

Bloomberg

TECHNICAL ANALYSIS

DeMark Indicators

20 May 2005

Version: 2.00

DEMARK INDICATORS™

- TD Sequential™
- TD Aggressive Sequential
- TD Combo™
- TD Aggressive Combo
- TD Range Projection™
- TD Lines™
- TD Relative Retracement™
- TD Absolute Retracement™
- TD Trend Factor™
- TD Channel I™
- TD Channel II™
- TD REI™ (Range Expansion Index)
- TD DeMarker I™
- TD DeMarker II™
- TD Moving Average 1™
- TD Pressure™
- TD Camouflage™
- TD Rate of Change™
- TD Alignment™
- TD Aggressive Alignment™
- TD D-Wave™

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INTRODUCTION

There are three distinct levels of market timing or chart analysis.

The basic and most widely followed and used approach is the most subjectively applied. It involves reviewing a chart and then drawing conclusions based upon what one perceives to be occurring with the price action. The problem with this approach is that it is almost totally guesswork and whims and predispositions often influence timing decisions more than logic or reason. This type of analysis is inconsistent and not likely to be successful. This decision making process is haphazard and fraught with inconsistencies.

The next stage of market analysis requires the use of indicators that are designed to guide the user. Specifically, the indicators can be applied based upon their success historically and ideally this will repeat in the future. The difficulty is in discerning the value of an assortment of indicators and, once selected, to apply them with discipline.

The final method of analysis invokes the use of indicators and to then systematically to apply them in one's decision-making process. This is a hard and fast approach and requires not only the implementation of discipline, but also money management skills as well. Our goal is to equip you with the background and tools to satisfy level two above. This should enable you to operate successfully and with more experience and confidence we hope that you will develop to the point that you can approach level three.

- Thomas DEMark

TD SEQUENTIAL™

TD Sequential™ (TD SEQ™) is a trading indicator companion to TD Combo™. Both are designed to anticipate prospective market bottoms and tops prior to their completion. TD Sequential™ attempts to identify price zones typically associated with the completion of a trend and the establishment of a likely new trend in the opposite direction.

It is easy to buy when the market rallies and to sell when the market declines. Human nature is such that most traders prefer to participate in market moves rather than anticipate the termination of a move and the inception of a new one. Most traders adhere to the adage "the trend is your friend." We prefer to adopt a corollary to this phrase: "unless the trend is about to end."

Having been involved in institutional investment for years, we recognize the importance of buying into market weakness or prior to the completion of a market bottom. Conversely, the need to sell into market strength before a market's top has been completed is preferable to selling after the top has been formed. Once a price reversal has occurred and a trend has been established, it is often too late and difficult to participate in the trend without exaggerating the move, particularly if you are a major trading factor in the market. Consequently, TD Sequential™ attempts to identify price zones typically associated with the completion of a trend and the establishment of a likely new trend in the opposite direction.

In applying TD Sequential™, the identification of the exhaustion of a downtrend or of an uptrend is our goal.

SETUP

Before you can enter the market as either a buyer or seller, the market environment must be discovered. Once defined, the market disposition is either vulnerable or susceptible to an advance or decline. Prerequisites must be fulfilled first to establish the market bias. Initially, a series of eight or more consecutive closes less than the close four price bars earlier, or greater than the close four price bars earlier, was required to complete a buy and a sell Setup, respectively.

As a result of extensive research, this requirement was subsequently changed to nine or more price bars. Therefore, once a minimum series of nine consecutive closes less than the close four price bars earlier are completed, a buy Setup is recorded. Conversely, once a minimum series of nine consecutive closes greater than the close four price bars earlier is completed, a sell Setup is recorded. To initialize the first price bar of a buy Setup series, the prior price bar's close must be greater than or equal to the close four price bars earlier. Similarly, to initialize the first price bar of a sell Setup series, the prior price bar's close must be less than or equal to the close four price bars earlier. Once a Setup is completed, the market has two options: it may continue its outstanding trend or it may undergo a trend reversal. Usually, the distinction as to which one will occur is dependent

upon whether or not the market successfully exceeds on a closing basis the extreme price level (known as TD Setup Trend or TDST) formed by the prior Setup in the other direction. In other words, the most recent market sell Setup exceeds the highest price level of the prior buy Setup in the other direction on a closing basis.

Often, if the highest high of the buy Setup is exceeded on a closing basis, it indicates that the current market trend is strong and likely to undergo Countdown as well as Setup before its trend will change.

On the other hand, should the current Setup fail to exceed on a closing basis, the extreme price level of the prior Setup (TD Setup Trend or TDST) in the other direction, a price reversal is likely to occur at that time, rather than awaiting completion of Countdown. Regardless, once Setup has been completed, it is prudent to commence Countdown just in case the TDST rule fails to differentiate correctly between the continuation of the ongoing trend and the start of a new trend.

Typically, after the minimum requirement for a buy setup is completed—9 consecutive closes less than the close 4 days earlier—a reflex rally occurs regardless whether the market extends through countdown or not. The only apparent prerequisite for this expected "hiccup" rally is that price bars 8 or 9 of the buy setup be less than both price bars 6 and 7. Likewise after the minimum requirement for a sell setup is completed--9 consecutive closes greater than the close 4 days earlier--a reflex decline occurs regardless whether the market extends through countdown or not. The only apparent prerequisite for this expected "hiccup" correction is that price bars 8 or 9 of the sell setup be greater than both price bars 6 and 7.

Whereas the buy Setup count sequence appears below each price bar, convention requires that the sell Setup count series appear above the upper price bar. This placement distinction quickly becomes second nature, and whenever you rely upon chart reading to provide a meaningful picture of the market landscape, it is certainly helpful. Once again, typically both buy and sell Setups appear as the same color on the chart, but their respective placements above and below the respective price bars sufficiently differentiate the buy Setup (lower) from the sell Setup (higher).

STANDARD COUNTDOWN

Commencement

The standard, or basic, Countdown process for TD Sequential™ compares the current price bar's close with the high and the low two price bars earlier. TD Sequential™ commences the Countdown process once the minimum requirement for the Setup process of nine closes less than or greater than the close four price bars earlier is completed. Once a total of 13 comparisons are fulfilled, TD Sequential™ Countdown is completed.

In order to facilitate the fulfillment of a 13 Countdown, the last Countdown price bar's close can be substituted with the open of the same price bar, so that EITHER comparison will suffice. This elective is referred to as *Termination Count*. It is a feature that only applies to the last Countdown entry. It enables the last count of Countdown to be completed by using either the close or, alternately, the same price bar's open level. This simplifies the fulfillment of Countdown completion. In order to ensure that the 13th or final countdown price bar for TD Sequential™ is sufficiently positioned for a low-risk buy, the low of Countdown bar 13 must be less than or equal to the close of Countdown bar eight. Conversely, to ensure the 13th or final Countdown price bar for TD Sequential™ is sufficiently positioned for a low-risk sell, the high of Countdown bar 13 must be greater than or equal to the close of Countdown bar eight.

To identify the TD Sequential™ Countdown price bars that fail to meet the requirement that price bar 13's low/high Countdown must be less than/greater than (depending on whether it is a low risk buy or low risk sell) price bar eight's close, a "+" sign appears until the qualifier is fulfilled.

AGGRESSIVE COUNTDOWN

The previous discussion is related to conventional Countdown methodology for TD Sequential™. In recent years, volatility has increased dramatically, particularly within the equity sector. To accelerate the Countdown method, an alternate Countdown method can be applied. It is referred to as the Aggressive Countdown process.

Very simply, this option replaces the closing Countdown buy comparisons versus the respective lows two price bars earlier with just low comparisons and the closing Countdown sell comparisons versus the respective highs two price bars earlier with just high comparisons. In other words, this substitution process compares the lows versus lows two price bars earlier for buy Countdown. If it is less than or equal to the low value two price bars earlier and any other buy prerequisite, such as the low of Countdown 13 being less than or equal to the close of Countdown eight as well, then an Aggressive buy Countdown number is recorded. Likewise, this substitution process compares the highs versus highs two price bars earlier for sell Countdown. If it is greater than or equal to the high value two price bars earlier, and the other sell prerequisite, such as the high of Countdown 13 being greater than or equal to the Close of Countdown eight as well, then an Aggressive sell Countdown number is recorded. Finally, to insure that the 13th, or final, low-risk buy Countdown price bar is sufficiently positioned low for a low-risk buy, the low of Countdown price bar 13 must be less than or equal to the close of Countdown bar eight. Likewise, to insure the high of low-risk sell Countdown price bar 13 is sufficiently positioned high for a low-risk sell, the high of Countdown bar 13 must be greater than or equal to the close of Countdown price bar eight.

The Aggressive Countdown method requires the user to remove the "close" selection from the Countdown box and replace it with the selection "low buy/high sell." In other words, instead of comparing the close versus the low and the high two price bars earlier, this is a more liberal approach that requires the current low be less than or equal to the low or greater than or equal to the high two price bars earlier, depending whether a low-risk buy or low-risk sell is being calculated. The relationship between Countdown price bar eight and Countdown price bar 13 described above applies as well.

RECYCLING

The market is dynamic, and both economic and corporate news changes virtually by the second. Investors' perception of value and opportunities are in a constant state of flux. It is the collective interpretation of all traders and investors of how events and factors can influence the market for securities that produces price change. It is all translated into one variable—market price. Therefore, it is possible that a market, in an up trend, is capable of extending its advance by attracting more buyers. Conversely, down trending markets can behave similarly, only in reverse.

How does TD Sequential™ address these periods of renewed influx of unanticipated buyers or sellers? Very simply, the study undergoes a process called Recycling that restarts the Countdown process and extends the perceived ultimate market top or bottom.

Historically, the very basic nine Setup followed by 13 Countdown was sufficient to identify prospective market bottom and top reversals. More than likely, this was the result of most markets' tendency to operate within trading ranges. Another contributing factor was the lack of information flowing from the companies, economists, politicians, and market analysts to the investment community.

Today, the amount of information is enormous and the response from its dissemination to investment action is immediate. The playing field for investment information has become level. Little, if any, advantage can only be acquired by applying conventional or traditional market-timing techniques. As a consequence, we developed proprietary market timing tools specifically designed to deal with the intricacies of the market and, therefore, sufficiently sensitive to decode market behavior.

Recycling, the unexpected increase in demand or decrease in supply in an up trend or the unanticipated increase in supply or decrease in demand in a down trend, produces an extension in a price movement. As a result, it is critical to monitor and identify the resurgences of supply or demand affecting a market in a trend.

How does recycling work? Once a buy or a sell Setup has occurred, the current environment for a trader has been defined. If nine or more consecutive closes less than the close four price bars earlier are recorded, a trader should anticipate the formation of a market bottom. If nine or more consecutive closes greater than the close four price bars earlier are recorded, a trader should be inclined to expect a market top.

There are many occasions when a market will trough or peak once the Setup process is complete provided that the buy Setup fails to decline below the lowest price level established by the most recent sell Setup completed in the other direction, or, in the alternative, the sell Setup fails to exceed the highest price level set by the most recent buy Setup completed in the other direction.

In those instances when the Setup process extends to Countdown, Recycling is always an issue. This is due to the interruption of the Countdown process by the formation of a new Setup. Therefore, the prior Setup is void and the Countdown process is restarted. In its most liberal interpretative sense, a Recycle occurs any time TD Sequential™ records a new series of nine or more consecutive closes less than the close four price bars earlier, or nine or more closes greater than the close four price bars earlier, depending on whether a renewed buy Setup or sell Setup occurs prior to, coincident with, or subsequent to the perfection of Countdown. Buy Countdown perfection requires a close greater than or equal to the close four price bars earlier before a new buy Setup occurs and Sell Countdown perfection requires a close less than or equal to the close four price bars earlier before a new sell Setup occurs. If the Countdown is not perfected and a new Setup appears, it replaces the prior Setup and Countdown is restarted unless some other method is applied that ignores certain instances of Recycling such as Recycle Count 12.

Obviously, Recycling prevents premature top and bottom identification. However, there are times when the highs and lows occur, but the traditional Recycling process precludes taking advantage of the trading opportunity. Therefore, the exceptions to the basic approach to Recycling are critical.

After 30 years of research, two options have been developed to avoid those instances when conventional Recycling would be applied and therefore prohibit a potential trading opportunity.

The first and somewhat less complex alternative to Recycling requires the most recent Setup to discontinue its Setup process prior to recording 12 or more consecutive price bar comparisons. In other words, if the Recycle process terminates somewhere between the minimum Setup requirement of nine consecutive closes less than the close four price bars earlier for buy Setup and 12 consecutive closes, thereby failing to record at least 12 or more consecutive closing comparisons, then the Setup is ignored as a Recycle possibility and the Countdown process continues through completion. In other words, we require the market to demonstrate or justify the Recycle by recognizing only those instances when Setup continues for at least 12 consecutive price bars since only then is there a proven period of a new, legitimate Setup.

The second method used to determine whether a renewed Setup causes a Recycle is slightly more complex. Namely, the price distance covered by the first Setup must be compared to the more recent Setup's price distance. If the more recent Setup from intra-day high to intra-day low is less than the prior Setup or if the more current Setup is larger than 1.618 times the original or prior Setup, then the current Setup is ignored and no Recycling is applied. Remember that Setup includes nine or more consecutive closes greater than the close four price bars earlier for a sell Setup and includes nine or more consecutive closes less than the close four price bars earlier for a buy Setup. This Setup process does not complete for purposes of measurement comparison until a close takes place that interrupts the consecutive series of closing comparisons.

Therefore, this method to cancel Recycling compares successive price thrusts and ignores Recycling those which are less than the previous Setup or those greater than the previous Setup by a factor of 161.8%.

CANCELLATION OF A SETUP

There are three ways to cancel either a buy Setup or a sell Setup:

CANCELLATION METHOD #1

Buy Setup Cancellation

If the highest true high of the entire buy Setup period (nine or more consecutive closes less than the close four price bars earlier) is exceeded upside by a true low at any time subsequent to the completion of at least nine consecutive closes less than the close four price bars earlier and prior to the completion of Countdown, then buy Countdown is cancelled. In other words, if a true low occurs above the TD Setup Trend (TDST) level after Setup and prior to Countdown, then buy Countdown is cancelled and the Setup must be reset.

Sell Setup Cancellation

If the lowest true low of the entire sell Setup period (nine or more consecutive closes less than the close four price bars earlier) is exceeded downside by a true high at any time subsequent to the completion of at least nine consecutive closes greater than the close four price bars earlier and prior to the completion of Countdown, then sell Countdown is cancelled. In other words, if a true high occurs below the TD Setup Trend (TDST) level after Setup and prior to Countdown, then sell Countdown is cancelled and the Setup must be reset.

CANCELLATION METHOD #2

If, at any time subsequent to the completion of a minimal buy Setup series of nine consecutive closes less than the close four price bars earlier and prior to the completion of buy Countdown, a minimum sell Setup series of nine consecutive closes greater than the close four price bars earlier is completed, then the original buy Setup is replaced by the opposing sell Setup. Conversely, if, at any time subsequent to the completion of a minimal sell Setup series of nine consecutive closes greater than the close four price bars earlier and prior to the completion of sell Countdown, a minimum buy Setup series of nine consecutive closes less than the close four price bars earlier is completed, then the original sell Setup is replaced by the opposing buy Setup.

Whereas we believe that Cancellation Method #1 is important and should always be active, it appears that there are instances when Cancellation Method #2 can be ignored and an uninterrupted Countdown series occurs. As a result, valuable low-risk signals have been generated. This observation is particularly valid when the TDST level is not exceeded. Nevertheless, we have chosen to activate Cancellation Method #2 at all times, just like Cancellation Method #1.

CANCELLATION METHOD #3

If, at any time subsequent to the completion of a minimum buy Setup series of at least nine consecutive closes less than the close four price bars earlier and prior to the completion of buy Countdown, a second buy Setup series occurs, then the original buy Setup is typically recycled and replaced by the second, more recent, buy Setup. However, an exception to this rule does exist. Specifically, if the closes of each new Setup price bar is contained within the highest true high and lowest true low of the original Setup, then the first buy Setup is not replaced by the more recent buy Setup and the original Countdown process is continued. This process applies in reverse to a sell Setup.

TD SETUP TREND (TDST)

After a low-risk buy 13 has occurred, how long should one remain in a position? We believe in most instances that if a sell Setup is completed and all closing prices have failed to close above the TD Setup Trend level, then the position should be exited. On the other hand, if a sell Setup is completed and a closing price has exceeded upside the TD Setup Trend level, then the position should be maintained and therefore the usefulness of TDST becomes apparent. Similarly, after a low-risk sell 13 has occurred, how long should one remain in a position? We believe that if a buy Setup is completed and the closing price has failed to close below the TD Setup Trend level, then the position should be exited. On the other hand, if a buy Setup is completed and a closing price has exceeded downside the TD Setup Trend level, then the position should be maintained, and therefore the utility of TDST becomes apparent.

Keep in mind that these are not hard, steadfast rules for you to apply. Rather, they are observations we have made. At the same time that we have seen this distinction hold true, we have also seen it fail. Over time, one also acquires an intuitive feel that helps distinguish between the continuation and the termination of a trend.

TD COMBO™

TD Combo™ (TD COM™) is a trading indicator companion to TD Sequential™. Both are designed to anticipate prospective market bottoms and tops prior to their completion.

TD Combo™ attempts to identify the utmost lowest or highest closing price of a trend just prior to its completion and the inception of a trend in the opposite direction.

It is easy to buy when the market rallies and to sell when the market declines. Human nature is such that most traders prefer to participate in market moves rather than anticipate the termination of a move and the inception of a new one. Most traders adhere to the adage "the trend is your friend." We prefer to adopt a corollary to this phrase: "unless the trend is about to end."

Having been involved in institutional investment for years, we recognize the importance of buying into market weakness or prior to the completion of a market bottom. Conversely, the need to sell into market strength before a market's top has been completed is preferable to selling after the top has been formed.

Once a price reversal has occurred and a trend has been established, it is often too late and difficult to participate in the trend without exaggerating the move, particularly if you are a major trading factor in the market.

Consequently, TD Combo™ has been developed to anticipate prospective market turning points prior to their inception. TD Combo™ attempts to identify the utmost lowest or highest closing price of a trend just prior to its completion and the inception of a trend in the opposite direction.

In applying TD Combo™, the identification of the exhaustion of a downtrend or of an uptrend is our goal.

SETUP

Before you can enter the market as either a buyer or seller, the market environment must be discovered. Once defined, the market disposition is either vulnerable or susceptible to an advance or decline. Prerequisites must be fulfilled first to establish the market bias. Initially, a series of eight or more consecutive closes less than the close four price bars earlier, or greater than the close four price bars earlier, was required to complete a buy and a sell Setup, respectively.

As a result of extensive research, this requirement was subsequently changed to nine or more price bars. Therefore, once a minimum series of nine consecutive closes less than the close four price bars earlier are completed, a buy Setup is recorded. Conversely, once a minimum series of nine consecutive closes greater than the close four price bars earlier is completed, a sell Setup is recorded. To initialize the first price bar of a buy Setup series, the prior price bar's close must be greater than or equal to the close four price bars earlier. Similarly, to initialize the first price bar of a sell Setup series, the prior price bar's close must be less than or equal to the close four price bars earlier.

Once a Setup is completed, the market has two options: it may continue its outstanding trend or it may undergo a trend reversal. Usually, the distinction as to which one will occur is dependent upon whether or not the market successfully exceeds on a closing basis the extreme price level (known as TD Setup Trend or TDST) formed by the prior Setup in the other direction.

In other words, the most recent market sell Setup exceeds the highest price level of the prior buy Setup in the other direction on a closing basis. Often, if the highest high of the buy Setup is exceeded on a closing basis, it indicates that the current market trend is strong and likely to undergo Countdown as well as Setup before its trend will change.

On the other hand, should the current Setup fail to exceed on a closing basis, the extreme price level of the prior Setup (TD Setup Trend or TDST) in the other direction, a price reversal is likely to occur at that time, rather than awaiting completion of Countdown. Regardless, once Setup has been completed, it is prudent to commence Countdown just in case the TDST rule fails to differentiate correctly between the continuation of the ongoing trend and the start of a new trend. Whereas the buy Setup count sequence appears below each price bar, convention requires that the sell Setup count series appear above the upper price bar. This placement distinction quickly becomes second nature, and whenever you rely upon chart reading to provide a meaningful picture of the market landscape, it is certainly helpful. Once again, typically both buy and sell Setups appear as the same color on the chart, but their respective placements above and below the respective price bars sufficiently differentiate the buy Setup (lower) from the sell Setup (higher).

STANDARD COUNTDOWN

Commencement

The standard, or basic, Countdown process for TD Combo™ compares the current price bar's close with the high and the low two price bars earlier. TD Combo™ commences the Countdown process once the minimum requirement for the Setup process of nine closes less than or greater than the close four price bars earlier is completed.

To commence TD Combo™ Countdown, one must refer all the way back to Setup price bar one. Not only does TD Combo™ make a similar closing price comparison versus the low for a buy Countdown and the high for a sell Countdown, as does TD Sequential™, but it has additional requirements. TD Combo™ begins its Countdown once the first price bar of Setup is identified. One might raise the question as to how one can know the first price bar of a potential Setup will, in fact, mature into a Setup. This is achieved by awaiting the completion of a minimum Setup requirement of nine consecutive closes less than or greater than the close four price bars earlier. Once satisfied, one must return to the first price bar of Setup to commence Countdown. In addition to comparing the close with the low or the high two price bars earlier, TD Combo™ requires that each close of buy Countdown be successively lower for a low risk buy indication. Each close of sell Countdown must be successively higher for a low-risk sell indication. Additionally, to qualify for a buy Countdown, TD Combo™ Countdown requires that each Countdown bar's low be less than the prior price bar's low. For a sell indication, each Countdown bar's high must be greater than the previous price bar's high.

Once a TD Combo™ Countdown of ten has been completed, two TD Combo™ versions for completing Countdown exist. Version one requires that the same rules applied to Countdown 1-10 be used for 11-13. Version two merely requires that the closes of price bars 11, 12, and 13 be successively lower for a buy indication and successively higher for a sell indication. The additional requirements of price comparison two price bars earlier, as well as lower low/higher high than the previous price bar, are not necessary. Once a total of 13 comparisons are fulfilled, TD Combo™ Countdown is completed.

In order to facilitate the fulfillment of a 13 Countdown, the last Countdown price bar's close can be substituted with the open of a price bar, so that EITHER comparison will suffice. This elective is referred to as Termination Count. It is a feature that only applies to the last Countdown entry. It enables the last count of Countdown to be completed by using either the close or, alternately, that same price bar's open level. This simplifies the fulfillment of Countdown completion.

AGGRESSIVE COUNTDOWN

The previous discussion related to conventional Countdown methodology for TD Combo™. In recent years, volatility has increased dramatically, particularly within the equity sector. To accelerate the Countdown method, an alternate Countdown method can be applied. It is referred to as the Aggressive Countdown process. Very simply, this option replaces the closing Countdown buy comparisons versus the respective lows two price bars earlier with just low comparisons and the closing Countdown sell comparisons versus the respective highs with just high comparisons. In other words, this substitution process compares the lows versus lows two price bars earlier for buy Countdown. If it is less than or equal to the low value two bars earlier and the other buy prerequisites, such as lower low than the prior bar's low and it is the lowest of a succession of lower Countdown lows as well, then an Aggressive buy Countdown number is recorded. Likewise, this substitution process compares the highs versus highs two price bars earlier for sell Countdown. If it is greater than or equal to the high value two bars earlier and the other sell prerequisites, such as higher high than the prior bar's high, and it is the highest of a succession of higher Countdown highs as well, then an Aggressive sell Countdown number is recorded.

The Aggressive Countdown method requires the user to remove the "close" selection from the Countdown box and replace it with the selection "low buy/high sell." In other words, instead of comparing the close versus the low and the high two price bars earlier, this is a more liberal approach that requires the current low be less than or equal to the low two price bars earlier or the current high be

greater than or equal to the high two price bars earlier, depending whether a low-risk buy or low-risk sell is being calculated. The prerequisites described above apply as well.

RECYCLING

The market is dynamic, and both economic and corporate news changes virtually by the second. Investors' perception of value and opportunities are in a constant state of flux. It is the collective interpretation of all traders and investors of how events and factors can influence the market for securities that produces price change. It is all translated into one variable—market price. Therefore, it is possible that a market, in an up trend, is capable of extending its advance by attracting more buyers. Conversely, down trending markets can behave similarly, only in reverse. How does TD Combo™ address these periods of renewed influx of unanticipated buyers or sellers?

Very simply, the study undergoes a process called Recycling that restarts the Countdown process and extends the perceived ultimate market top or bottom. Historically, the very basic nine Setup followed by 13 Countdown was sufficient to identify prospective market bottom and top reversals. More than likely, this was the result of most markets' tendency to operate within trading ranges.

Another contributing factor was the lack of information flowing from the companies, economists, politicians, and market analysts to the investment community.

Today, the amount of information is enormous and the response from its dissemination to investment action is immediate. The playing field for investment information has become level. Little, if any, advantage can only be acquired by applying conventional or traditional market-timing techniques. As a consequence, we developed proprietary market timing tools specifically designed to deal with the intricacies of the market and, therefore, sufficiently sensitive to decode market behavior. Recycling, the unexpected increase in demand or decrease in supply in an up trend or the unanticipated increase in supply or decrease in demand in a down trend, produces an extension in a price movement. As a result, it is critical to monitor and identify the resurgences of supply or demand affecting a market in a trend.

How does recycling work? Once a buy or a sell Setup has occurred, the current environment for a trader has been defined. If nine or more consecutive closes less than the close four price bars earlier are recorded, a trader should anticipate the formation of a market bottom. If nine or more consecutive closes greater than the close four price bars earlier are recorded, a trader should be inclined to expect a market top. There are many occasions when a market will trough or peak once the Setup process is complete provided that the buy Setup fails to decline below the lowest price level established by the most recent sell Setup completed in the other direction, or, in the alternative, the sell Setup fails to exceed the highest price level set by the most recent buy Setup completed in the other direction. In those instances when the Setup process extends to

Countdown, Recycling is always an issue. This is due to the interruption of the Countdown process by the formation of a new Setup. Therefore, the prior Setup is void and the Countdown process is restarted.

In its most liberal interpretative sense, a Recycle occurs any time TD Combo™ records a new series of nine or more consecutive closes less than the close four price bars earlier, or nine or more consecutive closes greater than the close four price bars earlier, depending on whether a renewed buy Setup or sell Setup occurs prior to, coincident with, or subsequent to the perfection of Countdown. Buy Countdown perfection requires a close greater than or equal to the close four price bars earlier before a new buy Setup occurs and Sell Countdown perfection requires a close less than or equal to the close four price bars earlier before a new sell Setup occurs. If the Countdown is not perfected and a new Setup appears, it replaces the prior Setup and Countdown is restarted, unless some other method is applied that ignores certain instances of Recycling, such as Recycle Count 12.

Obviously, Recycling prevents premature top and bottom identification. However, there are times when the highs and lows occur but the traditional Recycling process precludes taking advantage of the trading opportunity. Therefore, the exceptions to the basic approach to Recycling are critical.

After 30 years of research, two options have been developed to avoid those instances when conventional Recycling would be applied and therefore prohibit a potential trading opportunity. The first and somewhat less complex alternative to Recycling requires the most recent Setup to discontinue its Setup process prior to recording 12 or more consecutive price bar comparisons.

In other words, if the Recycle process terminates somewhere between the minimum Setup requirement of nine consecutive closes less than the close four price bars earlier for buy Setup and 12 consecutive closes, thereby failing to record at least 12 or more consecutive closing comparisons, then the Setup is ignored as a Recycle possibility and the Countdown process continues through completion. In other words, we require the market to demonstrate or justify the Recycle by recognizing only those instances when Setup continues for at least 12 consecutive price bars since only then is there a proven period of a new, legitimate Setup. The second method used to determine whether a renewed Setup causes a Recycle is slightly more complex. Namely, the price distance covered by the first Setup must be compared to the more recent Setup's price distance. If the more recent Setup from intra-day high to intra-day low is less than the prior Setup or if the more current Setup is larger than 1.618 times the original or prior

Setup, then the current Setup is ignored and no Recycling is applied. Remember that Setup includes nine or more consecutive closes greater than the close four price bars earlier for a sell Setup and includes nine or more consecutive closes less than the close four price bars earlier for a buy Setup. This Setup process does not complete for purposes of measurement comparison until a close takes place that interrupts the consecutive series of closing comparisons. Therefore, this method to cancel Recycling compares successive price thrusts and ignores Recycling those which are less than the previous Setup or those greater than the previous Setup by a factor of 161.8%.

CANCELLATION OF A SETUP

There are three ways to cancel either a buy Setup or a sell Setup:

CANCELLATION METHOD #1

Buy Setup Cancellation

If the highest true high of the entire buy Setup period (nine or more consecutive closes less than the close four price bars earlier) is exceeded upside by a true low at any time subsequent to the completion of at least nine consecutive closes less than the close four price bars earlier and prior to the completion of Countdown, then buy Countdown is cancelled. In other words, if a true low occurs above the TD Setup Trend (TDST) level after Setup and prior to Countdown, then buy Countdown is cancelled and the Setup must be reset.

Sell Setup Cancellation

If the lowest true low of the entire sell Setup period (nine or more consecutive closes greater than the close four price bars earlier) is exceeded downside by a true high at any time subsequent to the completion of at least nine consecutive closes greater than the close four price bars earlier and prior to the completion of Countdown, then sell Countdown is cancelled. In other words, if a true high occurs below the TD Setup Trend (TDST) level after Setup and prior to Countdown, then sell Countdown is cancelled and the Setup must be reset.

CANCELLATION METHOD #2

If, at any time subsequent to the completion of a minimal buy Setup series of nine consecutive closes less than the close four price bars earlier and prior to the completion of buy Countdown, a minimum sell Setup series of nine consecutive closes greater than the close four price bars earlier is completed, then the original buy Setup is replaced by the opposing sell Setup. Conversely, if, at any time subsequent to the completion of a minimal sell Setup series of nine consecutive closes greater than the close four price bars earlier and prior to the completion of sell Countdown, a minimum buy Setup series of nine consecutive closes less than the close four price bars earlier is completed, then the original sell Setup is replaced by the opposing buy Setup.

Whereas we believe that Cancellation Method #1 is important and should always be active, it appears that there are instances when Cancellation Method #2 can be ignored and an uninterrupted Countdown series occurs. As a result, valuable low-risk signals have been generated. This observation is particularly valid when the TDST level is not exceeded. Nevertheless, we have chosen to activate Cancellation Method #2 at all times, just like Cancellation Method #1.

CANCELLATION METHOD #3

If, at any time subsequent to the completion of a minimum buy Setup series of at least nine consecutive closes less than the close four price bars earlier and prior

to the completion of buy Countdown, a second buy Setup series occurs, then the original buy Setup is typically recycled and replaced by the second, more recent, buy Setup. However, an exception to this rule does exist. Specifically, if the closes of each new Setup price bar is contained within the highest true high and lowest true low of the original Setup, then the first buy Setup is not replaced by the more recent buy Setup and the original Countdown process is continued. This process applies in reverse to a sell Setup.

TD SETUP TREND (TDST)

After a low-risk buy 13 has occurred, how long should one remain in a position? We believe that if a sell Setup is completed and all closing prices have failed to close above the TD Setup Trend level, then the position should be exited. On the other hand, if a sell Setup is completed and a closing price has exceeded upside the TD Setup Trend level, then the position should be maintained, and therefore the usefulness of TDST becomes apparent. Similarly, after a low-risk sell 13 has occurred, how long should one remain in a position? We believe that if a buy Setup is completed and the closing price has failed to close below the TD Setup Trend level, then the position should be exited. On the other hand, if a buy Setup is completed and a closing price has exceeded downside the TD Setup Trend level, then the position should be maintained, and therefore the utility of TDST becomes apparent.

Keep in mind that these are not hard, steadfast rules for you to apply. Rather, they are observations we have made. At the same time that we have seen this distinction hold true, we have also seen it fail. Over time, one also acquires an intuitive feel that helps distinguish between the continuation and the termination of a trend, and therefore the utility of TDST.

TD RANGE PROJECTION™

TD Range Projection™ is used to forecast a future price bar's approximate high and low prices based on the price movement of the most recent price bar. TD Range Projection™ measures the price movement from today's opening price to today's closing price, as well as the intraday high and low price to calculate tomorrow's estimated price range.

Despite what most believe impossible, a trader can approximate a future price bar's high and low by extrapolating the price movement of the most recent price bar. From this information, one is able to establish benchmarks for future price activity. Consequently, once price has opened within the projected high and projected low, levels of support and resistance can be defined. Whenever price opens outside the projected range, potential breakouts can be identified. Our research confirms that the widely accepted practice of

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calculating price movement by comparing the closing price of a security to its prior closing price does not represent the dynamics of the marketplace as well as comparing the closing price of a security to that same price bar's opening price level. In other words, the price movement from yesterday's closing price to today's closing price is less meaningful than the price movement recorded from today's opening price to today's closing price.

News is often announced after the close of trading or prior to the next trading bar's open. Therefore, the price movement from yesterday's closing price to the current trading day's closing price does not differentiate the movement subsequent to the news release to the current trading day's close. Calculating the price movement from the current trading day's opening price to the same trading day's closing price derives a better representation of this movement. By measuring movement from the opening price level, TD Range Projection™ assumes more significance and relevance. For example, if a company announces favorable earnings after yesterday's close or prior to today's open, the opening may be much higher than the previous trading day's close, but by the end of trading, the close may be below the opening.

For example, assume IBM closes at \$120 and, after the close, announces earnings above analysts' expectations. As a result, the market opens the next trading day at \$126 and then closes at \$122. The media and financial information data providers report a price change of +2 points. However, the true price movement for the trading day did not present accumulation, rather it depicted stock distribution of -4 points. This is precisely why most of our analytical methods are tied one way or another into the relationship between opening price levels and closing price levels.

TD Range Projection™ incorporates the relationship between the prior trading bar's close and open. If the prior close is above the prior trading day's open, strength or accumulation is represented. As a result, the high for that price bar is given a double weighting in the TD Range Projection™ formula. Conversely, if the close is below the prior trading bar's open, weakness or distribution is

depicted. As a result, the low is given a double weighting in the Price Projection™ formula. In those rare instances in which the close is equal to the open, the closing price level is given a double weighting.

CALCULATION OF TD RANGE PROJECTION™

1. If the current trading bar's close is above the open, then the true high is doubled, and the true low and closing price level are then added to the doubled true high value. The true high is the high of the price bar or the prior price bar's close, whichever is greater. The true low is the low of the price bar or the prior price bar's close, whichever is less. The four summed values are then divided by 2, and the true low is subtracted from this value to arrive at the projected high for the next price bar. The true high is subtracted from this value to arrive at the projected low for the next price bar.

2. If the current trading bar's close is below the open, then the true low is doubled, and the true high and closing price level are then added to the doubled true low value. The four summed values are then divided by 2, and the true low is subtracted from the value to arrive at the projected high for the next price bar. The true high is subtracted from this value to arrive at the projected low for the next price bar.
3. If the current trading bar's close is equal to the open, then the closing price level is doubled, and the true high and true low are then added to the doubled close value. The four summed values are then divided by 2, and the true low is subtracted from this value to arrive at the projected high for the next price bar. The true high is subtracted from this value to arrive at the projected low for the next price bar.

The results are estimates for the following price bar's high and low. They serve as a benchmark provided that no significant news developments occur overnight to influence the following trading day's price range. Most of the time, when price opens within the projected range, the closing price level is contained within that projected price range. Any price movement outside the projected range is often resolved by recording a close within it. However, to adapt to and compensate for opening price levels outside the projected price range, the following interpretation is assigned to the market:

- If the open is above the projected high then price moves higher by at least one price tick, it implies that the market price has broken out upside and the original upside price projection can be ignored.
- Conversely, if the open is below the projected low then price moves lower by at least one price tick, it implies that the market price has broken out downside and the original downside price projection can be ignored.
- Occasionally, a market will open on its high or its low for a given price bar. If a market opens at its high for a given price bar but less than or equal to the projected high for that price bar and then declines below the projected low for that price bar, the close for that price bar should be below its projected low.
- Conversely, if a market opens at its low for a given price bar but greater than or equal to the projected low for that price bar and then advances above the projected high, the close for that price bar should be above the projected high.

TD LINES™

The indicator TD Lines™ was developed to establish a standard for trendline construction, as well as to anticipate and to identify qualified and disqualified breakout opportunities. Additionally, a beneficial by-product of TD Line™ construction and analysis is the ability to estimate upside and downside break out price projections.

Every trader, whether a fundamentalist, an economist, or a technician, is familiar with the use and the application of trendline analysis. The problem is that invariably no two people draw a trend line over the same price history exactly the same. In fact, the same individual may even draw a trend line on the identical price chart over the same time period differently from one day to another. There exists no widely accepted or recognized prescription for the proper construction of trend lines. Unfortunately, however, before anyone can test or evaluate the success of trend line usage, proper guidelines must be developed defining their construction, application, and interpretation. Obviously, a trend line is constructed by connecting two price points. Most traders draw a trend line by selecting a price point situated to the left of a chart, connect this price point to one in the future, and then extend the line. It is amazing the importance most traders assign to some historical point in time and their refusal to connect more recent price points to draw a trend line. What happened to the left of a chart is history and its relevance upon current price activity diminishes with time due to continuous changes in supply and demand. Our work indicates that the more recent the price points used to construct a trend line, the more valid and reliable the trend line is in identifying breakouts. Consequently, we recommend that traders select trend line points from the right of the chart to its left. This method is more descriptive, since the more recent the price points, the more useful they become. The two most significant price points from the chart's right side are connected, and then this line is extended to the right, not to the left, into the future in order to identify breakout opportunities.

TD POINTS™ AND TD LINES™

The price points connected to draw trend lines are described as TD Points™. To draw a TD Demand™ line that slopes up, the two most recent TD Point™ Lows, or consecutive lows surrounded by higher lows, are identified, and they, in turn, are connected and this line is then extended into the future. This line is referred to as a TD Demand™ line. Every time a subsequent low surrounded by higher lows is formed, it is redrawn connecting the two most recent TD Points™ in order to more accurately represent demand. Conversely, to draw a TD Supply™ line that slopes down, the two most recent TD Point™ highs, or consecutive highs surrounded by lower highs, are identified, and they, in turn, are connected and this line is then extended into the future. This line is referred to as a TD Supply™ line. Every time a subsequent high surrounded by lower highs is formed, however, it is redrawn connecting the two most recent TD Points™ in order to more accurately represent supply.

Since only one higher low on each side is required, this TD Point™ low is referred to as a Level One TD Point™ low. Likewise, since only one lower high on each side is required, this TD Point™ high is referred to as a Level One TD Point™ high.

Similarly, Level Two TD Point™ lows require a series of two consecutive higher lows on each side of the low, just as Level Two TD Point™ highs require a series of two consecutive lower highs on each side of the high. Also, Level Three TD Point™ highs and lows require a series of three on each side, and so on.

QUALIFIED AND DISQUALIFIED TD LINE™ BREAKOUTS

It's often said, "That which is obvious in the market is obviously wrong." In other words, if a majority of traders expect the market to behave in a particular fashion, it more than likely will not occur as commonly expected. Why is this? Because if everyone has already acted in anticipation of an event's occurrence, then who is left to actually act upon it when it happens? This is similar to our theory as to what causes markets to top and to bottom. Specifically, we believe that markets record highs not because of "smart" sellers or a coordinated selling by sophisticated trading groups, but because of a lack of buyers. Similarly, rather than a contrived or a coordinated effort to buy at market lows, bottoms form because the last seller, figuratively speaking, has liquidated his position and by default price moves sideways or higher. Whereas premature buying campaigns may occur, they are usually attributed to short covering. Meaningful bottoms are usually accompanied by bad news, just like most important tops occur simultaneously with a release of good news. The only prerequisite, in each instance, is the coincidence of a culmination or exhaustion of selling or buying pressure at these turning points. Research and experience have helped in the development of a series of qualifiers that are designed to alert a trader to those times that the market is vulnerable to recording a breakout above important resistance levels or below important support levels. In fact, these filters are designed specifically to enable a trader to take positions when price breakouts occur rather than await the completion of a price bar and the recording of that price bar's close. Invariably, most traders have participated in perceived breakouts in the past, only to have them fail and suffer trading losses in the process. It appears that the more obvious the breakout, the less likely it is to come to fruition. To overcome the temptation to get drawn into these deceptive price moves, many traders rely upon the close of trading to confirm the existence of a breakout. This practice often results in forfeited opportunities. In order to capitalize on the breakout trades that may arise, exhaustive testing and analysis were completed many years ago. At that time, all breakouts of TD Lines™, as well as retracement and moving average levels, were recorded, compared, and rated. The conclusions of the studies are presented below.

UPSIDE BREAKOUT QUALIFIERS

The following list of upside qualifiers serves to identify trading opportunities that arise at the time breakouts occur:

1. If the price bar immediately prior to the current breakout price bar has a close less than the prior price bar's close, then at the time an upside breakout occurs, low-risk buy entry is qualified. Or, if the price bar immediately prior to the current breakout price bar has a close less than the same price bar's open, then at the time the upside breakout occurs, low-risk buy entry is qualified.

2. If the open of the current price bar exceeds upside the breakout level and price continues to trade at least one to two price ticks above the opening level AND the open is above the prior price bar's close, then at the time an upside breakout occurs, low-risk buy entry is qualified.
3. If the price bar immediately prior to the current price bar has an up close versus the prior price bar's close, but the difference between the close and true low of the price bar immediately prior to the current price bar when added to that same price bar's close is less than the breakout value, then at the time an upside breakout occurs, low-risk buy entry is qualified.

Humans are creatures of habit and if the market closes down versus the previous day's close, the expectation is for the market to close lower the next price bar as well. This is particularly true in the case of a series of consecutive down closes. This tendency for traders to extrapolate a trend makes it difficult for them to quickly reverse their positions and, given the numerous times in the past when they have reversed prior to the close only to suffer misfortune, this skepticism is often justified. At the same time, this prudence provides opportunities for alert traders to introduce qualifiers that enable them to recognize and anticipate potentially successful trading opportunities as they develop.

Qualifier #1 is designed to capitalize on just such trading possibilities. In other words, a down close one price bar earlier predisposes a trader to question an upside breakout until the close of the price bar occurs. That is why there is often price vacillation at the breakout level for an extended period of time and then, just prior to the close of trading price accomplishes an emphatic breakout, since, collectively, the fence sitters finally capitulate and buy.

Qualifier #2 applies to those occasions when important news or research pronouncements are made subsequent to the prior price bar's close but before the current price bar's open. If the event is of sufficient impact, the open often exceeds the breakout level. In order to ensure that its occurrence is more meaningful and not an aberration, the open must not only exceed upside the breakout level, but also the high must exceed upside the opening price level, and the open must be above the previous price bar's close.

Qualifier #3 requires that the market exceed the prior price bar's expression of buying pressure and then exceed the breakout price level. The first requirement to replicate the prior price bar's demand is formidable but then to exceed the breakout price level subsequently is even more noteworthy. Jointly, the two accomplishments should be sufficient to justify the breakout. On the other hand, to have the market first breakout and then expect it to replicate the prior price bar's demand is presumptuous, since when the breakout occurs first it usually offers insurmountable resistance to further advance.

Therefore, those times in which the breakout level is less than the level duplicating the prior price bar's demand are treated as disqualified trading opportunities.

DOWNSIDE BREAKOUT QUALIFIERS

The following list of downside qualifiers serves to identify trading opportunities that arise when breakouts occur:

1. If the price bar immediately prior to the current breakout price bar has a close greater than the prior price bar's close, then at the time a downside breakout occurs, low-risk sell entry is qualified. Or, if the price bar immediately prior to the current breakout price bar has a close greater than the same price bar's open then at the time the downside breakout occurs, low-risk sell entry is qualified.
2. If the open of the current price bar exceeds downside the breakout level and price continues to trade at least one to two price ticks below the opening level AND the open is below the prior price bar's close, then at the time a downside breakout occurs, low-risk sell entry is qualified.
3. If the price bar immediately prior to the current price bar has a down close versus the prior price bar's close, but the difference between the true high and the close of the price bar immediately prior to the current price bar when subtracted from that same price bar's close is greater than the breakout value then, at the time a downside breakout occurs, low-risk sell entry is qualified.

Again, humans are creatures of habit and if the market closes up versus the previous day's close, the expectation is for the market to close higher the next price bar as well. This is particularly true in the case of a series of consecutive up closes. This tendency for traders to extrapolate a trend makes it difficult for them to quickly reverse their positions and, given the numerous times in the past when they have reversed prior to the close only to suffer misfortune, this caution is often justified. At the same time, this prudence provides opportunities for alert traders to introduce qualifiers that enable them to recognize and anticipate potentially successful trading opportunities as they develop.

Qualifier #1 is designed to capitalize on just such trading possibilities. In other words, an up close one price bar earlier predisposes a trader to question a downside breakout until the close of the price bar occurs. That is why often there is price vacillation at the breakout level for an extended period of time and then, just prior to the close of trading, the market accomplishes an emphatic breakout since, collectively, the fence sitters finally capitulate and sell.

Qualifier #2 applies to those occasions when important news or research pronouncements are made subsequent to the prior price bar's close but before the current price bar's open. If the event is of sufficient impact, the open often exceeds the breakout level. In order to ensure that its occurrence is meaningful and not an aberration, the open must not only exceed downside the breakout level, but also the low must exceed downside the opening price level, and the open must be below the previous price bar's close.

Qualifier #3 requires that the market exceed the prior price bar's expression of selling pressure and then exceed the breakout price level. The first requirement to replicate the prior price bar's supply is formidable but then to exceed the breakout price level subsequently is even more noteworthy. Jointly, the two accomplishments should be sufficient to justify the breakout. On the other hand, to have the market first breakout and then expect it to replicate the prior price bar's supply is presumptuous, since when the breakout occurs first it usually offers undeniable support for further decline.

Therefore, those times in which the break out level is more than the level duplicating the prior price bar's demand are treated as disqualified trading opportunities.

CANCELLED BREAKOUTS

To cancel or invalidate a qualified breakout upside, one of the following must occur:

1. The open of the price bar immediately following the breakout exceeds downside the value of the TD Line™ breakout level recorded for the previous price bar.
2. The open of the price bar immediately following the qualified upside breakout is less than the prior price bar's close and the close of the current price bar is below the value of the TD Line™ for the previous bar when price broke out upside.
3. The high of the first price bar immediately after an upside breakout fails to exceed the breakout day's high

Conversely, to cancel or invalidate a qualified breakout downside, one of the following must occur:

1. The open of the price bar immediately following the breakout exceeds upside the value of the TD Line™ breakout level recorded for the previous price bar.
2. The open of the price bar following the qualified downside breakout is greater than the prior price bar's close and the close of the current price bar is above the value of the TD Line™ for the previous bar when price broke out downside.
3. The low of the first price bar after a downside breakout fails to exceed the breakout day's low.

PRICE OBJECTIVES

It is not uncommon for price to rally subsequent to a qualified breakout upside an amount equivalent to the difference between the lowest price beneath a TD Supply™ line and the value of the TD Supply™ line immediately above that lowest price. Similarly, a price decline below a qualified breakout downside projects a price objective equivalent to the breakout price level minus the difference between the highest price above a TD Demand™ line and the value of the TD Demand™ line immediately below that highest price. Due to the market's symmetrical tendencies, these price objectives are often exact. However, should subsequent contradictory TD Line™ breakouts occur prior to fulfilling one of these price objectives, the breakouts should be followed and the price objectives ignored.

QUALIFIED BREAKOUTS

Possibly, the best opportunities to trade markets with the greatest potential occur when one buys disqualified breakouts downside and sells disqualified breakouts upside. At the time the perceived breakouts are occurring, the trend is established in the direction of the breakout. Therefore, trading with the trend would likely produce price slippage, unfilled limit orders, and poorly filled market orders. On the other hand, by trading against the trend, the possibility of limit orders being filled at price levels better than the limit and market orders being transacted at prices even better than expected are commonplace. Furthermore, by selling strength and buying weakness, many opportunities exist for buying put and call options at reduced premiums just before price reversals and selling put and call options at expanded premiums at the propitious times typically coincident with market reversals.

In other words, many favorable developments arise when one is predisposed to operate against the prevailing trend, such as at disqualified breakout levels since they often precede or are accompanied by price reversals.

TD RELATIVE RETRACEMENT™

TD Relative Retracement™ (TD RRET™) is a trading indicator designed to establish likely levels of market resistance after a low has been established and of market support after a high has been established. The methodology specified to arrive at TD Relative Retracement™ levels insures that the techniques applied and the calculations made are accomplished objectively and systematically and are easily reproducible. In other words, the same results are achieved every time regardless when and by whom the calculations are conducted.

The subjectivity and arbitrariness associated with the selection of trendline points and their construction by most traders are apparent as well in the selection of retracement levels. Specifically, at a suspected low, it is not uncommon for most traders to select numerous highs, subtract the difference, and then multiply by various widely used and accepted ratios. The difficulty is that the selection process of the various highs oftentimes demonstrates the lack of consistency employed by most traders to arrive at these important levels.

In order to codify this process we have identified two methods for calculating retracement levels--TD Relative Retracement™ and TD Absolute Retracement™. The former approach relates a suspected low to the last time the market traded at a comparable or lower price and then locates the highest high positioned between these two lows. Conversely, at a suspected high, one need only relate the last time the market traded at a comparable or higher price and then locate the lowest low positioned between these two highs. This approach is simple and straightforward, can be consistently reproduced, and removes subjectivity. The ratios multiplied by the respective differences include 38.2%, 61.8%, Magnet Price, 1.382%, 2.618%, 3.618%, etc. In other words, off of a low the difference is multiplied by each ratio and that value is added to the low to arrive at the retracement level. Rather than have a 100% retracement calculation added to a low, as most traders would apply, we have identified an alternative retracement level that we refer to as the Magnet Price. In this case, the Magnet Price is the high day's close, not the intraday high, as most traders believe.

Conversely, off of a high the difference is multiplied by each ratio and that value is then subtracted from the high to arrive at the retracement level. Rather than have a 100% retracement calculation subtracted from a high, as most traders would expect and apply, we have identified an alternative retracement level that we refer to as the Magnet Price. In this case, the Magnet Price is the low day's close, not the intraday low, as most traders believe. We believe many traders' epitaphs might read, "I waited for the 100% retracement level, rather than the high or low day's close--the Magnet Price."

Once again, the only prerequisites are a low and the identification of the most recent time when price traded at or below that low and the location of the highest high in between, and a high and the identification of the most recent time when price traded at or above that high and the location of the lowest low in between. There is a situation that does not conform to these specifications and that occurs when there is no reference level or price that can be related to the current market low or high. These price levels occur at all-time lows or all-time highs. In these instances, TD Absolute Retracement™ is applied as an alternative retracement technique to TD Relative Retracement™.

TD ABSOLUTE RETRACEMENT™

TD Absolute Retracement™ (TD ARET™) is a trading indicator designed to anticipate potential levels of price support off of all-time or significant-price highs and levels of price resistance off of all-time or significant-price lows.

Whereas TD Relative Retracement™ identifies price support and resistance levels by relating recent highs and lows with former higher highs and lows and then selecting intervening lows and highs to calculate retracement levels, TD Absolute Retracement™ is applied when no prior reference level exists, or when the last comparable price level occurred many months earlier.

Off of a high, the calculation of TD Relative Retracement™ requires the identification of the last time when the high was exceeded upside and the selection of the intervening low. The low is subtracted from the recent high and the standard retracement ratios are used. However, if there has not been a prior equivalent high, or if there has not been an equivalent high in many months, the TD Absolute Retracement™ must be applied.

TD Absolute Retracement™ calculations off of all-time highs (or many-month highs) require multiplication by a ratio of 61.8% and then by 38.2%. In order to perfect the selection of the high price, the high day must be accompanied by the highest close; or if not accompanied, the high close or the high day's close is substituted. Similarly, off of a low, the calculation of TD Relative Retracement™ requires the identification of the last time the low was exceeded downside and the selection of the intervening high. The recent low is then subtracted from the intervening high and the standard retracement ratios are used. However, if there has not been a prior equivalent low, or if there has not been an equivalent low in many months, the TD Absolute Retracement™ must be applied. TD Absolute Retracement™ calculations off of all-time lows (or many-month lows) require multiplication by ratios of 138.2%, 161.8%, 2.618%, and then by 3.618%. In order to perfect the selection of the low price, the low day must be accompanied by the lowest close and, if not, the low close or the low day's close is substituted.

TD TREND FACTOR™

TD Trend Factor is used to determine potential upside and/or downside price objective levels.

PROPER SELECTION OF REFERENCE PRICES

Before a low can be used as a reference level to calculate an upside price objective, a decline of at least 5.56% from a prior high must have occurred to a subsequent low. If the closing price of the lowest price bar of a decline of at least 5.56% is a down close versus the prior price bar's close, multiply the entire TD Trend Factor™ series of ratios by the low price of that price bar. In those instances when the lowest price bar of a decline of at least 5.56% is an up close, then multiply the close of the lowest price bar only for the first level calculation when 5.56% is applied; for all additional upside price objectives, multiply the series of ratios by the low of the lowest price bar.

Conversely, before a high can be used as a reference level to calculate a downside price objective, an advance of at least 5.56% from a prior low must have occurred to a subsequent high. If the closing price of the highest price bar of an advance of at least 5.56% is an up close versus the prior price bar's close, multiply the high of that price bar by 94.44% and each subsequent price objective by that same ratio. In those instances when the highest price bar of an advance of at least 5.56% is a down close, multiply the close of the highest price bar by 94.44%; for all additional downside price objectives, multiply the various price objectives by 94.44% and recalculate these projections from the high of the highest price bar.

TD TREND FACTOR™

Many years of research indicated that most markets advance in increments of 5.56% and decline initially 5.56% (94.44%) and subsequently in levels of 94.44%. Introducing 1/2 or 50% interim objectives between each increment can perfect the objectives defined by these ratio series further. To differentiate the full increments from the intermediate 1/2 or 50% increments, a solid line is applied for the full objectives and a dotted line for the halves. Every time the market records a 5.56% movement from a low to a subsequent high, the new high is used to initialize subsequent market moves. Similarly, every time the market records a 5.56% movement from a high to a subsequent low, the new low is used to initialize subsequent market moves. Prior TD Trend Factor™ objectives off of other reference levels become inactive and are replaced by the new reference prices.

CALCULATION OF TD TREND FACTOR™ OBJECTIVES

The TD Trend Factor™ series of ratios includes multiples of 5.56%, e.g., 5.56%, 11.12%, 16.68%, 22.24%, 27.8%, etc. Conversely, the first downside ratio is $100\% - 5.56\% = 94.44\%$. All additional downside objectives are calculated based upon each successive objective being multiplied by 94.44%. As with the upside calculations, 50% or 1/2 objectives between each full TD Trend Factor™ level can be used as well to define support and resistance levels. Subsequent to a decline of 5.56% or more, the lowest price bar is the reference bar and all upside projections are made off of the low if that price bar's close is less than the prior price bar's close. If the low price bar is an up close, the first TD Trend Factor™ projection is multiplied by the close of the low price bar.

However, all subsequent projections are made from the low of that price bar. The reverse applies at a market top preceded by an advance of at least 5.56%. Unlike the upside calculations, which are multiples of 5.56%, each level subsequent to the first downside objective is derived by multiplying the respective objectives themselves by 94.44%.

TD CHANNEL I™

TD Channel I™ is a study that is used to anticipate prospective long term support and resistance levels, as well as likely trend reversal opportunities.

Over 30 years ago, Charles W. Keltner applied a trading band to the price activity of commodities in order to establish areas associated with trend exhaustion and extreme trading expectations. His primary contribution was the creation of mathematically and statistically derived price bands above and below current price activity to represent two standard deviations outside the price norm. In recent years, John Bollinger coined the phrase Bollinger Bands and popularized their usage to describe this price relationship to a statistically calculated trading envelope.

Rather than rely upon pure mathematical and statistical models, we elected to create our own price channels to represent extreme price trading activity. TD Channel I™ was of a long-term variety and its counterpart, TD Channel II, was by design shorter term. These trading bands served to define and identify those instances associated with extreme price behavior and, therefore, potential market reversal areas.

CALCULATION OF TD CHANNEL I™

Initially, TD Channel I™ was developed as a three-day moving average of daily price range midpoints. One factor, such as 103 percent, was multiplied by the average of mid points to arrive at an upper extreme. The reciprocal of 103 percent, or 97 percent, was multiplied by the average of mid points of daily price ranges to arrive at a lower extreme.

In 1982, simultaneous with the introduction of stock index futures, TD Channel I™ replaced a three-day moving average of the mid points with a three-day moving average of daily true lows and true highs. A true high is the high of a price bar or the prior price bar's close, whichever is greater. A true low is the low of the price bar or the prior price bar's close, whichever is less. In other words, 103 percent was multiplied by a three-day moving average of the true lows and 97 percent was multiplied by a three-day moving average of the true highs. The three-day moving average included the current trading day's true high and true low, as well as the prior two trading day's true highs and true lows. Since TD Channel I™ requires that the larger percentage be multiplied by a three-day average of the true lows and the smaller percentage be multiplied by a three-day moving average of the true highs, real time intraday recording of lower daily lows and higher daily highs does not continuously change the channel placement, as they do with traditional channels.

In other words, the conventional methodology multiplies the higher percentage by a three-day average of highs and the lower percentage is multiplied by a three-day moving average of the lows. Consequently, by definition the channel becomes more sensitive to price change and, in effect, becomes a moving target, since it is continuously adjusting itself as the price records higher intraday highs and lower intraday lows. Since TD Channel I™ is calculated just the opposite as described, the channels are, in actuality, a better fit than what may appear on the chart at the conclusion of trading.

For example, once a low is recorded in early trading and the lower channel has correctly identified the low, the market records a series of new highs for the day, the channel level elevates as the price rallies to new intraday highs. Similarly, lower channel highs are recorded if the price subsequently records lower lows later in the trading session.

Typically, markets trading in large whole numbers, such as S&P futures contracts and Treasury bonds, conform well to the standard settings of 103 percent times a three-day moving average of true lows and 97 percent times a three-day moving average of true highs. Lower priced securities with typically less volatility require larger percentages. Consequently, we recommend for most stocks that the settings be changed to 111 percent and 89 percent and that they be multiplied by a three-day average of true lows and true highs, respectively.

There is a major flaw associated with most commonly calculated channels that use real time price as a component. For example, as price records a lower low or higher high, the channel is continually redrawn. By multiplying the series of highs by the lower percentage and the series of lows by a higher percentage as does TD Channel I™, both the sensitivity of the upper channel changing as higher highs are recorded and the lower channel changing as lower lows are recorded is removed. This is a marked departure from the experience witnessed by conventional channels. Specifically, the upper band of TD Channel I™ remains static as new highs are recorded and the lower band of TD Channel 1™ remains the constant as lower prices are made.

The construction of TD Channel I™ is unorthodox since it contradicts the outcome produced by conventional channels since they typically multiply the highs by larger percentages and the lows by smaller percentages. Therefore, as new highs or lows are recorded, they continually adjust the position of the channel.

Since most markets operate within a trading range, channels identify ideal price reversal levels that often coincide with price exhaustion. Much like overbought/oversold oscillators, channels operate most effectively and efficiently in a trading range or slightly trending market. In a directional, or trending market, channels are less effective. There is a perceived negative for the application of channels since they produce limited predictive value for the identification of price reversals. However, in trending markets this lack of predictability is a unique indicator unto itself since lack of pattern recognition is a by-product of an unusual pattern characteristic of a trending market. The only channel parameter settings discussed are 103 percent times a three-day moving average of the lows and 97 percent times a three-day moving average of the highs. These settings are adequate for stock index futures, as well as many commodities' markets. Since most stocks are lower priced and are not as volatile as commodities, we defer to settings of 111 percent and 89 percent for most stocks. Therefore, we alternate between these two settings depending upon which market we are following.

TD CHANNEL II™

TD Channel II™ is a study that is used to anticipate prospective short-term support and resistance levels, as well as likely price trend reversal zones.

Unlike its trading indicator relative (TD Channel I™), the construction of TD Channel II™ is more conventional since it multiplies a series of three highs (including the current high) by a larger percentage (100.5%), and it multiplies a series of three lows (including the current low) by a smaller percentage (99.5%) for futures and most commodities. The multiples are 107% and 93% for most stocks. Once price movements exceed the boundaries defined by these channels, they are expected to retreat. Any two consecutive closes outside the channel are indicative of price exhaustion and pending price reversal.

LIMITATIONS OF CONVENTIONAL OSCILLATORS

TD DeMarker I™ is an oscillator designed to distinguish between trading ranges and trending markets, anticipate likely price trend reversals, and define and confirm the underlying direction or trend of the market. Most overbought/oversold indicators are exponentially calculated and focus only upon the daily price change from closing price to closing price. Because they are exponential, any extraneous, non-market related factors artificially affect the closing price of a market, and therefore, contaminate the indicator's value until the specific security is either de-listed or replaced. There are some unnatural events that may produce an early market closing such as a presidential assassination, electrical failure, weather, etc. These factors may influence the value of the indicator. If the indicator were arithmetically calculated, the affect would be eliminated once the time period of the indicator had been exceeded.

Despite the fact that most indicators compare a closing price with the prior day's close, there is nothing more statistically reliable about such a daily comparison. In fact, to reduce the impact of one-day volatility due to a news announcement or an unexpected event, the option exists to make intraday price comparisons of highs and lows. TD REI™ does precisely that. It is arithmetically calculated and compares intraday highs and lows that are two days apart, and reduces the possibility of premature movement into overbought and oversold areas.

TD REI™

TD Range Expansion Index (TD REI™) was designed to avoid the pitfalls and complaints associated with other widely followed, popular oscillators. Specifically, its construction is not dependent upon a series of consecutive closing prices, but rather it compares alternative high and low prices in order to be more sensitive to the formation of a trend. Once a trend is formed, TD REI™ allows a trader to participate in the trend, instead of producing premature overbought or oversold indications that force a trader to exit a position too early.

TD REI™ is an arithmetically calculated oscillator. Its formula consists of five independent steps:

1. Whereas most traditional oscillator calculations require consecutive closing price comparisons, Step 1 for calculating TD REI™ compares the high and the low of the current price bar with the high and low two price bars earlier. This comparison serves to lessen the impact of short-term news events and only recognizes them when they persist for more than one price period. Furthermore, this comparison tends to produce a more stable and smoother oscillator presentation, thereby enabling a trader to arrive at more discernible conclusions regarding market price activity. For this first step, subtract the high two price bars ago from the current price bar's high, and subtract the low two price bars ago from the current price bar's low. These two differences are then added together to create a value. This value can be either positive or negative depending upon whether the current high and low are above the prior high and low. The degree of positive and negative is determined by how much above or below the current high and low are versus the prior two comparable price fields.

2. Step 2 determines whether the necessary calculations to be completed in Step 1 should be performed. Specifically, if Step 2 qualification rules are not met, there is a strong likelihood that the market is in a trending phase and a zero value is assigned to the TD REI™ oscillator total. This serves to reduce the likelihood of a market prematurely becoming oversold or overbought, and thereby postpones a trader's decision to exit a position. Specifically, this qualifier requires price intersection, which indicates price overlap and presumably a trading range. Either of the following criteria must be met:
 - The current bar's price range must intersect with the price activity five or six price bars ago. In other words, the current bar must be greater than or equal to the low five or six price bars earlier. The current bar must be less than or equal to the high five or six price bars earlier.
 - The price range two price bars earlier must intersect with the close either seven or eight price bars from the current price bar. In other words, the high two price bars prior to the current price bar must be greater than or equal to the close seven or eight price bars earlier, and the low two price bars prior to the current price bar must be less than or equal to the close seven or eight price bars earlier.
3. Step 3 includes the calculation made in Step 1 together with values assigned to the prior four price bars, provided the qualifier is fulfilled. However, should the qualifier not be met, a zero is recorded for the current bar, and it is added to the prior four price bars to arrive at the current TD REI™ reading. This can include a series of positive, negative, and zero values. By summing these values over a period of five price bars, the numerator of an equation is complete. To calculate the denominator, the absolute value of each of the five price bars is summed (in other words, the direction of the difference is ignored and only the distance in positive terms is summed to arrive at the denominator value). The numerator can therefore be positive, negative, or zero. However, the denominator cannot be zero unless the highs and the lows over a seven consecutive price bar period are equal since the indicator is calculated using five price bars with a two price bar lookback. Once the numerator and denominator values are summed, a positive or a negative ratio appears and is multiplied by 100. The value fluctuates between -100 to +100.
4. Step 4 selects an indicator band for the identification of oversold and overbought TD REI™ zones. Typically, -40 and +40 are selected as oversold and overbought thresholds for a five-day TD REI™.

5. Step 5 is designed to alert a trader to a market that is evolving from a trading range to a trending environment. The duration, or time spent in overbought or oversold, is defined on the chart with a number. Typically, for a five-day TD REI™ calculation, a period of over six consecutive trading days in oversold or in overbought territory is an alert that the market has become severely or extremely oversold or overbought. Mild or modest oversold or overbought readings generally accompany price reversals, whereas extreme or severe readings indicate a trending market. Should a severe reading be recorded, either oversold or overbought, it is prudent to await a return to neutral and then a subsequent return to oversold or overbought. A price reversal should occur provided the reading is mild or modest. Many traders incorrectly look for divergence analysis to determine their market entries. In other words, they compare an oversold or overbought oscillator reading with price activity over the same time period. For example, should price record two successively lower thrusts downside over the same time period, and the oscillator fails to confirm by recording two successively lower oscillator thrusts, divergence appears. They believe the oscillator condition will prevail and price will rally. Our research indicates that divergence is a symptom and duration (the amount of time overbought or oversold) is the cause. For example, it is possible that a move into deep oversold can occur but only for a period of one to three price bars. This movement into deep oversold does not have to be accompanied by a subsequent higher oversold move which produces a divergence since the duration was six or less price bars. Had the indicator been in overbought or oversold territory for more than six price bars, then divergence analysis would have been coincidentally applicable as well. In this instance, the market can rally without a divergence since the first decline into oversold was a modest reading.

TD REI™ METHODS OF INTERPRETATION

Various methods can be applied successfully to analyze TD REI™, as well as other oscillators. Among the more common are the two interpretations presented below.

TD REI™ LOW RISK OSCILLATOR BUY #1 USING TD CLASSIC METHOD

The following is a five-price bar indicator:

Where: $TD\ REI^{\text{TM}} \leq -39$ and $TD\ REI^{\text{TM}}\ 1\ \text{bar ago} \leq -34$

Close > Open

Close 1 bar ago < Open 1 bar ago

High 1 bar ago < True High 2 bars ago OR Low 1 bar ago < True Low 2 bars ago

Open < True High 1 bar ago

The true high is the current bar's high or the close one bar ago, whichever is greater.
True low is the current bar's low or the close one bar ago, whichever is less.

TD REI™ LOW RISK OSCILLATOR SELL #1 USING TD CLASSIC METHOD

The following is a five-price bar indicator:

Where: TD REI™ ≥ 39 and TD REI™ 1 bar ago ≥ 34

Close < Open

Close 1 bar ago > Open 1 bar ago

High 1 bar ago > True High 2 bars ago OR Low 1 bar ago > True Low 2 bars ago

Open > True Low 1 bar ago

The true high is the current bar's high or the close one bar ago, whichever is greater.

True low is the current bar's low or the close one bar ago, whichever is less.

TD REI™ LOW RISK OSCILLATOR BUY #2 USING TD POQ™ (PRICE OSCILLATOR QUALIFIER) METHOD

This alternative method is a much more flexible approach to derive low-risk buy and sell opportunities. Specifically, price patterns and movement are required to be aligned with a series of comparable qualifying indicator values. For instance, the criteria for a low-risk buy indication are:

1. The five-day TD REI™ oscillator reading must be less than or equal to -40.00.
2. Compare the price relationship to insure a price bar whose close is either less than the prior price bar's close or whose close is less than the same price bar's opening.
3. The immediately succeeding price bar must record an up close compared to either the prior bar's close or the same price bar's opening. The high of that price bar serves as a reference price for the immediately following price bar. This is contingent on the following price bar's open being below or equal to the reference price and the high of that same price bar must exceed the reference price, then the reference price is the low-risk entry price.
4. However, if the open of the price bar immediately following the reference price is above the reference high, low-risk buy entry becomes the close of that price bar, provided it is a down close versus the prior price bar's close. If the open is also above the highs of both the reference bar and the bar immediately prior to the reference bar, then a one price bar TD POQ™ sell may be indicated. This one-day sell may be operative at the opening, and the opening becomes an intraday selling opportunity.
5. The oscillator reading of the price bar immediately succeeding the reference price bar must not exceed +15.00.

EXIT OPTIONS

1. In those instances in which the high of the price bar immediately following the reference price exceeds upside the reference price level (producing a low-risk buying opportunity) and is accompanied by a failure to close above the reference level, the next subsequent price bar's high which exceeds upside the high of the entry price bar is a low-risk exit opportunity. The conditions that generally precipitate such a poor follow-through is identical to those that produce severe or extreme oversold indicator conditions. Therefore, duration assumes an important role weighing upon the market, thereby forcing liquidation.
2. Ideally, you can offset a low-risk buy opportunity with a low-risk sell opportunity.
3. The first profitable close or open subsequent to the low-risk entry bar can serve as a profit-taking level. As an alternative, a succession of multiple closes or opens, not necessarily consecutive, can serve as a profit-taking level.
4. The first oscillator movement into overbought after a low-risk buy indication can be used as a trading offset.
- 5.

A stop loss, either intraday or on a closing basis, can be placed beneath the reference price bar's low or beneath the entry price bar's low.

TD REI™ LOW RISK OSCILLATOR SELL #2 USING TD POQ™ (PRICE OSCILLATOR QUALIFIER) METHOD

The criteria for a low-risk sell indication are:

1. The five-day TD REI™ oscillator reading must be greater than or equal to +40.00.
2. Compare the price relationship to insure a price bar whose close is either greater than the prior price bar's close or whose close is greater than the same price bar's opening.
3. The immediately succeeding price bar must record a down close compared to either the prior bar's close or the same price bar's opening. The low of that price bar serves as a reference price for the immediately following price bar. This is contingent on the following price bar's opening being above or equal to the reference price and the low of that same price bar must exceed the reference price, then the reference price is the low-risk entry price.

4. However, if the open of the price bar immediately following the reference price bar is below the reference low, low-risk sell entry becomes the close of that price bar, provided it is an up close versus the prior price bar's close. If the open is also below the lows of both the reference bar and the bar immediately prior to the reference bar, then a one-price bar TD POQ buy may be indicated. This one-day buy may be operative at the opening, and the opening becomes the intraday buying opportunity.
5. The oscillator reading of the price bar immediately succeeding the reference price bar must not exceed -15.00.

EXIT OPTIONS

1. In those instances in which the low of the price bar immediately following the reference price exceeds downside the reference price level (producing a low-risk selling opportunity) and is accompanied by a failure to close below the reference level, the next subsequent price bar's low which exceeds downside the low of the entry price bar is a low-risk exit opportunity. The conditions that generally precipitate such a poor follow-through is identical to those that produce severe or extreme oversold indicator conditions. Therefore, duration assumes an important role weighing upon the market, thereby forcing liquidation.
2. Ideally, you can offset a low-risk sell opportunity with a low-risk buy opportunity.
3. The first profitable close or open subsequent to the low-risk entry bar can serve as a profit-taking level. As an alternative, a succession of multiple closes or opens, not necessarily consecutive, can serve as a profit-taking level.
4. The first oscillator movement into oversold after a low-risk sell indication can be used as a trading offset.

A stop loss, either intraday or on a closing basis, can be placed above the reference price bar's high or above the entry price bar's high.

Together, TD Classic Method and TD POQ™ are low-risk entry methods that can be used to identify low-risk buy and sell opportunities. There are other conventional approaches that similarly work well. However, it is important to note that no methodology is infallible. By combining TD REI™ with other oscillators and indicators, analysis might be simplified. Market Studies Inc. recommends that you incorporate this indicator into a total regimen of TD indicators for the best results.

TD DEMARKER I™

TD DeMarker I™ compares the current and previous price bar's highs. If the current price bar's high is greater than the previous price bar's high, then the difference is calculated and recorded. However, if the difference is either negative or equal, then zero is assigned to that price bar's value. A similar comparison and calculation are conducted over an additional {XX} consecutive price bars. The respective differences are summed and this value becomes the numerator of the TD DeMarker I™ equation.

The denominator value is the summation of the numerator total plus the sum of the differences between consecutive price bar's lows. The difference between the lows, however, compares the prior low to the current low. Once again, if either of the differences are zero or negative, they are ignored. Ideally, this calculation is made for at least a thirteen-price bar period. Next the numerator value is divided by the denominator value and this result, which can fluctuate between 0 and 100, is then plotted on a chart beneath the price bar activity.

In a trading range market, most overbought/oversold oscillators identify market reversal points. However, in a trending market, premature overbought/oversold readings easily appear as well. To deal with this condition, most conventional market timers apply the practice of divergence analysis. This analysis compares successively lower price movements with concurrent non-confirmation of the oscillator values at prospective lows, and compares successively higher price movements with concurrent non-confirmation of the oscillator values at potential highs.

This type of analysis is helpful but its value derives from the fact that the condition known as duration is responsible for its occurrence and its manifestation in a divergence is coincidental.

Specifically, duration, or the amount of time that the oscillator remains in overbought or oversold, is more important than the divergence comparison. For example, a standard period of six units of time typically delineates between a mild and modest overbought/oversold periods as opposed to an excessive or extreme reading of more than six consecutive units of time. Excessive consecutive periods of time warrant the necessity of the oscillator recycling and recording a neutral value, and then once it returns into overbought/oversold the same analysis is applied. If the amount of time the oscillator resides in the overbought/oversold zone is six or less units of time, there is a greater chance that it is coinciding with a price reversal point. More importantly, TD DeMarker I™ is intended to identify ideal low risk buy and sell opportunity zones. Specifically, those low risk buy opportunities are associated with mildly oversold markets and severely overbought markets that have exceeded the duration limit. Duration limit is when the number of consecutive trading price bars in the overbought zone is greater than six.

Conversely, those low risk sell opportunities are associated with mildly overbought markets and severely oversold markets that have exceeded the duration limit. Just as the same interpretation assigned to other TD oscillators, such as TD REI™ and TD DeMarker II™, the duration is critical in distinguishing between a pending reversal or the continuation of a trend. The duration is the lapse of time the oscillator remains in the overbought or oversold zone.

TD DEMARKER II™

TD DeMarker II™ is a study that is used to measure and compare the components of buying and selling pressure.

For a variety of reasons, a set of indicators may prove to be inadequate in anticipating price movements of a market. Their design and construction, as well as lack of sensitivity, may be responsible for their inability to predict market movements or improper execution. Traders are often ill equipped to properly apply indicators to the market and derive profitable forecasts. Their education may be limited to aspects of analysis that are neither compatible nor consistent with the interpretations of certain oscillators. Consequently, it is presumptuous to expect to predict the movement of a security by merely using an indicator. This is the situation most traders find themselves in and frequently they do not admit to this inadequacy until they have endured a series of trading losses. Trading success is dependent upon the combination of two factors: proper indicator construction and, even more importantly, the proper interpretation of the indicator.

The amount of time an indicator remains overbought or oversold (duration) is as important as the fact that it is overbought or oversold. Duration is discussed in the context of other oscillators such as TD DeMarker I™ and TD REI™. These oscillators highlight the fact that the indicator movement must be overlaid upon the security movement. The importance of the interaction between price and oscillator movement cannot be overemphasized. Whereas TD DeMarker I™ and TD REI™ compare intra-day highs and lows and their respective counterparts one and two price bars earlier, TD DeMarker II™ measures and compares the components of buying and selling pressure. TD DeMarker II™ uses its unique formula to calculate the degree of buying and selling pressure.

CALCULATION OF TD DeMARKER II™

1. The difference between the current price bar's high and the previous price bar's close is added to the difference between the current price bar's low and close. If the former calculation is negative, then a zero value is assigned.
2. Conversely, to arrive at the selling pressure, the difference between the current price bar's low and the prior price bar's close is added to the difference between the current price bar's high and the current price bar's close. If the former calculation is negative, then a zero is assigned.
3. To calculate the oscillator value, the buying pressure becomes the numerator and the total of the buying and selling pressure becomes the denominator. In other words, TD DeMarker II™ divides the buying pressure by the total market pressure (both buying and selling).

TD DeMarker II™ provides another way to view and evaluate the market. It complements both TD REI™ and TD DeMarker I™. TD REI™ measures market volatility and anticipates trend reversals, while TD DeMarker I™ confirms the completion of market bottoms and tops.

LIMITATIONS OF CONVENTIONAL MOVING AVERAGES

In non-trending, trading range markets, the application, usage, and interpretation of traditional moving averages have little or no value since often just about the time price exceeds an upside or downside moving average and entry is activated, the price movement reverses itself, thereby establishing a trading range. In trending markets, however, almost any type of moving average and time series selected correctly identifies a market price breakout and can profitably chart the path of the market. In other words, any type of moving average and time series is effective in identifying a breakout in a trending market, and no time period or type of moving average is particularly helpful or valuable in a non-trending market. In trading range, or non-trending markets, market timing oscillators are more effective tools for identifying potential peak and bottom reversal areas particularly when they are associated with zones of "mild" or "modest" overbought or oversold readings.

The dilemma a trader faces is to distinguish correctly between a trading range and a trending market. Studies have shown that 65-80% of the time most markets are non-trending and locked in a trading range. The 20-35% of the time in which markets may trend present profitable trading opportunities to an alert trader who uses moving averages properly to time his market entries and exits. Of the entire period in which markets trend, they typically trend higher 2/3 of the time and trend lower the other 1/3 of the time. Buying is often a cumulative process that is reinforced by positive news, developments, and expectations, whereas selling is generally a single decision made when a trader dislikes a market. When a trader liquidates, he usually sells his entire position. Due to the possibility of frequent false trend breakouts, many traders are reluctant to rely upon moving averages to generate low risk trading opportunities. We believe that we have overcome a major shortcoming of conventional moving averages by creating a sensitive market-timing tool capable of distinguishing between trading range and trending markets. Specifically, our moving average method has been designed to remain silent during a trading range market and active and responsive once a trend appears to be established.

TD MOVING AVERAGE 1™

TD Moving Average 1™ is used to identify trend reversals before and as they occur so you can plan your entry and, in particular, exit strategies.

TD Moving Average 1™ attempts to anticipate trends before and as they occur since most large financial institutions and fund managers must buy into market weakness and sell into market strength, rather than await price reversals and the initiation of a trend. We recommend using TD Moving Average 1™ to confirm the existence of a trend, to add incrementally to current positions, and to exit outstanding positions. We do not mean to imply that this indicator is not sufficiently robust to enable a trader to initiate low risk entry positions; however, many of the other TD Indicators have been developed to anticipate trend reversals more precisely than TD Moving Average 1™.

Throughout the years, we have observed that being a trend follower and entering a trade after the market has completed a bottom/top and begun a trend creates a series of problems for a trader. Problems include price vacuums or gaps, entry price slippage, and bad fills. These are all unwelcome by-products of poor market timing and being a trend follower, rather than anticipating a trend reversal.

These assorted deficiencies are not as pronounced if the moving average approach is used to confirm an existing trend or to exit an outstanding position. Therefore we recommend our moving average technique when attempting to accomplish the latter two goals.

CALCULATION OF TD MOVING AVERAGE 1™

To identify potential **upside** breakouts, an upper moving average is calculated as follows:

1. The lowest true high recorded within the last 13 price bars (including the current price bar) activates the moving average selection process. The true high is the high of a price bar or the prior price bar's close, whichever is greater.
2. That particular price bar's true high is then added together with the true highs of the previous 4 price bars, then averaged, and finally the calculated value is plotted above the high of the current price bar (the lowest true high price bar).
3. This calculation is continued for an additional 3 price bars and then is extinguished UNLESS a subsequent true high price bar has been recorded which is less than ALL previous 12 price bar highs. If this occurs, this calculation is once again continued for an additional 3 price bars.
4. Once a closing price bar is recorded above TD Moving Average 1™, this indicates a potential breakout. This breakout needs to be confirmed by the next trading bar opening above the breakout close AND the high of the trading bar must be above that same price bar's open. When these criteria are met, a legitimate upside breakout occurs. Any outstanding short positions should be liquidated, since it is recommended that TD Moving Average 1™ be used as an exit method or as a trend validation indicator, not necessarily as a low risk entry indicator.
5. If no moving average plot appears on the chart, the moving average is not active and the suggested decision rules can be ignored.

For potential **downside** breakouts, an upper moving average is calculated as follows:

1. The highest true low recorded within the last 13 price bars (including the current price bar) activates the moving average selection process. The true low is the low of the price bar or the prior price bar's close, whichever is less.
2. That particular price bar's true low is then added together with the true lows of the previous 4 price bars, then averaged, and finally the calculated value is plotted below the low of the current price bar (the highest true low price bar).

3. This calculation is continued for an additional 3 price bars and then is extinguished UNLESS a subsequent true low price bar has been recorded which is greater than ALL previous 12 price bar lows. If this occurs, this calculation is once again continued for an additional 3 price bars.
4. Once a closing price bar is recorded below TD Moving Average 1™, this indicates a potential breakout. This breakout needs to be confirmed by the next trading bar opening below the breakout close AND the low of the trading bar must be below that same price bar's open. When these criteria are met, a legitimate downside breakout occurs. Any outstanding long positions should be liquidated, since it is recommended that TD Moving Average 1™ be used as an exit method or as a trend validation indicator, not necessarily as a low risk entry technique.
5. If no moving average plot appears on the chart, the moving average is not active and the suggested decision rules can be ignored.

TD PRESSURE™

TD Pressure™ is a trading indicator that measures and evaluates the market forces of accumulation and distribution.

Whereas most techniques that analyze volume and price change rely solely upon price change from one price bar's close to another's and plot volume accordingly to a cumulative index, TD Pressure™ is calculated, applied, and interpreted differently. Simply put, TD Pressure™ compares close-to-open price movement and then compares that value to the total price movement of a market. It then calculates the percentage of buying over a specified period of time as a percentage of overall trading activity, thereby enabling a trader to rank various trading opportunities according to their relative attractiveness. Finally, by calculating the rate of change of the buying as a percentage of the overall total trading level, the urgency or immediacy attached to the buying or the selling can be evaluated.

Markets advance and they decline. The overriding question is "which markets are about to move and by how much?" Relying solely upon the trading data provided by the various exchanges and supplied by data vendors, quotation services, and the media, one possesses the necessary tools to forecast the market based upon measurements of supply and demand. Elementary economics teaches that price moves higher when there are more buyers than sellers and that prices decline when there are more sellers than buyers. Various analysts have related price change and volume to create market models they believe are sufficiently sensitive to detect and anticipate market moves by evaluating supply and demand. Specifically, their analyses relate price activity to an indicator that is designed to measure accumulation and distribution. The two most popular methods for calculating buying and selling pressure are: 1) on-balance volume--the construction of a cumulative index that is the summation of volume, both positive or negative, assigned to each price bar dependent on whether the closing price is up or down versus the prior price bar's close, and 2) accumulative index that is a summation of volume adjusted by the price change associated with each price bar's closing price. The details of each exercise are presented below.

Depending upon whether the price change is positive or negative, the on-balance volume method merely adds or subtracts the volume assigned to each price bar to a cumulative index positioned beneath the price activity. The amount of the price change from one price bar to another is not considered a factor in the calculation of this index, just the absolute volume. The second price-adjusted volume method multiplies the price bar volume by the price change, whether positive or negative, from one price bar to the next. In other words, the intensity of the move is measured in terms of price change, and this value is multiplied by the volume and then cumulatively added or subtracted to construct the index that appears beneath the chart of the price movement of the underlying security. Whereas the first method described above only concentrates upon volume to create a cumulative index and ignores price change, it is possible to run an index composed only of price change, thereby ignoring volume, just as it is possible to combine the two to create an index. Variations of price change and volume combinations can also be applied as well.

A more compelling measure of price change comparisons than merely relating one price bar's close to another price bar's close involves comparing a specific price bar's close to its open. Unfortunately, among the biggest perpetrators of promoting price change measurements based upon one close to another are members of the media, suppliers of price data, and the exchanges themselves. Convention for these groups requires the release of the price change relationship in this manner, whereas logic might argue that what occurred the previous price bar is history and can be affected by events that occur between the close and the ensuing opening, such as news announcements, earnings reports, etc. For example, assume IBM Corp. closes at \$120 and, after the close, announces earnings above analysts' expectations. As a result, the market opens the next trading day at \$126 and then closes at \$122. Thus, the media and financial information data providers report a price change of +2 points. However, the true price movement for the trading day did not present accumulation; rather, it depicted stock distribution of -4 points. This is precisely why most of our analytical methods are tied one way or another into the relationship between the opening price levels and closing price levels.

Given the additional degree of sensitivity to accumulation and distribution provided by using open as a reference rather than the prior price bar's close, a more acute measurement also incorporates the movement from a price bar's high to low at the same time the movement from open to close occurs. Were the market to open at a particular price bar's high and then close at its low or, conversely, were it to open at a particular price bar's low and then close at its high, the entire movement for the price bar was one directional and the percentage of volume allocated to the cumulative index as accumulation or distribution would be the entire period. However, with opens and closes that are not the high or the low for the price bar, partial allocations can be made. Relating or subtracting the close from the open as the numerator of an equation accomplishes this and, at the same time, by subtracting the price bar's low from its companion high, the total trading activity for the price bar is presented as a denominator. This ratio represents the percentage of the volume that can be allocated to the cumulative index. Obviously, whether the index is positive or negative depends upon whether the close is above or below the open.

Although many formulas can be used to measure supply and demand, the one we prefer is therefore close minus open, divided by high minus low. This ratio is then multiplied by that price bar's volume. Should one accept the notion that the measurement of price movement from the opening of trading is more valuable than calculating the movement from the previous price bar's close, there is one exception to using the open. This instance arises when the open is either greater than or less than the prior price bar's close by 8% or more. In these cases, the formula for measuring buying or selling pressure is: buying pressure is the difference between the current price bar's high and the previous price bar's close PLUS the difference between the current price bar's close and low; selling pressure is the difference between the previous price bar's close and the current price bar's low PLUS the difference between the current price bar's high and its close.

This calculation change is referred to as the "adjust" formula. Since moves of 8% or more are deemed significant, they must be accorded special attention and by pivoting off of the open rather than the previous price bar's close, the recognition is lacking. Therefore, the "adjust" formula accommodates these usually unexpected, news-driven moves. Regardless which of the methods described above is used, each cumulative index is intended to confirm price movement.

The last method that compares price movement from open to close as the numerator and that compares movement from high to low as the denominator is the most sensitive to relating price movement and therefore to create a leading index. However, it is unable to rate the attractiveness of one security to another, as well as to provide the approximate timing of when a market inconsistent with its indicator is about to resolve this disparity. More importantly, it is impossible to compare, rank, or weigh the relative attractiveness of various investments based solely upon a cumulative index. More information is needed to establish a method for this type of comparison.

TD PRESSURE™ RATIO

Once the price change and volume formula is selected, the next step of evaluation can begin. Making open-to-close comparisons rather than close-to-close comparisons, as well as relating the portion of open-to-close price movement versus the price movement for the entire price bar describe a more complete picture of trading activity. If one selects a specific period of trading history, such as 55 price bars, and then combines all the price bars in which the close was greater than the open or, in other words, where the market was under accumulation, then this combined result is the numerator. Next, combine all the price bars in which the close was less than the open and then add the absolute value (disregard the negative sign) of that total to the total displayed in the numerator. This becomes the denominator and this ratio describes the buying as a percentage of the total of trading activity--buying plus selling. This ratio is important since it can be compared to other markets and the degree of relative attractiveness can be calculated and presented. By applying a 55 price bar TD Pressure™ Ratio, one can establish oversold and overbought thresholds and can make comparisons between successive highs and lows and the activity of the indicator when it leaves an extreme oscillator zone.

RATE OF CHANGE

Now, if one were to compare the pressure ratio for one period as opposed to the ratio reading eight price bars earlier, the rate of change can be calculated. Once plotted this will illustrate the aggressiveness of buyers and could lead to trading opportunities before they become obvious and therefore too late. Typically, an 89 or 55 price bar pressure ratio is calculated and the rate of change calculated is either 5, 8, or 13. Since the momentum typically diminishes before price, this technique is valuable to follow. For example, by plotting over a five price-bar rate of change basis the 55-day period of buying as a percentage of total trading--in other words, buying divided by the absolute value of buying plus selling--one can anticipate some price turning points. One can then define overbought and oversold thresholds, such as 107 and 93, and when the oscillator returns from these zones back into neutral, anticipatory low-risk signals can be given. Likewise, calculating the 13-price bar rate of change over an 89-price bar period creates similar oscillator activity. In fact, sometimes during volatile trading periods the interaction of the rates of change of two different TD Pressure™ ratio calculations can also be instructive.

TD CAMOUFLAGE™

TD Camouflage™ is intended to uncover price activity not readily apparent through conventional price reporting procedures. Specifically, to a discerning trader, the information obtained by relating price activity to a market's opening price is more valuable than referencing price behavior to its prior trading day's closing price.

Sometimes markets speak and traders either does not hear, listen, or understand what they are saying. TD Camouflage™ is intended to broadcast the short-term message of what the market is saying internally. Whereas most market followers track obsolete advance and decline indications based solely upon closing price relationships,

TD Camouflage™ and its derivatives utilize more relevant price data and information to evaluate the market and to anticipate prospective turning points and movements. Conventional market timers, media, as well as data vendors and suppliers relate the closing price of markets to their respective prior bar's closings to forecast price movement. This commonly accepted practice sometimes distorts or "camouflages" the true short-term price movement.

For example, corporate or economic news or events typically are announced after the close and prior to a market's opening. Therefore, the opening price is often influenced by these announcements or events. Rather than measuring the price movement from the prior bar's close, the activity from the opening of trading depicts and represents supply and demand more accurately. If the market opens lower than the prior trading day's close and closes down for the trading day versus the prior trading day's close, most analysts would describe the price activity as distribution. However, if the closing price for the current trading day is above the current trading day's open then, more likely than not, accumulation has occurred under the guise of selling.

Conversely, if the market opens higher than the prior trading day's close, then closes up for the trading day versus the prior trading day's close, most analysts would describe the price activity as accumulation. However, if the closing price for the current trading day is below the current trading day's open then, more likely than not, distribution has occurred under the guise of buying. Therefore, the relationship of the closing price versus the market's opening price, rather than the prior price bar's close, is more meaningful to a trader. The gauge of close to open is one critical factor.

Another important variable is the price bar's low and high versus the true low (low or prior day's close, whichever is less) or true high (high or prior day's close, whichever is greater) two price bars earlier. Specifically, for a low risk TD Camouflage™ buy indication, not only must the current close be less than the prior price bar's close and greater than the current open, the current low must also be less than the true low two price bar's earlier. Likewise, for a low risk TD Camouflage™ sell indication, not only must the current close be greater than the prior price bar's close and less than the current open, the current high must also be greater than the true high two price bar's earlier.

At a minimum, when a TD Camouflage™ low risk buy occurs, the market price that the succeeding price bar will likely exceed is the intraday high of the TD Camouflage™ formation price bar before it will likely exceed the TD Camouflage™ formation price bar's low. Conversely, at a minimum, when a TD Camouflage™ low risk sell occurs, the market price that the succeeding price bar exceeds is the intraday low of the TD Camouflage™ formation price bar before it will likely exceed the TD Camouflage™ formation price bar's high.

TD RATE OF CHANGE™

TD Rate of Change™ (TD ROC™) is designed to identify price exhaustion areas associated with market overbought and oversold zones. This indicator confirms low and high-risk buy and sell opportunities, rather than act as a single indicator and more importantly, is a component of TD Alignment™, an amalgam of TD Oscillators™.

TD ROC™ is an arithmetically calculated measure of a market's momentum. Simply stated, its calculation consists of the division of the current market's closing price bar versus the value of the closing price bar 12 price bars previous. Although the selection of closing comparisons may appear to be arbitrary, they are nevertheless rooted in the initial application of this indicator to monthly closing prices versus their respective values 12 months or, in other words, one year previous.

The current most common usage and application of this indicator are daily closing price values twelve trading days apart from one another. In other words, the current closing price is divided by the closing price 12 trading days earlier. This indicator is capable of identifying specific overbought areas of the market. The recommended settings for daily price bar oversold and overbought levels are: overbought above 102.5% and oversold below 97.5%.

The concept of duration, or the amount of time the oscillator reading resides in overbought or oversold zones, is a critical component of the interpretation and analysis of this indicator. Specifically, if the reading is overbought or oversold for a consecutive period of more than six price bars, the market can be rated as extremely or severely overbought or oversold. When this occurs, instead of expecting a potential price reversal at that time, it is more likely that a continuation of the trend will occur until the TD ROC™ indicator returns to neutral and then records an overbought or an oversold reading for a period of six or fewer price bars, thereby insuring a mild overbought or oversold oscillator reading and the potential for producing a price reversal. Given different price bar time periods, TD ROC™ overbought and oversold zones may have to be adjusted, or the duration requirement may be have to be changed.

DURATION

Many traders incorrectly look for divergence analysis to arrive at market entries. In other words, they compare an oversold or an overbought oscillator reading with corresponding price activity. For example, if the price movement on the upper chart records two successively lower price thrusts to the downside and the oscillator fails to confirm by likewise recording two successively lower moves downside, divergence between the price chart and the oscillator arises. Traders believe the oscillator condition will prevail and price will rally.

Our research indicates that divergence is a symptom and that duration (the amount of time overbought or oversold) is the cause. For example, it is possible that a move into deep oversold can occur but only for a period of one to three price bars. This movement into deep oversold does not have to be accompanied by a subsequent higher oversold move, which produces a divergence, since the duration was six or less price bars. If the indicator had been in overbought or oversold territory for more than six price bars, divergence analysis would have been coincidentally applicable as well.

In this instance, the market can rally without a divergence since the first decline into oversold was a modest reading.

TD ALIGNMENT™

TD Alignment™ is a diffusion index, or an amalgam, of various TD Oscillators™. Typically, these oscillators include the following TD Indicators™: TD REI™, TD ROC™, TD DeMarker I™, TD DeMarker II™, and TD Pressure™ (TD Pressure Ratio™). Although this group of TD Indicators™ is recommended, the user can select the combination and setting preferences of TD Indicators™ used. Ideally, the combination of indicators produces a composite indicator, TD Alignment™ that collectively identifies price exhaustion zones better than the indicators individually.

Each of the five TD Indicators™ in TD Alignment™ is given a weighting of +1 for overbought, 0 for neutral, and -1 for oversold. Therefore, the maximum value for overbought and for oversold when five TD Indicators™ are combined is either +5 (overbought) or -5 (oversold). In other words, -5 TD Alignment™ readings are associated with markets that have experienced a period of decline and are sufficiently oversold to support a rally. Conversely, +5 TD Alignment™ readings are associated with markets that have experienced a period of advance and are sufficiently overbought to support a decline. The fact that TD Alignment™ has recorded either a +5 or a -5 reading in and of itself is not always sufficient evidence that a price reversal is imminent; other TD Indicators™ should be investigated to confirm the possibility of a turn. TD Sequential™ and TD Combo™ are two such TD Indicators™.

The various selections used to calculate and display TD Alignment™ can be changed to adapt to your trading needs. We have merely included a schedule that we suggest as default values. This does not imply that other selections may not be better suited to your trading purposes. Each TD Indicator™ has the following preference settings. If you elect to combine the TD Indicators™, the recommended threshold overbought and oversold settings include:

- TD REI™.

Five price bars, with overbought and oversold thresholds of +40 and -40, respectively.

- TD ROC™.

Twelve price bars, with overbought and oversold thresholds of 101 and 99, respectively. NOTE: These are not the same settings recommended for the indicator when it is used by itself, since the overbought and oversold threshold zones are: overbought, greater than 102.5%, and oversold, less than 97.5%.

- TD DeMarker I™.

Thirteen price bars and overbought and oversold thresholds of 60 and 40, respectively.

- TD DeMarker II™.

Eight price bars and overbought and oversold thresholds of 60 and 40, respectively.

- TD Pressure™ (TD Pressure Ratio™).

Five price bars and overbought and oversold thresholds of 82 and 18, respectively.

NOTE: TD Pressure™ can be: Price * Volume, Price Only, or Volume Only.

The preferred selection is Price * Volume, unless no volume is available, then Price Only is the selection.