ALTERNATIVE PAY-PER-VIEW TECHNOLOGIES:
A LOAD CAPACITY ANALYSIS

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ABSTRACT

1986 has been heralded as the year that will establish pay-per-view as a significant revenue-producing business for the cable industry. The advent of satellite delivered programming in PPV format, along with the ever-expanding universe of addressable converters, have motivated many cable system operators to analyze the viability of the pay-per-view business in their own systems.

Two essential elements must be examined in such analysis:
1. The anticipated volume of PPV program sales.
2. The capacity of the ordering mechanism which enables the subscriber to purchase a film or event.

This paper will present the penetration levels and peak ordering load distribution data from cable operators with extensive pay-per-view experience, and will evaluate the various ordering mechanisms currently available or in development. In the contexts of system size, PPV buy rates, and peak load - handling requirements, examination of each technology's capacities and limitations will be provided to assist the cable operator in selecting the ordering mechanism most appropriate for his/her own application.

OPERATOR EXPERIENCE

Penetration levels of pay-per-view programming vary widely among systems, as indicated by research of the operators whose data were used in compiling this paper: Cox Cable/San Diego, Daniels/ Baton Rouge, Gill Cable/San Jose, Group W Cable/Roseville, NYT Cable/NJ, Oceanic Cable/Honolulu, Rogers Cable/Portland, Storer Cable/Beaverton, Tribune-United/ Oakland, and Warner Amex/Columbus.

Naturally, each system offered programs with varying frequency, sales promotions, pricing, regional interest, (e.g., sporting events), and "early order" incentives.

Many variables affect the but rates of a PPV program, and no attempt is made here to downplay their importance; however, since variables such as program content, market demographics and frequency/positioning of showings do not substantially impact the distribution of peak order load, only those factors pertaining to the ordering mechanism technology will be isolated for discussion.

Crucial to the comparison of PPV ordering mechanisms is the maximum load of purchase tranactions that must be accommodated in order to optimise the sales potential of the program being offered. Additionally, the buyers' behavior should be considered, to predict the traffic patterns in event orders that will define the system's peak load.

Figure (1) tabulates the average monthly (cumulative) penetration levels of pay-per-view programs to addressable subscribers experienced by several systems.

FIGURE #1

SYSTEM	% PEN./MO.	ADDR. SUBS	NET PEN./MO.
NYT Cable[1]	70%	21,000	14,700 orders
WAX/Cols.[1]	54%	29,000	15,660 orders
Rogers/Port.[2]	27%	70,000	18,900 orders
Trib./Un.[2]	25%	4,800*	1,200 orders
Daniels/B.R.[3]	20%	30,000	6,000 orders
Gill/SanJ.[3]	7.5%	35,000	2,625 orders
GWC/Rosv.[3]	2.5%	14,000	350 orders
Cox/SanD.[4]	8.5%	120,000	10,200 orders
Oceanic[4]	11%	88,000	9,680 orders
Storer/Or.[4]	10%	33,000	3,300 orders

[1] fully interactive two-way addressable system
[2] at least 1/2 of addressable subs are two-way, balance call-in to CSR's
[3] subscriber call-in to CSR's
[4] subscriber call-in to automated voice-response system
*actual addressable subscriber base in this system is 50,000, but pay-per-view was offered to a control group of 4,800

Several observations can be made in a cursory examination of the table in Figure (1):

1. The volume of PPV orders processed is impacted as much by the size of the subscriber base as by the percentage of those subscribers who buy an event. Three systems had subscriber bases of 29-33,000, with penetration rates varying from 10% to 54%. The total volume of orders processed for these systems ranged from 3,300 to 15,660. As mentioned earlier, many variables can affect the penetration rates of PPV programming; the important point here is to identify which technologies will be most appropriate for the volume of orders anticipated in a particular system.

2. It is also interesting to note that the systems with the highest monthly penetration rates, 25% and above, offer true "impulse" pay-per-view to at least a portion of their subscriber bases, with interactive addressable systems. This correlation is also evident in research conducted by United, Rogers, and Group W. Each MSO found that in systems offering PPV by both subscriber call-in and impulse ordering technology, the impulse-buy orders outnumbered the call-in orders by two to one (in several cases, the ratio was 3:1).

3. Several of the systems listed in Figure (1) are currently operating with limited addressable dedication. The penetration rates observed here must therefore be extrapolated to the ultimate addressable subscriber base, to determine whether the existing ordering mechanism will handle the anticipated volume.

The most important factor in identifying peak system loads, however, is the maximum order volume to be handled at any given point in time. The penetration rates experienced for single showings of successful recent PPV programs/events are outlined in Figure (2), along with an extrapolation of these rates over each system's extended addressable base.

Figure 2
PPV EVENT PENETRATIONS

	Current Addr. Subs	Pen/Event	Orders/ Event	Ultimate Addr Subs	Ult. Orders/ Event
NYT	21,000	4.1%	861	120,000	4,920
WAX/CMS	29,000	5.6%	1,624	53,500	2,996
Daniels/BR	30,000	50%	15,000	30,000	15,000
Cox/SanD	90,000	6%	5,400	260,000	15,600
Oceanic	88,000	4%	3,520	155,000	6,200
GW/Rosev	14,000	3%	420	14,000	420
Gill/SanJ	35,000	15%	5,250	150,000	22,500
Trib/Un	2,400	5%	120	55,000	2,750

Note that the average buy rate for a single event is between 4 and 6%. For Oceanic Cable in Honolulu, a 4% take rate out of 88,000 subscribers yielded a respectable 3,520 orders. If the same penetration rate is anticipated for the system's extended subscriber base of 155,000, the PPV ordering mechanism must be capable of handling 6,200 purchases. But how many of these orders come in at any given point in time, and more importantly, what is the peak load the system must accommodate to assure that the subscribers who want to purchase the program have access to it?

For a true picture of the event ordering traffic each system must contend with, it becomes necessary to examine peak load distribution prior to the event's start time (Figure 3), and to apply the peak load to the anticipated optimal penetration level for the system.

In those systems with impulse capability, and hence, no practical limitation on last minute orders, operator consensus was that 50% of the event orders came in at the last 15-20 minutes prior to start time (remember, this group also reported double the buy rates).

The systems with subscriber call-in ordering procedures, by design and by subscriber education, had as few as 15% of orders in the last 15-20 minutes, with 50% of the orders coming in before the two hours preceding the event. As a group, however, these systems had little or no data on order distribution, and several suspected they were losing last minute "impulse buyers" to busy signals (Rogers has estimated this loss to be as high as 20% for a popular movie). All believed that their buy rates would be enhanced by a technology that would facilitate impulse purchasing.

For purposes of analysis, it is

conservative to assume a 50% peak penetration rate distributed (variably) over the last 30 minutes prior to event start.

If we go back to Figure (2) and factor in the distribution peak of 50% to the total orders for a single event, the total orders to be handled in the last 30 minutes prior to event start can be derived. These net, peak period orders are presented, both for current subscriber bases and for expanded systems, in Figure (4).

Figure #4
PPV PENETRATIONS

	CURRENT ADDR SUBS	PEN/EVENT	ORDERS/ EVENT	ULTIMATE ADDR SUBS	ULT ORDERS/ EVENT	CURRENT PK @ 50%	ULT. PEAK @ 50%
HYT	21000	4.10%	861	120000	4920	430.5	2460
WAX/CMN	29000	5.60%	1624	53500	2996	812	1498
DANIELS/BR	30000	50.00%	15000	SAME	15000	7500	7500
COX/SAN D	90000	8.00%	6400	200000	15800	2700	7900
OCEANIC	88000	4.00%	3520	155000	6200	1760	3100
EW/MOSEV	14000	3.00%	420	SAME	420	210	210
HILL/SAN J	35000	15.00%	5250	150000	22500	2625	11250
TRIB/WM. MI	2400	5.00%	120	55000	2750	60	1375

The system with the most orders coming in over their expanded addressable base is Gill Cable, with 22,500 orders, at 15% penetration of 150,000 subscribers. At Gill's present subscriber base of 35,000, or more manageable volume of 5,250 orders comes in for the successful single event. But in either case, a bottleneck may occur if 50% of these orders are received in a 30-minute period (we'll return to this point).

Naturally, there are marketing solutions to any such situation; subscribers can be "trained" to pre-order; the event (if not a live sporting event) can be offered several times throughout the month to distribute the ordering load more evenly; pricing can be adjusted to reduce the number of orders. All these measures, and others, have been utilized in the system that have shown the most success in pay-per-view without ordering mechanisms that allow for substantial peak load-handling capability (see Figure [1]). But the same system operators also agree that by offering their subscribers true impulse purchase capability, they could sell more PPV programs.

Figure #3

(see CONCLUSION)

The dilemma of optimizing PPV sales without encumbrance to the system must be addressed through technology. An analysis of several PPV ordering mechanisms follows, with emphasis on application to our sample systems' peak ordering load requirements.

PPV Ordering Mechanisms

There are two broad categories into which every PPV ordering mechanism can be placed: real time, vs non-real time.

Real Time systems require communication between the subscriber and the headend or the business office at the time the order is placed --- whether through a telephone call to aCSR, or by selecting the program directly through the interactive addressable converter. Decoder authorization procedures, such as account verification and credit check, account number to terminal ID match, and validation of the transaction, are performed at the time the order is received, and the transaction is completed with an authorize command to the addressable decoder. Real time ordering systems include CSR call-in, automated voice responce call-in, ANI (automated number identification), some telephone dialer systems, and two-way interactive addressable converters.

Non-real time systems do not require that the subscriber and the headend or business office ever communicate at a given point in time. The subscriber's addressable decoder can be pre-authorized for a down-loadable credit limit, enabling the subscriber to select an event locally, without further communication with the cable system. The subscriber's selection is stored in the converter, and the headend later retrieves the ordering information by commanding the terminal to report its memory contents. The return path for terminal reporting can be either telephone or two-way cable, but the distinguishing characteristic here is that the communication loop need not be completed at the time the event is ordered. This technique is commonly known as "store and forward" technology.

CSR Call-In

Although several operators have initiated very successful PPV programs utilizing CSR's to accept telepone calls and mail-in pre-orders, the inherent limitations in system capacity must curtail last-minute impulse purchases.

Peak load capacity is determined in these systems strictly by the number of telephone lines coming into the cable system's office. Gill Cable, with 16 lines dedicated to CSR's, can handle about 16 orders per minute at 60 seconds/transaction. This translates to 480 calls in any half hour peak period prior to event start, 9% of the 5,250 orders received on an event with 15% penetration of Gill's 35,000 subscriber base.

If the transaction time can be reduced to 30 sec./call (rather difficult, since credit checks must also be done simultaneously with multiple users on the system), 960 orders can be processed in 30 minutes, a maximum of 18% of Gill's orders for the same event.

This ordering mechanism has served many operators well in their initial forays into pay-per-view, and subscribers have adapted some of their buying habits to the system's capacity. But maximization of the PPV business in a particular cable system requires that any subscriber who wishes to purchase an event may do so. In order to accommodate the "impulse buyers" who purchase in the last 30 to 60 minutes, and to ensure that would-be buyers do not reach a busy signal or an on-hold queue, a different technology must be employed.

Automated Voice-Response

An automated voice-response system is the next step up in technology. The maximum load capacity is still determined by the number of telephone lines dedicated to order-taking and by the time required to process a transaction, but the the number of CSR's required is reduced.

The subscriber still makes a telephone call to order a program/event, but rather than talking to a CSR, responds to prompts from a digitized voice by punching the appropriate buttons on a touch-tone phone. Subscribers without push-button phones (50% of the telephone population, approx. 30% of cable households) stay on the line for a live CSR to complete the transaction, unless provided with a tone-generating device.

The touch-tone subscriber's order, when completed, is handed over from the voice response computer to the billing computer for credit check and telephone/account number to terminal ID match, and then down-loaded to the addressable controller for the decoder authorization

poll. (Some voice response systems vary slightly in how these steps are handled; some voice response computers have mini data bases that are updated daily with credit clearance, and terminal ID match to telephone/account numbers to speed up the validation process. Others also tie into dial-out systems which initiate return calls to the subscriber whose account is not current, or whose transaction was invalid.)

Peak load capacity is still only 1,920 orders per hour for a 16-line system with 30-second transactions. Referring back to Figure (4), this capacity for 960 calls in the last 30 minutes would accommodate only 4 of the 8 operators listed if 50% of their orders came in the last 1/2 hour.

Although voice response systems are very effective for cable operators with prolonged event-order distribution, their reliance on real-time telephone communiation with subscribers still inhibits the impulse buyer who wants to place an order in the last 30-60 minutes.

Auto-Dialer Ordering Devices

Several manufacturers have conducted field tests of auto-dialer devices which further stream-line the ordering process for the subscriber. The dialer ordering unit is allocated an ID or "address" by the cable operator, and connected to the subscriber's telephone. When a subscriber wishes to order a program or event, the appropriate keys are depressed on the dialer device in the home. The auto-dialer calls its own control computer at the cable office and relays the event ordering information, which, along with the dialer's ID, is then processed for account verification and credit check. If all is well with the order, the information is passed along through the billing system and the addressable controller for converter/decoder authorization. The subscriber's feedback on transaction acceptance is through LED's on the dialer device.

The auto-dialer cuts down substantially on the transaction time per order (approx. 10 seconds), enabling a 16-phone line cable system to accept 2,880 orders in 30 minutes. This capacity would enable Gill Cable to process 55% of their 5,250 orders in a one-half hour peak period, which should adequately facilitate the last-minute purchases experienced by the impulse-capable operators discussed previously.

Even with this increased order-taking capability, however, the auto-dialer system is subject to an additional bottleneck that is faced by all real-time based ordering systems. Because the authorization poll enabling the addressable decoder to descramble the purchased event cannot be sent out until after the order has been processed, the addressable controller's capability becomes the limiting factor.

Most one-way addressable controllers in use today are designed to poll large terminal bases sequentially, but polling on individual terminals to enable single event can take as long as 2-6 seconds. Consequently, although the order processing system may accept 2,880 orders in 30 minutes, it is likely that the addressable controller will only enable 600 of these terminals in the same period of time.

ANI (Automated Number Identification)

AT&T and Pacific Bell are currently launching market tests of ANI ordering systems with Viacom, Showtime/The Movie Channel, Zenith, and Cabledata, to acquire practical field experience applying this technology to PPV. Through special switching networks the telco handles a much larger volume of calls than is possible with conventional dedicated telephone lines into the cable system's office, and passes the data to the operator's billing computer for processing and terminal authorization through the addressable controller.

The subscriber dials a special telephone number (on either a rotary or a push button phone), which identifies the call as an order for an event, and then identifies the event being ordered. The subscriber's incoming phone number is recorded by the telco computer, and along with the ordering information, is passed to the operator's billing computer (especially enhanced and modified for this application) for a match to the addressable terminal ID.

The subscriber's interaction with the ordering system is complete once the ANI computer receives the order. If the biling computer cannot process the order (e.g., for poor credit, or inability to match the caller's originating phone number to a terminal ID), a CSR must call the subscriber back to complete or abort the transaction. The subscriber's verification that the event has been proprly ordered comes when the program begins.

AT&T is presently capable of feeding approx. 240 orders per minute (per line) to the billing computer, but this real-time system is still gated by the billing computer's order processing time, and the capacity of addressable controller. With the Zenith Intel controller's limitation of polling 900 terminals in a 30 minute period, most of the ANI system's additional capacity is wasted. Again, only four of the eight sample systems in Figure (4) would be accommodated, at current system size. Fully expanded, all systems would be limited if a 50% peak load occurred in the last 30 minutes.

Both software and hardware enhancements will increase the capacities of the addressable controller currently in use, but at no small expense to addressable system manufacturers and the billing cmpanies with which they are interfaced. Some operators may find it necessary to upgrade both addressable controllers and billing systems in order to derive the benefits that ANI can offer.

Two-Way Interactive Converters

The most notorious of the two-way addressable systems, QUBE, also boasts the truest impulse purchase capability. Although it is a real-time system, QUBE's exceptionally high speed data (256K bps) enables instantaneous PPV orders to be transacted between the subscribers converter and the operator's headend, eliminating the traffic jam problems inherent in all other real-time based systems.

Two-way addressable systems enable the cable operator to satisfy last-minute subscribers' PPV purchases, and to get the most mileage from PPV programs and events. Rather than artifically distribute the PPV load over a longer period of time (as dictated by the limitations of non-impulse ordering mechanisms), these systems can accommodate virtually any volume of orders as they come in. (One operator reported as high as 50% of her PPV orders in the last 15 minutes, another claimed 80% in the last half hour). The capacity to accommodate these incremental subscribers brings in the additional revenue tht makes PPV a successful business.

But the costs associated with two-way interactive plant maintenance expenses have inhibited this approach from gaining widespread popularity in the cable industry.

Store & Forward

Because it is a non-real time pre-authorization ordering system, the store and forward approach to PPV offers the subscriber instantaneous access to PPV programming, yet does not require high speed data (with its associated hardware costs) to provide communication between the subscriber's terminal and the headend/business office. Event-ordering credit limits are downloaded in the one-way addressable command stream on a sub by sub basis, and the terminals are pre-authorized for viewing of those events. When a PPV program is about to begin, the subscriber simply selects the program on the converter and uses an authorize code or command on the converter to verify the purchase. As long as the subscriber is within the prescribed credit limit for this event, it is immediately descrambled, without any real time communication with the cable operator. Since the terminal has already been pre-authorized, no bottlenecking occurs with multiple orders queuing up for authorization polls through the addressable controller.

Once purchased, the event ID is stored in the terminal's memory for retrieval at a later time by the addressable controller. This reporting-back to the headend can be done by cable return, or by telephone for one-way systems. Through a downstream command from the controller, each terminal is requested to report back the contents of its memory. For hybrid, telephone return systems, this command is typically sent during off-peak telephone usage periods, when a dialer in the terminal will respond on the subscriber's telephone line. If the line is in use when the terminal is asked to respond, a "no answer" status is logged for the unit, and it will be tried again later, after the other terminals in the system have reported back. Repeated "no answers" from a terminal raise a flag to the operator that further investigation is required.

The store and forward approach is being used by several addressable converter manufacturers, notably Pioneer, Jerrold, Tocom, and Scientific Atlanta (in development). Interestingly, three of these four manufacturers have also produced two-way interacive systems.

Pioneer's PULSE system is an add-on device that upgrades the BA5000 one-way addressable converter to store and forward impulse PPV capability. The unit is bolted to the converter, and through a bus connection to the BA5000 micro-processor, becomes an integral part of the addressable converter. Consequently, the tamper detection circuit which disables the BA5000 when opened is also activated if the PULSE unit is tampered with, rendering even basic programming unviewable. An additional security measure built into the PULSE is a battery back-up to keep the unit's memory intact and retrievable by the cable operator for up to nine years -- even after the terminal has been disconnected -- thwarting attempts at preventing the PULSE unit from reporting back.

Although approaches vary between manufacturers, several features distinguish the complete integration of those products developed for a pay-per-view environment.

A unique and significant advantage of the store and forward application in some addressable systems is its compatibility between VCR's and PPV programming. The converter program timer can be set to authorize a PPV event in the subscriber's absence. By synchronizing with the VCR timer, the subscriber can purchase and record a PPV program without being at home to initiate the order.

The parental control override of PPV CHANNEL ACCESS gives the subscriber control over unauthorized orders by children or babysitters. This is an important distinction to note between the impulse PPV systems and those relying on telephone calls or stand-alone dialers; secure ordering mechanisms can prevent CSR tie-ups in billing disputes that result from unauthorized orders.

To further assist the operator in determining whether a subscriber actually viewed a particular event that may be claimed to have been selected in error, some store and forward products record the first full 15 minutes of viewing time on the program's channel, giving the operator a hard record with which to combat any subs who attempt to "beat the system" by denying intent to buy. this feature's use should be infrequent, but it obviates the need to develop elaborate operational measures to combat the same problem.

In addition to a 20-event register for PPV events, a desirable feature is the capability to store and report terminal status as codified by the converter's auto-diagnostic function. Another register retains subscriber

responses to opinion-polling, and can be utilized for other transactional services, such as shop-at-home, catalog/information requests, etc.

Perhaps the most significant application of store and forward technology outside of IPPV is its "system snapshot" feature. A "record" command can be sent to every addressable converter in the system instantaneously, whereupon each unit will record terminal status for that particular point in time: whether or not the terminal is on, and what channel it is tuned to. This operation can be repeated successively up to five times, in intervals as short as several seconds. Obvious applications are for juxtapositon of programming, provision of accurate viewer information to program-rating services, and ad sales. Naturally, the latter functions must be managed with sufficient care and discretion to prevent community ill will--but cable operators now have the capability to use any of these discretional features at their option, even in one-way cable plant.

Store and forward ordering mechanisms require enhancement of the addressable controller system to retrieve and process the incoming information and to feed the necesary data back into the billing computer; but since these functions can be performed at a far more leisurely pace than for real time systems, the enhancements are relatively simple and economical.

The user friendliness derived from store-and forward systems contributes to the incremental revenues from impulse buyers, and as the matrix in Figure (5) illustrates, capability for peak order load is unlimited.
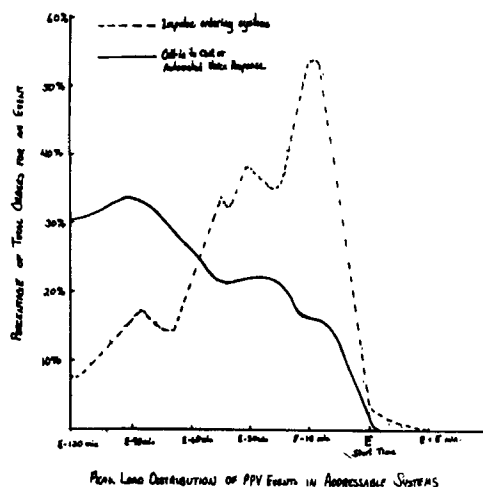
CONCLUSION

An evaluation of the peak order volume requirements outlined in Figure (5) for varying penetration levels and system sizes is useful in deciding which PPV ordering mechanisms is most appropriate for a cable system's pay-per-view plans. It is apparent from the peak load distribution matrix that although systems such as voice response and ANI may provide short term, low cost entry to the PPV market, impulse-capable technologies must ultimately be employed to allow for successful market penetration of PPV programming.

Order-taking capabilities vary somewhat among the real time based systems, with the true gating factor resting on the addressable controller. At the optimal terminal authorization rate of 30 terminals per minute, all the ordering mechanisms which rely on queuing up terminal ID's for real time authorization are subject to the same system constraints. These systems (CSR call-in, automated voice response, stand-alone dialer systems, and ANI), can authorize 900 terminals per half hour, or 1800 per hour at the current state of the art in addressable controllers.

A practical limitation is thereby placed on the peak load handling capabilities of the system, irrespective of order-taking capacity. A 30,000 addressable subscriber base on one of these ordering systems must plan a pay-per-view program not to exceed the 6% penetration mark for a peak order load of 50% in a 30 minute period. If, through special marketing and promotional efforts, this 50% peak load can be distributed over 60 minutes, the system shoot for a maximum of 12% penetration for a particular event, and be able to handle the 1,800 terminal authorizations in one hour.

Blockbuster events and heavily promoted new releases which have typically enjoyed penetration rates from 15-60% in many PPV systems, must be offered with one of the ordering mechanisms capable of handling the peak load just prior to event start, in order to maximize the sales potential of the program.

Alternately, if limited by the ordering mechanism technology, a system operator must face the duplicitous task of discouraging a particular set of subscribers from buying the event offered.
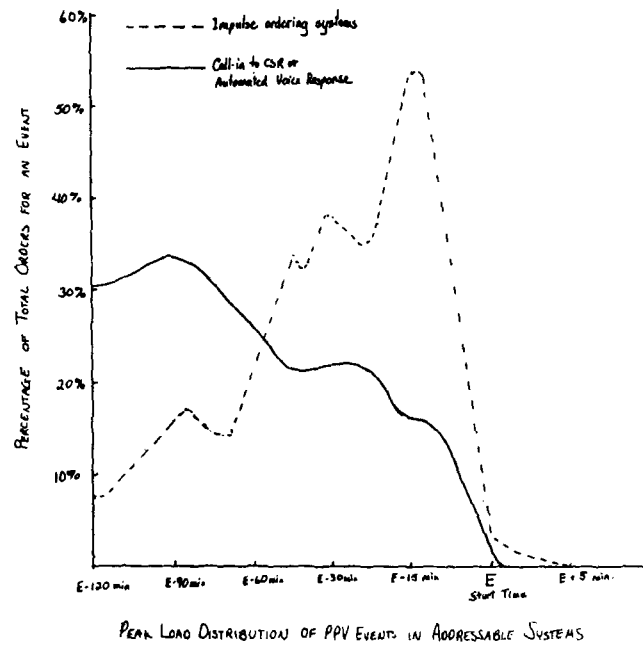

FIGURE #3

Peak Load Distribution of PPV Event in Addressable Systems

cont'd

FIGURE #3 (enlarged)

Peak Load Distribution of PPV Events in Addressable Systems

FIGURE #5

50% PEAK LOAD DISTRIBUTION MATRIX

Event Penetration →	2%	3%	4%	5%	6%	7%	10%	12%	15%	20%	25%	30%	35%	40%	45%	50%
10000	100	150	200	250	300	350	500	600	750	1000	1250	1500	1750	2000	2250	2500
15000	150	225	300	375	450	525	750	900	1125	1500	1875	2250	2625	3000	3375	3750
20000	200	300	400	500	600	700	1000	1200	1500	2000	2500	3000	3500	4000	4500	5000
25000	250	375	500	625	750	875	1250	1500	1875	2500	3125	3750	4375	5000	5625	6250
30000	300	450	600	750	900	1050	1500	1800	2250	3000	3750	4500	5250	6000	6750	7500
40000	400	600	800	1000	1200	1400	2000	2400	3000	4000	5000	6000	7000	8000	9000	10000
50000	500	750	1000	1250	1500	1750	2500	3000	3750	5000	6250	7500	8750	10000	11250	12500
60000	600	900	1200	1500	1800	2100	3000	3600	4500	6000	7500	9000	10500	12000	13500	15000
75000	750	1125	1500	1875	2250	2625	3750	4500	5625	7500	9375	11250	13125	15000	16875	18750
80000	800	1200	1600	2000	2400	2800	4000	4800	6000	8000	10000	12000	14000	16000	18000	20000
90000	900	1350	1800	2250	2700	3150	4500	5400	6750	9000	11250	13500	15750	18000	20250	22500
100000	1000	1500	2000	2500	3000	3500	5000	6000	7500	10000	12500	15000	17500	20000	22500	25000
110000	1100	1650	2200	2750	3300	3850	5500	6600	8250	11000	13750	16500	19250	22000	24750	27500
125000	1250	1875	2500	3125	3750	4375	6250	7500	9375	12500	15625	18750	21875	25000	28125	31250
150000	1500	2250	3000	3750	4500	5250	7500	9000	11250	15000	18750	22500	26250	30000	33750	37500
200000	2000	3000	4000	5000	6000	7000	10000	12000	15000	20000	25000	30000	35000	40000	45000	50000

(left axis label: ADDRESSABLE SUBSCRIBERS)

This distribution matrix assumes a 50% peak load of event orders in the designated time period.

Load limitations of various ordering mechanisms are drawn into the matrix, and shaded by technology.

Peak load distributed over 30 minute period/all controller-gated real time systems (CSR call-in, automated voice response, auto-dialers, and ANI)

Peak load distributed over 60 minute period/ all controller-gated real time systems

Peak load capacity over 30 minute period/impulse capable and store and forward systems