(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
14 June 2001 (14.06.2001)

PCT

(10) International Publication Number
WO 01/43027 A1

(51) International Patent Classification[7]: G06F 17/60

(21) International Application Number: PCT/US00/33179

(22) International Filing Date: 8 December 2000 (08.12.2000)

(25) Filing Language: English

(26) Publication Language: English

(30) Priority Data:

60/169,973	10 December 1999 (10.12.1999)	US
60/197,672	17 April 2000 (17.04.2000)	US
60/202,813	8 May 2000 (08.05.2000)	US

(71) Applicant: **SHOLTZ & ASSOCIATES L.L.C.** [US/US]; 15 South Raymond Avenue, Suite 200, Pasedena, CA 91105 (US).

(72) Inventors: **BYKOWSKY, Mark, M.**; 4513 Chase Avenue, Bethesda, MA 20814 (US). **OLSON, Mark, A.**; 1343 East Renfrew Place, Tucson, AZ 85719 (US). **RASSENTI, Stephen**; 2902 East Mabel Street, Tucson, AZ 85716 (US). **SHOLTZ, Anne, M.**; 515 Deodar Lane, Bradbury, CA 91010 (US).

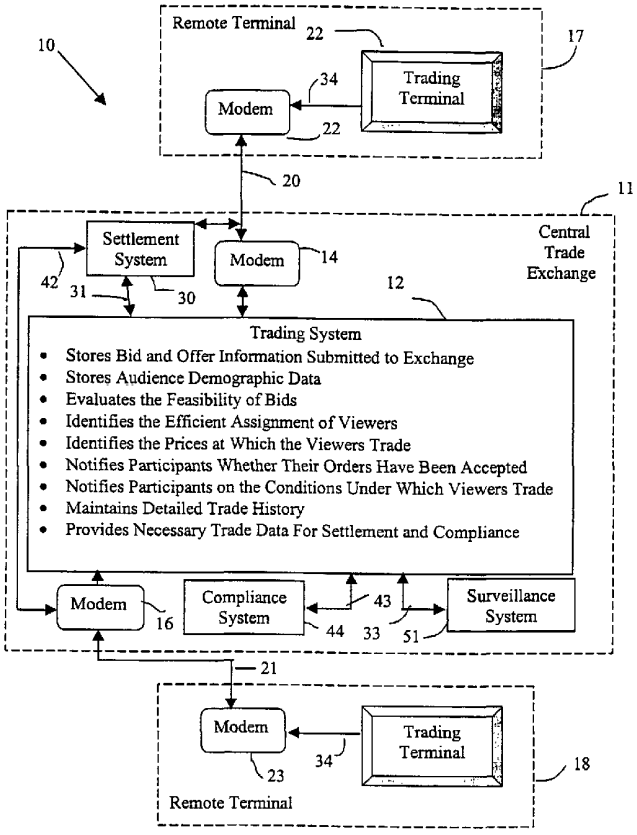
(74) Agent: **BRACKETT, Tim, L.**; Nixon Peabody, Suite 800, 8180 Greensboro Drive, McLean, VA 22102 (US).

(81) Designated States *(national)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CR, CU, CZ, DE, DK, DM, DZ, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, UZ, VN, YU, ZA, ZW.

(84) Designated States *(regional)*: ARIPO patent (GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).

[Continued on next page]

(54) Title: AUTOMATED EXCHANGE FOR THE EFFICIENT ASSIGNMENT OF AUDIENCE ITEMS



(57) Abstract: An automated exchange system is provided which includes a smart electronic double auction for allocating audience items among perspective buyers and sellers for calculating a set of prices for these items, i.e. any form of advertising time and/or space in any media environment, based on buyer bids and seller offers. The system and method include processing bids and offers, identifying a set of trades in audience items between buyers and sellers which optimize gains obtained by buyers and sellers from the set of trades in the audience items and calculating a price for each item (12). The system processes participants' complex preferences for multiple, heterogeneous, items while providing efficiency advantages, such as reduced transaction costs.

WO 01/43027 A1

Published:

— *With international search report.*

— *Before the expiration of the time limit for amending the claims and to be republished in the event of receipt of amendments.*

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

AUTOMATED EXCHANGE FOR THE EFFICIENT ASSIGNMENT OF AUDIENCE ITEMS

FIELD OF THE INVENTION

This invention relates to an automated exchange and method for assigning advertising time and space, and, more specifically, to an electronic auction and method which determines, using complex mathematical algorithms, an efficient assignment of heterogeneous items from sellers to buyers and a set of transaction prices for such items, based upon "single-item" and "multiple-item" bids and offers.

BACKGROUND OF THE INVENTION

Advertising time is currently assigned primarily through a burdensome series of sequential bilateral negotiations between buyers and sellers, or their representatives. Given the complex preferences buyers and sellers exhibit for these items, this method of assignment will likely not assign advertising time to those buyers that value it the most. For example, the vast majority of available blocks of television advertising time is subdivided into advertising spots and assigned through a series of bilateral negotiations between broadcasters/program syndicators and advertisers, or, more commonly, between a set of intermediaries acting on behalf of the respective parties. Economic theory suggests that the existence of the intermediaries creates a potential economic inefficiency. Intermediaries attempt to maximize their commissions. To this end, an intermediary acting on behalf of a seller compares the cost associated with finding an advertiser that is willing to pay more for a particular advertising spot, with the increased potential revenue from identifying such an advertiser. Due to the unavoidably high cost under bilateral negotiation of continuing to search for a buyer willing to pay a higher price, an intermediary currently has an incentive to find a reasonably "good" buyer, and then move on to find another buyer for a different advertising spot. On the other

hand, a broadcaster/program syndicator maximizes its profits by finding the advertisers that value its advertising time available for sale most highly. Because of the different optimization problem that each attempts to solve, the seller cannot expect that its intermediary will necessarily act in a manner that maximizes the seller's profits given the intermediary's high search costs. An intermediary acting on behalf of a buyer creates a similar problem for the buyer.

Economic theory and experimental evidence strongly indicate that bilateral bargaining is unlikely to lead to the assignment of advertising time that optimizes the gains obtained by buyers and sellers. An inefficient assignment often occurs because of the lack of information that buyers and sellers have about each other's true willingness to participate in a trade -- a situation described as "asymmetric information." Problems caused by asymmetric information in bilateral bargaining environments are frequently observed. For example, a prolonged strike is a common outcome of a bilateral negotiation even though an agreement on terms would promote each party's welfare, or an opportunity is missed to sell an asset/service to the buyer that values it the most. Using a series of laboratory experiments described in "Auction Design for Composite Goods: The Natural Gas Industry" (Journal of Economic Behavior and Organization, September 1990, pp. 127-149), McCabe, Rassenti, and Smith report that when bilateral bargaining is used to trade natural gas the outcomes are Pareto-inferior (all parties make less profit) than when the market is coordinated with a smart auction. In general, both lost and non-optimal trades often impose important economic losses upon society.

There is no reason to believe that bilateral bargaining will lead to more efficient assignments of advertising time than it does for other items. Under bilateral bargaining, an advertising agency attempts to buy advertising spots by bargaining with, in a sequential manner, various sellers. To increase his share of the gains from trade, each bargainer has an incentive to misrepresent his willingness to trade. Bargainers attempt to limit the effect of this misrepresentation by soliciting bids or offers from alternative sources. Problems of obtaining the solicited information, combined with the fact that it is also likely to be misrepresented, often causes the bilateral bargaining mechanism to exhibit a poor ability to

discover competitive market prices, which in turn ensures an inefficient assignment of advertising time.

In any multiple-item environment, generating efficient assignments requires that buyers have the opportunity to place bids on the complete array of different, yet substitutable, items up for sale. Similarly, sellers must have the opportunity to place offers to sell their items to all buyers that may have an interest in acquiring them. Without such opportunities for buyer and sellers, the efficient assignment of items is not guaranteed, even if participants truthfully reveal their willingness to participate in a trade. For example, broadcast television advertisers often demonstrate a willingness to acquire advertising spots on multiple programs, subject to the condition that each spot provides access to a particular type of viewer (i.e., the advertiser's "target audience"). Virtually all programs attract a portfolio of different types of viewers. Consequently, an advertiser can typically acquire his desired level of access to his target audience in multiple ways, where a "way" is defined as any combination of advertising spots on one or more programs that in total attract the desired type and number of viewers.

Consider the following simple example. Suppose that an advertiser wishes to buy a set of advertising spots that will provide access to at least 100 female viewers, ages 18 – 49, in a given broadcast television market between 10:00-10:30 am on Monday morning. Suppose, further, that the five stations that operate in that market attract the following number of such viewers to the programs being shown at that time:

Broadcast Television Station Viewers (Monday: 10:00 - 10:30 AM)					
	$Station_1$	$Station_2$	$Station_3$	$Station_4$	$Station_5$
Viewers (Females, 18 – 49)	30	70	30	70	100

The advertiser has the opportunity to buy a set of spots that will provide access to 100 female viewers in the following six different ways:

$$Station_5 = 100$$

$$Station_1 + Station_2 = 100$$

$$Station_2 + Station_3 = 100$$

$$Station_3 + Station_4 = 100$$

$$Station_2 + Station_4 > 100$$

$$Station_1 + Station_4 = 100$$

To increase the likelihood of obtaining access to his desired viewers at the least cost, the advertiser must simultaneously negotiate with five different television stations and throughout this negotiation process calculate and compare the cost effectiveness of the six alternatives. For example, a change in $Station_4$'s offer to sell a spot requires the advertiser to re-calculate the cost effectiveness of three different alternatives (i.e., $Station_3 + Station_4$; $Station_2 + Station_4$; and $Station_1 + Station_4$). The number of re-calculations that must take place given a change in any one station's offer increases with the number of television stations in a given market and the number of programs that attract the buyer's target audience. The above evaluation and re-evaluation are unthinkable under the current method by which advertising time is assigned because television stations typically do not submit their offers to sell advertising time to buyers simultaneously, and because of the very large number of combinations of advertising spots on various programs and various stations that can often satisfy an advertiser's requirements.

There are many other reasons why the current method for assigning advertising time is highly unlikely to produce efficient assignments. For example, broadcasters typically have blocks of continuous seconds of advertising time to assign to advertisers, in which each continuous block of seconds can be partitioned in several different ways. Moreover, advertisers typically request a particular advertising spot length. This heterogeneity in spot length preference among advertisers makes it possible to partition, say, a 60-second block of continuous seconds in multiple ways -- four 15-second spots, two 30-second spots, one 30-second and two 15-second spots, or simply a single 60-second spot. To ensure the efficient assignment of time, broadcasters must evaluate and compare the numerous ways in which a

block of seconds can be partitioned and sold to buyers. However, under current trading methods, time is assigned approximately on a first-come, first-serve basis. Consequently, each sequential assignment of advertising spots limits the set of spots that may be assigned subsequently and, in so doing, may make it impossible to assign spots to the advertisers that value them most.

Advertising spots are typically acquired weeks, and in some cases months, in advance of airing advertisements. Because of stochastic events (e.g., news events, unanticipated competitive responses, worker strikes, mergers and acquisitions), the value an advertiser places on an advertising spot fluctuates during the period beginning when the spot is acquired and ending when the advertisement is finally aired. Changes in such valuations expose broadcasters and syndicators to the risk of selling their advertising time too cheaply, while advertisers incur the risk of overpaying for their acquired spots. Both sides of the market respond to their respective risks by selling and buying advertising time over an extended period of time.

Participants have developed other methods for managing the price risk. For example, broadcasters respond to the risk by selling a portion of their advertising time on a "preemptable" basis. A preemptable spot is a spot sold to an advertiser that the broadcaster may take back and resell for a higher price prior to the airing of the advertisement. The cost a broadcaster incurs from managing his price risk in this manner is equal to the price discount he must provide an advertiser to compensate him for assuming the risk of being preempted. Some advertisers manage the price risk by simply walking away from a purchase agreement. Their ability to walk away occurs because, first, an advertising spot is currently paid for only after the advertisement is aired, and second, it is simply too costly for broadcasters to go after defaulters. The cost advertisers currently pay for handling price risk in this manner is equal to the "default premium" broadcasters impose upon all advertisers (both defaulters and non-defaulters).

The tendency for broadcasters and advertisers to sell and buy advertising time weeks, and sometimes months, in advance of the airing of the advertisement also creates uncertainty

regarding the exact number of target viewers that will be attracted to a given program. This uncertainty exposes both buyers and sellers to "audience access" risk. More precisely, broadcasters face the risk, in selling advertising time on a particular program, of underestimating the number of targeted viewers that will be attracted to the program, while advertisers face the risk of overestimating the access that will ultimately be provided.

To handle audience access risk, advertisers often obtain a guaranty from broadcasters that a particular advertising spot will provide access to a minimum number of targeted viewers. Such a guaranty is, in effect, an insurance policy for which advertisers pay a premium over the cost of acquiring the spot on an "uninsured" basis. Broadcasters handle audience access risk by providing a high estimate of the number of likely viewers that can be accessed through a spot on a given program. When the estimated number of viewers is insured, the cost of an overly optimistic estimate comes in the form of having to "make good" by providing additional access to targeted viewers in the future. While there is no direct cost associated with an overly optimistic estimate when the broadcaster does not insure, he does incur a cost equal to the price discount he must provide to induce an advertiser to buy advertising spots on an uninsured basis. The efficient assignment of advertising time requires that audience access risk and price risk be assigned to the buyers and sellers that are most willing to assume such risk. However, the crude approach by which the current method attempts to assign audience access risk and price risk makes it unlikely that such risks will be assigned efficiently.

There are numerous other reasons why the current method is highly unlikely to assign advertising time in an efficient manner. For example, sellers often require that advertising time be sold only on a "program" basis, as opposed to a "day-part" basis. This decision would lead to an inefficient assignment if advertisers were willing to pay more for spots when acquiring them on a "day-part" basis. In addition, sellers sometimes bundle advertising time on a highly desired program with advertising time on a less desired program. The seller's desire to do this arises, in part, from its concern that it may be unable to sell the advertising time on the less desirable program. Under the current methods, in such a situation a single

buyer must acquire an entire bundle of advertising spots. However, there are numerous situations in which such bundling will not lead to the efficient assignment of spots to advertisers. Consider an example where there are two advertising spots (Spot A and Spot B) for sale, each on a different television program, and where three different advertisers uniformly prefer Spot A to Spot B. For purposes of illustration, suppose the three advertisers place the following values on Spot A and Spot B.

Commercial Spot Assignment		
	Spot A	Spot B
Advertiser #1	10*	3
Advertiser #2	9	5
Advertiser #3	7	6*

The efficient assignment assigns Spot A to Advertiser #1 and Spot B to Advertiser #3. However, this assignment is impossible when the seller requires that both spots be sold on a bundled basis to a single buyer.

Finally, national advertisers currently buy access to a large national audience from the networks (e.g., ABC, CBS, NBC) through a single bilateral negotiation with each network. While this may be transaction cost minimizing, such network advertising has an important undesirable feature from some advertisers' perspectives. Under network advertising, the advertiser is constrained to buy advertising spots from all of the network's affiliates that have elected to exhibit the network's program, regardless of whether such spots are good buys in each affiliate's local broadcast market. There may be local broadcast stations that, from the advertisers' perspective, can provide much better buys. In addition, some of the network advertising spots may occur in local broadcast markets that are outside the geographic service area of the advertiser. This undesirable feature of network advertising is due to "station bundling." Importantly, the existing National Spot Market, in which national advertisers buy advertising spots directly from local broadcast stations or their agents, can never effectively

overcome the problems associated with station bundling because buyers find it too expensive to negotiate with the sellers in the many individual geographic areas for which a more efficient assignment of advertising time from sellers to buyers is possible.

Because of the current method's poor price discovery features, the substantial price risk it imposes upon market participants, the importance of assigning audience access risk to the entity that can assume it most efficiently, participants' reliance on intermediaries whose incentives may differ from their own because of intermediaries' high search costs, the inefficiencies associated with network advertising, the inefficiencies associated with the bundling of advertising spots, and the absence of a mechanism to evaluate complex preferences to create an assignment of advertising time from sellers to buyers that will optimize the gains from trade, a more economically efficient method of assigning broadcast television advertising time is needed. However, because buyers (e.g., television advertisers, ad agencies) and sellers (e.g., broadcasters, cable operators) vary in their preferences regarding the manner in which advertising time should be sold (e.g., preemptable versus non-preemptable), the geographic location and demographic characteristics of the viewers attracted to the offered and desired spots, as well as the day and time location of such spots, it is widely believed that the preferences that buyers and sellers exhibit are simply too complex to allow trading by any method other than through a sequential bilateral bargaining process.

While the Internet has lead to new approaches for the buying and selling of advertising time, none has solved the advertising time assignment problem. For example, BuyMedia (http://www.BuyMedia.com) provides software that allows advertisers to communicate directly to broadcast television stations their interest in buying advertising spots. Following such an expression of interest, the television station and advertiser attempt to complete a trade through bilateral negotiation. OneMediaPlace (http://www.OneMediaPlace.com) provides advertisers the opportunity to submit via the Internet a "Request for Proposal ('RFP') to acquire advertising spots. This RFP is sent to member sellers who are capable of satisfying the buyer's needs. Interested sellers respond by sending an offer to sell to the buyer. The buyer attempts to complete a trade with one or more

sellers through a series of sequential bilateral negotiations. This approach has recently been developed following OneMediaPlace's (referred to as AdAuction) failed attempt to employ an auction to assign advertising spots to buyers. MediaPassage.com (http://www.mediapassage.com) is another Internet "portal" that enables buyers to submit an "avail request" to a collection of prospective sellers in the hope of obtaining advertising spots or written copy space. Again, any trade takes place after a series of sequential bilateral negotiations.

The above and other Internet-based methods (e.g., http://www.AdOutlet.com, http://www. MediaSpaceBank) are similar in that none provide a fundamental change in the way in which advertising time is currently bought and sold. With the exception of AdAuction's use of a simple auction to assign advertising spots, each existing approach simply attempts to create an Internet version of the current method. The "simple" auction proposed by AdAuction does not permit advertisers to express their complex preferences, and, furthermore, by inducing only buyers to compete among themselves for the right to engage in a trade, it assigns a disproportionate amount of the gains from trade to sellers.

In addition to auctions that assign advertising time, there has generally been a rapid growth, particularly on the Internet, in the use of one-sided auctions (i.e., single seller, multiple buyers) to assign items for sale among competing buyers. The auctions used are "simple" in that they permit prospective buyers to submit bids for individual items only (e.g., an IBM computer, a Hewlett Packard printer). Because of the bid's single-item nature, an individual that wishes to acquire two items (e.g., an IBM computer and a Hewlett Packard printer) must, in a "simple" auction, submit an independent bid for each item. From the auctioneer's perspective a "simple" auction has the advantage that identifying the winning bid is straightforward. In the case where "n" homogeneous units of the item are up for sale, selecting the winning bidders involves simply identifying the "n"-highest bids (assuming each winning bidder requests no more than one unit). In addition, despite the variety of possible auction pricing rules (e.g., pay one's bid, pay the highest rejected bid), identifying the prices for the sold items in a "simple" auction is also straightforward.

Items for sale are considered "heterogeneous" when a prospective buyer does not consider one item a perfect substitute for another. The use of a "simple" auction to assign heterogeneous items is appropriate if the value placed on each item by any buyer, or the cost of providing each item by a seller, is independent of which other items he buys or provides. If each buyer's valuation and each seller's cost of providing any collection of items is purely additive, there exists a host of market mechanisms that can create an efficient assignment of heterogeneous items to the buyers that value them the most. However, in many instances, the valuations prospective buyers have for a collection of items may be super-additive. For example, a buyer may desire to purchase a printer only if he also purchases a computer. The value of a combination of items is said to be super-additive if the value of the combination exceeds the sum of the individual values. Similarly, the cost to provide a combination of items is sub-additive if the cost to provide the combination is less than the sum of the costs to provide the individual items. The use of a "simple" auction to assign multiple items in such circumstances may generate several undesirable outcomes, including an inefficient assignment of items and, in some instances, financial losses for participants.

Assignment problems become even more complicated when, in addition to the existence of super-additive valuations and sub-additive costs, there are multiple sellers and buyers. Under such conditions, the identification of the efficient assignment of items, and the prices at which the items should trade, becomes problematic. These problems are exacerbated in instances where the items traded are "multi-dimensional." An item may be considered "single-dimensional" if the quantity demanded and supplied for the item can be accurately measured using a single metric or dimension. For example, the quantity demanded and supplied involving the right to emit a pre-specified gas into the earth's atmosphere (a so-called "pollution emission credit") can be fully measured in terms of a single dimension – weight (e.g., pounds, tons). An item may be considered "multi-dimensional" if the quantity demanded and supplied for the item can only be fully measured using multiple dimensions. For example, an advertising spot on a television program is a multi-dimensional item in that it attracts a variety of different viewer types (e.g., males and females) and, moreover, these

different viewer types are considered non-substitutes (i.e., heterogeneous) from the perspective of the buyer of the advertising spot. The number of dimensions of an advertising spot is a function of the number of different viewer types who are attracted to the program in which the advertising spot is inserted.

Advanced economic thinking, the ability to conduct laboratory research experiments to test any auction's efficiency, reductions in the cost of computer processing power, and the data transmission capabilities of communications networks now make it possible to design market mechanisms that solve difficult assignment problems. Taken together, these factors can lead to the development of entirely new and, importantly, more economically efficient methods of solving assignment problems involving heterogeneous, multi-dimensional items and multiple buyers and sellers. For example, it is now possible to solve assignment problem in which participants constrain the set of feasible assignments through the specification of a set of "complex preferences." Broadly speaking, a "complex preference" is specified when a buyer or seller places one or more logical constraints on the set of items they would be willing to buy or sell. For example, a complex preference is specified by a buyer (seller) who has super-additive values (sub-additive costs) and declares a "package" bid (offer) such as, "I will buy (sell) item A if and only if I also buy (sell) item B." A complex preference is also specified by a buyer (seller) who is indifferent to buying (selling) some subset of items and declares a "subset" bid, for example, " I wish to buy (sell) at most (at least) three of the following five items C, D, E, F, or G." A complex preference may also be specified by a buyer (seller) who is indifferent between trading a specific item with one set of associated characteristics or another and declares, for example, "I will pay (accept) $100 for item H if it is provided with a two-year warranty, but only $40 if it is provided with a one-year warranty."

The last type of complex preference is particularly interesting. In many instances, an item can be defined by a set of characteristics that includes both "fixed" and "flexible" characteristics. A "fixed" characteristic is one that is established prior to sale, while a "flexible" characteristic is one that is established at the time of sale from a set of mutually

exclusive alternatives. For example, an advertising spot is characterized by a set of fixed characteristics (e.g., time of day location, geographic location) and by a set of flexible characteristics (e.g., "Insured Audience Delivery/Non-Insured Audience Delivery"). Assignment problems whose solutions involve the assignment of flexible characteristics to items may be referred to as "characteristic defining" assignment problems. Identifying important flexible characteristics in trading environments and solving characteristic defining assignment problems can result in much more efficient assignments. For example, excessive demand for electricity at peak-load periods may require service interruption for some consumers. The risk of such interruption cannot be assigned to those consumers least willing to pay for reliable service unless consumers have the opportunity to clearly express their willingness to acquire electricity on both an "interruptible" and "non-interruptible" basis during peak-load periods.

One method of satisfying a set of complex preferences among buyers and sellers over a variety of heterogeneous items involves creating a single, centralized market for such items, wherein buyers and sellers can place single and multi-item bids and offers which specify their complex preferences and the individual price levels of which differ according to a set of characteristics that help define the nature of the traded items. Under such a single, centralized market, one or more specially tailored mathematical algorithms can be used to identify a set of assigned items, the collection of buyers and sellers that are included in the assignment, and a set of prices for items assigned from sellers to buyers. Such a single, centralized market that uses mathematical algorithms to process bids and offers collected via a computer network from both buyers and sellers is called a "smart" electronic double auction ("SEDA"). Several examples follow.

The first published example of a "smart" auction that handles complex buyer preferences was designed and experimentally tested to trade packaged combinations of airport takeoff and landing slots ("A Combinatorial Auction Mechanism for Airport Time Slot Allocation," Stephen J. Rassenti, Vernon L. Smith, and Robert L. Bulfin, Bell Journal of Economics, Fall 1982). Sellers (various airport authorities) could offer a limited number of

slots per 15 minute time period during each day, and buyers (airlines) could express their willingness to pay for various routes (packages of slots) given their logistic constraints. The auction was conducted as a one-shot sealed bid. The allocation that maximized total revenue to the airports was computed, and prices for each similar slot were computed to be as close to uniform as possible. The airport slot auction was based on the Ph.D. dissertation of Stephen Rassenti ("0-1 Programming Problems," University of Arizona, 1981), which also discussed how to use a "smart" auction to differentially assign the costs of producing public television programs to the PBS member stations who each have complex preferences with regard to the set of programs they would prefer to air. The airport slot auction does not solve a "characteristic defining" assignment problem.

An article authored by Jeffrey Banks, John Ledyard, and David Porter entitled "Allocating Uncertain and Unresponsive Resources: An Experimental Approach," which appeared in the Rand Journal of Economics (Vol. 20 (1) Spring 1989, 1-25), describes a SEDA, termed the Adaptive User Selection Mechanism ("AUSM"), that allocates multiple resources among users in the presence of supply and demand uncertainties, no supply inventories, fixed production capacity, and significant demand indivisibilities. AUSM is an experimental auction in which buyers (e.g., private firms that design an instrument that uses Space Station resources to produce an output) submit single-item bids for access to a single resource (e.g., pressurized volume within the Space Station, data management services) and multi-item bids for packages of such resources. Suppliers of the fixed resources submit offers to provide the resources. Based upon these bids and offers a mathematical algorithm solves for the "allocation" that maximizes reported gains from trade (i.e., reported consumer plus producer surplus). To facilitate solving a "threshold problem," buyers that wish to acquire single or small packages of such resources can coordinate with other buyers in an attempt to defeat a buyer with a high package bid for an encompassing collection of resources. The tentative total surplus maximizing allocation and the prices that support it are revealed to the market participants. Constrained by certain rules, participants have the opportunity to revise their bids and offers and, following these revisions, the algorithm calculates another

allocation and a set of prices consistent with that allocation. The process continues until no participant changes his submitted bid or offer. AUSM does not solve a "characteristic defining" assignment problem.

An article authored by Stephen Rassenti, Stanley Reynolds, and Vernon Smith entitled "Cotenancy and Competition in an Experimental Auction Market for Natural Gas Pipeline Networks," which appeared in Economic Theory (Vol. 4 (1) 1994, 41- 66) describes a triple auction, Gas Auction Net, that determines an allocation of gas and pipeline capacity among sellers, buyers and transporters, and a set of prices, one for every gas intake, and withdrawal node in the network. Gas Auction Net is an experimental smart electronic triple auction in which wholesale buyers of gas submit bids to purchase gas delivered to their specific locations; gas suppliers submit offers to sell gas from their specific locations; and pipeline owners submit offers to sell transportation capacity over particular segments of the gas pipeline network. Based upon these bids and offers, a mathematical algorithm solves for an initial tentative allocation of resources that would maximize gains from trade, which are revealed to the market participants. Constrained by the rule that they may only increase their bids or decrease their offers, participants are given several rounds in which to make revisions. After each revision the algorithm recalculates the tentative allocation and the set of prices that support it. The process ends at a pre-specified final round. The Gas Auction Net does not need to solve a "characteristic defining" assignment problem as the item of value to any buyer at a particular location is of uniform delivered cost regardless of its source.

The Automated Credit Exchange™ ("ACE" with a primary office in Pasadena, California -- http://www.acemarket.com on the Internet's World Wide Web) currently operates a SEDA for the trading of a variety of items known generically as "pollution emission credits." ACE's largest market is for those credits called RECLAIM Trading Credits ("RTCs"), which grant their owner a license to emit one pound of oxides of Nitrogen or Sulfur (specified by the emission credit) into the Los Angeles air basin. ACE participants submit single-item and/or multi-item bids and offers to buy, sell, and swap up to 120 different types of RECLAIM emission credits, or 28 types of other pollution emissions credits. Based

upon these bids and offers, a mathematical algorithm determines that collection of trades that maximizes the revealed gains from trade. In addition, a separate mathematical algorithm determines a set of prices that are consistent with this allocation. Participants are confidentially notified whether their order(s) are part of this allocation. All participants receive the prices that are consistent with this allocation as well as high bids and low offers for credit types where the allocation shows no trade. The double auction proceeds in a sequence of bidding rounds in which the participants have the opportunity to add new bids and offers, improve those bids and offers that are included in the current allocation, and remove or revise other bids and offers. After each successive round an algorithm calculates another allocation and a set of prices. In most cases, the process continues for a minimum of three and a maximum of five rounds. Following the third round, if the change in the total surplus and the change in trading volume is less than 5% between rounds, the auction "closes." Following the "close" of the double auction, trades for all emission credit types are "executed". In general, non-marginal orders trade at their respective market prices, while marginal orders trade within each order's requirements (i.e., sellers receive no less than they ask while buyers pay no more than they bid), subject to the condition that the resulting prices support the optimized allocation. Trade execution involves the transfer of funds from buyers to sellers via an intermediate settlement account and emission credits from sellers to buyers via an intermediate settlement account. The RECLAIM version of the Automated Credit Exchange solves a form of "characteristic defining" assignment problem in the flexible characteristics defined by "zone" and "cycle".

SUMMARY OF THE INVENTION

The invention applies to an automated exchange and method for the trading of audience items that are currently traded primarily through a burdensome and inefficient series of sequential bilateral negotiations between buyers and sellers, or their representatives. The current trading method is particularly inappropriate given the complex preferences

participants exhibit for the traded items. The automated exchange of the present invention, by means of a "smart" electronic double auction ("SEDA"), makes it possible to create entirely new methods by which participants can express their complex preferences for multiple, heterogeneous, multi-dimensional audience items, and have such preferences properly evaluated to create an assignment of items from sellers to buyers that will optimize the gains from trade. By reducing transaction costs, assigning price and audience access risks to those entities most willing to assume such risks, increasing the amount and quality of the market information regarding the willingness of participants to trade items in existing and new configurations, better aligning the interests of the intermediary and the buyer and seller by lowering search costs, and by processing the complex set of preferences submitted electronically, the automated exchange represents an entirely new method by which participants can trade audience items, with substantial efficiency advantages over the current method by which audience items are traded.

The automated exchange of the invention employs a SEDA, which uses specially tailored mathematical algorithms to process complex bids and offers for audience items submitted electronically to the exchange by buyers and sellers. An audience item is any form of advertising time and/or space in any media environment. Examples of audience items include advertising time or commercial spots on cable television, broadcast television, direct broadcast satellite television, and radio programs; and written copy space in magazines and newspapers and display space on billboards. Since advertising ultimately provides access to recipients of the advertisement, audience items are also referred to herein as access to recipients, i.e., viewers, listeners, readers, etc. and other terms describing exposure events of a recipient(s) to the advertisement, such as impressions, eyeballs, etc. An audience item may also include advertising time and/or space provided electronically by an interconnected network of computers (e.g. the Internet) and access to the recipients, such as viewers and listeners, associated therewith. The automated exchange of this invention uses a SEDA to determine an efficient assignment of heterogeneous audience items from competing sellers to competing buyers, and a set of transaction prices for the assigned items based upon the single

and multiple-item bids and offers submitted. The assignment of items is considered efficient when no other feasible assignment can produce higher gains for all buyers and sellers given their submitted bids, offers and constraints.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** presents the total number of viewers attracted to the programs (i.e., Rivera Live, College Basketball, and The Tom Green Show) offered by a set of cable television networks (i.e., CNBC, ESPN, MTV) during the Weekdays 7:30 - 8:00 PM, segmented by age of viewer;

FIG. **2** illustrates an Offer Array that includes a set of hypothetical offers, arranged in ascending order, submitted by MTV for the sale of the 24,000 viewers attracted to its "The Tom Green Show" program;

FIG. **3** illustrates an Offer Array that includes a set of hypothetical offers, arranged in ascending order, submitted by MTV for the sale of the 12,000 18 – 49 year old viewers attracted to its "The Tom Green Show" program;

FIG. **4** illustrates a Bid Array which includes a set of hypothetical bids arranged in descending order, submitted by Intel, Ford, Xerox, Ford, and P&G, for the acquisition of the 12,000 18 – 49 year old viewers attracted to The Tom Green Show;

FIG. **5a** depicts the intersection of the "The Tom Green Show" offer and bid arrays and the price at which the demand for blocks of 240 seconds of access to the 12,000 18 – 49 year old viewers equals the supply of such blocks;

FIG. **5b** depicts the intersection of the "The Tom Green Show" offer and bid arrays and the price at which the demand for blocks of 240 seconds of access to the 12,000 12 – 17 year old and the 12,000 18-49 year old viewers equals the supply of such blocks;

FIG. **5c** depicts the intersection of the "College Basketball" offer and bid arrays and the price at which the demand for blocks of 240 seconds of access to the 3,000 12-17 year old and the 6,000 18 – 49 year old viewers equals the supply of such blocks;

FIG. **6** presents a diagrammatic representation of the automated exchange and its component elements;

FIG. **7** is a flowchart showing the required steps for operating the iterative version of the automated exchange;

FIG. **8** is a flowchart showing the required steps for operating the non-iterative version of the automated exchange;

FIG. **9** depicts the variety of ways in which "The Tom Green Show viewers" can be offered for sale under the invention;

FIG. **10** depicts the information sellers must submit to the automated exchange;

FIG. **11** depicts the "types" of buy orders buyers can submit to the automated exchange;

FIG. **12** depicts the information buyers must submit to the automated exchange when bidding on a program basis;

FIG. **13** depicts the bid information buyers must submit to the automated exchange when bidding on a demographics basis;

FIG. **14** depicts the information sellers receive on an inter-round basis regarding the status of their submitted offers;

FIG. **15** depicts the information buyers that bid by "day-part" receive on an inter-round basis regarding the status of their submitted bids;

FIG. **16** depicts the information buyers that bid "by program" receive on an inter-round basis regarding the status of their submitted bids;

FIG. **17** depicts a set of offers and bids that, because of buyer flexibility in the number of viewers they desire, a set of competitive equilibrium prices exist;

FIG. **18** depicts a set of offers and bids that, because of buyer inflexibility in the number of viewers they desire, a set of competitive equilibrium prices does not exist; and

FIGS. **19-46** illustrate various screens for permitting buyers and sellers to interface with the present system by, for example, allowing for the entry and submission of bid and offer information while also displaying important inter-round and other information.

DETAILED DESCRIPTION OF PREFERRED EMBODIMENT

The invention applies to a system and method that enables the development and operation of an automated exchange for the trading of audience items that are currently traded primarily through a burdensome and inefficient series of sequential bilateral negotiations between buyers and sellers, or their representatives. The current trading method is particularly inappropriate given the complex preferences participants exhibit for the traded items. The automated exchange of the present invention, by means of a "smart electronic double auction ("SEDA"), makes it possible to create entirely new methods by which participants can express their complex preferences for multiple, heterogeneous, multi-dimensional audience items, and have such preferences properly evaluated to create an assignment of items from sellers to buyers that will optimize the gains from trade. By reducing transaction costs, assigning price and audience access risks to those entities most willing to assume such risks, increasing the amount and quality of the market information regarding the willingness of participants to trade items in existing and new configurations, and by processing the complex set of preferences submitted electronically, the automated exchange represents an entirely new method by which participants can trade audience items with substantial efficiency advantages over the current method by which audience items are traded.

The automated exchange of the invention employs a SEDA, which uses specially tailored mathematical algorithms to process complex bids and offers submitted electronically to the exchange by buyers and sellers. An audience item is any form of advertising time and/or space in any media environment. Examples of audience items include advertising time or commercial spots on cable television, broadcast television, direct broadcast satellite television, and radio programs; and rights to written copy space in magazines and newspapers and display space on billboards. Since advertising ultimately provides access to recipients of the advertisement, audience items are also referred to herein as access to recipients, i.e., viewers, listeners, readers, etc. and other terms describing exposure events of a recipient(s),

such as impressions, eyeballs, etc. An audience item may also include advertising time and/or space provided electronically by an interconnected network of computers (e.g. the Internet) and access to the recipients, such as viewers and listeners, associated therewith. The automated exchange of this invention uses a SEDA to determine an efficient assignment of heterogeneous audience items from competing sellers to competing buyers, and a set of transaction prices for the assigned items based upon the single and multiple-item bids and offers submitted. The assignment of items is considered efficient when no other feasible assignment can produce higher gains for all buyers and sellers given their submitted bids, offers and constraints.

One particular application of this invention is an automated exchange for the trading of television advertising time that provide advertisers access to viewers attracted to various programs. Under such an application, sellers or their agents submit to the automated exchange "sell orders" that reflect their complex preferences. Each sell order is a single or multiple-item offer that identifies a block of advertising time, to be assigned to buyers in the form of one or more advertising spots, on various programs in various geographic areas that the seller has the right to provide. Buyers (advertisers or their agents) submit to the automated exchange "buy orders" that reflect their complex preferences. Each buy order is a single or multiple-item bid that identifies the "type" of viewers (e.g., Males, Ages 18 – 49) that the buyer wishes to access, the geographic areas in which they wish to access those viewers and certain bank account information that permits an authorized third-party to transfer funds from the buyer's bank account in the event that he is assigned any advertising spots. The SEDA of the automated exchange is an "iterative" auction in which buyers and sellers have one or more opportunities to modify a previously submitted buy or sell order. In Round #1, sellers "move" first by creating and submitting sell orders that identify the time interval for which the order holds, and the day, day-part, program, and geographic location of each block of advertising time they wish to offer for sale. Sellers also provide an estimate of the expected number of the various types of viewers that will be accessed during each block of advertising time. In addition, sellers identify the number of blocks of advertising time they wish to sell,

as well as the length, measured in terms of continuous seconds, of such blocks. Finally, sellers also identify an "offer price," defined as the minimum amount of money each requires in order to sell a block of continuous seconds of advertising time. Within a given sell order, the sellers have the opportunity to identify a set of offer prices that may differ according to the flexible characteristics (e.g., Insured, Preemptable) with which access to the viewers can be provided.

In Round #2, buyers "move" second by creating and submitting buy orders that identify the time interval for which their orders hold, the "type" of viewers they wish to access defined in terms of demographics (e.g., sex, age), the geographic, day and day-part location of such access, and the set of programs from which access to viewers can be provided. In addition, buyers indicate the length of the advertising spots (in continuous seconds) they wish to be assigned. Before buyers submit their buy orders in Round #2, the automated exchange evaluates the internal consistency of each buy order and whether there are one or more sell orders that can fill a buy order. This reduces the probability that a buy order may be rejected because no seller has offered access to the desired viewers. Finally, buyers identify a "bid price," defined as the maximum amount of money each is willing to pay, expressed on a cost per thousand (CPM) viewers basis, for access to their desired viewers. Within a given buy order, the buyers have the opportunity to establish one or more bid prices, each of which corresponds to a unique set of flexible characteristics (e.g., Insured, Preemptable). Each bid price represents the maximum amount of money the buyer is willing to pay for advertising time based upon the specified set of flexible characteristics. To encourage buyers to truthfully reveal their willingness to trade, bid price information is never revealed to sellers.

Following Rounds #1 and #2, based upon the submitted sell and buy orders of the first two rounds, a specially tailored mathematical algorithm identifies the set of trades that optimizes the gains from trade, and a second specially tailored algorithm generates a set of prices that, as nearly as possible, discriminates perfectly between accepted and rejected bids and offers. The phrase "optimizes the gains from trade" refers to a process that, constrained

by certain technical factors such as algorithm processing time and the quality of the hardware and software employed in executing the numerical computations required by the algorithms, attempts to discover the optimum benefits that can be shared between buyers and sellers as revealed in the bids and offers they have submitted. As discussed below, in a preferred embodiment for the trading of audience items related to cable television advertising, the optimization process attempts to maximize the revealed gains from trade shared by buyers and sellers. Based upon such numerical computations, sellers receive information regarding the number of blocks of continuous seconds they have tentatively sold, the flexible characteristics (e.g., Uninsured, Preemptable) under which such blocks have tentatively sold, the tentative price of each block, as well as the tentative price of a block when tentatively sold under a different set of flexible characteristics. Similarly, buyers receive information regarding whether they have tentatively acquired access to viewers and if so, the flexible characteristics under which such access is tentatively acquired, the tentative price of such access, expressed on a cost per thousand viewers basis, and the tentative prices for access to such viewers under different sets of flexible characteristics.

Participants are then permitted to modify their buy and sell orders in one or more subsequent rounds. In Rounds #3 and #5 buyers are inactive and sellers can only lower their offer prices, while in Rounds #4 and #6 sellers are inactive and buyers can only raise their bid prices. No other modifications of the buy and sell orders are permitted. All buy and sell orders that have not been modified are automatically entered "as is" into the next round. Modified buy and sell orders that are entered into the next round replace the previously submitted buy and sell orders. The calculated total gains from trade can only increase in each subsequent round as modified buy and sell orders provide increasingly beneficial terms for trade. The SEDA of the automated exchange ends after Round #4 if there are no tentative trades immediately following Round #2; otherwise, it ends after Round #6. After each round of modifications a new tentative assignment is computed. When the SEDA ends, the tentative assignment becomes final and all trades are executed accordingly by the automated exchange.

In a specific preferred embodiment discussed below, the automated exchange of the present invention is employed to facilitate the trading of audience items in the form of access to television viewers that are attracted to the television programs shown by cable television networks and carried by cable operators and offered for sale by such networks and operators. However, the automated exchange of the present invention may be applied to the trading of audience items in any media environment that attracts viewers, listeners, or readers. To this end, the automated exchange of the present invention may be used by participants to trade other types of audiences items, including access to broadcast television viewers, and/or direct broadcast satellite viewers, and/or radio listeners and/or movie theater viewers, and/or magazine and newspaper readers, and/or billboard viewers; and/or viewers of electronically displayed files over a computer network (e.g. Internet); by the airing, printing, or displaying of messages, as provided by or assigned to advertisers, program syndicators, program producers, broadcast television stations, radio stations, television networks, radio networks, basic cable networks, pay cable channels, cable operators, direct broadcast satellite providers, movie theatre owners, magazine and newspaper publishers, billboard owners or the appointed agents (e.g., advertising agencies, intermediaries) of any one of these users. For simplicity when referring to audience items hereafter, we will refer to audience items as blocks of advertising time (or their subdivision into advertising or commercial spots), or access to viewers.

An "exchange" is simply a set of rules that define: (1) the range of permissible behavior on the part of participants; (2) the amount and type of information made available to such participants; (3) a process that uses prices to allocate one or more items among competing users; (4) a procedure for identifying the prices at which the items trade; and (5) a process for executing trades. A "double auction" is a process in which buyers submit to an exchange "bids" to buy one or more items and sellers submit "offers" to sell one or more items. A "transaction" price -- a price that equates or attempts to equate the demand and supply for the good -- is determined through a series of "rounds" in which buyers compete for the opportunity to acquire a given quantity of items while sellers compete to sell a given

quantity of items to buyers. In a "simple" double auction a trade for a given quantity of items is executed whenever a buyer's bid is equal to a seller's offer. Because individual trades occur whenever a bid price is equal to an offer price, such auctions generate non-uniform prices for the traded items. Employing trading pits in which bids and offers are announced orally, numerous securities and other markets are organized as simple, double auctions.

The automated exchange of the present invention determines, using one or more mathematical algorithms, the assignment of audience items from buyers to sellers and a set of transaction prices for the assignments of such audience items. Under the system and method of the present invention, transaction prices are calculated in a manner that attempts to establish a uniform price to all buyers that acquire audience items in the same supply unit (e.g., same block of continuous seconds of advertising time) offered for sale. Under the system and method of the present invention participants are able to express their "complex preferences" regarding audience items. In general, a "complex preference" is one in which the participant (i.e., buyer or seller) places one or more constraints on the manner in which its market order can be filled. Under the system and method of the present invention, buyers are able to express their complex and other preferences by submitting multi-item and single-item bids to buy (i.e., buy orders), while sellers are able to express their complex and other preferences by submitting multi-item and single-item offers to sell (i.e., sell orders). Multi-item orders come in two varieties in the current context. A "package bid" consists of a market order to buy/sell a complete set of items or none at all. For example, a buyer is able to create and submit a buy order that indicates that it wishes to acquire access to a minimum number of viewers in a given week, or none at all. Similarly, a buyer is able to create and submit a buy order that specifies the minimum number of advertising spots (sometimes referred to herein as "commercial spots") it wishes to acquire from a given program across the entire length of the buyer's buy campaign. In addition, a seller is able to create and submit a sell order that indicates that it wishes to sell advertising time in Programs A and B as a "package," or none at all. However, unlike conventional methods by which advertising time is generally traded, the system and method of the present invention permits multiple

buyers to acquire the packaged commercial spots. If the commercial spots are assigned to more than one buyer, the sale of the commercial spots is subject to the condition that the complete set of bundled spots are sold, or none at all. Permitting more than one buyer to acquire the bundled commercial spots increases the likelihood that the commercial spots, and the viewers that are attracted to such spots, are assigned to those buyers that value such spots the most. The automated exchange of the present invention also permits sellers to package advertising time across two or more geographic areas.

The second variety of a multi-item order is a "subset bid." A "subset bid" consists of a bid to buy "n" number of "m" selected items, where $n < m$. Under such a bid and under the present invention, a buyer is able to create a bid that indicates that it wishes to acquire one or more commercial spots inserted, for example, into "Hardball With Chris Mathews" at a specific price or one or more commercial spots inserted into "Rivera Live" at a specific price, but not both. Another form of a subset bid is a "day-part" bid, which consists of a bid to buy access to a particular "type" (e.g., Female; 18 – 49) and number of viewers within a particular day-part within a particular geographic area subject to the restriction that the viewers are drawn from a subset of the programs shown during that time interval within that geographic area. Finally, under the present invention participants are able to express their willingness to trade audience items under a set of different terms and conditions. These terms and conditions represent a set of flexible characteristics the final identification of which help define the nature of the traded audience items. For example, under the system and method of the present invention buyers and sellers are able to express their willingness to trade access to viewers on an "insured" basis and on an "uninsured" basis.

The accommodation of the above and other complex preferences in a market for the assignment of audience items requires the use of advanced mathematics to allocate audience items among buyers and sellers consistent with the set of restrictions imposed by each participant. Allowing participants to express their willingness to trade audience items with flexible characteristics converts an already complex assignment problem into a more complex "characteristic defining" assignment problem.

The invention recognizes the complexity of the advertising time buying and selling process. In particular, television advertisers gain access to viewers through the acquisition of commercial spots. Although programs differ in the number of viewers they attract, all attracted viewers fall into a set of discrete categories defined by, for example, the sex and age of the viewer. An advertiser places a higher value on a commercial spot that attracts viewers that are more likely to purchase its product – an advertiser's so-called "target audience" -- than a commercial spot that attracts the advertiser's non-target audience. An advertiser's preference for one type of viewer over another means that viewers are "heterogeneous." Moreover, it means that a commercial spot is multi-dimensional, where the number of dimensions is equal to the number of target audiences desired by advertisers. For example, FIG. **1** presents three sets of viewers, broken out by viewer age, attracted to three different cable network television programs. Each set of viewers corresponds to a different commercial spot dimension. A necessary condition for the efficient assignment of audience items involves providing buyers the ability to express their willingness to gain access to a particular type of viewer (i.e., target audience). Another necessary condition for the efficient assignment of audience items involves providing sellers the ability to express their willingness to sell their audience items. Conventional program exhibition technology allows only one advertiser at a time to gain access to the complete set of heterogeneous viewers, including those viewers that represent its target audience and those viewers that do not represent its target audience. A simple example can be used to illustrate some of the basic features of an automated exchange involving the trading of access to viewers. Suppose that a local cable system carries three cable networks (i.e., CNBC, ESPN, and MTV) and, furthermore, that the television programs shown by these cable networks during weekdays between 7:30 - 8:00 PM are expected to attract the viewers, broken out by age of viewer (or target audience category), shown in FIG **1**. For purposes of simplicity, assume for the moment that a commercial spot is single-dimensioned in that all advertisers have the same target audience (i.e., 18 – 49 year old viewers). Finally, suppose that each cable network has the authority to insert 720 seconds of commercial time into the exhibited program.

Under the automated exchange of the present invention, cable networks or their agents submit "offers" to sell into the exchange. For purposes of the example, consider MTV. Based upon the cost it incurs from exhibiting "The Tom Green Show" as well as its estimate of the willingness of advertisers to pay for access to its viewers, MTV may submit the offers to sell shown in FIG. **2**. The length of each horizontal section or "step" corresponds to the number of continuous seconds, expressed in terms of a block length, the cable network MTV is willing to sell. The number of steps corresponds to the number of discrete blocks of continuous seconds MTV wishes to sell. The height of the step represents the minimum financial payment MTV requires -- on a $/second basis (or some equivalent measure) -- in exchange for access to the 24,000 viewers attracted to The Tom Green Show program. FIG. **3** depicts the set of offers submitted by MTV expressed in units of the assumed target audience (i.e., 18 – 49 year old viewers) to be accessed.

Under the automated exchange of the present invention, advertisers or their agents submit "bids" into the exchange. Each bid is based upon the revenue the advertiser expects to earn from obtaining access to its target viewers, and may also be based on the expected bids of their competitors. Upon receiving the respective bids, an algorithm within a central computer would, based upon this simple example, arrange the bids in descending order to form a "bid array." FIG. **4** lists a collection of hypothetical bids -- expressed in $/second (or some equivalent measure) – a set of advertisers (e.g., Intel, Proctor & Gamble, Ford, and Xerox) are willing to pay for access to the 12,000 18 – 49 year old viewers that are attracted to The Tom Green Show. The differences in the bids placed result from the fact that advertisers may place different values on access to the same target audience. The length of each horizontal section or "step" corresponds to the number of commercial seconds the advertiser wishes to acquire. The height of the horizontal section represents the maximum amount the advertiser is willing to pay -- on a $/second basis (or some equivalent measure) -- in exchange for access to the 12,000 18 – 49 year old viewers attracted to The Tom Green Show.

The price at which demand for access to The Tom Green Show viewers equals supply is termed the "transaction price." This price is determined by the point of intersection between the offer and bid arrays. The point of intersection also determines the number of commercial seconds that are assigned from sellers to buyers at the transaction price. The point of intersection of the two arrays in our hypothetical example is shown in FIG. **5a.** Given the form of the arrays, there is no unique intersection "point" but rather an intersection "interval" -- $14/second - $22/second. Consequently, there is no unique transaction price, but rather a set of transaction prices represented by the points located within the interval $14/second - $22/second. Under such conditions, the system and method of the preferred embodiment of the present invention selects the mid-point of the intersection interval as the transaction price which, in this case, is $18/second. At this price (or for that matter any price within the $14/second- $22/second interval), 480 seconds of commercial time are sold for The Tom Green Show. Given this quantity of seconds sold, the buyers are Intel and Xerox. Each of these buyers obtains 240 commercial seconds. The number of commercial spots sold depends upon the length of the commercial spot each buyer wishes to "run."

In the above example, the identified transaction price effectively sorts buyers and sellers into two groups -- those that successfully trade (i.e., buy or sell access to a targeted audience for an acceptable cash payment) and those that do not. The resulting assignments have an important and very desirable feature that the successful buyers and sellers are those for whom gaining access to a given target audience generates the greatest revealed economic gains. Using a uniform price, $18/second, that all buyers pay and all sellers receive regardless of their bids and offers, provides participants the incentive to truthfully reveal the values they place on trading. As shown in FIG. **5a**, these gains are measured by the combined size of Area B, which represents the monetary value of the revealed gains obtained by the buyers of the commercial spots, and Area S, which represents the revealed gains obtained by the sellers from selling the commercial spots. Total revealed gains are maximized when buyers that place the highest value on the offered items and sellers that are able to offer them most cheaply successfully trade.

The example has been simplified to draw attention to some of the important elements of the present invention. For example, the illustration assumed that all advertisers have the same target audience and, therefore, it ignores the multi-dimensional aspect of a commercial spot. However, the multi-dimensional nature of a commercial spot, combined with the constraint that only a single advertiser can be assigned a particular spot, are important elements of the assignment problem. The importance of these elements to the assignment process can be described by modifying the example to include an additional target audience. Figure **5b** depicts a set of hypothetical bid and offer arrays for blocks of 240 seconds of access to the 12,000 12 – 17 year old and the 12,000 18-49 year old viewers simultaneously attracted to The Tom Green Show. To promote the efficient assignment of commercial spots, the preferred embodiment of the present invention compares the revealed gains from trade involving the different target audiences and selects the assignment that generates the largest economic pie. Based upon the offer and bid arrays contained in Figure **5b**, under the system and method of the present invention, a mathematical algorithm would assign the commercial spots to Intel based upon its bid for access to 18 – 49 year old viewers, and to Nike based upon its bid for access to 12 – 17 year old viewers. In this case the gains-maximizing uniform price that both buyers pay and the seller receives, $23/second, would be determined by the fact that 480 seconds can be assigned at prices midway below the lowest rejected offer ($24) and above the highest rejected bid ($22 by Xerox).

Under the system and method of the present invention, the assignment of audience items to advertisers takes into account the complex preferences of buyers. For example, apart from day-part location, some advertisers are not overly sensitive to the programs from which their access to viewers is provided. Under the present invention advertisers can demonstrate this insensitivity by bidding for access to their target audience on a "day-part" basis. By bidding on this basis, the buyer is expressing his willingness to have his buy order filled with viewers attracted by one, or more, out of many programs. In addition to specifying the exact "type" of viewer he wishes to access, under a day-part bid the buyer would also specify the minimum and maximum number of commercial spots he wishes to acquire during his buy

campaign, the minimum number of viewers that he wishes to access each week, and the maximum price that he is willing to pay for access to such viewers. In other instances, advertisers are sensitive to the programs from which their access to viewers is provided. Under the present invention, advertisers can demonstrate this sensitivity by bidding for access to their target audience on a "program" basis. By bidding on this basis, the buyer is expressing his willingness to have his buy order filled with viewers attracted by a particular program. In addition to specifying the exact "type" of viewer the buyer wishes to access, such a bid would also specify the maximum number of commercial spots per program episode that he is willing to acquire, the minimum number of viewers that he wishes to access each week, and the maximum price the buyer is willing to pay for access to such viewers. Based upon the buy and sell orders submitted, the system and method of the preferred embodiment of the present invention identifies the gains-maximizing assignment of audience items and the prices at which such items trade.

The previous example can be expanded to include the expression of complex preferences by buyers in the presence of multiple sellers. Suppose that both MTV and ESPN place offers to sell access to their viewers. Figure **5c** depicts a set of hypothetical bid and offer arrays for blocks of 240 seconds of access to the 6,000 18 – 49 year old viewers attracted to ESPN's College Basketball program and the 3,000 12 – 17 year old viewers simultaneously attracted to that same program, while Figure **5b** continues to show us the bid and offer arrays for MTV's The Tom Green Show. Of particular interest is Intel's buy order. In contrast to the other buy orders, Intel's buy order can be thought to represent a day-part bid. The day-part nature of Intel's bid is demonstrated by its appearance on the bid arrays demanding access to 18 – 49 year old viewers of both programs, and a common price (cost per thousand (CPM) viewers per second of access) submitted for both bids. Notice Intel is willing to pay $30 per second for access to the 12,000 viewers attracted to The Tom Green Show, or $15 per second for access to half as many (6,000) of the same type of viewers attracted to College Basketball. These bids are both equivalent to $2.50 per thousand viewers per second. Under the preferred embodiment of the system and method of the present

invention, a mathematical algorithm evaluates the gains from trade for every feasible assignment of commercial spots from sellers to buyers and selects the assignment that maximizes the revealed gains from trade. Given all the orders to buy and sell, 240 second time blocks are sold to Intel and Nike on The Tom Green Show for $23/second, and to Dell, Nike and McDonald's on College Basketball for $20.50/second. Notice that Intel's common bid of $2.50 per thousand viewers per second was enough to win 1 block on The Tom Green show, but not on College Basketball.

The above example is simplified in that it also ignores several other important features of the conventional commercial spot buying and selling process. For example, in addition to cable networks, cable operators also have the ability to offer commercial spots for sale. Thus, the system and method of the present invention provides both cable networks and cable operators with the opportunity to offer commercial spots for sale. In addition, participants often desire to trade commercial spots in a particular geographic area (e.g., "national" versus "local") during a particular period of time. Under the system and method of the present invention, both buyers and sellers can select the exact geographic areas, herein defined as Designated Marketing Areas ("DMAs"), in which to buy and sell audience items. In addition, under the system and method of the present invention, buyers have the opportunity to specify the campaign period, in weeks, over which their buy order applies. Under the system and method of the present invention, a buyer is able to express the minimum and maximum number of commercial spots it desires to acquire during the campaign period and the maximum number of commercial spots it wishes to acquire within a given program episode within a given cable television system.

The system and method of the present invention is designed to accommodate other attributes of the audience item market not fully presented by the above simplified examples nor efficiently managed and effectively processed by the conventional method. Under the system and method of the present invention, participants have the opportunity to submit different bids and offers for each different set of flexible characteristics under which they would trade an audience item. For example, the buyers and sellers of cable television

commercial spots will wish to specify various prices under which access to a prespecified number of viewers is insured or not insured by the seller. They will also wish to specify various prices under which the seller retains the right to take back and resell a spot (preemptable) or sells a firm right (nonpreemptable) to the buyer to show his advertisement at the specified time. These participants would then have four conditions to price: Preemptable/Insured; Preemptable/Uninsured; Non-Preemptable/Insured; and Non-Preemptable/Uninsured. These and other terms and conditions, illustrated in FIG. 9, identify the "flexible characteristics" of an audience item. Under the system and method of the present invention, one or more mathematical algorithms simultaneously identify the assignment of audience items from buyers to sellers and the flexible characteristics of each assigned item that maximize the gains from trades enjoyed by the buyers and sellers. Because the characteristics of items are established at the time of assignment, the present system and method, using mathematical algorithms, solves a "characteristic defining" assignment problem.

The above examples are also simplified in other ways. For instance, the examples assume that the number of seconds of advertising time offered by the seller is equal to the number of seconds demanded by each of the buyers. This assumption will rarely, if ever, hold in practice. Under the preferred embodiment of the present invention, the process of assigning blocks of commercial time from sellers to buyers involves identifying the length of commercial spots desired by buyers such that the revealed gains from trade obtained by the buyers and sellers are maximized. To identify such an assignment, the present invention evaluates every possible way in which a continuous block of seconds offered by a seller can be partitioned into spots of particular lengths that buyers wish to acquire. The new trading institution created by the system and method of the present invention also provides participants the opportunity to trade an audience item under entirely new terms and conditions. For example, the present invention provides a seller the opportunity to assign to a buyer the right to "re-trade" an audience item. Under the system and method of the present invention, buyers have the opportunity to express the premium they are willing to pay, over

the price of a non-tradeable audience item, to acquire the item on a tradeable basis. Likewise, sellers have the opportunity to express the premium they must receive, over the price of a non-tradeable audience item, to sell the audience item on a tradeable basis. Furthermore, some buyers may have a strong preference to have their advertisements placed early in a given television program. Commercial spots located early in a program are termed "adjacencies". Under the system and method of the present invention, advertisers have the opportunity to express the premium they are willing to pay, over the price of a non-adjacency, to acquire a commercial spot on an adjacency basis.

The new trading institution created by the system and method of the present invention recognizes the possibility that the complex preferences of buyers and sellers may reduce "market liquidity." In this instance, the term "market liquidity" refers to the extent to which buyers and sellers can quickly conduct a trade and do so in a manner that does not adversely affect the price at which the transaction takes place. In the current context, market liquidity would be reduced if a buy order was rejected simply because it cannot be "filled," independent of price, by one or more existing sell orders. To reduce this possibility, the system and method of the present invention evaluates the internal consistency of each buy order and whether there are one or more sell orders that can fill each buy order. If a buy order cannot be filled, the system and method of the present invention instructs the buyer on how to change the buy order so that it can be filled. Market liquidity concerns are further reduced by the opportunity for participants to express their willingness to acquire audience items under different flexible characteristics. The system and method of the present invention makes it easy for participants to take advantage of this opportunity. The order creation process involves providing a buyer a list of each different set of flexible characteristics. The set of flexible characteristics on the far left of this list is the least valuable. Consequently, its associated bid price must be less than or equal to all other bid prices. The set of flexible characteristics on the far right is the most valuable. Consequently, its bid price must be greater than or equal to all other bid prices. The bid prices for the middle two flexible characteristics can assume any price relationship with respect to each other. In the case where the buyer does not submit a bid price for a particular set of flexible characteristics, that set of flexible characteristics will automatically be assigned a price equal to the highest priced set of

flexible characteristics to its left. Similarly, the order creation process involves providing a seller a list of each different set of flexible characteristics. The set of flexible characteristics on the far left of this list is the most valuable. Consequently, its bid price must be greater than or equal to all other bid prices. The set of flexible characteristics on the far right is the least valuable. Consequently, its bid price must be less than or equal to all other bid prices. The bid prices for the middle two flexible characteristics can assume any price relationship with respect to each other. In the case where the seller does not submit an offer price for a particular set of flexible characteristics, that set of flexible characteristics will automatically be assigned a price equal to the lowest priced set of flexible characteristics to its left. These "offer/bid price sequence" rules ensure pricing consistency among sets of flexible characteristics and, moreover, make it more likely that participants will price multiple sets of flexible characteristics.

Advances in technology will soon make it possible for sellers to show, within a given program, different advertisements to different viewers. Under these conditions, the basic audience item to be assigned is no longer the access to a group of individuals who cannot be subdivided, but the access to every individual who is now able to receive a different buyer message. After delivering this technology, the seller would be provided the ability to establish a unique offer price for each target audience category, just as the buyers are able to bid on that basis. The automated exchange of the present invention and the associated algorithms may be adapted easily to incorporate such advances in technology.

Because it is less sensitive to problems associated with asymmetric information, the present invention identifies a set of trades among buyers (i.e., ad agencies) and sellers (i.e., cable networks/cable operators) that generates more gains from trade than the gains from trade generated through the existing conventional bilateral bargaining institution. Moreover, the present invention creates a centralized exchange in which market participant orders reflect not only their willingness to either buy or sell a given item, but also their willingness to buy or sell substitutable items. By generating additional information on willingness to trade, the centralized, two-sided nature of the exchange makes it more likely, compared with the existing institutions, that obtaining and providing access to viewers will be assigned to those

buyers and sellers whose total gains, as revealed by their bids and offers, will be optimized. Finally, the present invention's use of advanced mathematics, combined with the necessary information elicited from prospective buyers and sellers, allows participants to conduct complex trades that are unthinkable using existing trading methods.

Unlike conventional trading mechanisms, the present invention can, with the use of sophisticated mathematical algorithms, handle the complex preferences exhibited by buyers and sellers. The handling of such preferences will increase the gains from trade associated with obtaining and providing access to television viewers. For example, under the present invention, buyers are able to place orders to access millions of viewers within a given day and day-part and across a large group of selected geographic areas without the restriction that access to those viewers can only be provided by a single cable television network exhibiting a particular program in the particular package of geographic areas in which the cable network is carried – so called "national advertising." Cable operators will benefit from the increased demand for their local advertising spots. A portion of this benefit will likely accrue to the cable networks in that they could, in theory, extract higher fees from the cable operator for carrying programs.

Compared to existing trading methods, the tentative prices calculated by the specialized mathematical algorithms of the present invention will provide more transparent and better price signals enabling advertisers to more reliably estimate the cost of a given "buy" campaign and cable networks to more reliably determine the best time to sell their commercial spots. In addition, the transaction costs of time and commissions associated with trading access to viewers will be significantly lower under the present invention than under the existing trading methods. The lower transaction costs can be expected to yield important indirect benefits, including providing buyers a greater opportunity to re-trade their assigned spots in response to changes in the value of such spots. Such trades will give rise to a secondary market for access to viewers and, in so doing, lower the price risk to which both cable networks and advertisers are currently subject. The system and method of the present invention solves a characteristic defining assignment problem in that it establishes the

identity of the set of flexible characteristics (e.g., Insured/Non-Preemptable) associated with every item assigned. In addition, the new trading institution created by the system and method of the present invention enables market forces to determine, subject to restrictions imposed by the cable networks, the "best" way in which a block of continuous seconds offered for sale should be partitioned. Finally, the new trading institution created by the system and method of the present invention enables market forces to determine, subject to restrictions imposed by the cable networks, the order in which a buyer's commercial appears within a block of continuous seconds.

FIG. **6** is a diagrammatic representation of the innovative automated exchange generally designated by the number **10**. The automated exchange **10** includes a central trade exchange **11** that includes a trading system **12** combined with data communication means, such as modems **14** and **16** connected to remote terminals **17** and **18** through common communications paths **20** and **21**, respectively. Central trade exchange **11** also includes a settlement system **30**, a compliance system **44** and a surveillance system **51**. Thus, central trade exchange **11** functions as a remote data processing system, including hardware and software, to which terminals **17** and **18** are connected. Trading system **12** preferably includes a host or central computer including, for example, a processor and data storage. Trading system **12** also includes software, including suitable database application software, including algorithms discussed hereinbelow, residing in a computer readable storage medium in the form of encoded executable instructions for operating the automated exchange, including the SEDA, of the present invention. Remote terminals **17** and **18** contain data communication means such as modems **22** and **23,** that serve to transmit and receive information through communications paths **20** and **21**. Communications paths **20** and **21** may include any data communications network capable of effectively transmitting the data, such as a worldwide interconnected network of computers (i.e. the Internet), the Public Switched Telephone Network (PSTN), or any other suitable data communication pathway. Also, the information/data may be transmitted using a variety of data communication paths such as phone lines, wireless transmissions and/or digital data lines. Users of remote terminals **17**

and **18** send bids to buy and offers to sell to the central processor of the trading system **12**. Given a suitably designed central processor, any number of remote terminals **17** and **18** may be used, but for simplicity and ease of presentation, only two such terminals **17** and **18** are shown in FIG. **6**.

Users of terminals **17** and **18** will be assigned a participant identification number by the central trade exchange **11**. The identification number must be entered into the system by the remote terminals **17** and **18** before trading system **12** will accept information from it. If the identification number is correct, the trading system **12** stores subsequent information sent to it by the participant. The trading system **12** also stores audience demographic data, evaluates the feasibility of bids, identifies, based upon a set of algorithms, the efficient assignment of audience items from sellers to buyers and determines the prices at which such items trade. It also notifies participants whether their bids and offers have been accepted, notifies successful participants of the characteristics of the items they trade, maintains detailed trade history, provides necessary trade data for settlement and compliance, and provides real-time surveillance to monitor software and bidding irregularities.

Settlement system **30**, which may or may not be located in the same geographic location as trading system **12**, receives data from trading system **12** via connection **31**, and transfers funds between financial accounts created by the trading participants prior to the start of the market. Assuming it is present at the same geographic location as trading system **12**, the settlement system **30** delivers information on line **42** to modems **14** and **16** and, thereafter, via lines **20** and **21**, to remote terminals **17** and **18**, respectively. In like manner, compliance system **44** receives data from trading system **12** via connection **43** and checks data to determine if it meets predetermined bidding limits or requirements established for each participant. Surveillance system **51** is connected to the central processor of trading system **12** by connection **33** to enable exchange officers to review all information relating to the operation of the exchange. Surveillance system **51** provides real time surveillance to detect software and trading irregularities.

The flowchart represented in FIG. **7** depicts the series of steps in accordance with a specific embodiment of the SEDA of the present invention. It includes a registration process **60**, an escrow funds submission process **61**, sell order creation and submission process **62**, sell order revision processes **62a**, and **62b**, order processing processes **63**, **63a**, and **63b**, buy order creation and submission process **64**, buy order revision processes **64a**, and **64b**, decision process **65** that determines bid feasibility given the orders to sell submitted into the exchange, order processing processes **66**, **66a**, and **66b**, decision process **67** that determines whether the SEDA market remains open, and a trade settlement process **68**. Under registration process **60**, each registrant obtains a participant identification number from the registrar, which may or may not be the entity that operates the SEDA. Each seller creates a customized "seller profile" that identifies the geographic and program location of the viewers to which they have the authority to provide access. This customized profile enables each seller to eliminate irrelevant geographic and program locations when making choices in the process of creating a market sell order. Each buyer has the ability to identify, prior to the opening of the SEDA of the automated exchange, the set of geographic areas in which it wishes to acquire access to viewers. This customized "buyer profile" allows buyers to eliminate unnecessary geographic data elements. To reduce the risk that buyers will fail to pay for assigned audience items, in the escrow funds process **61,** each registered buyer is required to either deposit money into a pre-specified escrow account or have one of its banks submit a letter of reference verifying the advertiser's ability to spend a specified amount of money. The SEDA opens following the registration and escrow funds processes.

Under the sell order creation and submission process **62** (Round #1), sellers, including but not limited to, program syndicators, cable operators, cable networks, and broadcast television stations or their representatives create and submit offers to sell commercial time. Under the sell order creation and submission process **62** sellers can express their complex preferences. For example, under the sell order creation and submission process **62** sellers can express their desire to condition the sale of one block of continuous seconds of commercial time available within a particular television program on the sale of another block of

continuous seconds of commercial time available within a different television program. The seller enters the desired sell order information into various data fields of one or more electronically displayable file. The order information is transmitted from a remote terminal **17, 18** (FIG. 6) to central trade exchange **11**. Under the order processing process **63,** algorithms determine, for a given DMA, the maximum number of commercial spots, assuming the minimum spot length, offered for sale, the maximum number of viewers of each given demographic type to which access is offered in each spot for sale, and the maximum number of weeks such spots and corresponding access to viewers are offered for sale. Under the buy order creation and submission process **64** (Round #2), buyers, including but not limited to, advertisers or their representatives, guided by the information generated from the calculations made under order processing process **63**, create and submit bids to buy commercial spots. Under the buy order creation and submission process **64,** buyers can express the complex preferences under which their buy orders must be filled to accept a trade. The buyer likewise enters the desired sell order information into various data fields of one or more electronically displayable files and transmit the information to central trade exchange **11** (FIG. 6).

Under decision process **65**, the system and method of the present invention, using a set of algorithms, determines whether each buyer's bid to buy is feasible given the offers to sell submitted into the SEDA and the constraints of each buyer's bid. Under this bid feasibility assessment, a set of algorithms determines, for example, the maximum number of viewers a buyer can acquire access to per week and notifies the buyer if he demands access to a minimum level of viewers which exceeds this maximum value. This evaluation also determines, for example, whether the constraints of a bid are internally consistent. For example, the system notifies the buyer if his request regarding the minimum number of spots per program schedule is inconsistent with his own request regarding the maximum number of spots per episode. Under the order processing process **66,** algorithms identify the tentative efficient assignment of spots from sellers to buyers, the characteristics (e.g., insured, non-preemptable) that apply to each spot assigned, the prices at which access to each type of

viewer tentatively trades, and the amount of money each seller (buyer) would receive (owe) if the SEDA closed at that point. After receiving this information, sellers have the opportunity to lower their offer prices under order submission process **62a** (Round #3).

Under the order processing process **63a,** computer algorithms identify the tentative efficient assignment of spots from sellers to buyers, the characteristics (e.g., insured, non-preemptable) that apply to each spot assigned, the prices at which access to each type of viewer tentatively trades, and the amount of money each seller (buyer) would receive (owe) if the SEDA closed at that point. After receiving this information, buyers have the opportunity to raise their bids under order submission process **64a** (Round #4). Under the order processing process **66a,** algorithms identify the tentative efficient assignment of spots from sellers to buyers, the characteristics (e.g., insured, non-preemptable) that apply to each spot assigned, the prices at which access to each type of viewer tentatively trades, and the amount of money each seller (buyer) would receive (owe) if the SEDA closed at that point.

Under decision process **67,** in the preferred embodiment, the system applies a closing rule whereby if there are no tentative trades between a buyer and a seller following order processing process **66**, the SEDA closes following order processing process **66a**, otherwise the SEDA closes after order processing process **66b**. The SEDA can be referred to as closed when, under the rules of the SEDA, buyers and sellers no longer have the opportunity to revise and resubmit the price terms of their market orders for consideration by the SEDA.

To encourage realistic initial bids and offers, the preferred embodiment of the present invention utilizes an "activity rule" in the SEDA that states that sellers can lower their offer prices in order submission process **62b** (Round #5) only on those market orders that were tentatively accepted following order processing process **66.** Similarly, under the present invention, buyers can raise their bid prices in order submission process **64b** (Round #6) only on those market orders that were tentatively accepted following order processing process **66**. Thus, this activity rule provides each seller and buyer who owned those tentatively successful "**66**" orders one final opportunity to lower the price terms of only those tentatively successful "**66**" sell orders in order submission process **62b** (Round #5) and raise the price

terms of only those tentatively successful "**66**" buy orders in order submission process **64b** (Round #6), respectively. There are many other such "activity rules" that may be used instead of, or in addition to, the above rule that are consistent with the objective of promoting the efficient assignment of access to television viewers from sellers to buyers. Through public announcement to potential participants prior to any SEDA, the rules of the SEDA may be modified to change or add an "activity rule".

Under the order processing process **66b,** computer algorithms identify the efficient assignment of spots from sellers to buyers, the characteristics (e.g., insured, non-preemptable) that apply to each spot assigned, the prices at which access to each type of viewer trades, and the amount of money each seller (buyer) would receive (owe). The SEDA then closes following order processing process **66b**. Through public announcement to potential participants prior to any SEDA, the rules of the SEDA may be modified to change the number of rounds before closing and the eligibility of various participants to participate in each round.

Under the settlement trade process **68**, the SEDA computes the final transaction prices that sellers receive for each particular commercial spot they will provide to a buyer and buyers pay for each particular commercial spot received from a seller. The automated exchange then delivers trade confirmation receipts to the respective traders. Trade settlement process **68** also includes the transference of funds from accounts established by the buyers into accounts established by the sellers.

The system and method of the present invention involves the use of an iterative auction wherein both buyers and sellers have multiple opportunities to adjust their buy and sell orders. Under this approach the auction closes only after a given number of opportunities have presented themselves. An iterative auction is ideal for use in situations in which, for instance, the number of buyers and sellers, relative to the number of items up for sale, is low and where buyers and sellers do not demand immediate execution of their orders. However, there may be instances in which buyers and sellers demand immediate order execution. The flowcharts represented in FIG. **8** depict a sequence of steps in another embodiment of the

automated exchange, the non-iterative automated exchange, that permits participants only a single opportunity to submit buy and sell orders before the auction closes and final trades occur. The non-iterative automated exchange includes a registration process **60**, an escrow funds submission process **61**, a sell order creation and submission process **62**, an order processing process **63**, a buy order creation and submission process **64**, decision process **65** that determines bid feasibility given the orders to sell submitted into the exchange and the characteristics of the buyer's bid to buy, an order processing process **66**, and a trade settlement process **68**.

FIG. **9** depicts the numerous flexible characteristics under which access to viewers can be assigned to buyers by the system and method of the present invention. Under the system and method of the present invention, buyers have the opportunity to express their willingness to acquire access to their desired viewers on each of the listed flexible characteristic bases. In addition to the characteristics preemptable/non-preemptable, insured/uninsured, and tradeable/non-tradeable, the system and method of the present invention defines an "adjacency" characteristic that provides buyers/sellers the opportunity to express their willingness to pay/receive a premium to obtain/provide access to viewers in the first block of commercial time offered in a particular program.

Advertisers often are not particularly sensitive to the programs in which their advertisements air. Under the system and method of the present invention, advertisers that bid on this basis are said to be bidding on a "day-part" basis. However, some advertisers are sensitive to the programs in which their advertisements air. Under the system and method of the present invention, advertisers that bid on this basis are said to be bidding on a "program" basis. In what follows, commercial spots are defined as "insured" if the seller guarantees that the buyer will obtain a minimum number of viewers of a particular demographic type; otherwise commercial spots are considered "uninsured." Commercial spots are defined as "preemptable" if the seller may take back the spot from a buyer prior to airtime; otherwise spots are "non-preemptable." Finally, commercial spots are defined as "tradeable" if the buyer may resell the spot prior to airtime; otherwise spots are "non-tradeable." The creation

of "tradeable spots" promotes the efficient assignment of commercial spots. Buyers typically purchase spots weeks, and sometimes months, before the actual airtime. During the intervening period, the value buyers place on the assigned spots may decline. This decline may be such that the current owner is not the most highly valued user of the commercial spot. Consistent with the efficient assignment of spots, the current spot owner should sell the spot to the entity that values it most.

In FIG. **9**, node **300** refers to The Tom Green Show spots that are bid for on a day-part, insured, preemptable, non-tradeable, adjacent basis. Node **301** refers to the spots that are bid for on a day-part, insured, preemptable, non-tradeable, non-adjacent basis. Node **302** refers to the spots that are bid for on a day-part, insured, non-preemptable, tradeable, adjacent basis. Node **303** refers to the spots that are bid for on a day-part, insured, non-preemptable, tradeable, non-adjacent basis. Node **304** refers to the spots that are bid for on a day-part, insured, non-preemptable, non-tradeable, adjacent basis. Node **305** refers to the spots that are bid for on a day-part, insured, non-preemptable, non-tradeable, non-adjacent basis. Node **306** refers to the spots that are bid for on a day-part, uninsured, preemptable, non-tradeable, adjacent basis. Node **307** refers to the spots that are bid for on a day-part, uninsured, preemptable, non-tradeable, non-adjacent basis. Node **308** refers to the spots that are bid for on a day-part, uninsured, non-preemptable, tradeable, adjacent basis. Node **309** refers to the spots that are bid for on a day-part, uninsured, non-preemptable, tradeable, non-adjacent basis. Node **310** refers to the spots that are bid for on a day-part, uninsured, non-preemptable, non-tradeable, adjacent basis. Node **311** refers to the spots that are bid for on a day-part, uninsured, non-preemptable, non-tradeable, non-adjacent basis. Node **312** refers to The Tom Green Show spots that are bid for on a program, insured, preemptable, non-tradeable, adjacent basis. Node **313** refers to the spots that are bid for on a program, insured, preemptable, non-tradeable, non-adjacent basis. Node **314** refers to the spots that are bid for on a program, insured, non-preemptable, tradeable, adjacent basis. Node **315** refers to the spots that are bid for on a program, insured, non-preemptable, non-tradeable, adjacent basis. Node **316** refers to the spots that are bid for on a program, insured, non-preemptable, non-

tradeable, adjacent basis. Node **317** refers to the spots that are bid for on a program, insured, non-preemptable, non-tradeable, non-adjacent basis. Node **318** refers to the spots that are bid for on a program, uninsured, preemptable, non-tradeable, adjacent basis. Node **319** refers to the spots that are bid for on a program, uninsured, preemptable, non-tradeable, non-adjacent basis. Node **320** refers to the spots that are bid for on a program, uninsured, non-preemptable, tradeable, adjacent basis. Node **321** refers to the spots that are bid for on a program, uninsured, non-preemptable, tradeable, non-adjacent basis. Node **322** refers to the spots that are bid for on a program, uninsured, non-preemptable, non-tradeable, adjacent basis. Node **323** refers to the spots that are bid for on a program, uninsured, non-preemptable, non-tradeable, non-adjacent basis. Of course, in another embodiment, any combination of flexible characteristics could be provided for selection by the buyer. Thus the system and method of the present invention permits numerous types of trades to be considered from multiple buyers and sellers in an automated fashion while determining the set of trades that optimize gains from trade.

Advertisers or their representatives ("buyers") and cable operators/cable networks or their representatives ("sellers") employ software to transmit bid and offer information to the automated exchange **10** (FIG. 6). FIG. **10** depicts the information sellers transmit to the automated exchange **10**. This information is referred to generally as offer information **80.** Offer information **80** includes time interval information **81**, which identifies the period of time over which blocks of commercial time are offered for sale on each airing of a particular program. Offer information **80** also includes program information **82**, which specifies the name of the program and its scheduled airtime and day-part location, and bundling information **82a**, which identifies whether this offer is part of a set of programs that are being bundled together for sale. Offer information **80** also includes geographic location information **83**, which identifies the specific DMAs of the offered spots, and viewer information **84**, which specifies the total number of viewers, broken out by age and sex, expected to be attracted to the offered program. Viewer information **84** can either be downloaded by the seller into the trading system **12** (FIG. 6) or may already reside within

such a system. Offer information **80** also includes continuous second information **85** that specifies both the length of the block of continuous seconds and the number of such blocks that are offered for sale. Offer information **80** also includes offer price information **86** in which the seller specifies, for each of the different characteristic defining ways to sell blocks of time (e.g., uninsured, preemptable, non-tradeable), the minimum payment it demands per block of time to provide access to viewers attracted to the program.

Advertisers have different preferences regarding the geographic location of viewers and the programs that attract them. FIG. **11** depicts the different ways in which buyers can bid for access to viewers under the present invention. This information is referred to generally as bid information **87**. For example, as discussed above, it is possible under the present invention to permit buyers to bid for access to viewers on a "program" basis, in which they specify the exact program that must attract the viewers they will access. On the other hand, some advertisers are not particularly sensitive, apart from the day-part of the commercial spots they are assigned, to the programs that attract the viewers they access. By bidding on a "day-part" or "multi-program" basis, advertisers can demonstrate their willingness to accept access to viewers attracted to any of a collection of programs that they select.

Finally, under the present invention buyers can specify the exact geographic location to which either their program or day-part bid applies by identifying whether they wish to obtain access to viewers across the entire set of DMAs or a subset of the DMAs within which a particular program is carried by cable operators. This information is referred to generally as bid information **87**. For example, as discussed above, it is possible under the system and method of the present invention to permit buyers to determine the exact program in which their advertisements must air. In addition, it is possible under the system and method of the present invention to permit buyers to determine the set of programs in which their advertisements can air. In the former case, the bidder is said to be bidding on a "program" basis, while in the latter case, the bidder is said to be bidding on a "day-part" or "multi-program" basis. In addition, under the present invention, buyers can specify the exact

geographic location to which their program or day-part bids apply. In FIG. 11, Node **87a** refers to a bid in which a buyer wishes to acquire access to viewers drawn from a particular program (i.e., "program-specific viewers") across all the DMAs in which that particular program is carried by cable operators. This bid may be call a "national program" bid. In this instance, the buyer specifies a single bid price for the package of DMAs in which it wishes to acquire access to its program-specific viewers.

Node **87b** refers to a bid in which a buyer wishes to acquire access to viewers drawn from a particular program across a subset of all the DMAs in which that particular program is carried by cable operators. The bid may be called a "local program" bid. In this instance, the buyer can either specify a single bid price across the package of DMAs in which it wishes to acquire access to its program-specific viewers, or can specify a separate bid price for each DMA in which it wishes to acquire access to its program-specific viewers.

Node **88a** refers to a bid in which a buyer is willing to acquire access to viewers drawn from one or more particular programs (i.e., "non-program-specific viewers") across all the DMAs in which such programs are carried by cable operators. This bid may be called a "multi-DMA, day-part" bid. In this instance, the buyer specifies a single bid price for the package of two or more DMAs in which it wishes to acquire access to its non-program-specific viewers. Node **88b** refers to a bid in which a buyer is willing to acquire access to viewers drawn from one or more particular programs within a given DMA in which such programs are carried by the local cable operators. This bid may be called a "single DMA, day-part" bid. In this instance, the buyer specifies a single bid price for each DMA.

For what follows it will be necessary to define the term "impression". An impression is an event that corresponds to one targeted viewer being exposed to one commercial spot. Therefore, for a buyer of advertising time, two impressions may either comprise two targeted viewers seeing his commercial one time each, or one targeted viewer seeing his commercial in two different spots.

FIG. **12** depicts the type of information that buyers who wish to submit "program" bids transmit to the automated exchange **10**. The submitted information is referred to

generally as bid information **89**. Bid information **89** includes the time interval of the advertising campaign **90**, which identifies the period of time in weeks over which the buyer wishes to buy access to viewers; program specific information **91**, which specifies the name of the program as well as its time and day-part location; geographic location information **92**, which identifies the specific DMAs of the desired access; target audience information **93**, which identifies the buyer's target audience by sex and age; spot and length information **94**, which specifies the total number of spots the buyer wishes to acquire and the length (expressed in seconds) of those spots; buy type information **95**, which permits the buyer to express whether it wishes to create a "local" or "national" bid; fulfillment discount information **96**, which specifies the monetary discount the buyer demands for each commercial tape copy the buyer must distribute; impressions/week information **97**, which identifies both the minimum and maximum number of impressions the buyer requires per week through the length of its advertising campaign; spots per episode per cable system information **98**, which identifies the maximum number of spots per episode per cable system the buyer is willing to accept; and finally, bid price information **99**, which specifies, for each of the different characteristic ways to acquire impressions through buying spots (e.g., uninsured, preemptable, non-tradeable), the maximum amount the buyer is willing to pay per thousand impressions of the specified target type that are attracted to the identified program.

Advertisers can demonstrate their willingness to accept access to viewers attracted to a broad variety of programs by bidding for their desired viewers on a "day-part" basis. FIG. **13** depicts the type of information that buyers who wish to submit day-part bids transmit to the automated exchange **10**. The submitted information is referred to as bid information **100**. Bid information **100** includes the time interval of the advertising campaign **101**, which identifies the period of time in weeks over which the buyer wishes to access viewers; program specific information **102**, which specifies the time and day-part location of programs eligible to provide access; geographic location information **103**, which identifies the specific DMAs of the desired access; target audience information **104**, which identifies the buyer's target audience by sex and age; excluded program information **105**, which allows the buyer to

specify the programs not eligible to provide access to viewers; spot length information **106,** which specifies the desired commercial spot length (expressed in seconds); bid type information **107**, which identifies whether the buyer wishes to create a multi-DMA or single-DMA bid; spots per program schedule **108**, which identifies the minimum and maximum number of commercial spots the buyer wishes to acquire from a given program during the length of the program's schedule ; spots per episode per cable system **109**, which identifies the maximum number of spots the buyer is willing to accept in a given episode per cable system; impressions per week **110**, which identifies the minimum and maximum number of impressions the buyer requires per week through the length of its advertising campaign; and finally, bid price information **111**, which specifies, for each of the different characteristic defining ways to acquire impressions through buying spots (e.g., uninsured, preemptable, non-tradeable), the maximum amount the buyer is willing to pay per thousand impressions of the specified target type that are attracted to any eligible program. The invention consists of an iterative, sealed-bid double auction. Under a sealed-bid auction, only the participant that submits the order knows the order's components. The auction is iterative in that participants have one or more opportunities in which to revise an initially submitted order to buy or sell access to television viewers. In between each round, sellers and buyers receive information regarding the status of their bids and offers. FIG. **14** presents the inter-round information received by the seller. Seller inter-round information **112** includes the program name **113**, inventory per episode **114**, offer price per block **115**, calculated tentative price per block per week **116**, total revenue **117**, blocks sold per week **118**.

FIG. **15** presents the inter-round information received by the buyer, assuming the buyer bids on a day-part basis. Buyer inter-round information **120** includes the DMA location **121**, target audience **122**, day and day-part location **123**, impressions per week (min) (max) **124**, bid price **125**, tentative price **126**, trade cost **127**, and impressions purchased per week **128**. If the bid has been accepted, trade cost **127** will also show what the total cost would be if the buyer paid his bid, as opposed to his transaction price.

FIG. **16** presents the inter-round information received by the buyer, assuming the buyer bids by program. Buyer inter-round information **130** includes DMA location **131**, program name **132**, day and day-part location of program **133**, impressions per week (min) (max) **134**, bid price **135**, tentative price **136**, trade cost **137**, and impressions purchased per week **138**. If the bid has been accepted, trade cost **137** will also show what the total cost would be if the buyer paid his bid, as opposed to his transaction price.

The problem of identifying a set of trades that, as in the preferred embodiment described herein, maximizes the revealed gains from trade based upon the bids and offers placed in the market is herein referred to as the "assignment problem." Solving the assignment problem at each round involves solving the following integer programming problem:

Maximize:

(1) $V = \Sigma_m \Sigma_t \Sigma_c b_{mtc} \cdot q_{mtc}$ Gains From Exchange;

subject to:

(2) $d_m = 0$ or $d_m \in [\alpha_m, 1] \quad \forall m$ Acceptance Level Constraints;

(3) $|Q_{mt}\downarrow| \; |q_{mt}| \; |Q_{mt}\uparrow| \quad \forall (m,t)$ Assignment Limit Constraints;

(4) $\Sigma_m \lambda_m \cdot q_{mtc} = 0 \quad \forall (t,c)$ Sold=Bought Balance Constraints;

(5) $\Sigma_t f_{mt} \cdot q_{mt} / F_m = d_m \quad \forall m$ Equivalence Constraints;

(6) $\Sigma_{m \in Lij} \text{int} \lceil d_m \rceil \; k_{ij}$ Logical Constraints;

(7) $q_{mt} = \Sigma_c q_{mtc}$, and $q_{mtc} \in \boldsymbol{I} \quad \forall (m,t,c)$ Feasibility Constraints;

where:

V is the revealed sum of buyer and seller surplus;

m = 1,...M indexes the buy and sell orders submitted;

c = 1,...C indexes the characteristic ways in which to assign spots;

t = 1,...T indexes the available commercial time blocks;

i = 1,...I indexes the individual buyers and sellers;

and the decision variables are:

d_m is the level at which order m is assigned;

q_{mtc}, the number of spots in block t that are assigned to order m under characteristic c;

$q_{mtc} > 0$ indicates the buyer of order m buys q_{mtc} spots;

$q_{mtc} < 0$ indicates the seller of order m sells q_{mtc} spots ;

q_{mt}, the total number of spots in block t that are assigned to order m under any characteristic;

$\mathbf{q}_m = (q_{m1}, q_{m2}, \ldots q_{mT})$ is the vector of spots allocated to market order m;

and the parameters (information) input by the buyers and sellers are:

$\lambda_m \in [1, 2, 3, \ldots]$ is the number of seconds per spot for order m;

b_{mtc}, the monetary bid or ask submitted by the owner of order m to buy or sell 1 spot of length λ_m in block t under characteristic c;

$b_{mtc} > 0$ indicates a buyer is willing to pay at most b_{mtc} to buy a spot;

$b_{mtc} < 0$ indicates a seller is willing to accept no less than b_{mtc} to sell a spot;

$Q_{mt}\downarrow$, the minimum number of spots in block t which can be assigned to order m;

$Q_{mt}\downarrow > 0$ indicates the buyer must buy at least $Q_{mt}\downarrow$ spots;

$Q_{mt}\downarrow < 0$ indicates the seller must sell at least $|Q_{mt}\downarrow|$ spots;

$Q_{mt}\uparrow$, the maximum number of spots in block t which can be assigned to order m;

$Q_{mt}\uparrow > 0$ indicates the buyer is willing to buy up to $Q_{mt}\uparrow$ spots;

$Q_{mt}\uparrow < 0$ indicates the seller is willing to sell up to $|Q_{mt}\uparrow|$ spots;

F_m, the number of equivalent spots which are required to completely fill order m;

$F_m > 0$ gives the buyer's maximum demand for equivalent spots;

$F_m < 0$ gives the negative of the seller's maximum supply of equivalent spots;

$|F_m / f_{mt}|$, the number of spots of the type in block t that would be needed to completely fill order m;

$\boldsymbol{L}_{ij}$ defines the jth logically bound subset of the set of orders that individual i submits;

$\alpha_m \in [0,1]$ is the minimum acceptable assignment level of order m.

The first input parameter, λ_m, specifies the length in seconds of the spots to be associated with filling order m. This would be 1 second for sellers who allow their offered block of continuous seconds to be sold to buyers who seek spots of various longer lengths. The final input parameter, α_m, specifies that the owner of order m is willing to have his order partially assigned as long as the acceptance level, d_m, is greater than α_m (constraint 2). The maximal total surplus generated by solving the above program, V^*, is always greater than or equal to 0, the "do-nothing" alternative. The solution to the assignment problem is given by a set of assignment variables, $\{q_{mtc}\}$,that each assign a particular number of spots from block t to order m under characteristic c. The total number of spots assigned from block t to order m under all characteristics, q_{mt}, has upper and lower bounds governed by constraint (3). Constraint (4) requires that the total assigned time bought for block t under characteristic c does not exceed the time sold that way. Constraint (5) requires that for any particular market order, m, the mix of spots from different blocks, t, assigned to satisfy that order, q_{mt}^*, are subject to substitutability and capacity preferences specified by the submitter of the order (e.g., "to completely fill order #3, Buyer i must buy slots of type a, b and c in any proportions that satisfy the following equation: $q_{3a} + 2q_{3b} + 3q_{3c} = 12$"). Constraint (6) requires that of all orders a buyer or seller submit, those assigned must meet any set of logical constraints a buyer or sell may specify (e.g., "I'd like to fill order #3 or order #7 but not both."). The assignment problem is a mixed-integer linear programming problem (MILP). There are many different methods to solve such a problem such as disclosed in Skiena, Steven (1997), *The Algorithm Design Manual*, Springer-Verlag, New York. In the current context, a MILP solution algorithm takes the collection of bids and asks at each iteration and finds that set of trades that maximizes, subject to the constraints listed above, gains from trade.

The SEDA of the present invention requires the calculation of a set of transaction prices for the spots bought and sold given the solution to the above assignment problem. The prices calculated must satisfy two criteria: successful buyers must pay no more than they bid while successful sellers must receive no less than they ask, and the total amount that buyers pay must balance the total amount that sellers receive. Such a calculation is complicated by

the fact that there might not exist, given the set of bids, offers and constraints placed in the market, a set of competitive equilibrium prices, because the decision variable d_m is semi-continuous and the variables q_{mt} are required to be integers. These prices would always exist if the decision variables were allowed to be real numbers within the specified ranges. Let the solution to the continuous version of the above gains maximization problem be the sets $\{d_m^R\}$ and $\{ \mathbf{q}_m^R \}$ of real numbers, which will be exactly equal to $\{d_m^*\}$ and $\{ \mathbf{q}_m^* \}$ when a competitive equilibrium solution does exist. Using the information generated by both solutions, the following optimization computes a set of competitive prices if it exists. Otherwise, it computes a set of prices that meet the two criteria above, and is, by the metric Δ, as close to equilibrium pricing as possible. It may sometimes be the case that more than one set of prices suffices to minimize Δ. We can use the outer optimization to minimize the difference between the total surplus of buyers and sellers when there exists some flexibility in pricing:

Minimize:

(8) $\Sigma_{m\in S^*,b>0} (\Sigma_t \Sigma_c b_{mtc} \cdot q_{mtc}^* - TP_m) - \Sigma_{m\in S^*,b<0} (\Sigma_t \Sigma_c b_{mtc} \cdot q_{mtc}^* - TP_m)$ Surplus split;

subject to:

(9) $\Delta = \text{inf.}\{\Sigma_{m\in S^*} \max[0,(TP_m - \Sigma_t \Sigma_c (\lambda_m \cdot \pi_{tc} + \rho_{mc}) \cdot q_{mtc}^*)]\}$ Minimum distance;

(10) $(\lambda_m \cdot \pi_{tc} + \rho_{mc}) \leq b_{mtc} \quad \forall\, q_{mtc}^R \geq 0$ Accepted assignment;

(11) $(\lambda_m \cdot \pi_{tc} + \rho_{mc}) \geq b_{mtc} \quad \forall\, q_{mtc}^R = 0$ Rejected assignment;

(12) $TP_m \leq \Sigma_t \Sigma_c b_{mtc} \cdot q_{mtc}^* \quad \forall\, m \in S^*$ Submitted price limits;

(13) $\Sigma_{m\in S^*} TP_m = 0$ Balanced budget.

where:

Δ is a measure of distance from achieving competitive equilibrium prices;

S^* is the set of successful orders (bids and asks) and $\sim S^*$ is the set of failed orders;

λ_m is the length in seconds of the spots for order m;

b_{mtc} is the original bid or ask submitted by the owner of order m for 1 spot of length λ_m in block t under characteristic c;

d_m^* is the optimal semi-continuous acceptance level of order m;

q_{mtc}^* and q_{mtc}^R are the optimal integer and real number of spots in block t assigned to order m under characteristic c;

and the decision variables are:

TP_m, the transaction price paid or received to fill order m at level d_m^*;

π_{tc}, a price associated with 1 second of block t time under characteristic c;

ρ_{mc}, a price associated with a order m under characteristic c.

The minimal aggregate distance from the competitive equilibrium prices, Δ^*, will always be equal to 0 if competitive equilibrium prices exist. The solution to the above minimization problem is given by a set of transaction prices, $\{TP_m^*\}$, one for each successful market order $m \in S^*$; and two sets of assignment prices, $\{\pi_{tc}^*\}$ and $\{\rho_{mc}^*\}$, which jointly affect the market price of assigning a spot in block t to an order m under characteristic c. The transaction price, TP_m^*, indicates precisely how much money the buyer is required to pay or the seller actually receives for the order accepted at level d_m^*. When a competitive equilibrium exists, the transaction price, TP_m^*, will correspond exactly to the total cost at market prices, $\Sigma_t \Sigma_c (\lambda_m \cdot \pi_{tc} + \rho_{mc}) \cdot q_{mtc}^*$, of the optimal mix of time slots assigned to satisfy market order m. Constraints (10) and (11) state necessary conditions to find the market prices, $\lambda_m \cdot \pi_{tc} + \rho_{mc}$, for each assignment, q_{mtc}^R, of the real version of the original maximization problem. Constraint (12) restricts the transaction price of a successful order to buy to be at or below the submitted bid, and the transaction price of a successful order to sell to be at or above the submitted offer. Constraint (13) guarantees that the total paid by all buyers will exactly match the total received by all sellers.

Given the bids and offers submitted to the market, there may or may not exist a set of competitive equilibrium prices. Consider the situation depicted in FIG. **17**. Suppose the Buyer wishes to obtain access to any number between 1000 and 3000 Male viewers, 18 – 49

years of age, and is willing to pay $3 per thousand viewers for such access. Seller #1 is willing to sell 2 commercial spots A, which each provide access to 1000 Male viewers (18-49), at a price of $2 per thousand. Finally, Seller #2 is willing to sell 1 commercial spot B, which provides access to 1000 Male viewers (18-49), at a price of $4 per thousand. Gains from trade are maximized if not all orders are filled. The Buyer will purchase access to 2000 Male viewers (18-49) from Seller #1, and Seller #2's ask will be rejected. The maximal gains from exchange, $V^* = \$2$, will be the Buyer's bid times his level of acceptance, $9 x 2/3, minus Seller #1's ask times his level of acceptance, $4 x 1. The competitive equilibrium prices must exist because the integer and real solutions are equal. The Buyer's and Seller #1's transaction price would be $6. The competitive equilibrium price for commercial spot A must be $3 because there is excess demand at that price, while the competitive equilibrium price of commercial spots B can be anywhere between $3 and $4, say $3.5, since that would simultaneously exclude the Buyer and Seller #2 from trading the third spot.

In FIG. **18** we reconsider the situation just described. Suppose the buyer now insists on access to a minimum of 3000 Male viewers, 18 – 49 years of age and is still only willing to pay $3 per thousand for such access. Assume Sellers #1 and #2 submit the same asks as described above. Gains from trade are now maximized only if all orders are filled. The maximal gains from exchange are $V^* = \$1$: the Buyer's bid times his level of acceptance, $9 x 1, minus Seller #1's ask times his level of acceptance, $2 x 2, minus Seller #2's ask times his level of acceptance, $4 x 1. The maximal gains have been reduced by $1 because the buyer is imposing an additional constraint on the assignment. The buyer pays the cost of the constraint, $1, in addition to the offered costs of the commercial spots, $8, for a transaction price of $9. Seller # 1 receives $5 and Seller #2 receives $4 as those transaction prices are the closest to the equilibrium prices, 2 x $3 and $3.5, that would arise if the buyer would not insist on completely filling his order.

The present invention includes numerous electronic displayable files stored in trading system **11** and accessed by remote terminals **17** and **18**. FIGS. **19-46** represent various screen shots corresponding to the electronic displayable files. As discussed hereinbelow, each

screen provides important information to the user while including data fields for receiving data from the user for transmission to central trade exchange **11**. Although not shown, various screens may be provided for interfacing with a system operator for performing monitoring and administration functions associated with the exchange.

FIG. **19** discloses a screen shot involving the application of the system and method of the present invention to trading "access to viewers" (referred to on the screen as "viewers") attracted to programs distributed by cable networks and exhibited by cable operators ("cable network viewers"). Employing the screen disclosed in FIG. **19**, a buyer that wishes to acquire cable network viewers on a day-part basis specifies the campaign period over which its "buy" applies, the precise day and day-part in which it wishes to acquire its desired cable network viewers, its target audience, its desired spot length, the "buy" type (i.e., multi-DMA or single DMA) and the geographic location where it wishes to acquire its desired cable network viewers. FIG. **20** discloses a screen shot for the same application that enables a buyer to identify the set of programs from which its acquired cable network viewers cannot be drawn. FIG. **21** discloses a screen shot that enables a buyer to specify the minimum and maximum number of commercial spots it wishes to be assigned from a given program, the maximum number of commercial spots the buyer is willing to accept per program episode per cable system, and the minimum and maximum number of impressions (e.g., cable network viewers) the buyer wishes to acquire per week during its buy campaign, and the maximum amount of money the buyer is willing to pay, expressed in terms of price per thousand impressions, for its desired cable network viewers under four different sets of flexible characteristics (i.e., Non-Guaranteed, Preemptable; Guaranteed, Preemptable; Non-Guaranteed, Non-Preemptable; Non-Guaranteed, Preemptable). Note that the terms "guaranteed" and "non-guaranteed" are intended to have the same meaning as "insured" and "uninsured" as defined herein, respectively. FIG. **22** discloses a screen shot that presents two day-part bids. FIG. **23** discloses a screen shot that displays the inter-round results information the buyer receives immediately following Round #2. FIG. **24** discloses a screen shot for the same application that displays the inter-round results information the buyer receives immediately following Round #3 and provides the buyer the opportunity to raise its bid prices. FIG. **25** discloses a screen shot that displays the inter-round results information the buyer receives immediately following Round #4. FIG. **26** discloses a screen shot that displays the inter-round results

information the buyer receives immediately following Round #5 and provides the buyer the opportunity to raise its bid prices. FIG. **27** discloses a screen shot for the same application that displays the buyer's completed trades.

FIG. **28** discloses a screen shot in which a buyer that wishes to acquire cable network viewers on a program basis specifies the campaign period over which its "buy" applies, the precise day and day-part in which its wishes to acquire its desired cable network viewers, the cable network and program from which its desired viewers must be drawn, its desired spot length, its target audience, the buy "type" (i.e., local or national) and, if local, the geographic location where it wishes to acquire its desired cable network viewers. Employing the screen disclosed in FIG. **29**, a buyer is able to specify the maximum number of commercial spots it is willing to accept per program episode per cable system, the minimum and maximum number of impressions (e.g., cable network viewers) the buyer wishes to acquire per week during its buy campaign, and the maximum amount of money it is willing to pay, expressed in terms of price per thousand impressions, for its desired cable network viewers under four different sets of flexible characteristics (i.e., Uninsured, Preemptable; Insured, Preemptable; Insured, Non-Preemptable; Uninsured, Non-Preemptable). FIG. **30** discloses a screen shot that presents two program bids. FIG. **31** discloses a screen shot for the same application that displays the inter-round results information the buyer receives following Round #2. FIG. **32** discloses a screen shot for the same application that displays the inter-round results information the buyer receives following Round #3 and provides the buyer the opportunity to raise its bid prices. FIG. **33** discloses a screen shot that displays the inter-round results information the buyer receives following Round #4. FIG. **34** discloses a screen shot that displays the inter-round results information the buyer receives following Round #5 and provides the buyer the opportunity to raise its bid prices. FIG. **35** discloses a screen shot that displays the buyer's completed trades.

FIG. **36** discloses a screen shot in which a seller specifies the period over which its "avail offer" applies, the precise day and day-part location of the "avails" (i.e., blocks of continuous seconds of advertising time) it wishes to sell, as well as the cable network location of those avails. FIG. **37** discloses a screen shot in which the seller identifies the number of avails it wishes to sell, the length of each avail, and the minimum amount of money it requires, expressed in terms of price per block of continuous seconds, in exchange for its

avails. Employing the screen disclosed in FIG. **37**, the seller has the opportunity to sell its avails under four different sets of flexible characteristics (i.e., Uninsured, Preemptable; Insured, Preemptable; Insured, Non-Preemptable; Uninsured, Non-Preemptable). Employing the screen disclosed in FIG. **37**, the seller has the opportunity to submit an estimate of the number of viewers, broken out by target audience category, attracted to a particular program. FIG. **38** discloses a screen shot that presents one sell order. FIG. **39** discloses a screen shot that presents two sell orders. Employing the screen disclosed in FIG. **40**, a seller has the opportunity to identify the set of avails from different programs that are bundled together for sale. FIG. **41** discloses a screen shot that presents two programs that are bundled together for sale. FIG. **42** discloses a screen shot that displays the inter-round results information the seller receives following Round #2 and provides the seller the opportunity to lower its offer prices. FIG. **43** discloses a screen shot that displays the inter-round results the seller receives following Round #3. FIG. **44** discloses a screen shot that displays the inter-round results the seller receives following Round #4 and provides the seller the opportunity to lower its offer prices. FIG. **45** discloses a screen shot that displays the inter-round results the seller receives following Round #5. FIG. **46** discloses a screen shot that displays the seller's completed trades.

We claim:

1. An automated exchange system including a smart electronic double auction for allocating audience items among prospective buyers and sellers and for calculating a set of prices for the audience items based on buyer bids from the buyers and seller offers from the sellers, comprising:

remote terminals for initiating and transmitting data including buyer bids and seller offers; and

a central trade exchange system including a trading means for receiving buyer bids and seller offers from said remote terminals, simultaneously processing the buyer bids and the seller offers, identifying a set of trades in audience items between buyers and sellers which optimize gains obtained by buyers and sellers from the set of trades in audience items based on the bids and offers received by said trading means, calculating a price for each audience item in the set of trades, and identifying rejected buyer bids and rejected seller offers.

2. The system of claim 1, wherein said audience items are multi-dimensional.

3. The system of claim 1, wherein said central trade exchange includes means for notifying respective terminals of said remote terminals of accepted buyer bids and seller offers forming the set of trades, said rejected buyer bids and said rejected seller offers.

4. The system of claim 1, wherein said buyer bids include single-item bids and multi-item bids and said seller offers include single-item offers and multi-item offers.

5. The system of claim 4, wherein said buyer bids and said seller offers include program bids and day-part bids.

6. The system of claim 4, wherein said multi-item buyer bids include at least one of a package bid and a subset bid.

7. The system of claim 1, wherein said audience items include tradeable items and non-tradeable items.

8. The system of claim 1, wherein said audience items include insured and uninsured items.

9. The system of claim 1, wherein said buyer bids include adjacency bids for adjacency audience items positioned in time early in a program, the remote terminal capable of receiving an adjacency bid including an adjacency premium and transmitting said adjacency bid to said central exchange system.

10. The system of claim 2, wherein said audience items include preemptable items and non-preemptable audience items.

11. The system of claim 10, wherein said audience items include tradeable and non-tradeable items.

12. The system of claim 2, wherein said trading means functions for processing at least two of the following types of audience items: insured preemptable non-tradeable items; insured non-preemptable non-tradeable items; insured non-preemptable tradeable; uninsured preemptable non-tradeable items; uninsured non-preemptable non-tradeable items; uninsured non-preemptable tradeable.

13. The system of claim 1, wherein said audience items include an audience item having a specific time length, said trading means functioning for partitioning said specific time length audience item into multiple advertising spots.

14. The system of claim 13, wherein said multiple advertising spots include at least two advertising spots having different time lengths.

15. The system of claim 1, wherein said set of trades is a set of tentative trades, said trading means further functioning for calculating gains from said set of tentative trades received during a first pair of bidding rounds, calculating gains from a set of second trades received during a second pair of bidding rounds and selecting one of said set of tentative trades and said set of second trades having a largest gains from trade.

16. The system of claim 1, wherein said buyer bids include a bid excluding a program, said trading means further functioning for receiving and processing said buyer bid excluding said program.

17. The system of claim 1, wherein said trading means further functions for performing a feasibility and internal consistency assessment of the buyer bids based on the seller offers.

18. The system of claim 1, wherein said trading means further functions for determining whether a set of tentative trades exist after receiving both seller offers and buyer bids and closing the auction if no set of tentative trades exist after receiving both seller offers and buyer bids.

19. The system of claim 1, wherein said trading means further functions for receiving and processing seller offer prices and buyer bid prices during a first set of bidding rounds, and for receiving and processing modified seller offer prices and modified buyer bid prices during a second set of bidding rounds, said trading means adapted to accept and process modified seller offer prices during said second set of bidding rounds which are less than said seller offer prices during said first set of bidding rounds and to reject modified seller offer prices during said second set of bidding rounds which are greater than said seller offer prices during said first set of bidding rounds, said trading means further adapted to accept and process modified buyer bid prices during said second set of bidding rounds which are greater than said buyer bid prices during said first set of bidding rounds and to reject modified buyer bid prices during said second set of bidding rounds which are less than said buyer bid prices during said first set of bidding rounds.

20. The system of claim 1, wherein said set of trades identified by said trading means is a tentative set of trades, said trading means adapted to accept two modifications to offer prices and bid prices associated with said set of tentative trades.

21. An automated method of allocating audience items among prospective buyers and sellers based on buyer bids from the buyers and seller offers from the sellers, comprising the steps of:

receiving, in a computer, buyer bids to buy audience items and seller offers to sell audience items;

processing the buyer bids and the seller offers;

identifying a set of trades in audience items between buyers and sellers which optimize gains obtained by buyers and sellers from the set of trades in audience items based on the bids and the offers received by said computer;

calculating a price for each audience item in the set of trades;

identifying rejected buyer bids and rejected seller offers;

transmitting electronic notifications of accepted buyer bids and seller offers forming the set of trades, said rejected buyer bids and said rejected seller offers, to respective remote buyer terminals and remote seller terminals.

22. The method of claim 21, wherein said audience items are multi-dimensional.

23. The method of claim 21, wherein said buyer bids include single-item bids and multi-item bids and said seller offers include single-item offers and multi-item offers.

24. The method of claim 23, wherein said buyer bids and said seller offers include program bids and day-part bids.

25. The method of claim 23, wherein said multi-item buyer bids include at least one of a package bid and a subset bid.

26. The method of claim 21, wherein said audience items include tradeable items and non-tradeable items.

27. The method of claim 21, wherein said audience items include insured and uninsured items.

28. The method of claim 21, wherein said buyer bids include adjacency bids for adjacency audience items positioned in time early in a program, further comprising the steps of transmitting an adjacency bid including an adjacency premium from a remote buyer terminal to said computer.

29. The method of claim 2, wherein said audience items include preemptable items and non-preemptable audience items.

30. The method of claim 29, wherein said audience items include tradeable and non-tradeable items.

31. The method of claim 22, further including the steps of processing at least two of the following types of audience items: insured preemptable non-tradeable items; insured non-preemptable non-tradeable items; insured non-preemptable tradeable; uninsured preemptable non-tradeable items; uninsured non-preemptable non-tradeable items; uninsured non-preemptable tradeable.

32. The method of claim 21, wherein said audience items include an audience item having a specific time length, further including the step of partitioning said specific time length audience item into multiple advertising spots.

33. The method of claim 32, wherein said multiple advertising spots include at least two advertising spots having different time lengths.

34. The method of claim 21, wherein said set of trades is a set of tentative trades, further including the steps of calculating gains from said set of tentative trades received during a first pair of bidding rounds, calculating gains from a set of second trades received

during a second pair of bidding rounds and selecting one of said set of tentative trades and said set of second trades having a largest gains from trade.

35. The method of claim 21, wherein said buyer bids include a bid excluding a program, further including the step of receiving and processing said buyer bid excluding said program.

36. The method of claim 21, further including the step of performing a feasibility assessment of the buyer bids based on the seller offers.

37. The method of claim 21, further including the steps of determining whether a set of tentative trades exist after receiving both seller offers and buyer bids and closing the auction if no set of tentative trades exist after receiving both seller offers and buyer bids.

38. The method of claim 21, further including the steps of receiving and processing seller offer prices and buyer bid prices during a first set of bidding rounds, and receiving and processing modified seller offer prices and modified buyer bid prices during a second set of bidding rounds including accepting and processing modified seller offer prices during said second set of bidding rounds which are less than said seller offer prices during said first set of bidding rounds, rejecting modified seller offer prices during said second set of bidding rounds which are greater than said seller offer prices during said first set of bidding rounds, accepting and processing modified buyer bid prices during said second set bidding rounds which are greater than said buyer bid prices during said first set of bidding rounds and rejecting modified buyer bid prices during said second set of bidding rounds which are less than said buyer bid prices during said first set of bidding rounds.

39. The method of claim 21, wherein said set of trades identified by said trading means is a tentative set of trades, further including the steps of accepting two modifications to offer prices and bid prices associated with said set of tentative trades.

40. A method of allocating audience items among prospective buyers and sellers based on buyer bids from the buyers and seller offers from the sellers, comprising the steps of:

receiving, in a central computer, seller offers to sell audience items;

processing the seller offers in said central processor;

transmitting processed seller offers to the buyers;

receiving, in said central computer, buyer bids from the buyers after processing the seller offers; and

processing said seller offers and said buyer bids and identifying a set of trades in audience items between buyers and sellers which optimize gains obtained by buyers and sellers from the set of trades in audience items based on the bids and the offers received by the central computer.

41. The method of claim 40, further including the steps of:

calculating a price for each audience item in the set of trades;

identifying rejected buyer bids and rejected seller offers;

means in said central computer for notifying buyers and sellers of accepted buyer bids and seller offers forming the set of trades, said rejected buyer bids and said rejected seller offers.

42. A computer readable storage medium encoded with executable instructions for operating an automated exchange including a smart electronic double auction for allocating audience items among prospective buyers and sellers, comprising:

a set of instructions for processing data including buyer bids and the seller offers;

a set of instructions for identifying a set of trades in audience items between buyers and sellers which optimize gains obtained by buyers and sellers from the set of trades in audience items based on the bids and offers received by said trading means; and

a set of instructions for calculating a price for each audience item in the set of trades.

FIG. 1

Cable Network Television Viewers				
	Total Viewers (Viewer Age)			
Cable Network Programs	12 - 17	18 - 49	50 - 65	Total
The Tom Green Show (MTV)	12,000	12,000	0	24,000
College Basketball (ESPN)	3,000	6,000	6,000	15,000
Rivera Live (CNBC)	6,000	4,000	4,000	14,000

FIG. 2

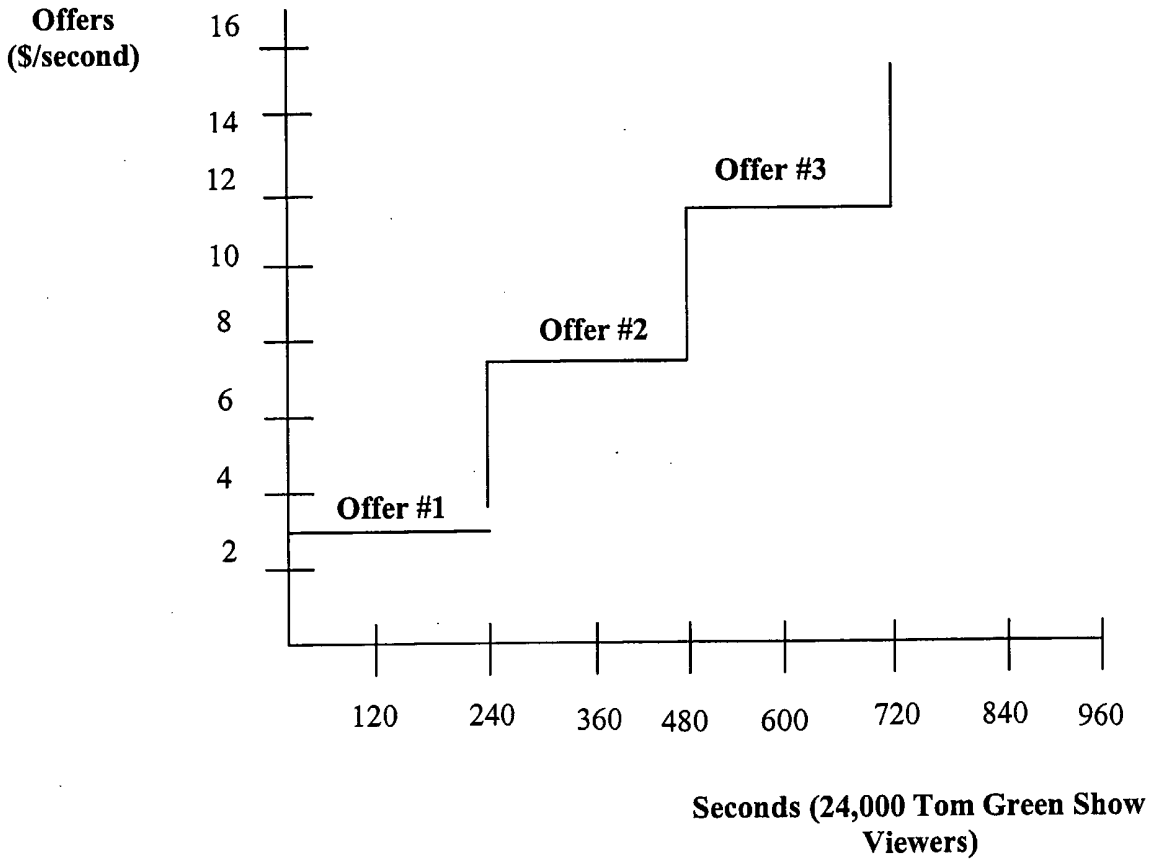

Offers ($/second)
16
14
12
10
8
6
4
2
Offer #1
Offer #2
Offer #3
120
240
360
480
600
720
840
960
Seconds (24,000 Tom Green Show Viewers)

FIG. 3

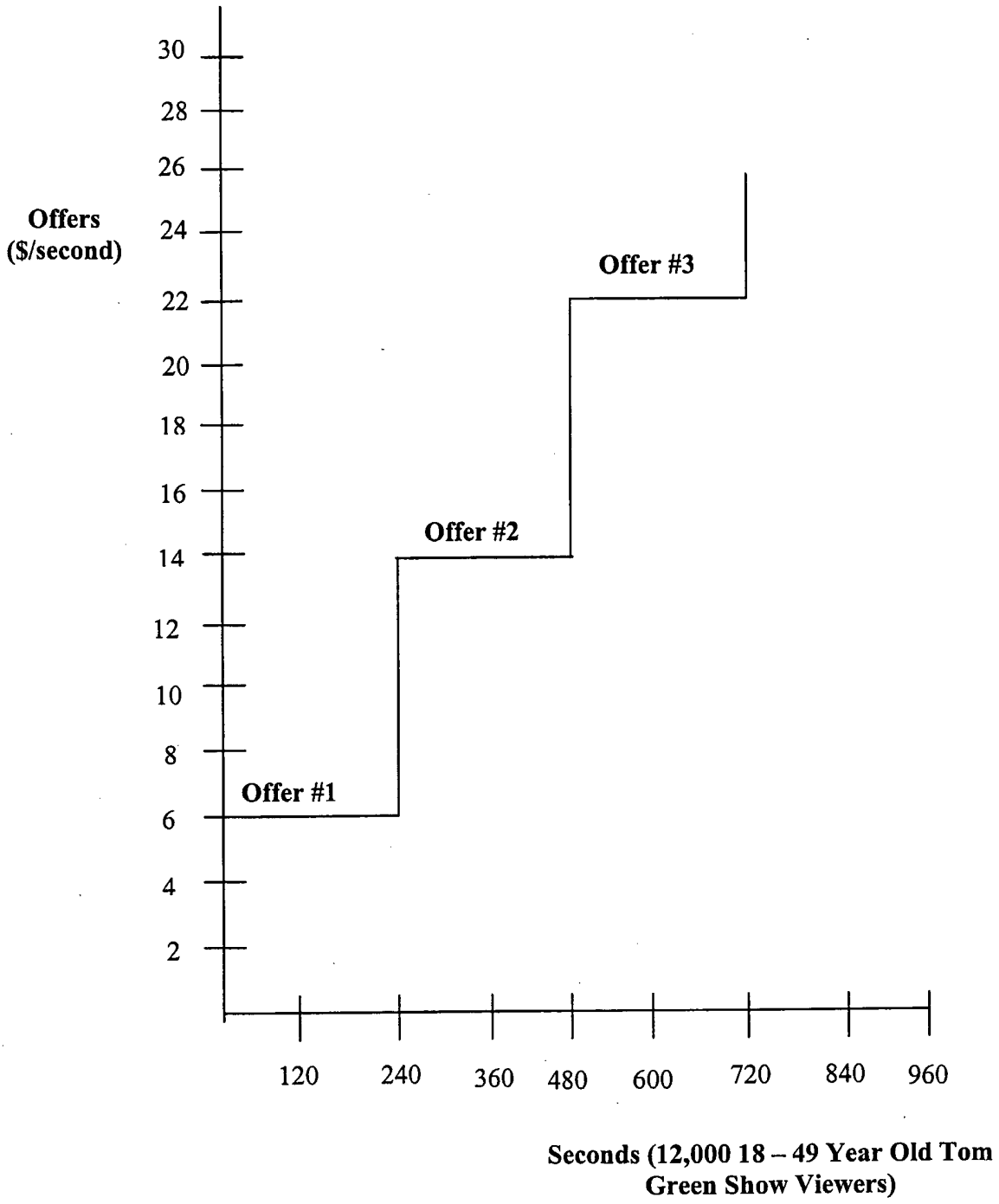

30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
Offers ($/second)
Offer #3
Offer #2
Offer #1
120
240
360
480
600
720
840
960
Seconds (12,000 18 – 49 Year Old Tom Green Show Viewers)

FIG. 4

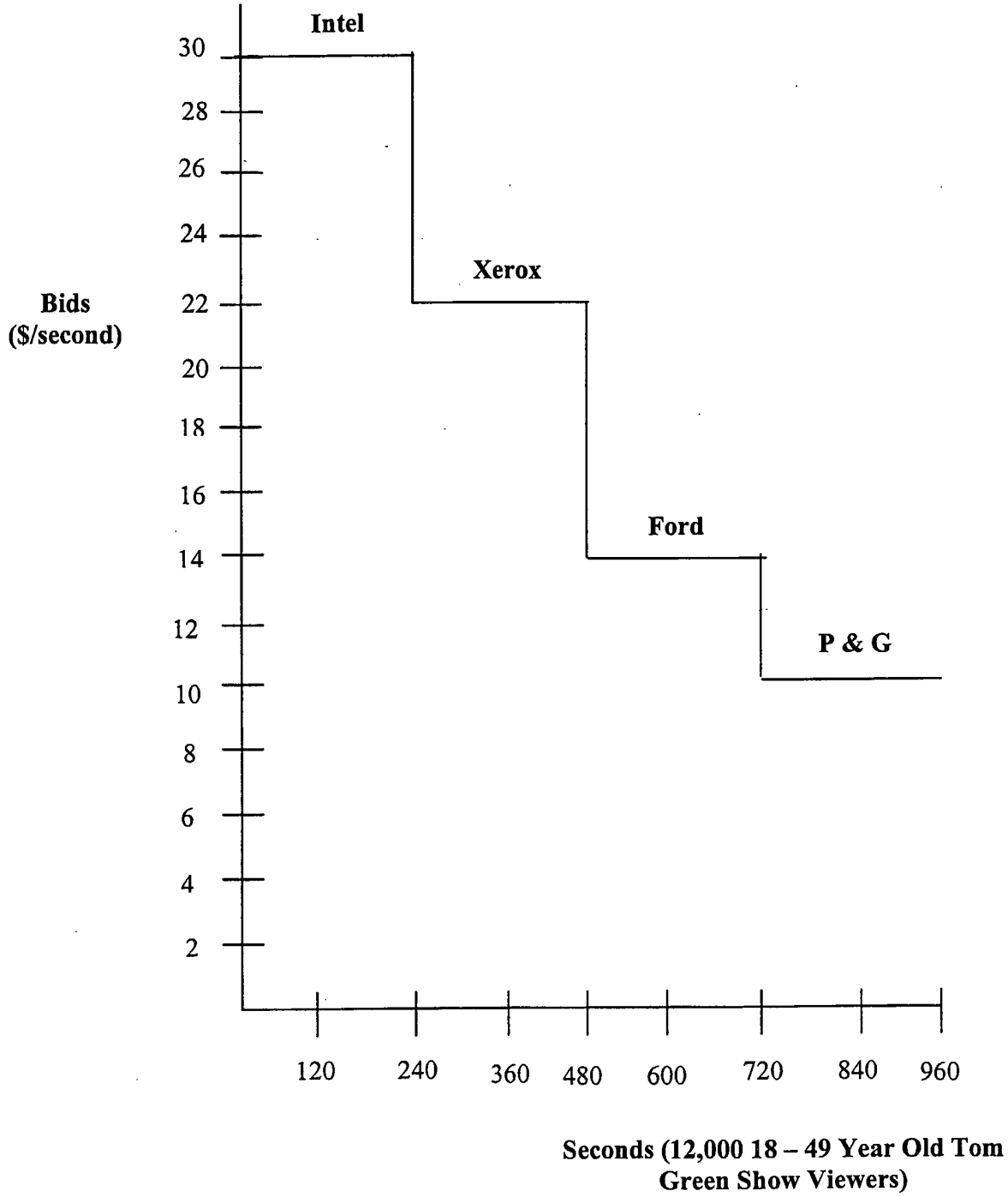

Intel
Xerox
Ford
P & G
Bids ($/second)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
120
240
360
480
600
720
840
960
Seconds (12,000 18 – 49 Year Old Tom Green Show Viewers)

FIG. 5a

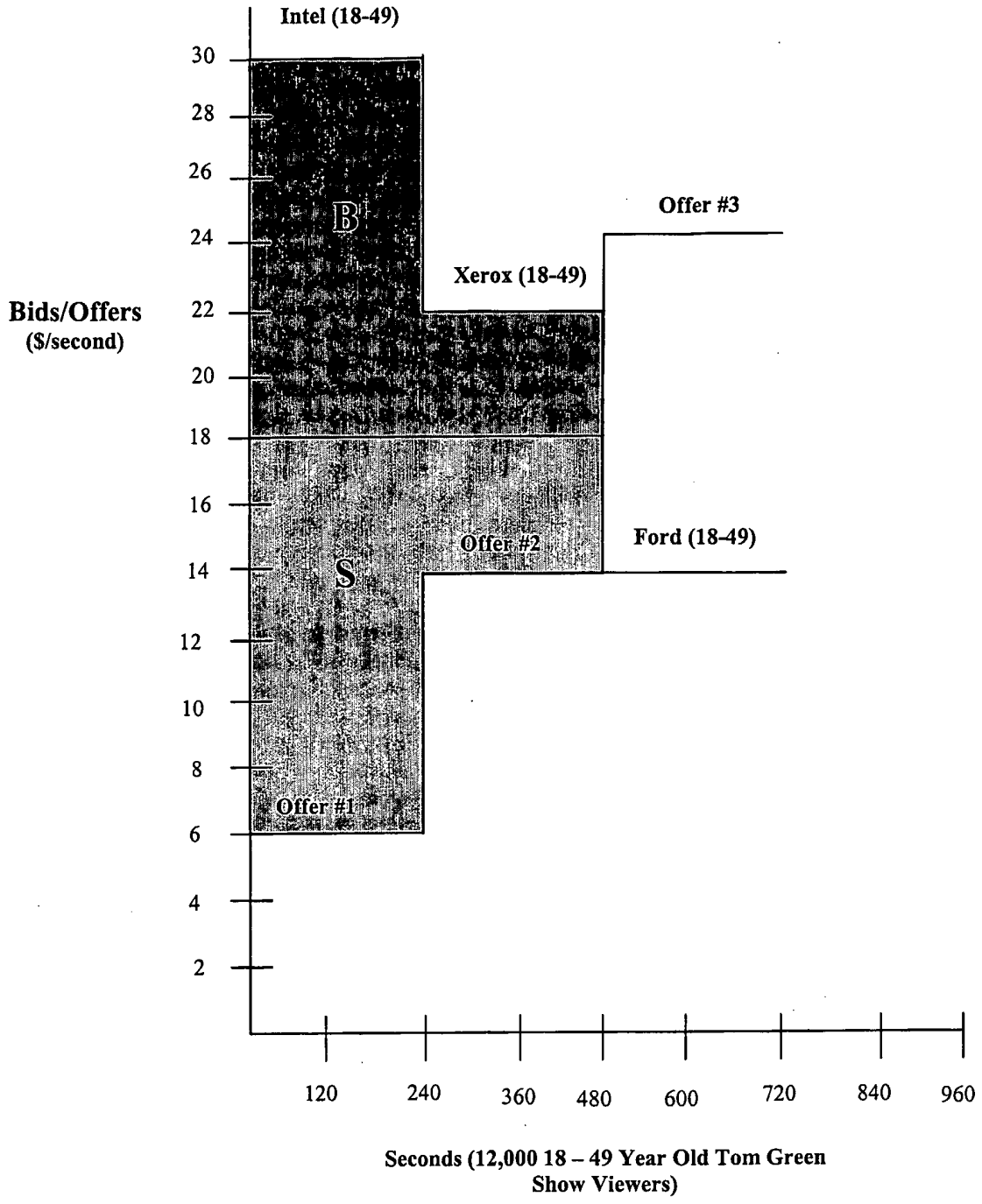

Intel (18-49)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
B
Offer #3
Xerox (18-49)
Bids/Offers
($/second)
Offer #2
Ford (18-49)
S
Offer #1
120
240
360
480
600
720
840
960
Seconds (12,000 18 – 49 Year Old Tom Green Show Viewers)

FIG. 5b

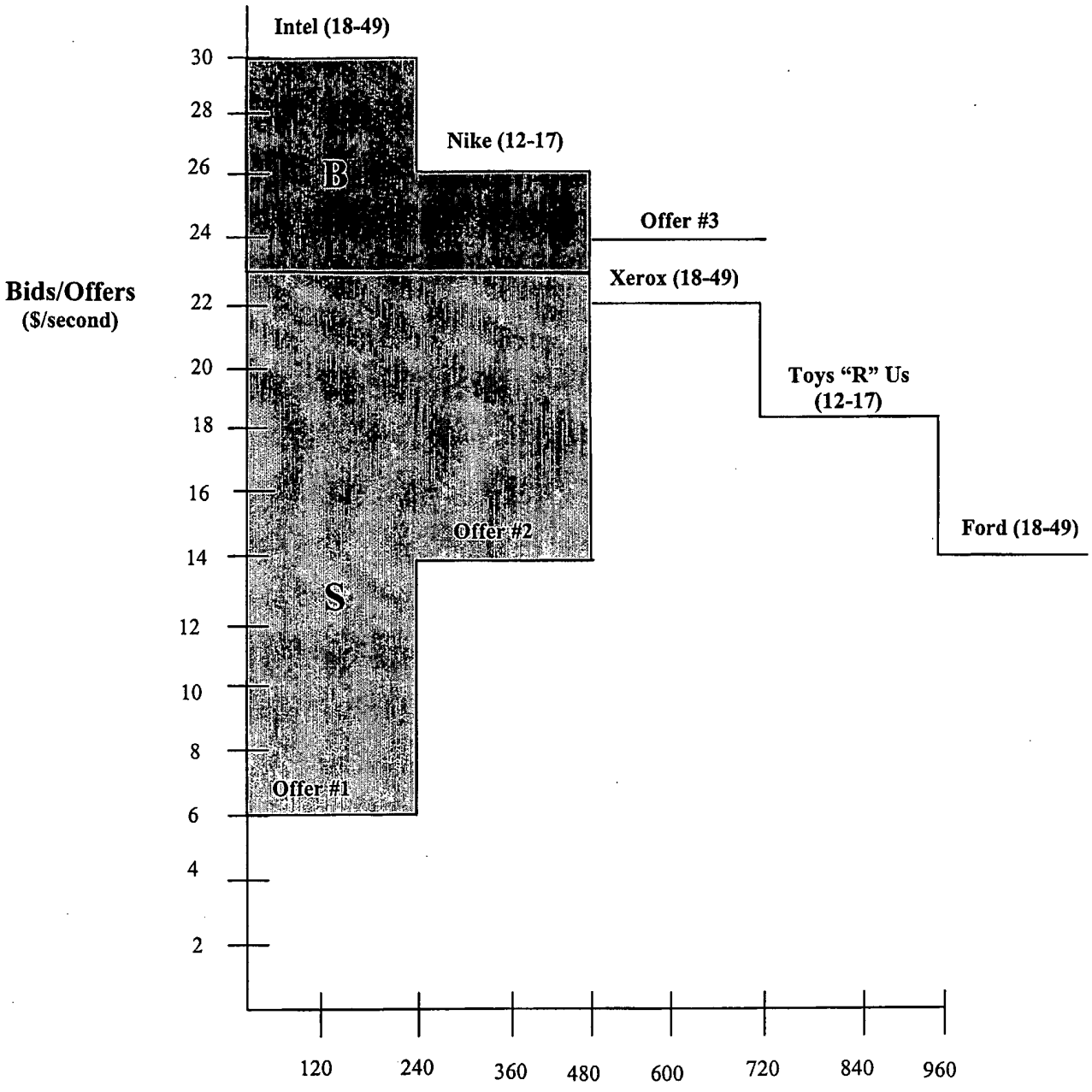

Intel (18-49)
Nike (12-17)
Offer #3
Xerox (18-49)
Toys "R" Us (12-17)
Ford (18-49)
Offer #2
Offer #1
B
S
Bids/Offers ($/second)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
120
240
360
480
600
720
840
960
Seconds (12,000 12 – 17 Year Old, and 12,000 18-49 Year Old Tom Green Show Viewers)

FIG. 5c

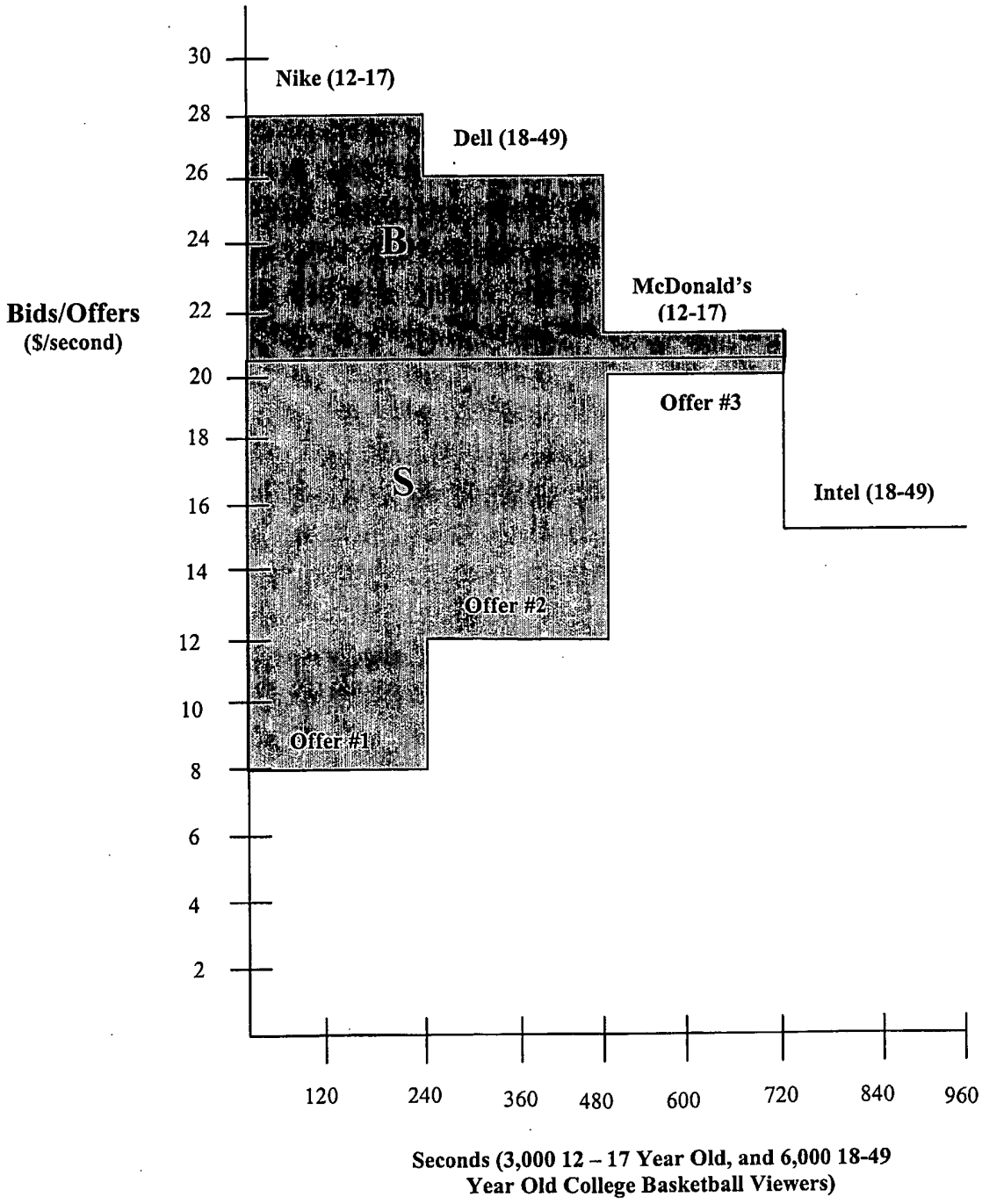

Bids/Offers
($/second)
30
28
26
24
22
20
18
16
14
12
10
8
6
4
2
Nike (12-17)
Dell (18-49)
B
McDonald's
(12-17)
Offer #3
S
Intel (18-49)
Offer #2
Offer #1
120
240
360
480
600
720
840
960
Seconds (3,000 12 – 17 Year Old, and 6,000 18-49
Year Old College Basketball Viewers)

FIG. 6

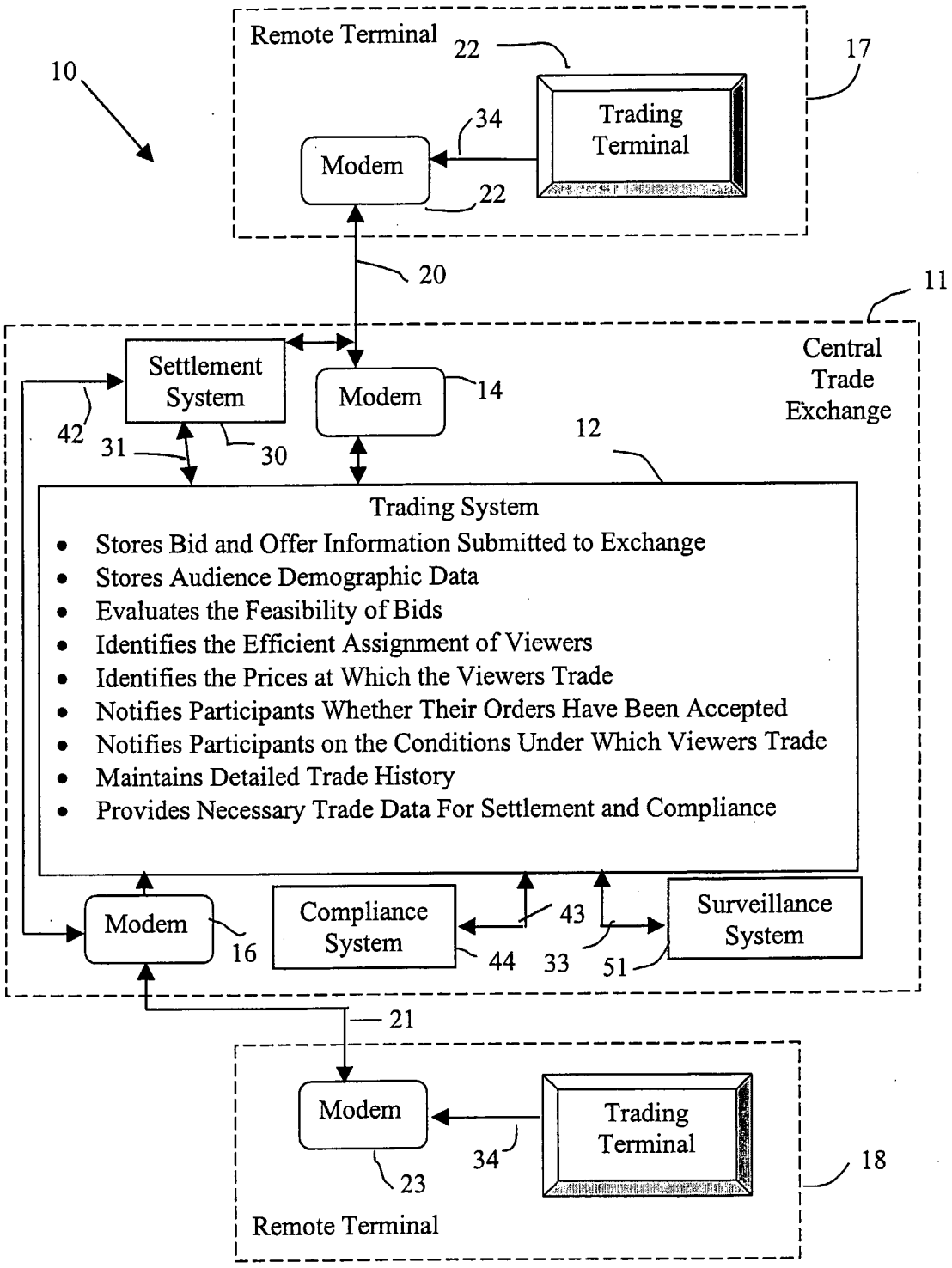

Remote Terminal
22
17
10
34
Trading Terminal
Modem
22
20
11
Central Trade Exchange
Settlement System
Modem
14
42
31
30
12
Trading System
• Stores Bid and Offer Information Submitted to Exchange
• Stores Audience Demographic Data
• Evaluates the Feasibility of Bids
• Identifies the Efficient Assignment of Viewers
• Identifies the Prices at Which the Viewers Trade
• Notifies Participants Whether Their Orders Have Been Accepted
• Notifies Participants on the Conditions Under Which Viewers Trade
• Maintains Detailed Trade History
• Provides Necessary Trade Data For Settlement and Compliance
Modem
16
Compliance System
43
44
33
Surveillance System
51
21
Modem
34
Trading Terminal
23
18
Remote Terminal

FIG. 7

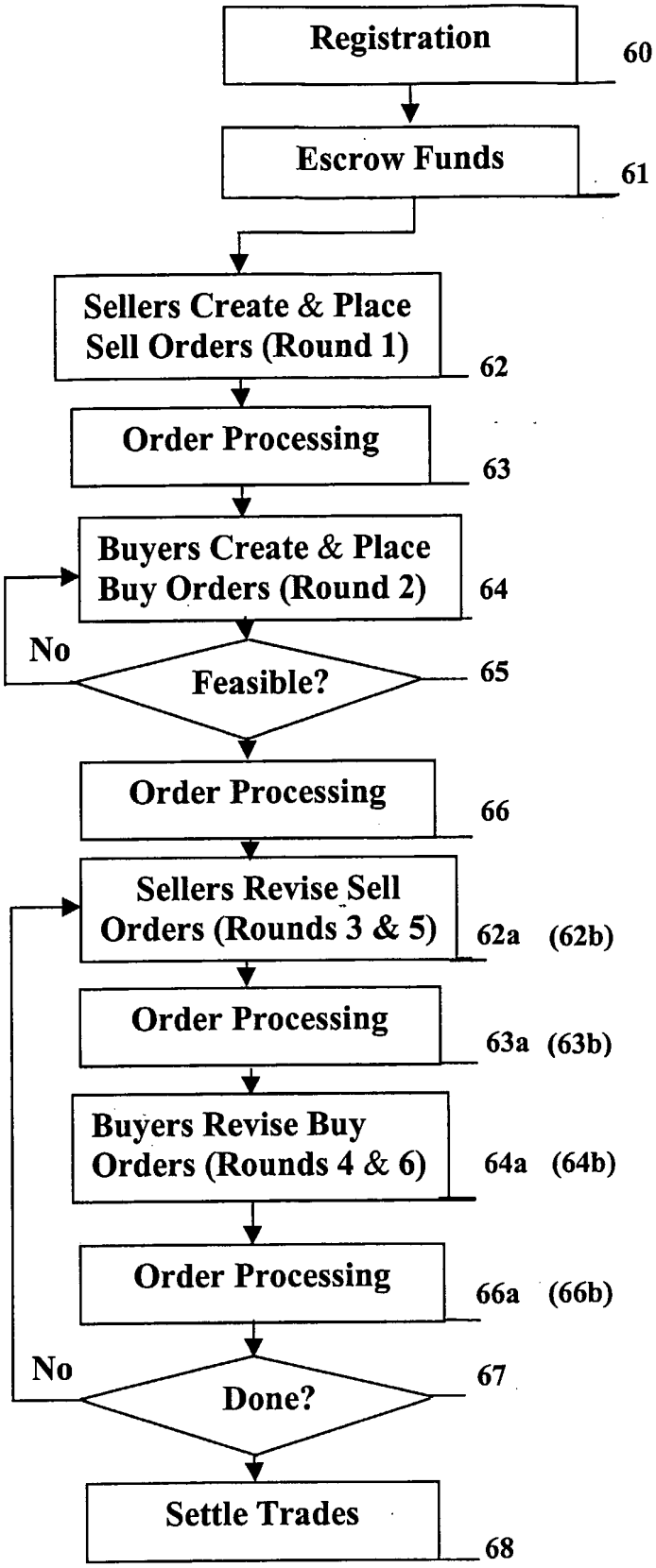
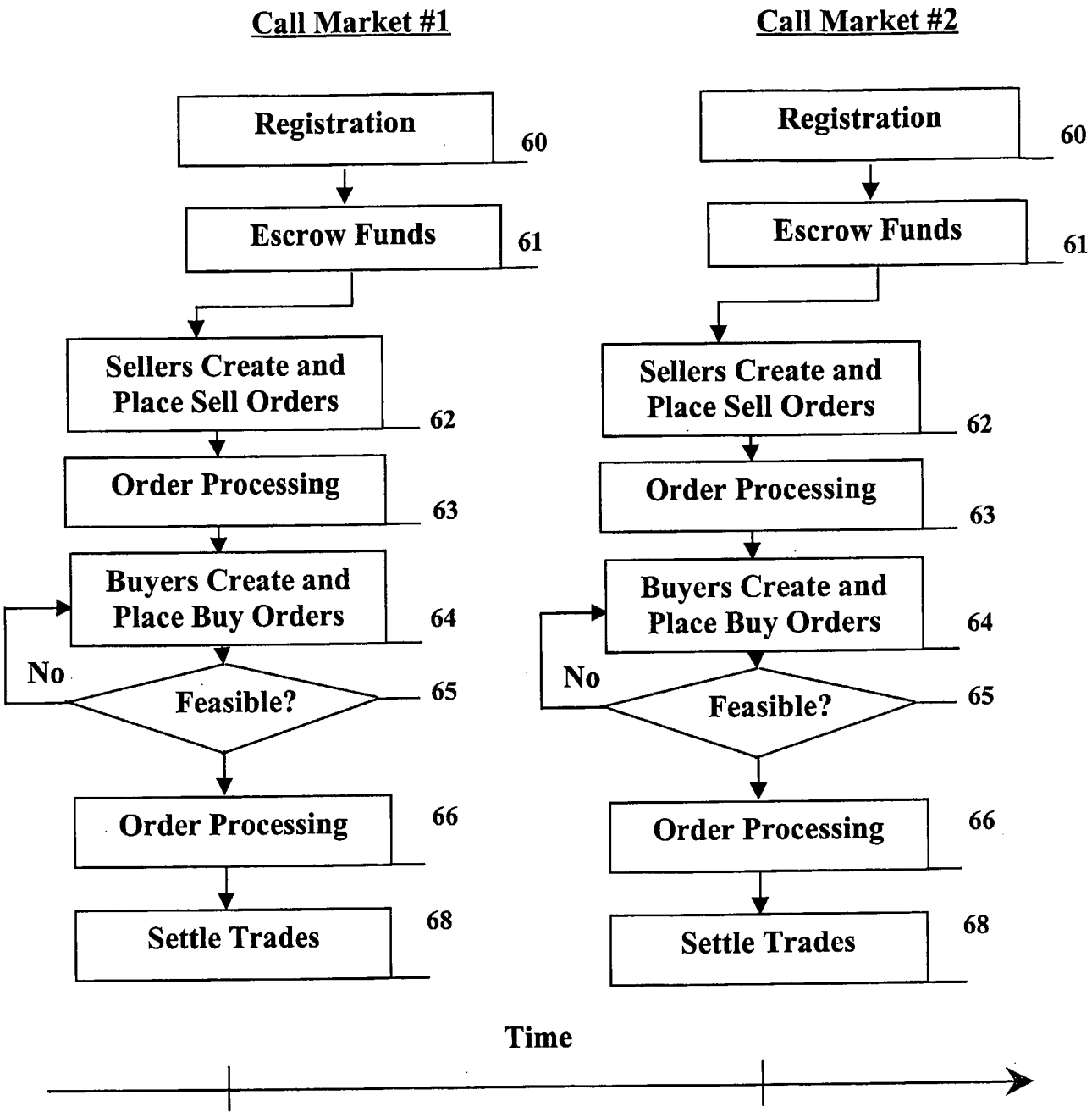

Registration
60
Escrow Funds
61
Sellers Create & Place Sell Orders (Round 1)
62
Order Processing
63
Buyers Create & Place Buy Orders (Round 2)
64
No
Feasible?
65
Order Processing
66
Sellers Revise Sell Orders (Rounds 3 & 5)
62a (62b)
Order Processing
63a (63b)
Buyers Revise Buy Orders (Rounds 4 & 6)
64a (64b)
Order Processing
66a (66b)
No
Done?
67
Settle Trades
68

FIG. 8


Call Market #1
Registration
60
Escrow Funds
61
Sellers Create and Place Sell Orders
62
Order Processing
63
Buyers Create and Place Buy Orders
64
No
Feasible?
65
Order Processing
66
Settle Trades
68
Call Market #2
Registration
60
Escrow Funds
61
Sellers Create and Place Sell Orders
62
Order Processing
63
Buyers Create and Place Buy Orders
64
No
Feasible?
65
Order Processing
66
Settle Trades
68
Time

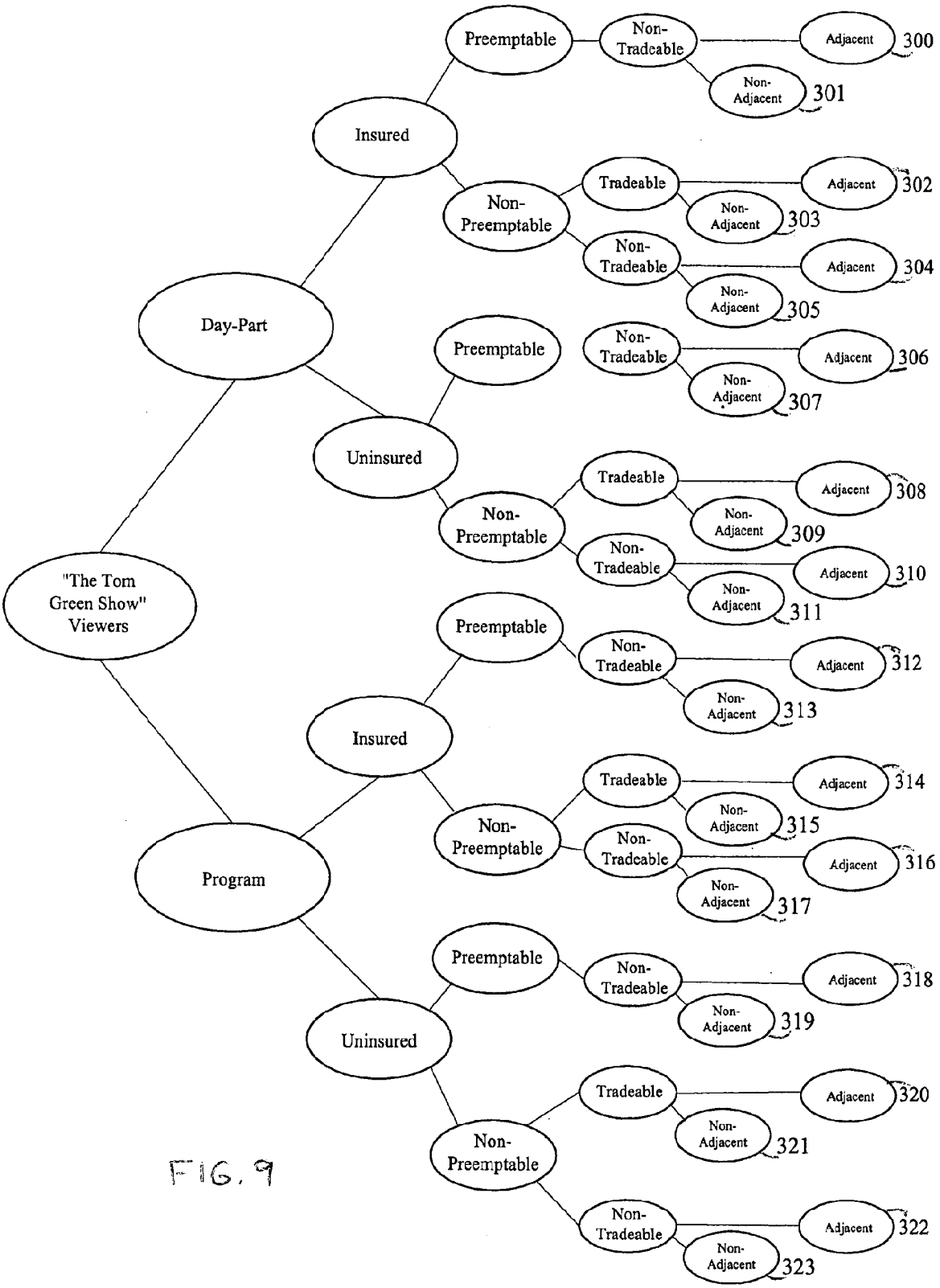

"The Tom Green Show" Viewers
Day-Part
Program
Insured
Uninsured
Insured
Uninsured
Preemptable
Non-Preemptable
Preemptable
Non-Preemptable
Preemptable
Non-Preemptable
Preemptable
Non-Preemptable
Non-Tradeable
Tradeable
Adjacent
Non-Adjacent
300
301
302
303
304
305
306
307
308
309
310
311
312
313
314
315
316
317
318
319
320
321
322
323

FIG. 9

FIG. 10

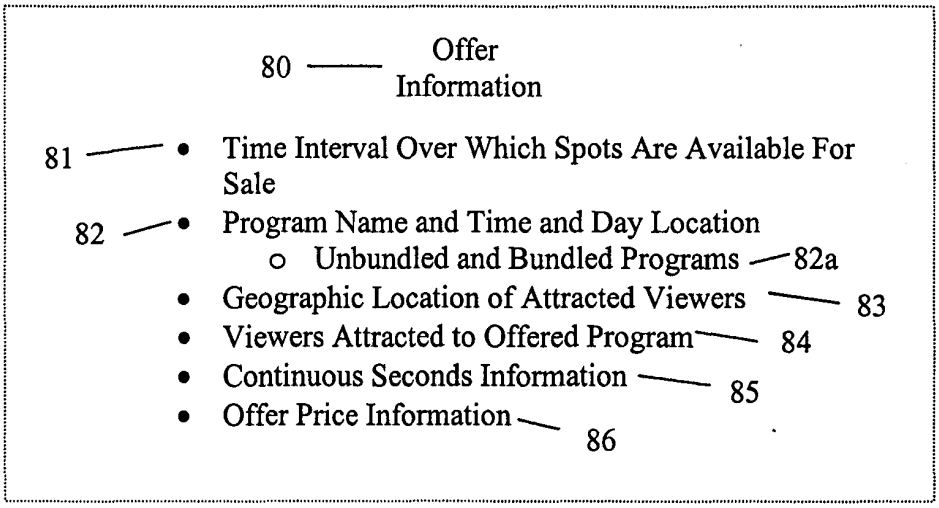

80
Offer Information
81
Time Interval Over Which Spots Are Available For Sale
82
Program Name and Time and Day Location
Unbundled and Bundled Programs
82a
Geographic Location of Attracted Viewers
83
Viewers Attracted to Offered Program
84
Continuous Seconds Information
85
Offer Price Information
86

FIG. 11

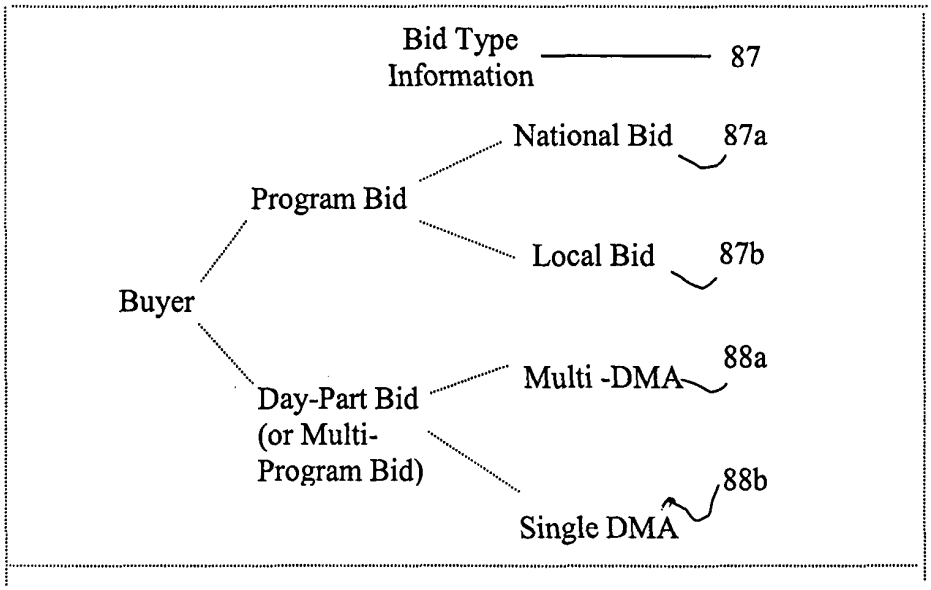

Bid Type Information
87
National Bid
87a
Program Bid
Local Bid
87b
Buyer
Multi -DMA
88a
Day-Part Bid (or Multi-Program Bid)
Single DMA
88b

FIG. 12

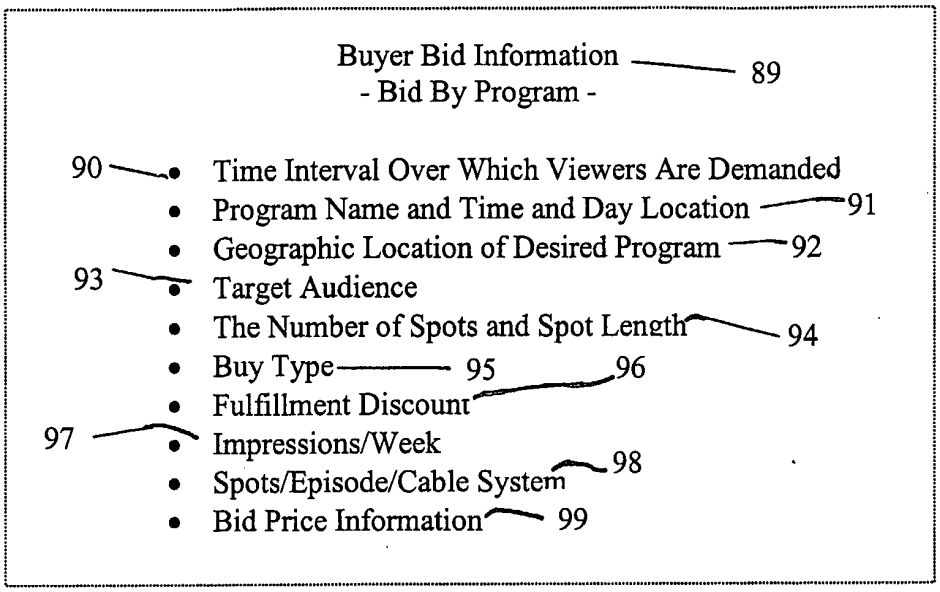

Buyer Bid Information
- Bid By Program -
89
90
Time Interval Over Which Viewers Are Demanded
Program Name and Time and Day Location
91
Geographic Location of Desired Program
92
93
Target Audience
The Number of Spots and Spot Length
94
Buy Type
95
96
Fulfillment Discount
97
Impressions/Week
98
Spots/Episode/Cable System
Bid Price Information
99

FIG. 13

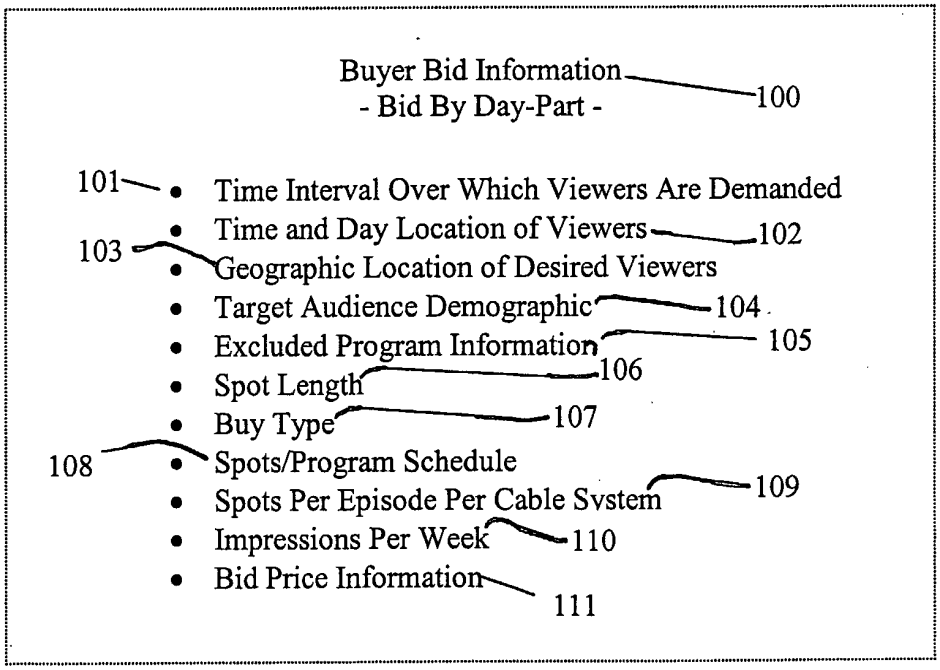

Buyer Bid Information
- Bid By Day-Part -
100
101
Time Interval Over Which Viewers Are Demanded
Time and Day Location of Viewers
102
103
Geographic Location of Desired Viewers
Target Audience Demographic
104
Excluded Program Information
105
Spot Length
106
Buy Type
107
108
Spots/Program Schedule
Spots Per Episode Per Cable System
109
Impressions Per Week
110
Bid Price Information
111

FIG. 14

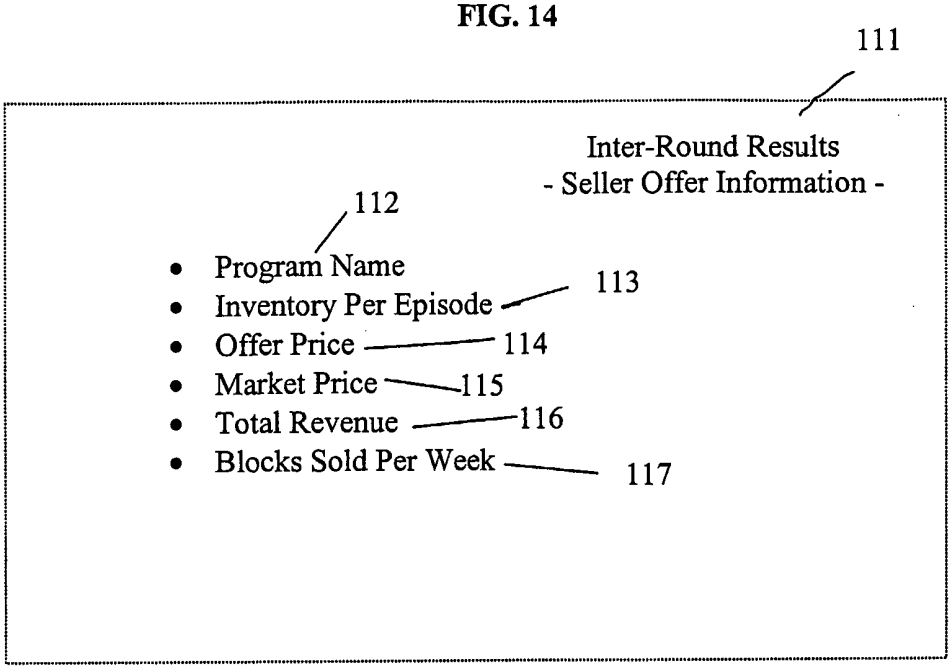

111
Inter-Round Results
- Seller Offer Information -
112
Program Name
Inventory Per Episode
113
Offer Price
114
Market Price
115
Total Revenue
116
Blocks Sold Per Week
117

FIG. 15

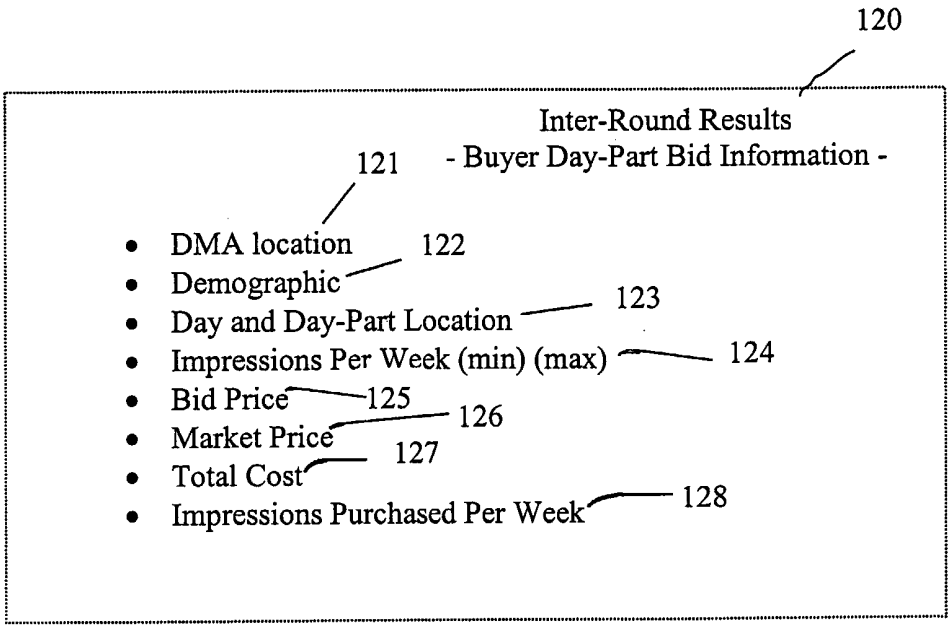

120
Inter-Round Results
- Buyer Day-Part Bid Information -
121
DMA location
122
Demographic
123
Day and Day-Part Location
124
Impressions Per Week (min) (max)
125
Bid Price
126
Market Price
127
Total Cost
128
Impressions Purchased Per Week

FIG. 16

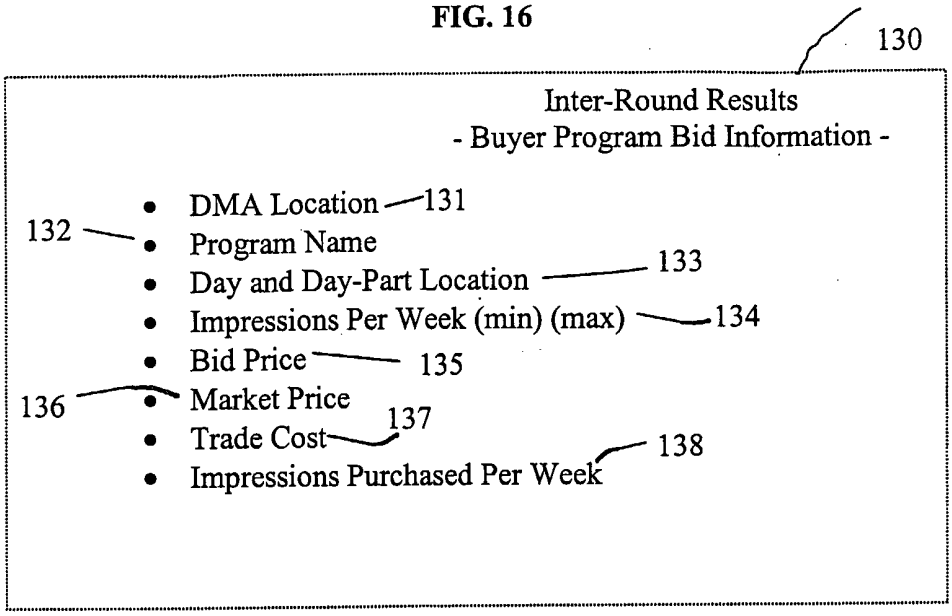

130
Inter-Round Results
- Buyer Program Bid Information -
DMA Location
131
132
Program Name
Day and Day-Part Location
133
Impressions Per Week (min) (max)
134
Bid Price
135
136
Market Price
137
Trade Cost
138
Impressions Purchased Per Week

FIG. 17

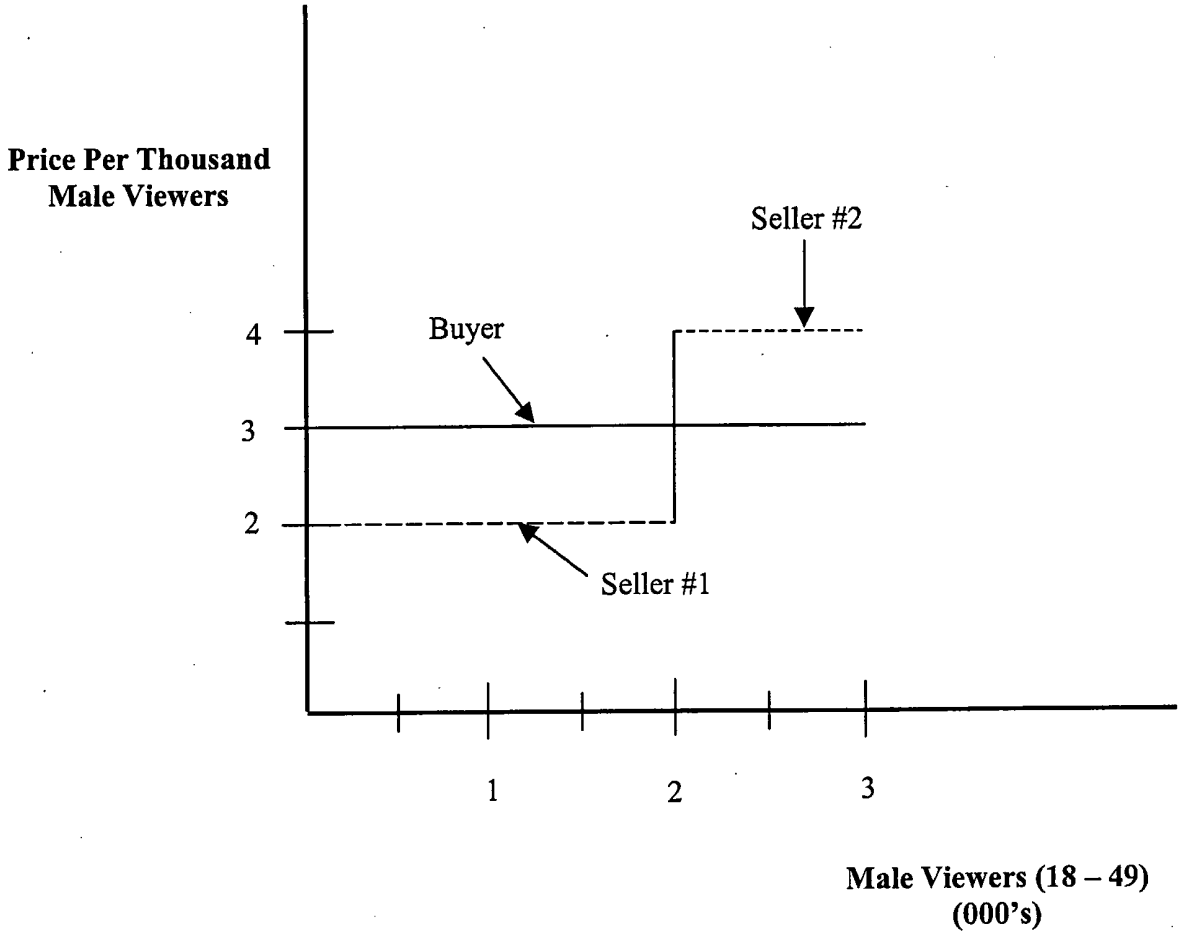
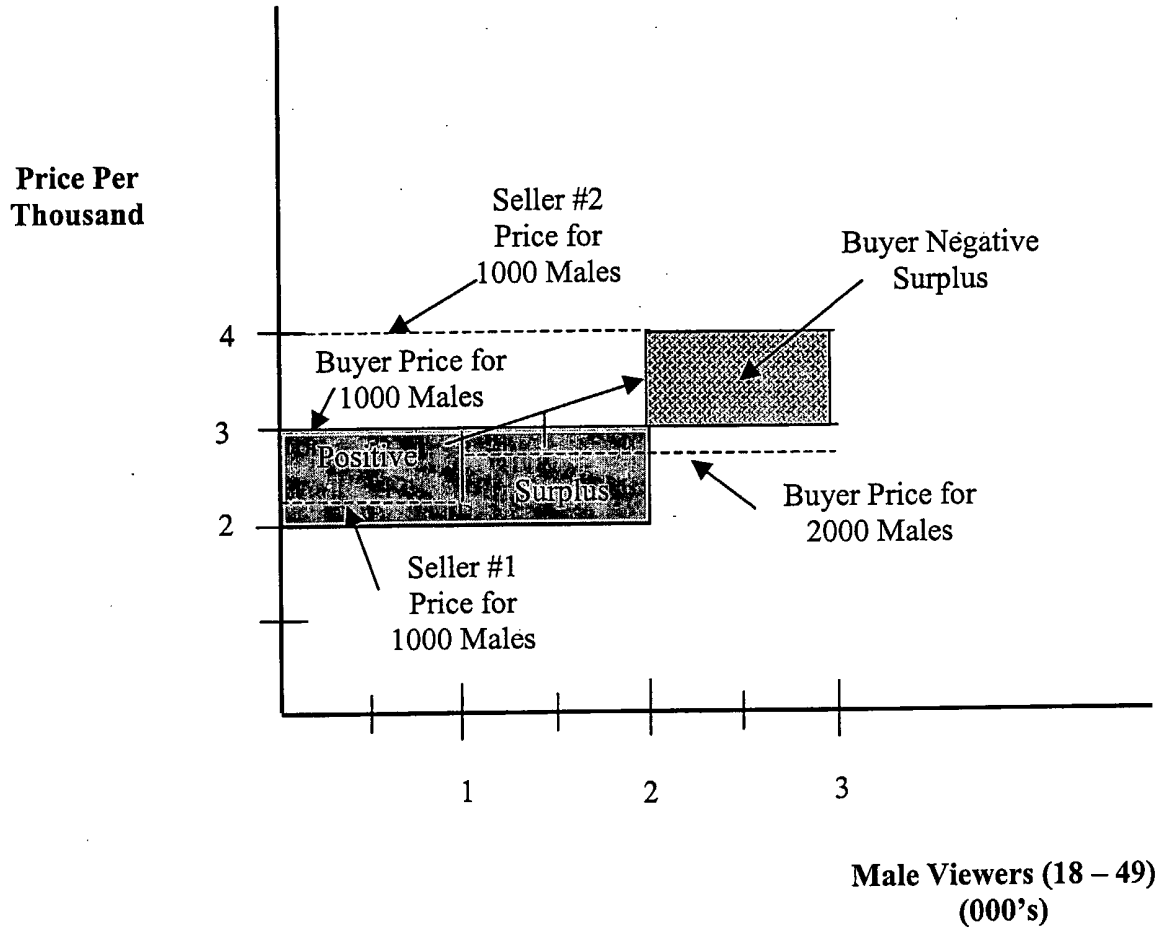

Price Per Thousand
Male Viewers
Seller #2
Buyer
4
3
2
Seller #1
1
2
3
Male Viewers (18 – 49)
(000's)

FIG. 18


Price Per Thousand
Seller #2 Price for 1000 Males
Buyer Negative Surplus
4
Buyer Price for 1000 Males
3
Positive
Surplus
Buyer Price for 2000 Males
2
Seller #1 Price for 1000 Males
1
2
3
Male Viewers (18 – 49) (000's)

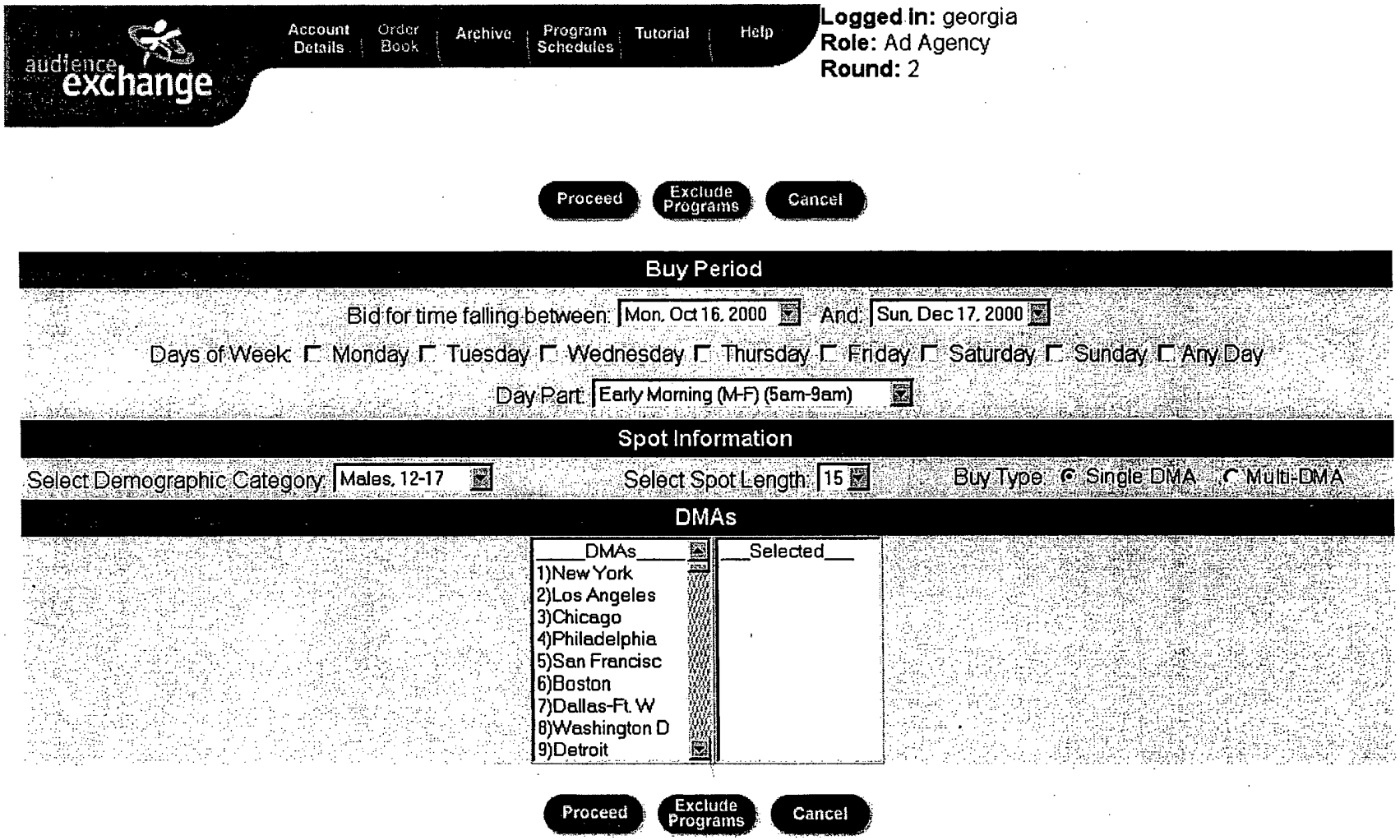
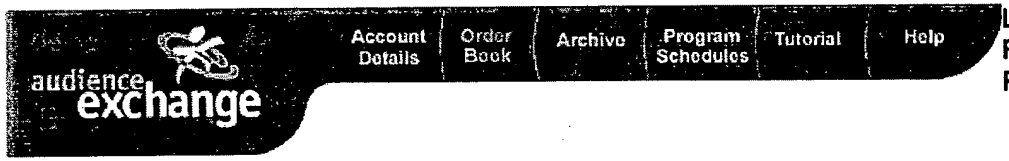

audience exchange
Account Details
Order Book
Archive
Program Schedules
Tutorial
Help
Logged In: georgia
Role: Ad Agency
Round: 2
Proceed
Exclude Programs
Cancel
Buy Period
Bid for time falling between: Mon, Oct 16, 2000 And: Sun, Dec 17, 2000
Days of Week: Monday Tuesday Wednesday Thursday Friday Saturday Sunday Any Day
Day Part: Early Morning (M-F) (5am-9am)
Spot Information
Select Demographic Category: Males, 12-17
Select Spot Length: 15
Buy Type: Single DMA Multi-DMA
DMAs
DMAs
Selected
1)New York
2)Los Angeles
3)Chicago
4)Philadelphia
5)San Francisc
6)Boston
7)Dallas-Ft. W
8)Washington D
9)Detroit
Proceed
Exclude Programs
Cancel

FIG. 19



Logged in: georgia
Role: Ad Agency
Round: 2

Day Part Bid Information

Duration	Day(s) of Week	Day Part	DMAs	Demographic	Spot Length
9 Weeks Starting 10-16 Ending 12-17	Thu	Prime Time (M-Sa)	New York Los Angeles Chicago	Males, 12-17	15 secs

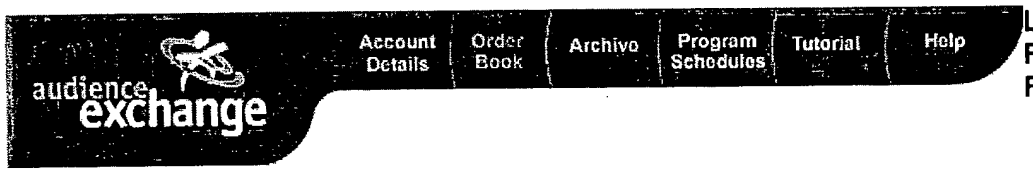
Program Exclusion

Cable Network:
MTV ☐ Exclude entire network

Programs:	Excluded:
Celebrity Deathmatch Say What? Karaoke TRL TRL Wannabes	

Proceed Cancel

FIG. 20



Logged in: georgia
Role: Ad Agency
Round: 2

Day Part Bid Information

Duration	Day(s) of Week	Day Part	DMAs	Demographic	Spot Length
9 Weeks Starting 10-16 Ending 12-17	Thu	Prime Time (M-Sa)	New York Los Angeles Chicago	Males, 12-17	15 secs

Save To Order Book | Cancel

Bids Per DMA

Fillment Discount: $0

DMA	Spots/Program Schedule		Spots/Episode/ Cable System	Impressions/Week		Price Per Thousand			
	Min	Max	Max	Min (000s)	Max (000s)	Non-Guaranteed Preemptable	Non-Guaranteed Non-Preemptable	Guaranteed Preemptable	Guaranteed Non-Preemptable
New York	No offers available in New York for the day(s) and day part you selected.								
Los Angeles	No offers available in Los Angeles for the day(s) and day part you selected.								
Chicago	0	0	0	0	0				

Save To Order Book | Cancel

FIG. 21

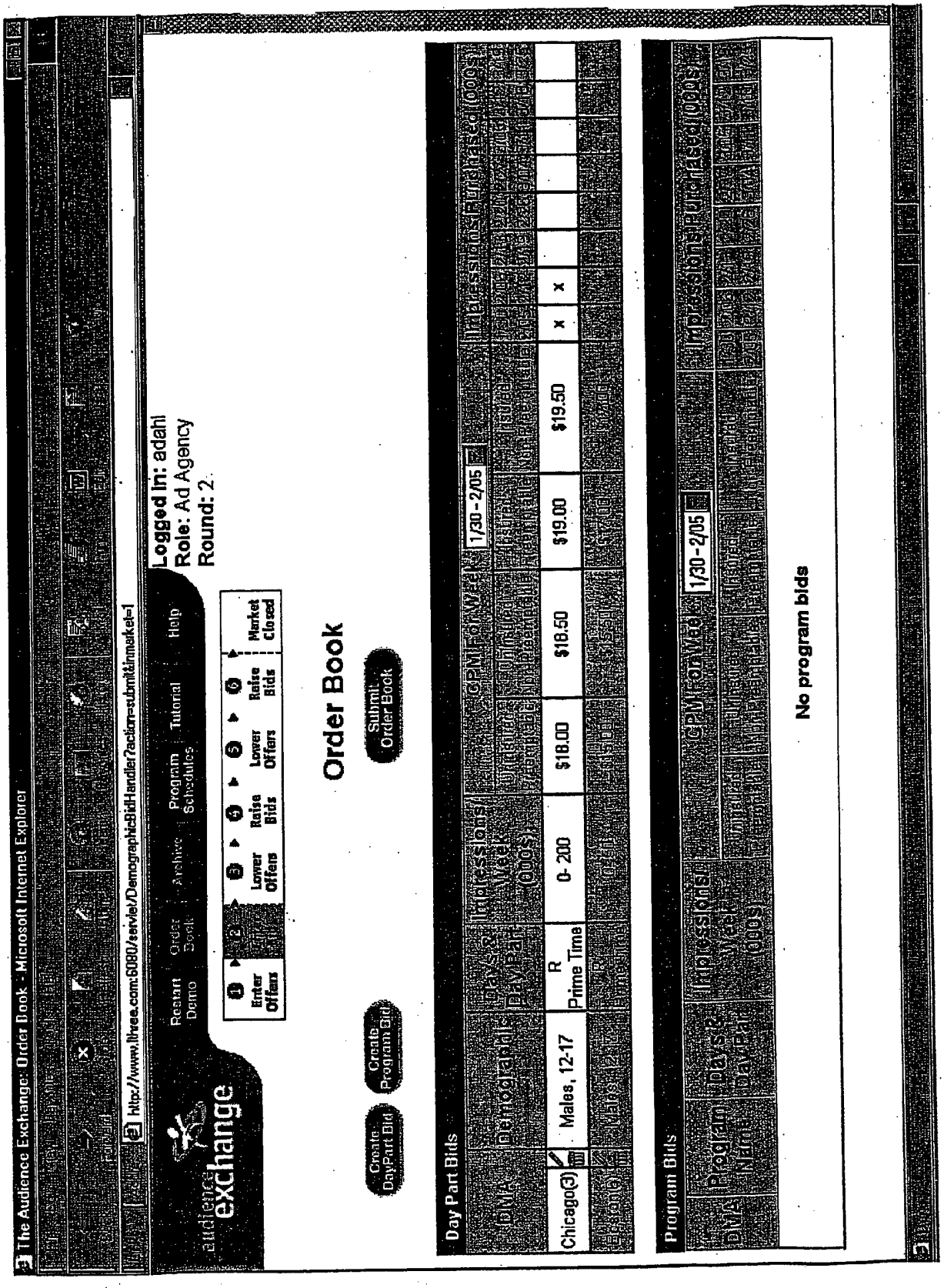

The Audience Exchange: Order Book - Microsoft Internet Explorer
http://www.ltlvee.com:8080/servlet/DemographicBidHandler?action=submitinmarket=1
audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Enter Offers
Lower Offers
Raise Bids
Lower Offers
Raise Bids
Market Closed
Logged In: adahl
Role: Ad Agency
Round: 2
Order Book
Create DayPart Bid
Create Program Bid
Submit Order Book
Day Part Bids
DMA
Demographic
Day/Part
Impressions (000s)
CPM For Week
1/30-2/05
Chicago(3)
Males, 12-17
R
Prime Time
0-200
$18.00
$18.50
$19.00
$19.50
Program Bids
DMA
Program Name
Days/Part
Impressions (000s)
CPM For Week
1/30-2/05
Impressions Purchased (000s)
No program bids

FIG. 22

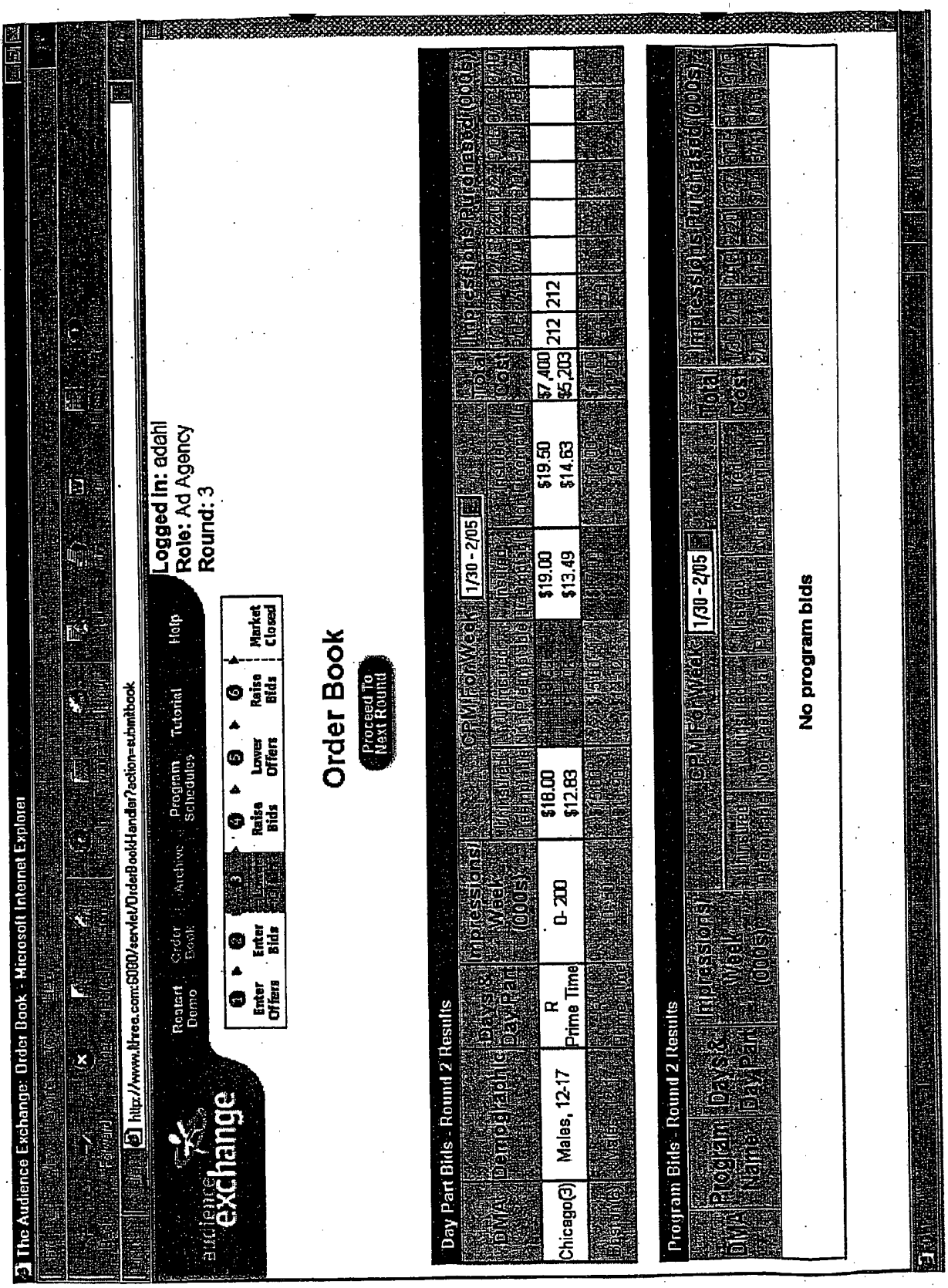

The Audience Exchange: Order Book - Microsoft Internet Explorer
http://www.three.com:8080/servlet/OrderBookHandler?action=submbook
audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
1 Enter Offers
2 Enter Bids
3
4 Raise Bids
5 Lower Offers
6 Raise Bids
Market Closed
Logged In: adahl
Role: Ad Agency
Round: 3
Order Book
Proceed To Next Round
Day Part Bids - Round 2 Results
DMA
Demographic
Days & Day Part
Impressions/ Week (000s)
CPM For Week
1/30 - 2/05
Total Cost
Impressions Purchased (000s)
Chicago(3)
Males, 12-17
R Prime Time
0- 200
$18.00
$12.83
$19.00
$13.49
$19.50
$14.63
$7,400
$5,203
212
212
Program Bids - Round 2 Results
DMA
Program Name
Days & Day Part
Impressions/ Week (000s)
CPM For Week
1/30 - 2/05
Total Cost
Impressions Purchased (000s)
No program bids

FIG. 23

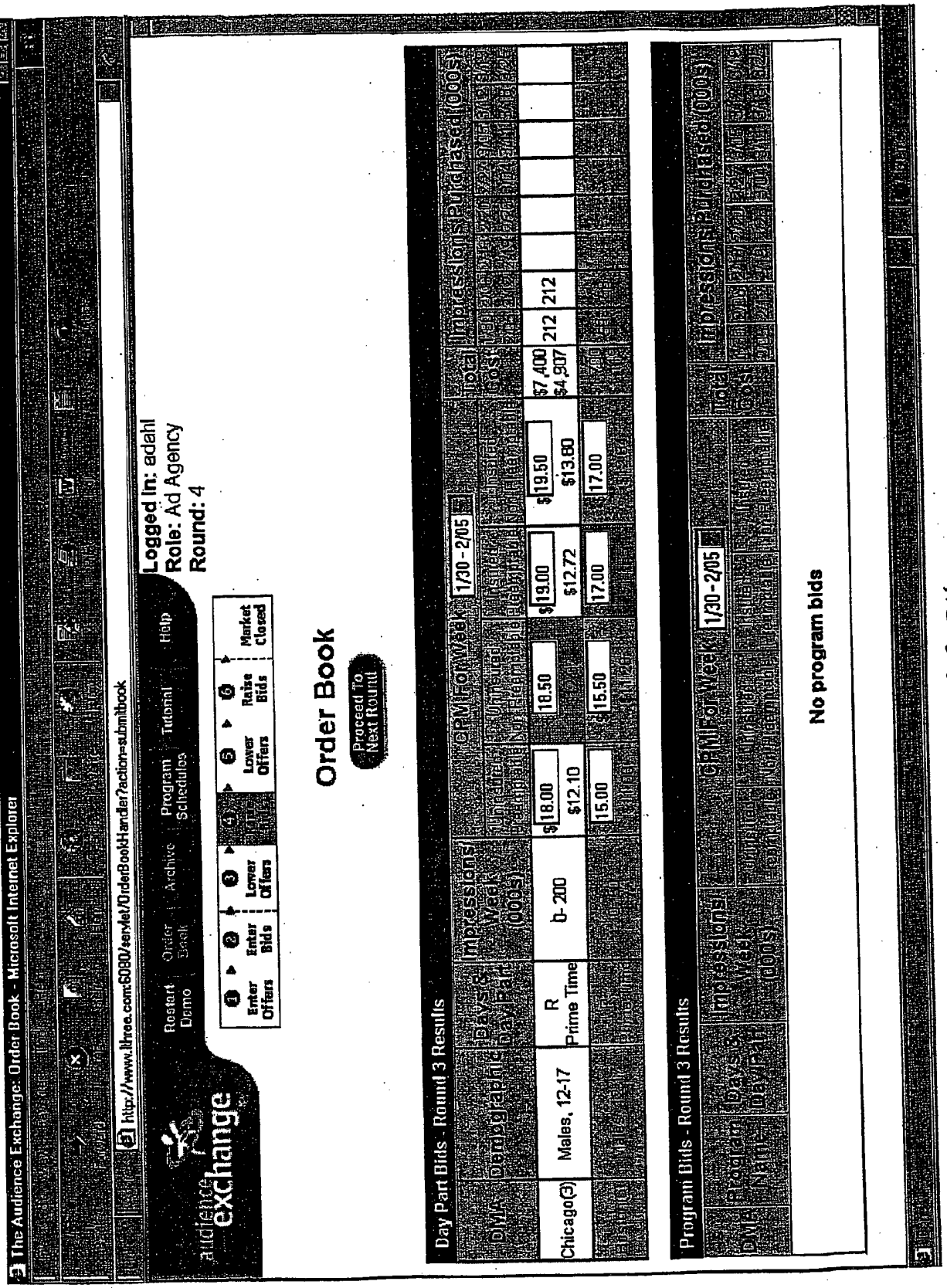

The Audience Exchange: Order Book - Microsoft Internet Explorer
http://www.ihree.com:6080/servlet/OrderBookHandler?action=submitbook
audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
1 Enter Offers
2 Enter Bids
3 Lower Offers
4
5 Lower Offers
6 Raise Bids
Market Closed
Logged In: adahl
Role: Ad Agency
Round: 4
Order Book
Proceed To Next Round
Day Part Bids - Round 3 Results
DMA
Demographic
Days & Day Part
Impressions/ Week (000s)
CPM For Week
1/30 - 2/05
Total Impressions Purchased (000s)
Chicago(3)
Males, 12-17
R
Prime Time
b-200
$18.00
$12.10
18.50
15.00
15.50
$19.00
$12.72
17.00
$19.50
$13.80
17.00
$7,400
$4,907
212
212
Program Bids - Round 3 Results
DMA
Program Name
Days & Day Part
Impressions/ Week (000s)
CPM For Week
1/30 - 2/05
Total Impressions Purchased (000s)
No program bids

FIG. 24

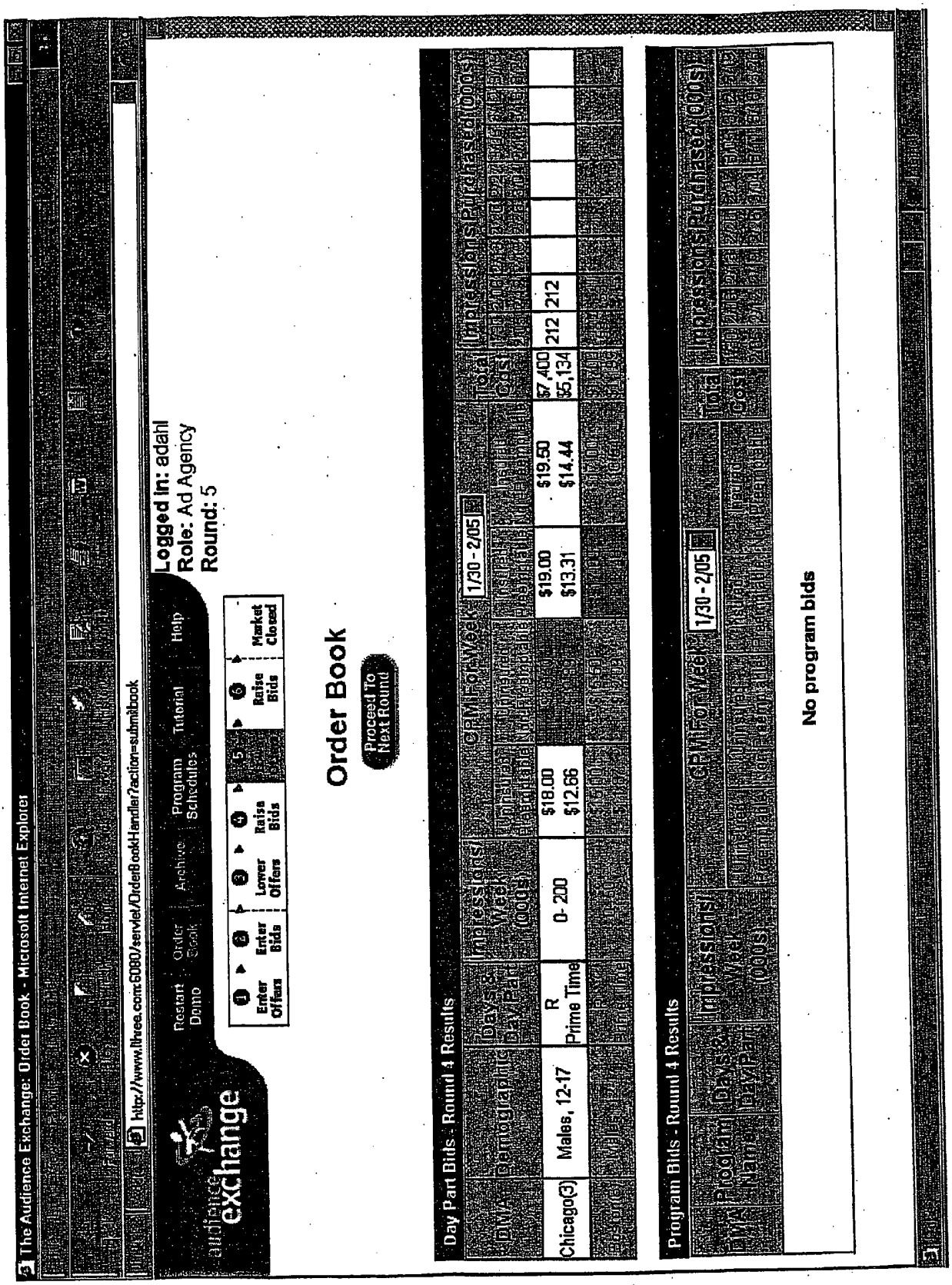

The Audience Exchange: Order Book - Microsoft Internet Explorer
http://www.ithree.com:6080/servlet/OrderBookHandler?action=submitbook
audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
1 Enter Offers
2 Enter Bids
3 Lower Offers
4 Raise Bids
5
6 Raise Bids
Market Closed
Logged In: adahl
Role: Ad Agency
Round: 5
Order Book
Proceed To Next Round
Day Part Bids - Round 4 Results
DMA
Demographic
Days & DayPart
Impressions Week (000s)
CPM For Week
1/30 - 2/05
Total Cost
Total Impressions Purchased (000s)
Chicago(3)
Males, 12-17
R
Prime Time
0- 200
$18.00
$12.66
$19.00
$13.31
$19.50
$14.44
$7,400
$5,134
212
212
Program Bids - Round 4 Results
Program Name
Days & DayPart
Impressions Week (000s)
CPM For Week
1/30 - 2/05
Total Cost
Total Impressions Purchased (000s)
No program bids

FIG. 25

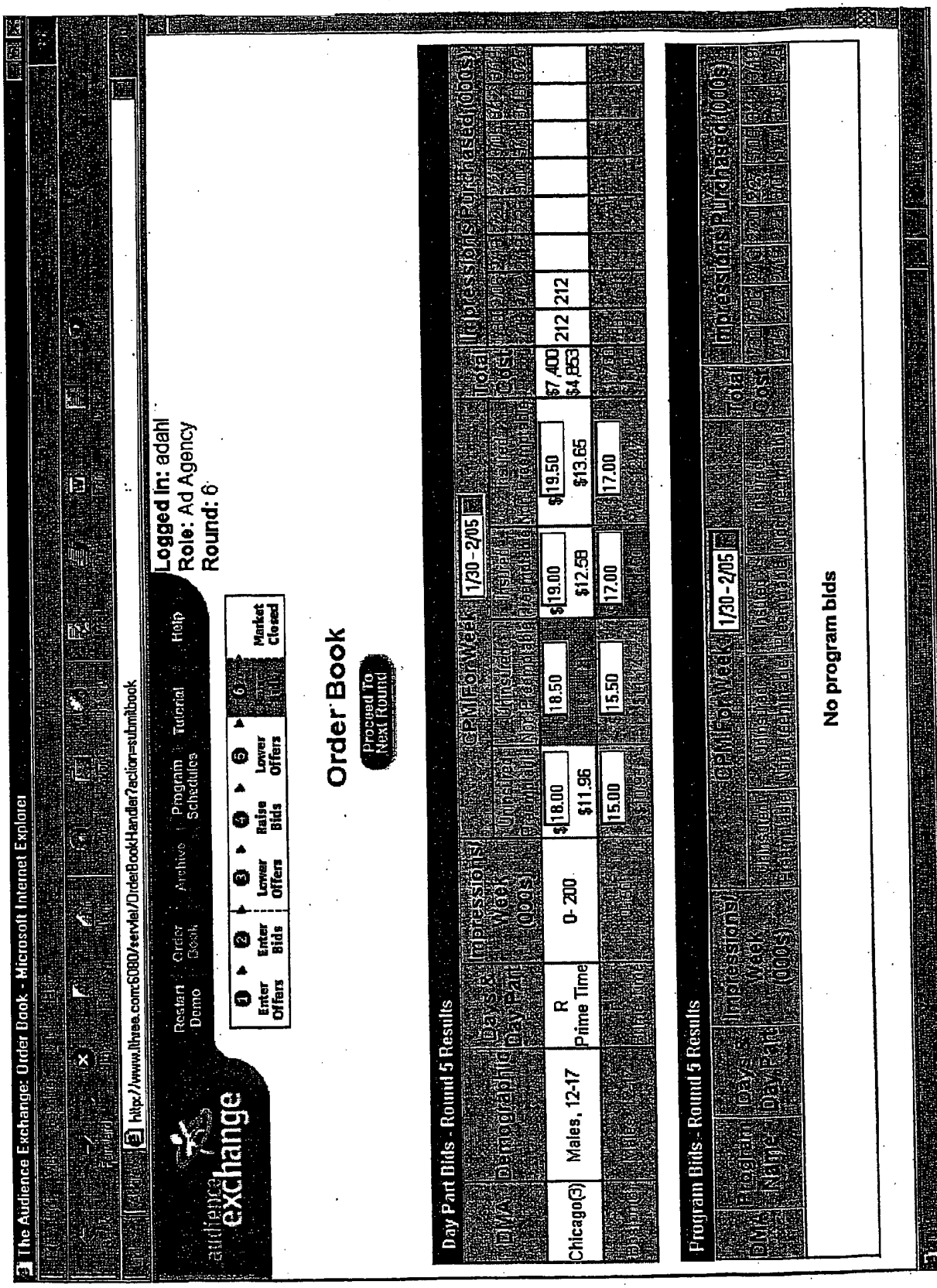

The Audience Exchange: Order Book - Microsoft Internet Explorer
http://www.ithree.com:6080/servlet/OrderBookHandler?action=submitbook
audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Logged In: adahl
Role: Ad Agency
Round: 6
1 Enter Offers
2 Enter Bids
3 Lower Offers
4 Raise Bids
5 Lower Offers
6 Market Closed
Order Book
Proceed To Next Round
Day Part Bids - Round 5 Results
Program Bids - Round 5 Results
No program bids

FIG. 26

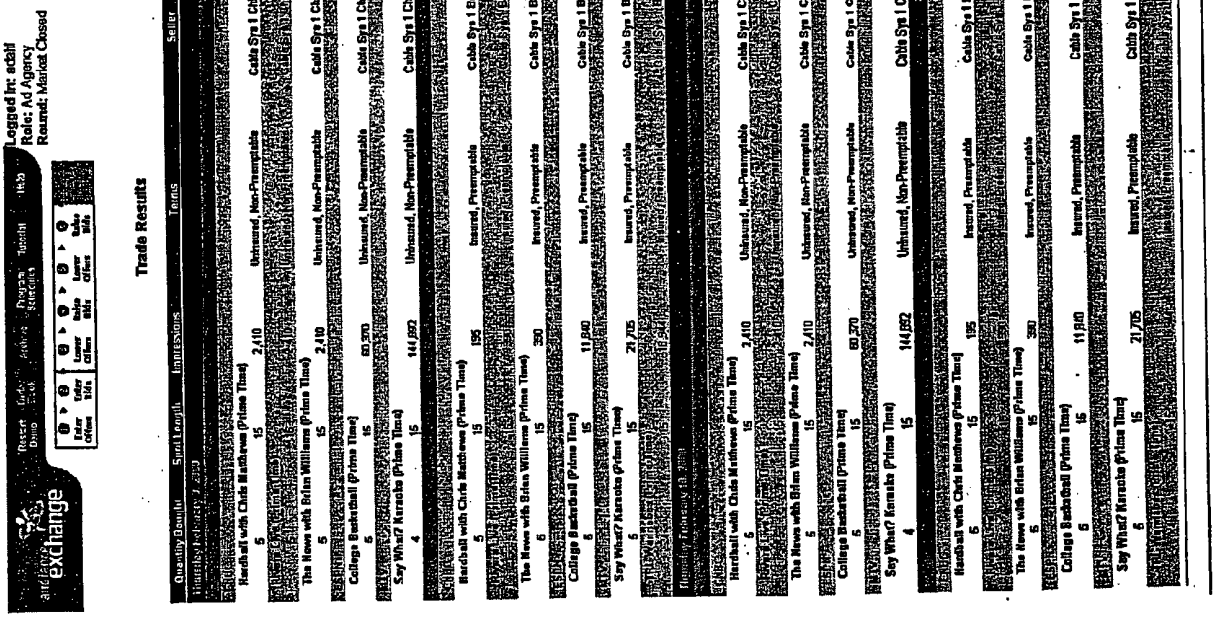

exchange
Logged In: adall
Role: Ad Agency
Round: Market Closed
Trade Results

FIG. 27

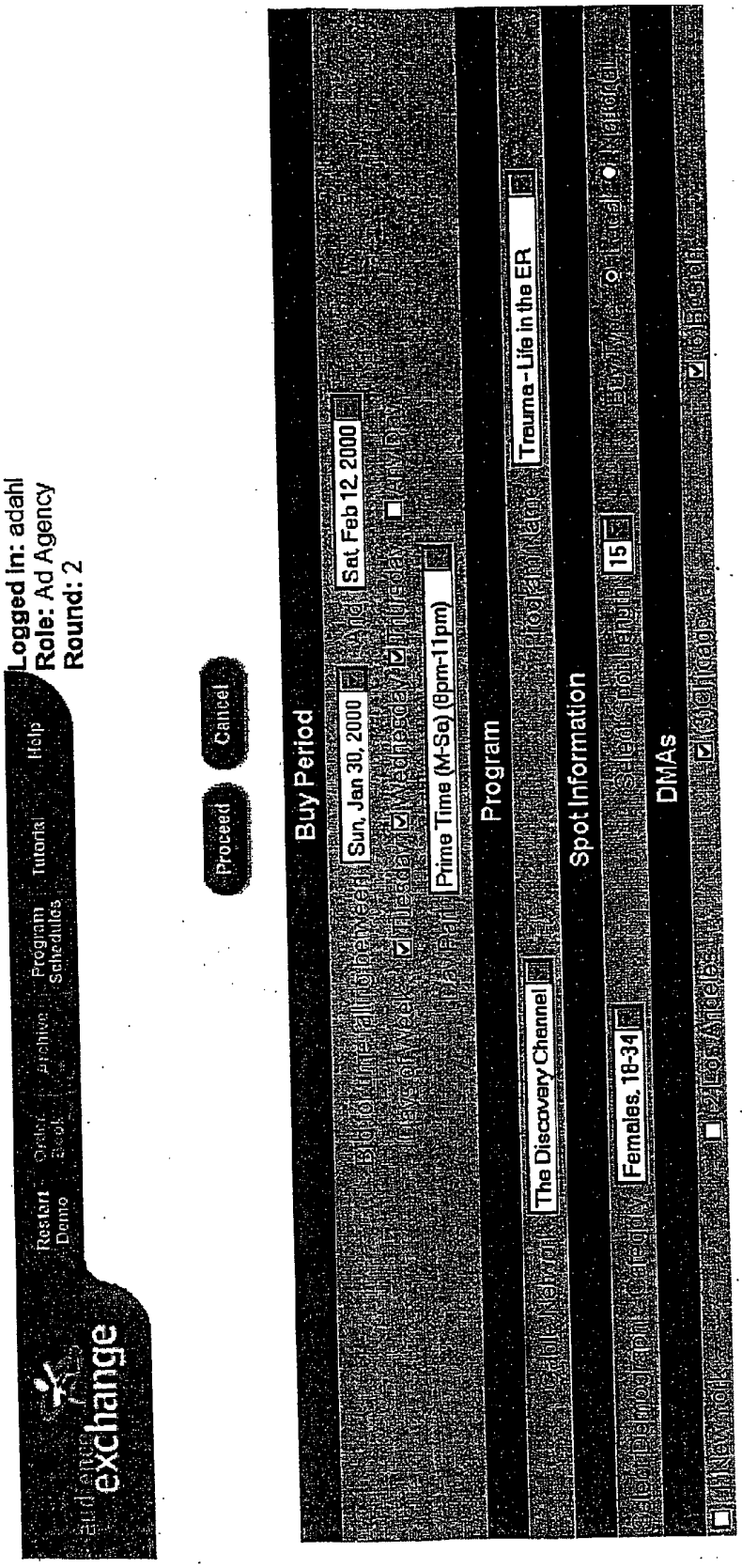

Logged In: adahl
Role: Ad Agency
Round: 2
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
exchange
Proceed
Cancel
Buy Period
Sun, Jan 30, 2000
Sat, Feb 12, 2000
Prime Time (M-Sa) (8pm-11pm)
Program
Trauma - Life in the ER
Spot Information
The Discovery Channel
Females, 18-34
15
DMAs
Proceed
Cancel

FIG. 28

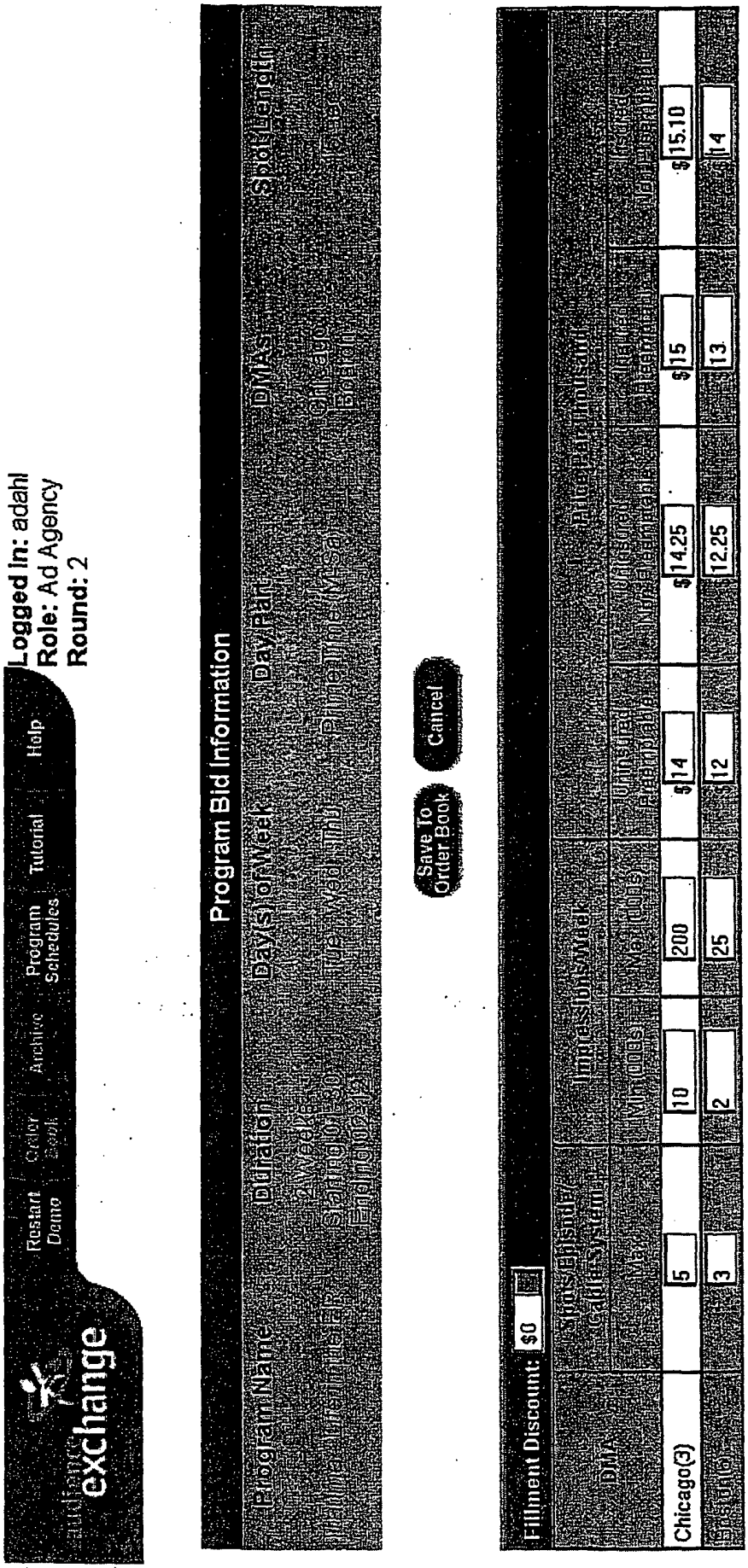
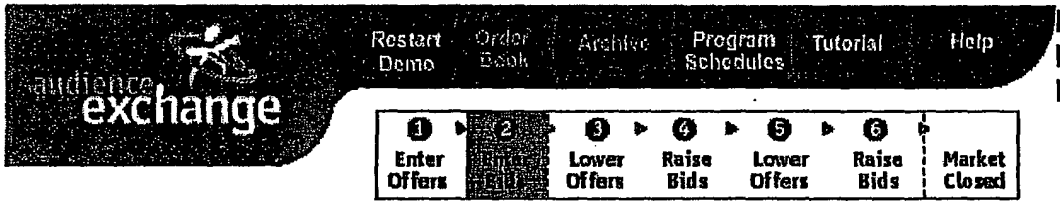

exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Logged In: adahl
Role: Ad Agency
Round: 2
Program Bid Information
Program Name
Duration
Day(s) of Week
Day Part
DMAs
Spot Length
Save To Order Book
Cancel
Fillment Discount: $0
Spots Ordered
Impressions/Week
Chicago(3)
5
10
200
$14
$14.25
$15
$15.10
25
12
12.25
13
14
Save To Order Book
Cancel

FIG. 29



Logged In: adahl
Role: Ad Agency
Round: 2

Order Book

Create DayPart Bid | Create Program Bid | Submit Order Book

Day Part Bids

DMA	Demographic	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non Preemptable	Insured Preemptable	Insured Non Preemptable	1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
No day part bids															

Program Bids

DMA	Program Name	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non Preemptable	Insured Preemptable	Insured Non Preemptable	1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
Chicago(3)	Trauma - L...	T,W,R Prime Time	10- 200	$14.00	$14.25	$15.00	$15.10	x	x						
Boston(6)	Trauma - L...	T,W,R Prime Time	10- 200	$12.00	$12.25	$13.00	$13.10								

FIG. 30

audience exchange

Restart Demo | Order Book | Archive | Program Schedules | Tutorial | Help

1 Enter Offers ▶ 2 Enter Bids ▶ 3 [illegible] ▶ 4 Raise Bids ▶ 5 Lower Offers ▶ 6 Raise Bids ▶ Market Closed

Logged In: adahl
Role: Ad Agency
Round: 3

Order Book

Proceed To Next Round

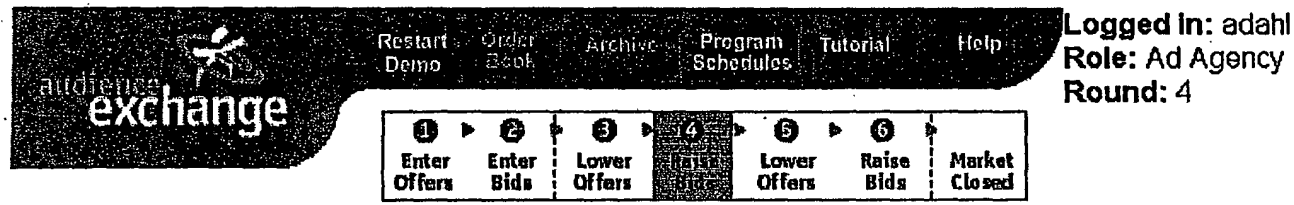
Day Part Bids - Round 2 Results

DMA	Demographic	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
No day part bids																

Program Bids - Round 2 Results

DMA	Program Name	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		1/30-2/05	2/06-2/12	2/13-2/19	2/20-2/26	2/27-3/04	3/05-3/11	3/12-3/18	3/19-3/25
Chicago(3)	Trauma - L...	T,W,R Prime Time	10- 200	$14.00 $10.64	$14.25 $10.84	[illegible]	$15.10 $12.14	$2,550.00 $1,901.00	85	85						
[illegible]	Trauma - L...	T,W,R Prime Time	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

FIG. 31



Order Book

Proceed To Next Round

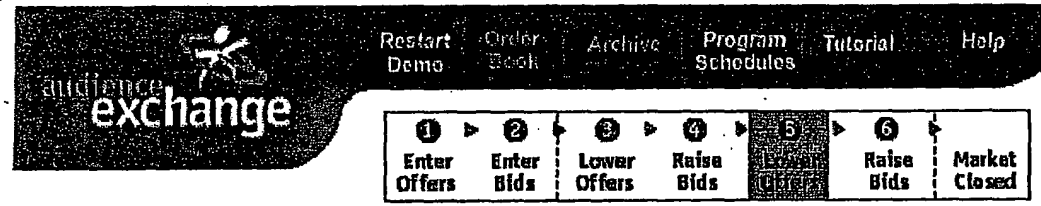
Day Part Bids - Round 3 Results

DMA	Demographic	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
No day part bids																

Program Bids - Round 3 Results

DMA	Program Name	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
Chicago(3)	Trauma - L...	T,W,R Prime Time	10- 200	$14.00 $9.77	$14.25 $9.95	$15.00 $10.46	$15.10 $11.14	$2,550.00 $1,744.00	85	85						
Boston(5)	Trauma - L...	T,W,R Prime Time	10- 200	$12.00 $11.76	$12.25 $10.97	$13.00 $12.74	$14.00 $13.40	$2,550.00 $2,400.00	85	85						

FIG. 32



Logged in: adahl
Role: Ad Agency
Round: 5

Order Book

Proceed To Next Round

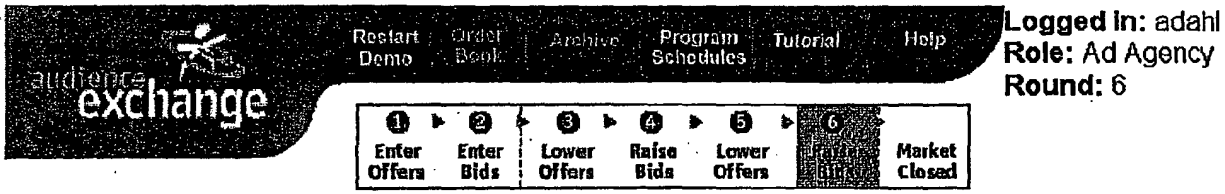
Day Part Bids - Round 4 Results

DMA	Demographic	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
No day part bids																

Program Bids - Round 4 Results

DMA	Program Name	Days & Day Part	Impressions/ Week (000s)	CPM For Week 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non-Preemptable	Insured Preemptable	Insured Non-Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
Chicago(3)	Trauma - L...	T,W,R Prime Time	10- 200	$14.00 $10.52	$14.25 $10.71	[illegible]	$15.10 $12.00	$2,550.00 $1,879.00	85	85						
Boston(4)	Trauma - L...	T,W,R Prime Time	[illegible]	$12.00 $12.06	$12.25 $12.09	[illegible]	$13.10 $12.10	$2,400.00 $2,420.00	[illegible]							

FIG. 33



Order Book

Proceed To Next Round

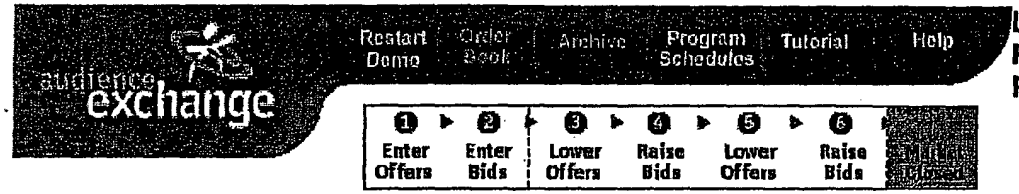
Day Part Bids - Round 5 Results

DMA	Demographic	Days & Day Part	Impressions/ Week (000s)	CPM For Week: 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non Preemptable	Insured Preemptable	Insured Non Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
No day part bids																

Program Bids - Round 5 Results

DMA	Program Name	Days & Day Part	Impressions/ Week (000s)	CPM For Week: 1/30 - 2/05				Total Cost	Impressions Purchased (000s)							
				Uninsured Preemptable	Uninsured Non Preemptable	Insured Preemptable	Insured Non Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
Chicago(3)	Trauma - L...	T,W,R Prime Time	10- 200	$14.00 $10.17	$14.25 $10.35	$15.00	$15.10 $11.60	$2,550.00 $1,816.00	85	85						
Boston(6)	Trauma - L...	T,W,R Prime Time	25- 75	$12.00 $10.5[illegible]	12.25 [illegible]	13.00 [illegible]	14.00 [illegible]	[illegible]	[illegible]	[illegible]						

FIG. 34



Logged in: adahl
Role: Ad Agency
Round: Market Closed

Trade Results

Quantity Bought	Spot Length	Impressions	Terms	Seller	Spot Price	Total Cost
Tuesday February 1, 2000						
The Discovery Channel						
Trauma - Life in the ER (Prime Time)						
5	15	42,500	Insured, Preemptable	Cable Sys 1 Chicago	$85.67	$428.33
The Discovery Channel						
Trauma - Life in the ER (Prime Time)						
3	15	3,786	Insured, Preemptable	Cable Sys 1 Boston	$15.46	$46.38
Tuesday February 8, 2000						
The Discovery Channel						
Trauma - Life in the ER (Prime Time)						
5	15	42,500	Insured, Preemptable	Cable Sys 1 Chicago	$87.84	$439.21

Total Cost: $1,878.97

FIG. 35

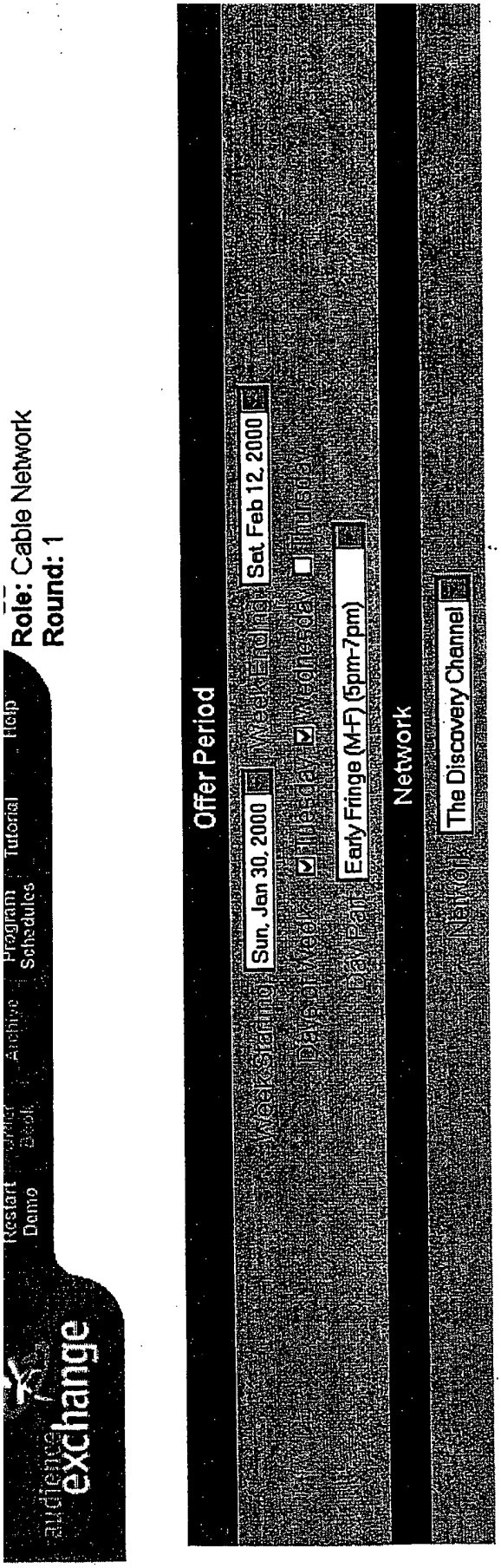

audience exchange
Restart Demo
Archive
Program Schedules
Tutorial
Help
Role: Cable Network
Round: 1
Offer Period
Week Starting
Sun, Jan 30, 2000
Week End
Sat Feb 12, 2000
Days of Week
Tuesday
Wednesday
Thursday
Day Part
Early Fringe (M-F) (5pm-7pm)
Network
Network
The Discovery Channel
Proceed
Cancel

FIG. 36

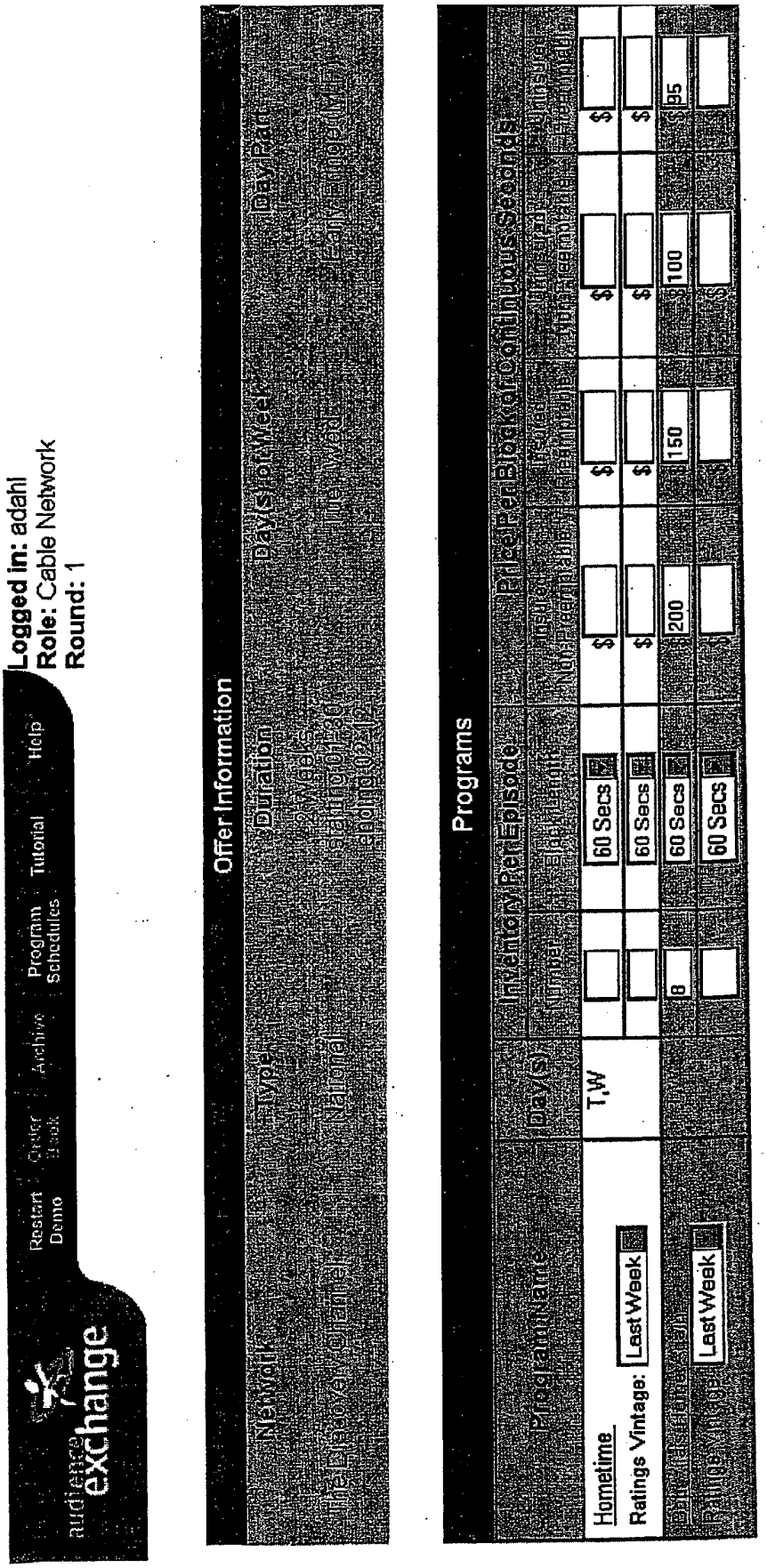
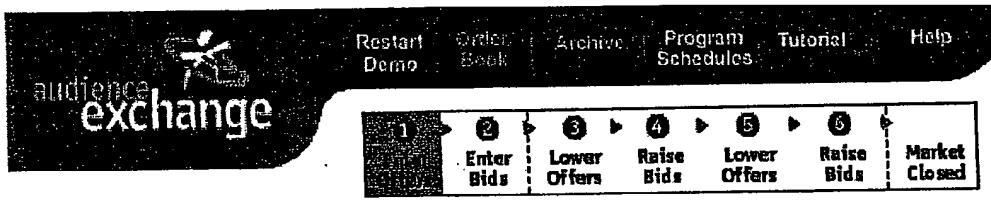

audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Logged in: adahl
Role: Cable Network
Round: 1
Offer Information
Network
Type
Duration
Day(s) of Week
Day Part
Programs
Program Name
Day(s)
Inventory Per Episode
Price Per Block of Contiguous Seconds
Number
Duration
Hometime
Ratings Vintage:
Last Week
T,W
60 Secs
$200
$150
$100
$95
Save To Order Book
Cancel

FIG. 37



Logged in: adahl
Role: Cable Network
Round: 1

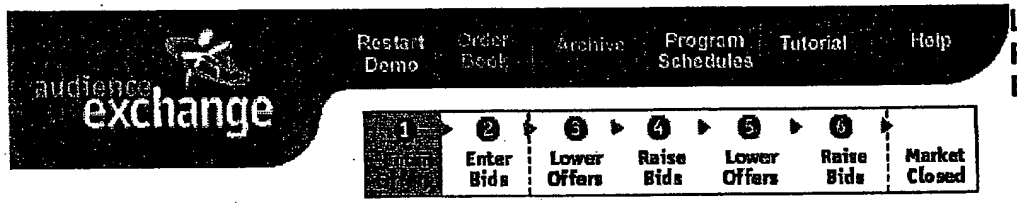
Order Book

Create Offer | Create Offer Bundle | Submit Order Book

Offers To Sell

Program Name	Inventory Per Episode	Price Per Block of Continuous Seconds				Weeks							
		Insured Non-Preemptable	Insured Preemptable	Uninsured Non-Preemptable	Uninsured Preemptable	2/05	2/12	2/19	2/26	3/04	3/11	3/18	3/25
Upfront To...	(5x) 60-secs	$ 1,200.00	$ 1,150.00	$ 1,000.00	$ 800.00	x	x						
	(6x) 90-secs	$ 1,300.00	$ 1,200.00	$ 1,100.00	$ 1,000.00	x	x						

FIG. 38



Logged In: adahl
Role: Cable Network
Round: 1

Order Book

Create Offer | Create Offer Bundle | Submit Order Book

Offers To Sell

Program Name	Inventory Per Episode	Price Per Block or Continuous Seconds				Weeks							
		Insured Non-Preemptible	Insured Preemptible	Uninsured Non-Preemptible	Uninsured Preemptible	2/05	2/12	2/19	2/26	3/04	3/11	3/18	3/25
Upfront To...	(5x) 60-secs	$ 1,200.00	$ 1,150.00	$ 1,000.00	$ 800.00	x	x						
	(6x) 90-secs	$ 1,300.00	$ 1,200.00	$ 1,100.00	$ 1,000.00	x	x						
Bud Light	(5x) 60-secs	$ 1,200.00	$ 1,150.00	$ 1,000.00	$ 800.00								

FIG. 39

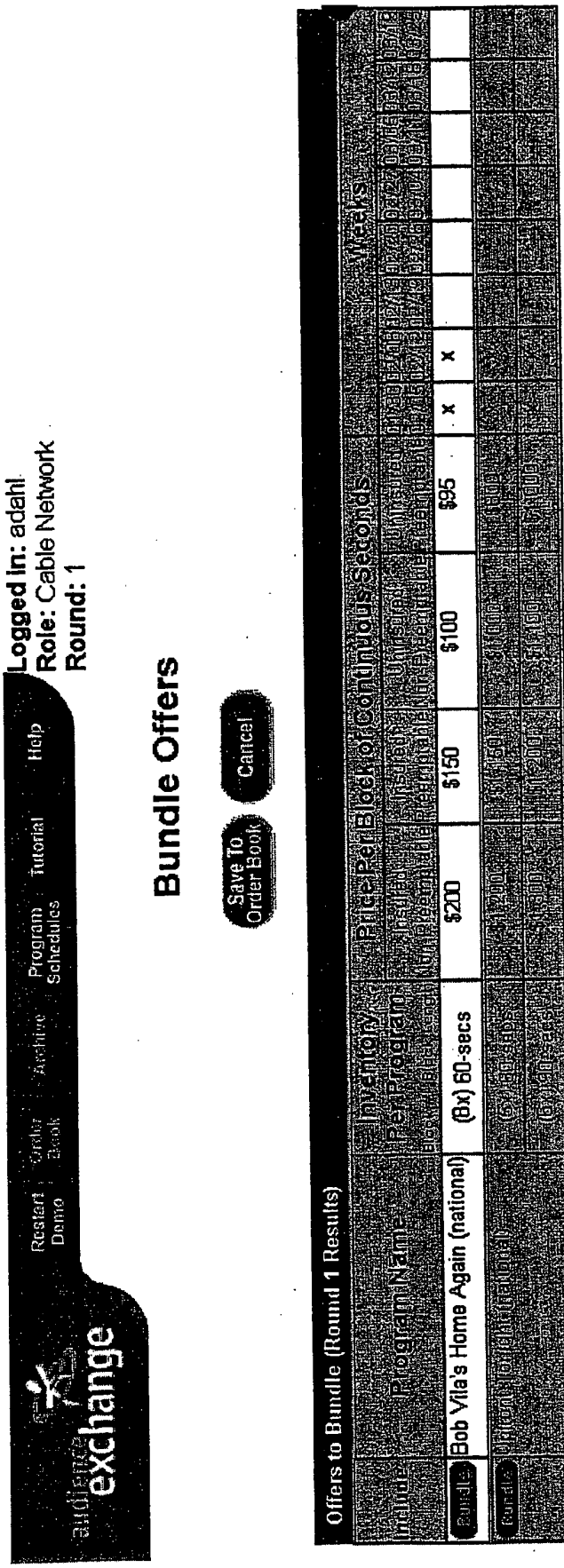

audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Logged In: adahl
Role: Cable Network
Round: 1
Bundle Offers
Save To Order Book
Cancel
Offers to Bundle (Round 1 Results)
Include
Program Name
Inventory
Per Program
Per Block
Price Per Block of Continuous Seconds
Weeks
Bundle
Bob Vila's Home Again (national)
(8x) 60-secs
$200
$150
$100
$95
x
x
Bundle

FIG. 40

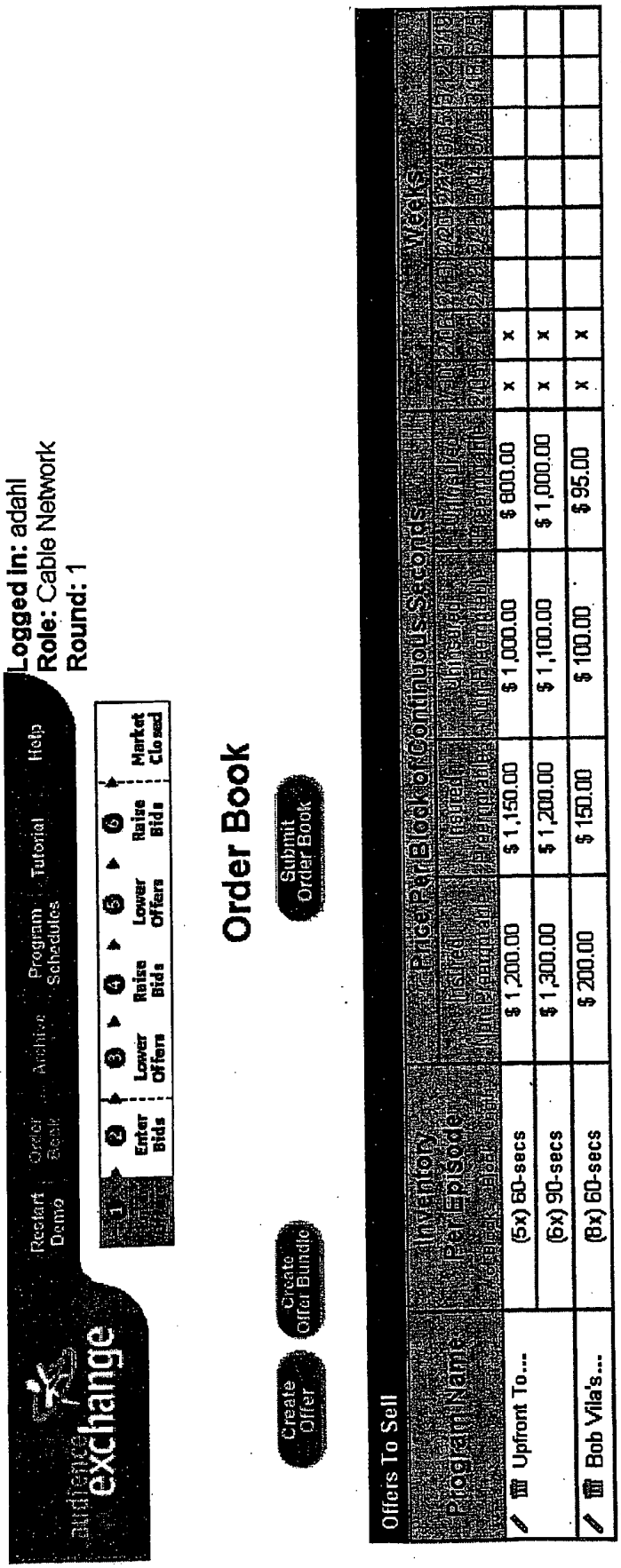
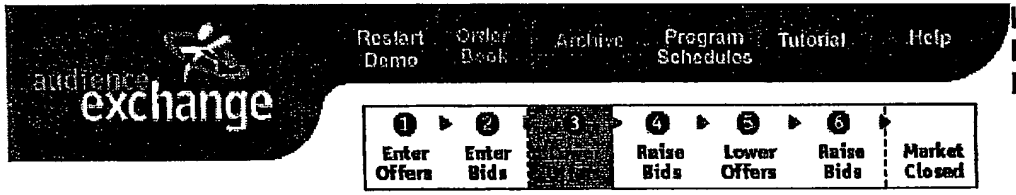

audience exchange
Restart Demo
Order Book
Archive
Program Schedules
Tutorial
Help
Logged In: adahl
Role: Cable Network
Round: 1
1
2 Enter Bids
3 Lower Offers
4 Raise Bids
5 Lower Offers
6 Raise Bids
Market Closed
Order Book
Create Offer
Create Offer Bundle
Submit Order Book
Offers To Sell
Program Name
Inventory Per Episode
Price Per Block or Continuous Seconds
Weeks
(5x) 60-secs
(6x) 90-secs
(8x) 60-secs
Upfront To....
Bob Vila's...
$ 1,200.00
$ 1,300.00
$ 200.00
$ 1,150.00
$ 1,200.00
$ 150.00
$ 1,000.00
$ 1,100.00
$ 100.00
$ 800.00
$ 1,000.00
$ 95.00

FIG. 41



Logged in: adahl
Role: Cable Network
Round: 3

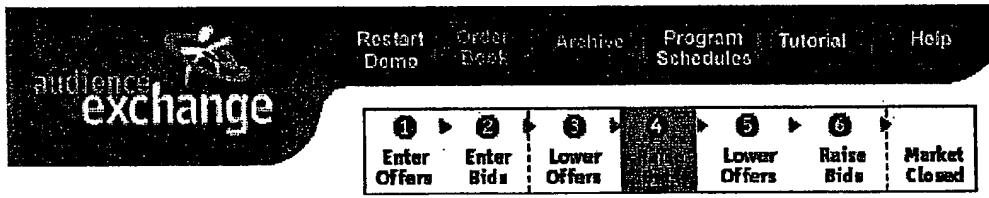
Order Book

Proceed To Next Round

Offers To Sell (Round 2 Results)

Program Name	Inventory Per Episode	Price Per Block for Week: 1/30 - 2/05				Total Revenue	Blocks Sold							
		Insured Non Preemptable	Insured Preemptable	Uninsured Non Preemptable	Uninsured Preemptable		2/05	2/12	2/19	2/26	3/04	3/11	3/18	3/25
Upfront To...	(5x) 60-secs	$ 1,200.00 $7,085.05	$ 1,150.00 $6,529.60	$ 1,000.00 $6,325.19	800.00	$8,000 $61,347	5	5						
	(6x) 90-secs	$ 1,300.00 $10,627.58	$ 1,200.00 $9,794.40	$ 1,100.00 $9,487.78	1,000.00	$12,000 $110 K	6	6						
Bob Vila's...	(8x) 60-secs	$ 200.00 $8,711.94	$ 150.00 $8,028.94	$ 100.00 $7,777.59	95.00	$3,040 $241 K	16	16						

FIG. 42



Logged in: adahl
Role: Cable Network
Round: 4

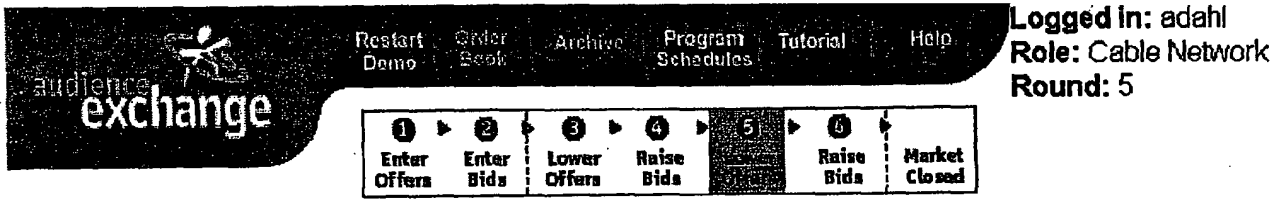
Order Book

Proceed To Next Round

Offers To Sell (Round 3 Results)

Program Name	Inventory Per Episode	Price Per Block for Week 1/30 - 2/05				Total Revenue	Blocks Sold							
		Insured Non-Preemptable	Insured Preemptable	Uninsured Non-Preemptable	Uninsured Preemptable		1/30 2/05	2/06 2/12	2/13	2/20 2/26	2/27 3/04	3/05 3/11	3/12 3/18	3/19 3/25
Upfront To...	(5x) 60-secs	$ 1,200.00 $6,727.55	$ 1,150.00 $6,200.12	$ 1,000.00 $6,006.02	[illegible]	$8,000 $58,246	5	5						
	(6x) 90-secs	$ 1,300.00 $10,091.33	$ 1,200.00 $9,300.18	$ 1,100.00 $9,009.04	[illegible]	$12,000 $105 K	6	6						
Bob Vila's...	(8x) 60-secs	$ 200.00 $8,262.57	$ 150.00 $7,614.80	$ 100.00 $7,376.42	[illegible]	$3,040 $228 K	16	16						

FIG. 43



Logged in: adahl
Role: Cable Network
Round: 5

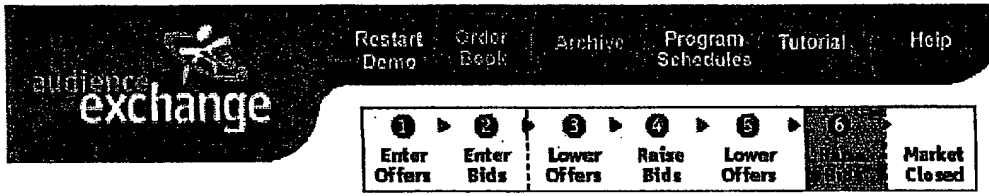
Order Book

Proceed To Next Round

Offers To Sell (Round 4 Results)

Program Name	Inventory Per Episode	Price Per Block for Week: 1/30 - 2/05				Total Revenue	Blocks Sold							
	# of Blocks / Block Tariff	Insured Non-Preemptable	Insured Preemptable	Uninsured Non-Preemptable	Uninsured Preemptable		1/30 2/05	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/05	3/06 3/12	3/13 3/19	3/20 3/26
Upfront To...	(5x) 60-secs	$ 1,200.00 $7,067.43	$ 1,150.00 $6,513.35	$ 1,000.00 $6,309.45	800.00	$8,000 $61,190	5	5						
	(6x) 90-secs	$ 1,300.00 $10,601.15	$ 1,200.00 $9,770.03	$ 1,100.00 $9,464.18	1,000.00	$12,000 $110 K	6	6						
Bob Vila's...	(8x) 60-secs	$ 200.00 $8,768.72	$ 150.00 $8,081.27	$ 100.00 $7,828.26	95.00	$3,040 $242 K	16	16						

FIG. 44



Logged in: adahl
Role: Cable Network
Round: 6

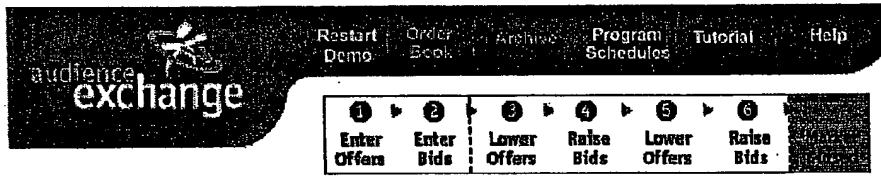
Order Book

Proceed To Next Round

Offers To Sell (Round 5 Results)

Program Name	Inventory Per Episode	Price Per Block for Week: 1/30 - 2/05					Total Revenue	Blocks Sold							
		Unsold Non-Preemptable	Unsold Preemptable	Unsold Non-Preemptable	Unsold Preemptable			1/30 2/02	2/06 2/12	2/13 2/19	2/20 2/26	2/27 3/05	3/06 3/11	3/12 3/18	3/19 3/25
Upfront To...	(5x) 60-secs	$ 1,200.00 $6,714.93	$ 1,150.00 $6,188.49	$ 1,000.00 $5,994.76			$8,000 $58,131	5	5						
	(6x) 90-secs	$ 1,300.00 $10,072.40	$ 1,200.00 $9,282.74	$ 1,100.00 $8,992.14			$12,000 $105 K	6	6						
Bob Vila's...	(8x) 60-secs	$ 200.00 $8,292.01	$ 150.00 $7,641.94	$ 100.00 $7,402.70			$3,040 $229 K	16	16						

FIG. 45



Logged in: adahl
Role: Cable Network
Round: Market Closed

Trade Results

Quantity Sold	Spot Length	Terms	Buyer	Price	Total Revenue
Tuesday February 1, 2000					
Bob Vila's Home Again (Early Fringe)					
16	15	Uninsured, Preemptable	Ad Agency	$1,829.10	$29,265.68
Wednesday February 2, 2000					
Bob Vila's Home Again (Early Fringe)					
4	15	Uninsured, Preemptable	Ad Agency	$1,979.58	$7,918.33
Upfront Tonight (Prime Access)					
6	15	Uninsured, Preemptable	Ad Agency	$1,546.68	$9,280.08
22	15	Uninsured, Preemptable	Ad Agency	$1,546.68	$34,026.95
Tuesday February 8, 2000					
Bob Vila's Home Again (Early Fringe)					
10	15	Uninsured, Preemptable	Ad Agency	$1,830.51	$18,305.07
Wednesday February 9, 2000					
Bob Vila's Home Again (Early Fringe)					
16	15	Uninsured, Preemptable	Ad Agency	$1,862.32	$29,797.06
Upfront Tonight (Prime Access)					
10	15	Uninsured, Preemptable	Ad Agency	$1,508.09	$15,080.88
10	15	Uninsured, Preemptable	Ad Agency	$1,508.09	$15,080.88

Total Revenue: $411,116.26

FIG. 46

INTERNATIONAL SEARCH REPORT

International application No.
PCT/US00/33179

A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) :G06F 17/60
US CL : 705/37

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

U.S. : 705/37

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EAST

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5,794,219 A (BROWN et. al.) 11 AUGUST 1998, Fig. 1/30/24/18/22; Fig. 5/76/60/44/50/62/64; Fig 6/66/68/62/50/78/57/64; Fig. 10/140/144; col 3 lines 44-65; col 4 lines 8-32; col 6 lines 25-40; col 6 lines 3-16; Fig 7/72/74; col 7 lines 2-18; col 9 lines 19-28; col 8 lines 47-59	1-42
Y	US 5,717,989 A (TOZZOLI et. al) 10 FEBRUARY 1998, Fig. 1; Fig 2A; Fig 2C/170/200/230; Fig 3B; Fig 4; col 4 lines 50-62; col 5 lines 21-43; col 7 lines 10-34; col 6 lines 20-44; col 7 line 53-col 8 line 3; col 11 lines 23-51; col 15 line 52-col 16 line 41	1-42

☐ Further documents are listed in the continuation of Box C. ☐ See patent family annex.

*	Special categories of cited documents:	"T"	later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A"	document defining the general state of the art which is not considered to be of particular relevance	"X"	document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E"	earlier document published on or after the international filing date	"Y"	document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
"L"	document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)	"&"	document member of the same patent family
"O"	document referring to an oral disclosure, use, exhibition or other means		
"P"	document published prior to the international filing date but later than the priority date claimed		

Date of the actual completion of the international search 21 FEBRUARY 2001	Date of mailing of the international search report 09 APR 2001
Name and mailing address of the ISA/US Commissioner of Patents and Trademarks Box PCT Washington, D.C. 20231 Facsimile No. (703) 305-3230	Authorized officer VINCENT MILLIN Telephone No. (703) 308-1065

Form PCT/ISA/210 (second sheet) (July 1998)★