies the format, i.e. extracts necessary fields, changes the sort order, basically converts the records into your loader’s desired format. You will need to write this yourself, it is a relatively simple piece of code because all it does is read in a file, modify the file contents then save it back to disk.

## Linking to EDI P04 prices

The adjustment feed has been designed so that every adjustment file has a matching price file, for example USCOMP adjustment records match to USCOMP price records and XNAS adjustment records match to XNAS price records.

Each set clearly defined by the file name, i.e. -

US\_USCOMP\_AFyymmdd <-> US\_USCOMP\_yyyymmdd

US\_XNAS\_AFyymmdd <-> US\_XNAS\_yyyymmdd

US\_XNYS\_AFyymmdd <-> US\_XNYS\_yyyymmdd

GB\_XLON\_AFyymmdd <-> GB\_XLON\_yyyymmdd

AU\_XASX\_AFyymmdd <-> AU\_XASX\_yyyymmdd

Etc.

The key you use to match adjustment records to price records will depend on the scope of the data in the database, for example if you are only databasing one exchange then the key will be as simple as the local code (generally the most unique of all codes), however if you are databasing multiple exchanges in the same table your key will also need an exchange code. We recommend using the ExchangeMIC; do not use the MarketMIC in the adjustment records for this purpose as it conveys the market/segment the security trades in.

Local code differences -

Note XJPX: Local codes are prefixed with four zeros in the adjustment records.

## Negative Factors

These are rare however can happen, for example when a DIV (dividend) is paid that is greater than the share price, on the ex-date, or a RCAP (return of capital) that is also greater than the share price, on the ex-date.

This type of event can happen when a fund is being closed down and final distributions made in form of a DIV or RCAP.

## Factors of 1

A factor of “1” can either be a valid factor or default factor where one could not be calculated.

Default factors are 1.0 because this is mathematically neutral and can be used as placeholders when factors cannot be calculated. Reasons for not being able to calculate factors include –

1. No stock close price when a stock close price required.
2. No issue open price when an issue open price required.
3. Unable to perform currency conversion when required.

For exact nature of reason why a factor could not be calculated refer to Errors field.

However, factors of “1” are valid in following circumstances –

1. When a RTS (rights) or ENT (entitlement) issue makes the issue available at a price that is equal to or above the current stock price (issue price > stock price).
2. When a company does a RTS (rights) or ENT (entitlement) issue of options with an exercise date far in the future the impact may be of little significance or difficult to determine due to uncertainty.
3. CAPRD (Capital reduction) of 1 for 1.

## Reissuing adjustments

Adjustments will be re-issued and the original adjustment record rescinded, if any of the corporate action key fields change after the date the adjustment was first published. For example, if the RatioNew or RatioOld change, after the date of first publication, then the original adjustment will be rescinded (after March 2010) and a new adjustment will be issued.

NOTE: Very rarely EDI might reprocess all adjustments for a specific exchange, in which case you will be supplied via email or special FTP download all reprocessed adjustment files going back to 2007. You will need to remove all data loaded from the original adjustment files, up to the date of the reprocess, and then load all data from the newly reprocessed adjustment files. The easiest way to remove the old data from your database is by using an identifying field that specifies the prefix of the filename from which they were loaded. For example, if loading from AU\_XASX\_AFyymmdd.txt you would set the "File" field in your database record to "AU\_XASX". Doing this will facilitate the later removal if necessary.

Reprocessed files are consolidated into a single file so one file replaces all incremental update files, for example -

CC\_MIC\_AFyymmdd.txt

Replaces all below -

CC\_MIC\_AFyymmdd.txt

CC\_MIC\_AFyymmdd\_02.txt

CC\_MIC\_AFyymmdd\_03.txt

All exchanges where reprocessed in early 2013 so history prior to 2013 should not contain any incremental update adjustment files. If you do receive history that has incremental update prior to 2013 then you have received the incorrect history ~ do not use this.

## Cancelling adjustments

Adjustments are rescinded if the original adjustment is cancelled or re-issued **after** the publication date (usually the ex-date).

Where an adjustment has been rescinded this will need to be removed/reversed out of your system.

If you are loading the adjustment records into a database then you will need to remove the rescinded adjustment record from your database.

If you are back-adjusting price series data then you will need to reverse the rescinded adjustment record from your price series data using the inverted factor to reverse the original adjustment.

It is recommended to process rescinded adjustment records before processing any re-issued adjustment records.

NOTE: During the day of publication, if an adjustment is cancelled or re-issued it is not rescinded; the change is simply reflected in the next interim file.

For example, if a dividend is cancelled on the day of publication then the interim file before cancellation will contain an adjustment record for that dividend however an interim file after the cancellation will not contain an adjustment record (it is not rescinded, it is simply gone).

For this reason, when using interim files it is especially important to track adjustments, see “Tracking the Adjustments”.

Lets look at a specific example.

On the 12/12/2012 we published a factor for ASX:JHX dividend of 0.047746370. On the 19/12/2012 the dividend changed from 0.047746370 to 0.047465 so we cancelled the original adjustment factor record by rescinding it and published a new record based on the revised information. You would need to remove the old record from your database before loading in the new record.

## Enhancements (by date)

1. Rescinding adjustments (8<sup>th</sup> March 2010): Where a corporate action is cancelled, deleted or suspended AFTER an adjustment factor has been published, that adjustment record will be rescinded, giving users greater control over historical price data management.
2. Incomplete actions (8<sup>th</sup> March 2010): Where a corporate action is incomplete (insufficient fields required to generate an adjustment record), on its ex-date, an adjustment record will not be generated until it becomes complete. This reduces the number of factors output as "1" due to incomplete corporate actions on their ex-date.
3. Currency conversions (1<sup>st</sup> April 2010): where a security trades in one currency and a dividend or new issue, e.g. rights, entitlement, etc., is made in a different currency, the currency will be converted as of the ex-date to enable a factor to be generated. Note where there is a denomination difference this also will be converted during currency conversion.
4. Option flag (1<sup>st</sup> April 2010): An Option flag has been added into the Detail field to enable users to distinguish between multiple options offered for the event.
5. PrimeEx prices (1<sup>st</sup> April 2010): When a price is required in the factor calculation, either open or last, and that price is not available on the listed exchange then a price will be looked up on the PrimeEx (primary exchange).
6. PrimeEx factor (1<sup>st</sup> April 2010): When a factor has not been calculated due to no price found then the factor from the PrimeEx (primary exchange) will be used instead.
7. Errors field (1<sup>st</sup> April 2010): Bit flag that indicates any errors encountered whilst calculating the factor and attempted solutions, e.g. used price from primary exchange, to overcome errors.
8. Re-issuing adjustments (1<sup>st</sup> Nov 2010): Adjustment records will be re-issued should any of the key fields change after the adjustment record has been created. For example if the RatioOld or RatioNew fields, in a subdivision, change after the adjustment record has been first issued then the adjustment record will be re-issued using the "corrected" fields.
9. Rescinded expansion (8<sup>th</sup> Nov 2010): When an adjustment record is re-issued, as in point 8 above, or cancelled, as in point 1 above, the original adjustment record will be re-published with the status set to "R" (Rescinded = Remove/Reverse) and the factor inverted (1/original\_factor).
10. Duplicated Bug (12<sup>th</sup> Nov 2010): Fixed bug causing rescinded records to duplicate when multiple corporate actions are rescinded that are linked together.
11. Weekend Actions (2<sup>nd</sup> Feb 2011): Enhanced processing to generate adjustment records from corporate actions that have an ex-date over a weekend.
12. PrimeEx grouping (1<sup>st</sup> Jun 2011): added specifically to overcome problems with USCOMP, where corporate actions from multiple exchanges are processed to generate adjustments. For example a security might be traded on the AMEX, NASD & NYSE and generate a dividend corporate action for each exchange. Previously this caused a problem, in USCOMP, however will now generate 3 separate adjustments allowing the user to decide which one to use.
13. Consolidation of same corporate action (1<sup>st</sup> Oct 2012): Where multiple corporate actions are issued for same event, SecID, ISIN & local code (see SecID 536366 in GB\_XLON\_AJ120725.txt) only one adjustment will be generated, where old system would generate one for each.
14. Matching corporate action to price record (1<sup>st</sup> Oct 2012): The old system searched for price information using SecID only, which caused problems where multiple securities had same SecID. The new system searches on Sedol (if available in corporate action) first then Local, then SecID and finally ISIN. Because Sedol, instead of SecID, is used as the primary key this reduces the incidence of using the wrong price record.
15. Sequencing of price files (1<sup>st</sup> Oct 2012): The old system would skip a missing price file, if a subsequent file became available. The new system will stop processing until the missing file has been loaded, ensuring no price file is missed.
16. Tomorrow's actions included today's actions (5<sup>th</sup> Oct 2012): The new system, implemented 1<sup>st</sup> Oct 2012, would incorrectly include today's actions in tomorrow's file of actions to be processed. This would cause a large number of actions to be removed, in later adjustment files, once the system realised the error. This has now been fixed.
17. Factor calculated for bonus and script issue, same stock, when no close (19<sup>th</sup> Jan 2013): Previously, when no previous close, a bonus or script issue, of same stock, would not calculate. Changed to force a calculation since previous close is not required to calculate a factor in this circumstance.
18. Search code order changed for previous close (21<sup>st</sup> Jan 2013): When searching for a previous close the Sedol was used first then Local then SecID then ISIN. This caused problems when multiple securities had the same

- Sedol, SecID & ISIN. This has now been changed to search using the Local first (if available) then Sedol then SecID then ISIN.
19. Empty file generated when previous incremental files exists (3<sup>rd</sup> Apr 2013): When there were no adjustments it would not generate an adjustment file, in most cases this is correct however this is incorrect when a previous incremental adjustment file exists because the empty file cancels the previous adjustments in the previous file.
  20. Rescinded adjustment search key modified (27<sup>th</sup> Apr 2013): Previously when searching for an adjustment record that has to be rescinded the MIC was not included in the key. The MIC is now included as the second field of the key to overcome the problem with USCOMP where multiple adjustment records exist for same event and different markets (MIC).
  21. Ignore corporate actions that have ListStatus = "D" (27<sup>th</sup> Apr 2013): Corporate actions that have a ListStatus of "D" are ignored even though their ActFlag (corporate action status) is "A" (Active).
  22. 11<sup>th</sup> Aug 2013 XMEX Symbol makeup changed: Generally the Symbol field matches the PriceFilesSymbol in the price files and the LocalCode in the corporate actions, however on the 7<sup>th</sup> June 2013 the XMEX PriceFilesSymbols construction changed, for example "AMX A" changed to "AMX" with a Comment of "A" and the LocalCode in the corporate actions remained as "AMX A". Therefore the construction of Symbol has been modified to reflect that of price files pre 07/06/13 and match the corporate action's LocalCode. The algorithm used is if Comment = "\*" then PriceFilesSymbol = PriceFilesSymbol else PriceFilesSymbol = PriceFilesSymbol + " " + Comment.
  23. 11<sup>th</sup> Aug 2013 XSWX Symbol makeup changed: Generally the Symbol field matches the PriceFilesSymbol in the price files and the LocalCode in the corporate actions, however due to the repetitive nature of both of these in their respective files the Symbol has been modified to reflect the PriceFilesSymbol + Currency in price files and the LocalCode and PVCurrency in corporate actions.
  24. 16<sup>th</sup> Sep 2013: Added DivPeriodCD as a "core" field. Though DivPeriodCD has no direct effect on factor calculation it can have an indirect effect, especially when rescinding a dividend record. Because DivPeriodCD is used as part of a key to identify a specific dividend adjustment record an untracked change in this field can make identifying an earlier record impossible. For example assume an adjustment record is published for an INT dividend, which is then changed to a FNL dividend and then later the dividend amount is changed, which would require a rescind record to be published. The key used to search for the original record would include FNL and would not match INT in the original record's key, hence the need to track DivPeriodCD changes.
  25. 23<sup>rd</sup> Oct 2014: Added new status "P" (Pending). This status indicates that the corporate action is complete (core fields available) but a required price is not available. Pending records have the factor set to "1" so can be ignored or loaded into a database (previously no record would have been disseminated). As soon as a price becomes available a factor will be generated and the pending record replaced (not rescinded). NOTE: Pending records will not be rescinded as they are simply for information purposes only. It is recommended that these records be ignored until a decision is made on how to handle them.
  26. 1<sup>st</sup> Oct 2015: Added factor for reclassification where ratio is not 1:1.
  27. 1<sup>st</sup> Oct 2015: Added factor for security swap where ratio is not 1:1.
  28. 1<sup>st</sup> Nov 2016: New format created, which is reflected in this document.

## Appendix 1 – Applying the adjustments, example

Assuming you have the following adjustments for a particular security –

2007/05/22	0.87
2008/09/27	0.555
2009/11/05	1.27
2010/03/03	0.666

The usual method used, to back adjust prices, is to move forward in time, i.e. start with the earliest factor and move to the most recent. This is usually the only method available when receiving a daily data feed of prices and adjustments and adjusting as they come in.

The method is simple –

1. Multiply all prices prior to 2007/05/22 by 0.87.
2. Multiply all prices prior to 2008/09/27 by 0.555 (including those done in point 1).
3. Multiply all prices prior to 2009/11/05 by 1.27 (including those done in point 2).
4. Multiply all prices prior to 2010/03/03 by 0.666 (including those done in point 3).

An alternative method, to back adjust prices, is to move back in time, i.e. start with the most recent factor and move to the earliest. This can only be used when bulk adjusting a large number of historical prices, however it is also the faster method.

The method is slightly more complex –

1. Factor = 1
2. Multiply all prices from most recent back to 2010/03/03 by Factor
3. Factor = Factor \* 0.666
4. Multiply all prices from 2010/03/02 back to 2009/11/05 by Factor
5. Factor = Factor \* 1.27
6. Multiply all prices from 2009/11/04 back to 2008/09/27 by Factor
7. Factor = Factor \* 0.555
8. Multiply all prices from 2008/09/26 back to 2007/05/22 by Factor
9. Factor = Factor \* 0.87
10. Multiply all prices from 2007/05/21 back to earliest prices by Factor

The second method is also used when the prices are stored in a database un-adjusted alongside the adjustments. When loading the prices, they can be back adjusted, on the fly using the second method.

Table of unadjusted and adjusted prices

<b>Date</b>	<b>Factor</b>	<b>Combined Factor</b>	<b>Unadjusted Price</b>	<b>Adjusted Price</b>
20/05/2007		0.408404187	57	23.279038659
21/05/2007		0.408404187	58	23.687442846
22/05/2007	0.87	0.4694301	52	24.4103652
23/05/2007		0.4694301	53	24.8797953
		0.4694301	55	25.8186555
25/09/2008		0.4694301	54	25.3492254
26/09/2008		0.4694301	53	24.8797953
27/09/2008	0.555	0.84582	30	25.3746
28/09/2008		0.84582	32	27.06624
		0.84582	33	27.91206
04/11/2009		0.84582	32	27.06624
05/11/2009	1.27	0.666	41	27.306
06/11/2009		0.666	41	27.306
		0.666	43	28.638
01/03/2009		0.666	44	29.304
02/03/2009		0.666	44	29.304
03/03/2009	0.666	1	28	28
04/03/2009		1	28	28

## Customisation

EDI is proud to offer the most effective and efficient solutions tailored to meet each individual customer's needs.

We offer a range of customisation options including:

- Delivery-based solutions to complement existing client infrastructure.
- Content provided at the geographical or portfolio holding level.
- Feeds containing particular formats, field content and integrated client level data items.

EDI uses its extensive data research expertise to source, scrub and integrate new client specified data items with existing products and services. For instance, a request from a multinational investment bank to source the DR universe and map it against its underlying share portfolio ultimately led to the development of EDI's successful Depository Receipt Database.

In addition, EDI was the first vendor to successfully launch an ISO 15022 Corporate Action Messaging feed. This enables customers to reduce costs and increase efficiency by removing the need for multiple feed handlers.

## Support

### Customer Support

**Monday – Friday**

Open 24 hours

**Saturday**

12AM - 8AM (GMT)

**Sunday**

11PM-12AM(GMT)

**Call +44 207 324 0020**

Email: [support@exchange-data.com](mailto:support@exchange-data.com)

Customer support is closed Christmas and New Year's Day.

We aim to acknowledge all queries within an hour of receipt and answer queries within 24 hours where possible.

We will send a progress report if a query is not resolved within that time-frame. We resolve around 95% of customer queries within 24 hours.

All queries sent to our Support department are filtered and dispatched to the relevant department. An IT staff member is engaged in the communication process to resolve complicated technical issues.

## Contact Information

### United Kingdom – Headquarters

5 Highgate Road  
London, NW5 1JY  
United Kingdom  
Tel: [+ 44 207 324 0020](tel:+442073240020)  
Fax: +1 212 214 0825

**Jonathan Bloch**, Chief Executive Officer  
Cell: [+ 44 7785 550 043](tel:+447785550043)  
E-mail: [j.bloch@exchange-data.com](mailto:j.bloch@exchange-data.com)

**Maria Scappaticci**, Global Sales Director  
Tel: [+44 207 324 0070](tel:+442073240070)  
E-mail: [m.scappaticci@exchange-data.com](mailto:m.scappaticci@exchange-data.com)

**Andrew Sabourin**, Business Manager  
Tel: [+ 44 207 324 0028](tel:+442073240028)  
E-mail: [a.sabourin@exchange-data.com](mailto:a.sabourin@exchange-data.com)

**Idil Ozkan**, Business Development Manager  
Tel: [+44 207 324 0266](tel:+442073240266)  
E-mail: [i.ozkan@exchange-data.com](mailto:i.ozkan@exchange-data.com)

### United States

Exchange Data International Inc  
1250 Front Street, no. 260  
Binghamton, NY 13901, USA  
Tel: [+1 607 238 4438](tel:+16072384438)  
Fax: +1 607 238 4439

**Michael Hyland**, Business Manager  
Cell: [+1 732 618-2854](tel:+17326182854)  
E-mail: [m.hyland@exchange-data.com](mailto:m.hyland@exchange-data.com)

**Nora Cervara**, Business Development  
Manager Cell: [+17326701935](tel:+17326701935)  
E-mail: [n.cervara@exchange-data.com](mailto:n.cervara@exchange-data.com)

### Canada

Exchange Data International Inc © 4920  
Boul. de Maisonneuve Ouest Suite 203,  
Westmount  
Montreal, H3Z 1N1  
Tel: [+1 514 755 8469](tel:+15147558469)  
Fax: +1 514 426 6101

**Said Benbihi**, Office Manager  
E-mail: [s.benbihi@exchange-data.com](mailto:s.benbihi@exchange-data.com)

### Morocco

Bloc A  
Numero 46 Lotissement Azaitoune  
Tikiouine, Agadir 80650  
Tel: [+212 528 290 255](tel:+212528290255)  
Fax: +212 528 290 356

**Ilze Gouws**, Project Leader  
Cell: +27 (0) 82 782 3750  
Email: [i.gouws@africadata.com](mailto:i.gouws@africadata.com)

### South Africa

PO Box 2176  
Cape Town 8000