5. Joint and common costs between coin and coinless calls should be allocated based on the estimated competitive quantities of these calls (i.e., that number which arises under competitive pricing).

In order to explain the basis of these conclusions, we turn first to a description of the workings of a locational monopoly market such as payphones. We begin by noting that a site with good public exposure, particularly among travelers (such as an airport), provides a valuable opportunity to whoever controls access to that site.[30] Like any other valuable asset, the owner of this site would wish to maximize his or her returns from it. It is a commonplace observation in economics that monopoly pricing is the means by which to maximize that return. Thus, the site owner would *not* ordinarily allow competing payphone suppliers to locate on its site since that would reduce rents obtainable. Thus, one expects monopoly operations at franchise sites.

1. LOCATIONAL MONOPOLY, COMPENSATION, AND CONSUMER WELFARE

Payphone operators wish to obtain beneficial sites for their operations. To do this, they negotiate with site owners for access and offer revenue sharing or other forms of compensation to secure franchise rights.[31] Free entry, and the degree of competition in bidding for sites, increases the bargaining positions of the site owners, just as increases in the numbers of bidders in an auction raises expected sale prices, benefiting sellers. Increased entry by payphone providers *does not* increase the number of good sites for payphones.

Since little competitive overlap exists between sites (and, indeed, site owners have a powerful incentive to see that competition does not occur), free entry and construction of payphones results, over time, in all profitable sites being filled. A part of the payphone operator's earnings arise from dial around service compensation. However, if there is indeed free entry into payphone services, and competition for good sites, then the rents arising from good sites are captured by the site owners. Payphone operators presumably have no market power in the provision of payphone equipment *per se*, and thus cannot earn rents in the long run.

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[30] More generally, what qualifies as a marketable site is itself somewhat endogenous. One expects property owners to seek to offer good sites.

[31] The fact that many such commission contracts specify a revenue share, rather than a fixed nominal payment, is itself irrelevant when shares can vary.

Figure II illustrates the equilibrium number of payphones n^* in a jurisdiction for a given dial around compensation scheme. Suppose there is a very large number $\tilde{N}$ of potential sites. The horizontal axis measures the desirability of locations from best (e.g., at a busy airport lobby) to worst (e.g., in a rural field). Let R^*_n be the revenues from profit-maximizing operation of the "n^{th} phone" (i.e., n^{th} best site), and, for simplicity, assume economic costs of service are constant and fixed per phone at level C.[32] The distance $R^*_n - C$ represents the locational rents obtainable from site n. All sites n such that $R^*_n - C > 0$ are economic and will be filled. Sites for which $R^*_n - C < 0$ will have no payphones. The "phone" in location n^* is only marginally profitable, and n^* is also the total number of payphones installed in the jurisdiction.

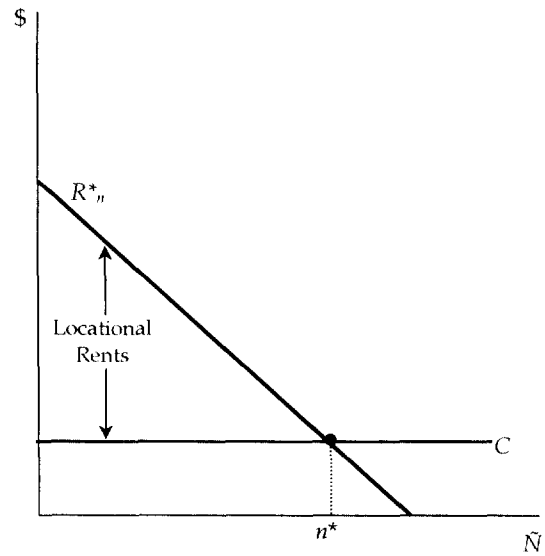

Figure II.

With free entry into the market for sites, the rents $R^*_n - C$ for $n < n^*$ accrue totally to the site owners in the long run. If payphone providers have market power also, then they presumably can receive some of these rents. In either case, there are no market forces that limit the ability or incentive of site owners and operators to extract all site rents, although they disagree over their divisions. Worse, site owners act to obtain and preserve monopoly type sites.

We note that the equilibrium number of phones n^* depends on the dial around compensation systems, since that system partially determines income to the operators. Consider, then, the effect of a change in the compensation system that raises earnings of payphones. This will cause an upward shift of the revenue curve R^*_n to R'_n for all n (except those n for which $R^*_n = 0$ initially). How will this shift occur? Under plausible circumstances, the shift will be one proportional to the level R^*_n initially. To see this, note first that differences in R^*_n and R'_n primarily reflect differences in phone demand at different sites. If one plausibly assumes that demand for dial around services are proportional, on

[32] Assuming C varies by site does not alter the basic conclusions.

average, to demands per phone for coin calls, then a phone that exhibits a higher revenue from coin calls likewise exhibits a proportionally higher dial around usage. This assumption is quite sensible because dial around calling is "free" to a caller, and dial around compensation costs only very weakly affect calling demand in the short run, much as call recipients have very weak incentives to attempt to affect terminating access charges paid by those who call them.[33]

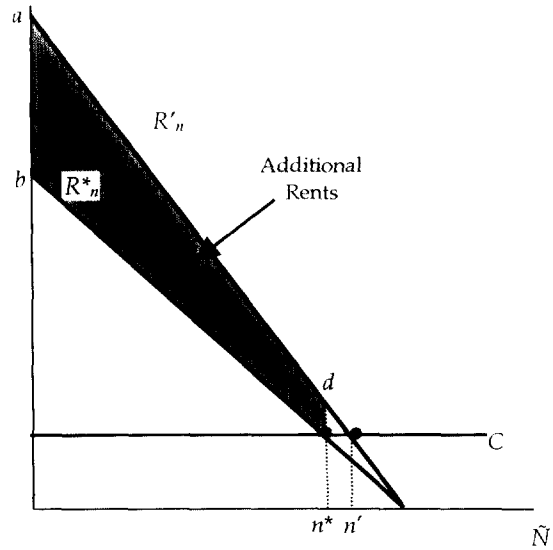

Figure III.

Figure III illustrates the new equilibrium number of phones, n', with increased dial around compensation.[34] The increase in phones $\Delta n = (n' - n^*)$ depends only on the number of previously unprofitable sites that are now profitable due solely to the change in dial around compensation. However, the overwhelming consequence of this change is to increase the rents R_n - C generated at all inframarginal sites, shown in Figure III by the shaded area *abcd*. Further, this increase in rents at "old" payphones is greater at sites with larger rents initially. Those sites enjoying the largest rents to begin with enjoy the largest windfalls from the change in compensation rates. This increase in rents at existing payphones, and the small increase in the number of new phones, is costly in terms of consumer welfare. In a previous study, we estimated the consumer surplus loss associated with this transfer (for an average state) to be $5,500 per new payphone (generated by the price increase) per year.[35] In other words, increases in the payphone rates do not generate a sufficient number of new phones to offset the (negative) welfare effects of higher prices at all previously existing payphones. It is unclear that

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[33] First Report and Order, FCC Docket No. 97-158, May 16, 1997, at ¶ 349.

[34] It is not certain that increased compensation will increase the number of payphones. BellSouth reported that raising the local coin rate to 35 cents was required in order to "maintain its current level of payphone service and coverage in the Southeast." Communications Today, October 31, 1997.

[35] E Group, Economic Effects of Excessive Compensation Rates to Pay Telephone Providers, (Ex Parte) Re: FCC Docket 96-128; Payphone Compensation (October 6, 1997).

such a transfer from consumers to holders of monopoly rights is in the public interest or "to the benefit of the general public."

2. Regulation, Locational Monopoly, and the Quantity Problem

Here an important subtlety emerges. The quantities of payphone calls observed under regulation of coin prices and entry reflects the regulation. On the other hand, the quantity of calls observed since deregulation, which has apparently triggered a 40 percent increase in coin rates ($0.25 to $0.35 in many locations) at many locations, reflects locational monopoly pricing. Neither of the quantities is the competitive quantity. Worse, it is impossible to infer competitive market prices from cost calculations that merely subtract site rents from total costs and calculate resulting break even prices (as the Commission did in the *Second Order*). This is because the quantities assumed to do these calculations are themselves inconsistent with the resulting prices. For example, if there are 700 calls per month given current prices, of some type, at a typical phone, and that phone costs $200 a month to operate, a price (p) that (oversimplifying) results in the equality $p \cdot 700 = \$200$ (or anything equivalent) will not actually result in 700 calls per month.

The difficulty described above is, at a basic level, intimately related to the issue of using observed prices to calculate dial around compensation. Observed payphone prices appear to reflect either *regulation*, or *monopoly*, or some transition from one to the other. But quantities of service purchased depend on prices, among other things. Thus, observed quantities reflect either regulation or monopoly as well. Efficient regulation should, so far as possible, seek to duplicate competitive outcomes. Regulators should therefore seek to implement prices that equal those expected under competitive conditions, i.e., prices one would obtain if sites accommodated multiple service providers at the same time, so that monopoly site rents were zero (due to competition for the patronage of payphone consumers).

There may well be a difference between a monopoly market stripped of site rents and a competitive market in which competing providers locate their phones side by side, however. With the monopoly structure, payphone customers' demands reflect zero competition from nearby competing phones, and their elasticities of demand arise solely from substitution between payphone services and other goods. On the contrary, with true competition the demand for service at any one payphone is much more elastic, influencing the resulting pricing and observed quantities.

The above analysis casts considerable doubt on the use of observed market quantities in apportioning joint and common costs between coin and dial around calls. Further complicating matters is the fact that increases in dial around/800 service type charges will eventually tend to lower demand and use of such services. In the absence of a true competitive market example, use of observed quantities to allocate common costs is likely to result in excessive levies on coinless services.

3. CARRIER PAYS AND THE TERMINATING ACCESS PROBLEM

Because initiators of dial around calls do not pay for service directly, they have essentially no incentive to economize on the use of such services. Rather, those firms or organizations that receive these calls pay the costs. Thus, the only way an increase in dial around rates will reduce dial around usage is by an eventual decline in the number of businesses using 800 services, the blocking 800 calls from payphones, and/or similar market exits.

The callers' lack of incentive to respond to dial around price changes closely resembles a similar problem long identified with terminating access charges.[36] In general, markets work less well, or more slowly, when the incentives of the parties that make decisions are weak. Just as those receiving non-collect long distance calls have little reason to seek out lower terminating access charges, those making 800 and other dial around calls correctly reason that "someone else will pay."

The muted responsiveness of dial around call initiators to cost increases should be recognized by regulators. In the short run, increases in dial around compensating rates may have far less effect on this market than in the long run.

4. SUMMARY

How, then, should coinless type services be priced? The theoretical answer, on which all economists are likely to agree, is that such services should be priced as they would be under effective competition. Since the payphone market was long regulated, only recently deregulated, and exhibits locational monopoly, market observations are unlikely to afford much insight into this requirement.

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[36] First Report and Order, FCC Docket No. 97-158, May 16, 1997, at ¶ 349.

Given these limitations, and the practical necessity of implementing a nationwide standard, it seems most useful to investigate the possibilities of cost-based pricing rules, taking account, as for as possible, of the aforementioned distortions in quantities that arise from the locational monopoly issue. In particular, if coin rates are "too high" (above competitive levels), then the numbers of coin calls are "too low." Conversely, if coinless service charges are claimed to be too low, then quantities of these calls, after equilibrium adjustment, are "too high." Both effects suggest that using current quantities to allocate common costs will result in excessive levies to coinless services.

IV. Effect of Deregulation and Price Changes on the Number of Payphones

In this section we examine the effects of state deregulation of payphone coin prices on entry into the payphone market. We show that deregulation of coin prices did not lead to significant increases in the number of payphones. This finding suggests that increased prices of coinless service will also not increase the number of payphones. In general, experience suggests that coin revenues will be more important to payphone service providers than will coinless service compensation. Thus, the inability of coin price deregulation to stimulate payphone entry implies that feasible increases in coinless compensation will have little effect.

To analyze this issue, we specified and estimated a series of regression models, which seek to explain net changes in the per capita number of payphones per state for the period 1992 through 1995.[37] We chose to explain net changes instead of the total number of payphones in order to capture the contemporaneous effects of changes in coin rates and regulations on net investment in new payphones. Unlike the total number of payphones the net change in the number of payphones is not encumbered by the effects of historical regulatory policies.

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[37] The total number of payphones includes LEC payphones plus privately own payphones. The number of LEC payphones was provided by the FCC Common Carrier Statistics, Table 2.5, 1988. The number of private payphones is based on the number of phones requesting dial-around compensation from MCI (source MCI).

The explanatory variables used in our models include the following:

LP =	log of the actual average state coin rate[38]
POPMILE =	population density per state
POOR =	percent of poor families in state
LOCAL =	relevant Bell average monthly line rate for a residential line per state
SLC =	monthly subscriber line charge per state
DEREG =	a dummy variable which takes on the value of 1 if a state did not regulate payphone coin charges[39]
D93-D94 =	dummy variables which take on the value of 1 for the respective years.

Our measure of payphone entry is the year-to-year change in the number of payphones per capita in a state, *CHG*. Under a regime of effective price regulation, any increase in coin prices should result in an increase the number payphones, since such changes makes previously unprofitable sites profitable. We would also expect to find that deregulation of the coin prices would induce an increase in the number of payphones.

To test these assumption we specified the following econometric equation:

$$CHG = \beta_0 + \beta_1 LP + \beta_2 POPMILE + \beta_3 POOR + \beta_4 LOCAL$$
$$+\beta_5 SLC + \beta_6 DEREG + \beta_7 D93 + \beta_8 D94.$$

Using data from 44 of the contiguous states, the equation above was estimated by ordinary least squares. The results are provided in Table I.[40]

Our findings suggest the following. First, price increases have no statistically significant effect on the addition of payphones during this period. If price increase had the desired effect we should have found a positive and significant coefficient on the price variable. Second, as expected, poor families and higher local rates increase payphones per capita. Poor families are more likely not to

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[38] The coin rate is from the NARUC Compilation of Utility regulatory Policy, Table 161 -- Coin Telephone Rates For Major telephone Companies, Year End 1988-1995.

[39] The states with deregulated rates for part or all of the sample period are, Iowa, Montana, Nebraska, North Dakota , and South Dakota. See Ex Parte Presentation to FCC from Michael Kellogg (September 26, 1997).

[40] Since we had no cost data for California, Missouri, Nevada, or Texas, they were not included in the sample.

have a phone in the home and thus rely more on payphones than higher income families. Higher local rates would have a similar effect, decreasing the number of households with local phone service thus increasing the demand for payphones. Third, and most importantly, deregulation of coin rates in selected jurisdictions had no significant effect on the number of payphones in those jurisdictions. Taken together these findings suggest that increasing payphone coin prices as a means of stimulating additional payphones is not effective.

Table I.

Variable	Coefficient
LP	0.00018
	(0.99)
POPMILE	-0.000000028
	(1.16)
POOR	0.00002
	(2.06)
LOCAL	0.00002
	(3.29)
SLC	-0.00008
	(1.09)
DEREG	0.00002
	(0.21)
D93	-0.00003
	(0.041)
D94	0.00005
	(0.55)
Constant	-0.0013
	(-2.53)
R^2	0.20
Observations	124

Note: t-statistics in parenthesis

These results offer policy guidance for setting coinless service compensation. It appears unlikely that increases in coinless charges will induce a significant increase in the number of payphones. Coin rate increases, or deregulation of these rates in some states, did not appear to provide any significant gains in payphone service availability. Caution is warranted in formulating policy in this area since price increases harm consumers directly, and are largely dissipated on transfers to owners of monopoly rights.

V. Conclusion

Regulators face an important challenge in correctly selecting rates for dial around compensation in the U. S. payphone industry. Any method for setting rates should, at a minimum, satisfy the following constraints.

1. The fact that observed coin prices incorporate locational monopoly rents, which are not social costs, must be recognized.

2. Prices and quantities observed to occur under either regulation or locational monopoly conditions cannot generally be used to correctly calculate dial around compensating rates.

3. Prices for dial around services should, as far as possible, equal those prices that would prevail under competition, i.e., when different providers' payphones sit side by side at sites earning producing zero site rents. Since (welfare maximizing) competition is not observed in the payphone industry, a compensation rate consistent with what competitive market would produce must be based on the cost calculation describes in Section III.

4. Evidence on the effects of coin price increases and coin price deregulation in various states prior to the Telecommunications Act of 1996 suggests that price increases did little to increase the numbers of payphones available to the public. Because coin revenues are generally more important than dial around compensation will ever be, these results suggest that the primary beneficiaries of price increases are site owners and, to a lesser extent, payphone operators, and that increases in dial around compensation will have little effect on the numbers of payphones.

A prudent approach to setting dial around service prices would necessarily consist of establishing the probable *competitive* levels of these costs. Besides illustrating the importance of establishing payphone costs to a great precision, any prudent approach would also include a careful study, using the well-regarded antitrust market analysis criteria, of the U.S. payphone industry.

Payphone Cost Study

Exhibit 2

Introduction

This study calculates the entire cost for a Payphone Service Provider (PSP) to provide an additional payphone, including usage costs associated with an average number of coin sent-paid calls (local and coin-paid long distance) and 800 or access code calls. The study assumes the use of "smart" payphones and "semi-smart" payphones (see Figure 1). Smart phones are those that can be remotely programmed to determine call rates and provide voice prompts to guide callers through the call. Semi-smart phones are sometimes referred to as "fat phones" and are countertop units that have limited programming capabilities through the keypad.

Smart payphones are ubiquitous in society while semi-smart payphones are often placed in small businesses such as restaurants and hair salons. Another type of payphone, dumb payphones, is a payphone with all the intelligence either in the telco line or the central office, not in the station equipment. While dumb phones are a large percentage of the embedded base, equipment prices are difficult to obtain since almost all new payphones being placed are either smart or semi-smart. The study, therefore, only considers costs for smart and semi-smart phones.

The total cost of the phone is estimated and shown on a per call basis for all calls made on the phone (see Table 1). In addition, the cost per call for 800 and access code calls is estimated by removing coin related costs from the average per call costs for all calls (see Table 2). The monthly cost per payphone is divided by 700 calls[1] to get a monthly cost per call. The total costs are composed of three major components: capital costs, operating expenses and overhead.

The investment costs include the station investment, enclosure/pedestal investment, installation costs and line initialization costs. When the capitalized cost of installation and engineering is added to the purchase price of these assets, these investments are also known as engineered, furnished and installed (EF&I) investments. Monthly capital costs are calculated for these investments to include the costs of depreciation, return to shareholders, interest on debt, and income taxes. Operating expenses are the costs to run the business such as telco line charges and maintenance and repair. Overhead generally accounts for items such as office space and staff functions.

[1] As described in the accompanying report by the E Group, *A Study of Payphone Market Organization and Compensation,* choosing the correct number of calls to determine the per call cost is complicated by a number of factors. First, observed call quantities reflect either regulation or monopoly, and therefore do not represent the quantity that would be obtained in a competitive market. Second, it is inappropriate to infer market prices or quantities by calculating the breakeven number of calls excluding site rents (as the Commission did in the Second Order). Since historical coin rates have generated profits, i.e., locational rents, that average about one-quarter of revenues, the observed market quantities are below those that would result in a competitive market. Consistent with the conservative approach to cost estimation adopted by this study, we choose the average number of calls per phone as supplied by the APCC and cited by the FCC in the Second Order (ft. 124), about 700 calls. Since this quantity is consistent with above cost prices, it is conservative and will render a per call cost estimate above that of a truly competitive payphone industry.

Capital Costs

Payphone station investment – this includes the actual purchase price of the station equipment itself and is an average for smart coin payphone stations and semi-smart stations. Prices for payphones from various suppliers were used and the station investment number is an unweighted average (range $549 to $1,581 for smart phones and $149 to $560 for semi-smart phones) of payphones such as the Protel 310, Dura-Smart, Protel 7800, A+ and Profit Phone, just to name a few. See Attachment 1 – payphone stations, for pictures and description of some station equipment used.

The final station investment number includes equipment investment, payphone-programming charges, and equipment discounts of 20% based on a confidential quote and industry experience. A median national sales tax rate of 5% is also used. The cost of a modem and software to do remote programming are excluded from this study because these costs do not vary with the number of payphones installed.

Enclosure/pedestal investment – this includes investments for various enclosures and pedestals commonly found in the market (see Figure 2). The different types of pedestal/enclosures combinations are listed in the chart below. Semi-smart payphones have little or no need for enclosures and pedestals, but occasionally there is a need to secure the phones to a wall for theft protection (see Attachment 2 – enclosures/pedestals and installation, for sample photos of enclosures and pedestals used).

The investment for each enclosure/pedestal category is weighted by the percentage (MCI estimate) of each type of enclosure likely to be used and includes an estimated factor for supplies such as concrete, bolts and cables that may not be included with the original enclosure purchase (see chart below). The final investment number also includes equipment discounts as well as sales tax similar to station investments.

Enclosure type	*smart*	*semi-smart*	*supplies factor*
packaged fancy pedestal and enclosure	10%	0%	10%
pedestal and corporate enclosure (fancy)	10%	0%	20%
pedestal and basic enclosure (sardine can)	30%	0%	20%
wooden enclosure with phonebook shelf	22%	0%	5%
fully recessed stainless steel panel mount	25%	0%	5%
direct mount backplate	3%	10%	1%
no mounting - countertop placement	0%	90%	0%

Installation – this includes the weighted average of installation charges for payphone stations as well as enclosures/pedestals. The installation charges are $250 in all cases except when there is a direct backplate wall mount ($80) and countertop placement ($50). The installation charges include the labor to install the station and enclosure/pedestal as well as any inside wire or cabling work that may need to be done.

Line initialization by LEC – this includes any non-recurring charges for line initialization such as line connection, service order and premise visits. The study assumes that an average premise visit will be 30 minutes long and that a premise visit will be required 30% of the time. This cost is then added to the average NRC across RBOCs to get a total line initialization charge. The methodology is conservative because many ILECs already include a premise visit charge in their non-recurring charges.

Once a physical plant is capitalized, the company must incur costs such as depreciation, return to shareholders, interest expense and income taxes on the equity portion of the return. The study uses a standard capital cost calculation. The calculation assumes a straight-line depreciation over 10 years as the useful life of a payphone[2]. The return to shareholders can be calculated with the weighted average cost of capital, WACC, which is set at the FCC rate of 11.25%. The components of the WACC are set as follows: cost of debt, 8.8%; debt fraction, 44.2%; and cost of equity 13.19%[3]. The combined federal, state and local income tax rate used is 39.25%.

Operating Expenses

Telco charges – these are the charges from the telco that appear on the monthly bill for an individual payphone. All telco charges are an average across all fifty states for RBOCs where figures are available in current tariffs. The study assumes a dial tone line used for smart and semi-smart phones to be a two-way measured rate line (excluding usage) equipped with touch tone, and blocking and screening for fraud protection. The usage component of telco charges is calculated by subtracting the average measured rate line charge excluding usage ($22.21) from the average flat rate line charge with usage ($37.80) to arrive at $15.59.

The EUCL or SLC represents the charges for a multiline business as directed by the tariffs. Payphone line coding rates are applied to a region and so far only exist for Bell Atlantic, Nynex (same as BA's) and Ameritech and are an average for the three companies. Since some PSPs may not actually be incurring this obligation today, the study is conservative in assuming this expense occurs now. Taxes and 911 charges of $4.84 are used[4]. See Attachment 3 – line charges, for a tabulation of data collected from RBOC tariffs from all fifty states as well as other backup documentation. Telco charges are the same for a smart phone as well as a semi-smart phone.

Maintenance, repair and coin collection – this includes the costs to maintain and repair the equipment as well as the costs of coin collection. The 1996 ARMIS ratio for the RBOC's USOA 2315 and 6315, public telephone terminal equipment, is used as a factor against the EF&I investment for smart phones as a measure of the operating expenses

[2] People's Telephone Corporation (PTC) 10-K report, page 30.
[3] 5 FCC Record No. 25, p. 7529. FCC did not specify a cost of equity, hence it is calculated using the other two parameters to produce an overall WACC of 11.25%.
[4] FCC's *Trends in Telephone Service*, February 98, page 65. The latest available data for business rates are from 1996.

incurred[5]. The data for 1996 were used because this is the latest year of publicly available data, and the ratio is an average across RBOCs in the fifty states. For semi-smart phones, the above costs are multiplied by 25% to reflect the fact that a semi-smart phone has considerably less associated maintenance because of its simplicity and typical indoor location.

USF – these charges are collected as a percentage of revenue and are shown separately from the telco bill. The study assumes that .75% is applied to all revenues and is used to pay for S&L and RHC, while an additional 3.14% is applied only to interstate and international revenue to pay for the High Cost Fund and Lifeline. The average revenue per payphone is assumed to be $243.99[6], and it is further assumed that 20% of the revenues will be interstate and international.

Commissions paid to premise owners are not included in this study as explained by the E Group[7]. The profit attributable to a locational monopoly is not an economic cost. Warehousing costs are assumed to be zero since an additional payphone can be placed by ordering from a supplier without incurring storage costs. To the extent any such costs are actually ever incurred, they are reflected in the variable overhead factor.

Variable Overhead

A 10.4% factor is used to account for variable costs such as office space, legal services, human resources and other staff functions. The variable overhead percentage is applied to the sum of the capital costs and operating expenses.

Adjustments for 800 or Access Code Calls

To obtain the cost of an 800 or access code call, the cost for all calls was adjusted by subtracting out the "costs directly attributable to coin calls...."[8] The adjustments were made for the coin mechanism, local usage, maintenance, repair and coin collection and USF.

The investment for a sophisticated electronic coin mechanism is $250 for an average smart station investment of $1,065[9]. The study uses this ratio (250/1,065 = 23%) as a percentage of the average smart phone investment to account for the coin mechanism. The capital cost related to the coin mechanism was then subtracted from the total capital costs to reflect avoidable coin mechanism costs.

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[5] Code of Federal Regulation for Telecommunications, October 1997, page 464. Published by the Office of the Federal Register National Archive and Records Administration. "This account shall include expenses associated with public telephone terminal expenses."

[6] PTC's 10-K, page 25.

[7] See E GROUP's paper, *A Study of Payphone Market Organization and Compensation*, pages 13-15.

[8] FCC Second Report and Order 97-371 page 19.

[9] This investment number is an average of phones that identified their electronic coin mechanism costs separately.

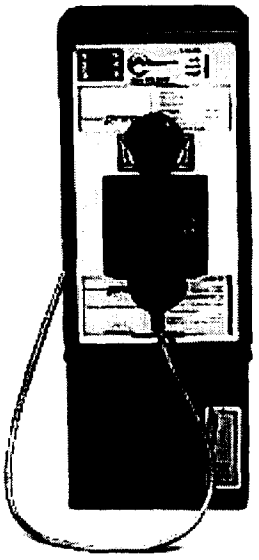
Usage cost calculations are described earlier in the telco charges section. The usage costs are removed since PSPs taking measured service pay message charges for local coin calls but not for access code or 800 subscriber calls. This represents a difference between coin and coinless calls.

The total maintenance, repair and coin collection expenses of the phone was also multiplied by 23% (the ratio of investment cost saved) to reflect maintenance costs associated directly with coin mechanisms, and this amount by subtracted out from the total monthly amount. Coin box telephones are intrinsically more tempting to vandals and hence have higher repair and maintenance costs, hence the actual maintenance percentage associated with coin may be considerably higher and the adjustment is highly conservative.

USF charges were subtracted out because USF charges are assessed against end user retail revenue, not payphone compensation revenue. Since non-coin calls have no *retail* revenue, the USF charge is avoidable.

Conclusion

Payphone compensation should be based on the results presented in this study. This study provides a comprehensive bottoms-up cost based method for determining payphone compensation. In many instances the inputs and methodology err on the side of conservatism to produce a range of results for the cost per call with and without coin related adjustments. There is also extensive publicly available documentation attached here that supports the inputs used in the study.



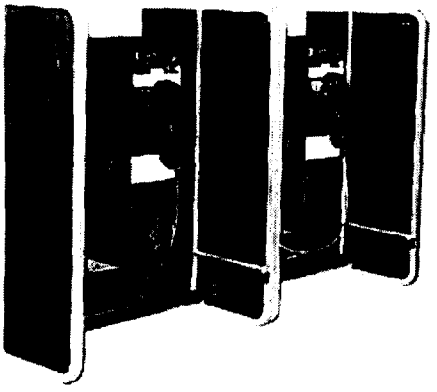
Protel 7500 Smart Phone

A+ 2000 Semi-smart Phone

Figure 1 – Station equipment

Source: Vendor websites

Corporate enclosure



Wooden enclosure

Figure 2 – Enclosures and pedestals

EF&I	Smart Phone	Semi-Smart		Notes
payphone station investment	$ 985	$ 271	@	20% discount
enclosure/pedestal investment	333	3	@	20% discount
installation	245	53		
line initialization by LEC	87	87		
total EF&I	$ 1,650	$ 414		
capital costs	$ 26.72	$ 6.70	@	11.25% over 10 years
operating expenses				
telco charges				
DTL measured, TT, block/screen	$22.21	$22.21		
Usage	15.59	15.59		
EUCL / SLC	7.62	7.62		
Payphone Line Coding	1.46	1.46		
911and taxes	4.84	4.84		
subtotal telco charges	$ 51.72	$ 51.72		
maintenance / repair / coin collection	22.66	5.66		
USF	3.36	3.36		
total operating expenses	$ 77.74	$ 60.75		
variable overhead	$ 10.86	$ 7.01	@	10.4%
total cost / month / payphone	**$115.32**	**$74.46**		
cost / all calls / month	**$ 0.16**	**$ 0.11**	@	700 calls / month

Table 1 – Cost for all calls

	Smart Phone		Semi-Smart Phone	
	total cost	cost / call	total cost	cost / call
cost for all calls	$ 115.32	$ 0.16	$74.46	$ 0.11
coin related adjustments				
coin mechanism	$ (3.75)	$ (0.005)	$ (1.03)	$ (0.001)
local usage	(15.59)	(0.022)	(15.59)	(0.022)
maintenance / repair / coin collection	(5.32)	(0.008)	(1.33)	(0.002)
USF	(3.36)	(0.005)	(3.36)	(0.005)
total adjustments	$ (28.02)	$ (0.04)	$ (21.31)	$ (0.03)
total cost per month	**$ 87.31**		**$ 53.15**	
cost / 800 or access code call / month		**$0.12**		**$0.08**

Table 2 – Cost for 800 or access code calls

Attachment 1.
Payphone Stations

Payphone Station Investment

Average Station Investment

	Average Smart Phone	Average Semi-Smart Phone
Price	1,143	310
Equipment Discount (20%)	(229)	(62)
Subtotal	914	248
Tax (5%)	46	12
Programming Expense	25	11
Total Investment	985	271

Smart Phone Vendor Quotes

Model	*Protel 310*	*Protel 7000*	*Protel 7500*	*Protel 7800*
Investment	924	974	1246	1581
Programming Quote	25	25	25	25

Model	*Dura-Smart*	*Intellicall Astratel 2*	*Elcotel 100104*	*Elcotel 100115*
Investment	549	970	955	1160
Programming Quote	25	25	25	25

Model	*Elcotel 105519A*	*Elcotel 105503*	*Elcotel Eclipse*	*Elcotel Comet*
Investment	1160	1185	1555	1455
Programming Quote	25	25	25	25

Semi-Smart Phone Vendor Quotes

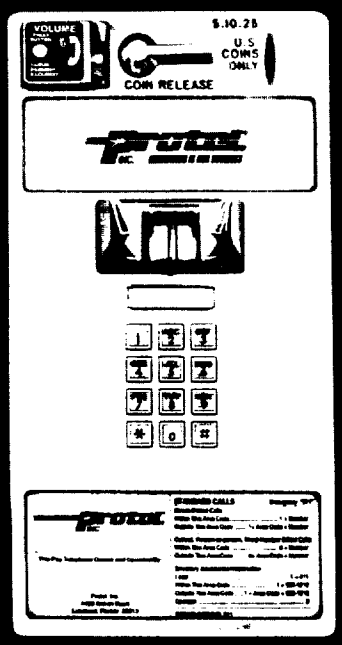
Model	*Profit Phone 707*	*Profit Phone 727*	*Profit Phone 757*	*Profit Phone 777*
Price Quote	249	299	495	560
Programming Quote[1]	0	0	0	0

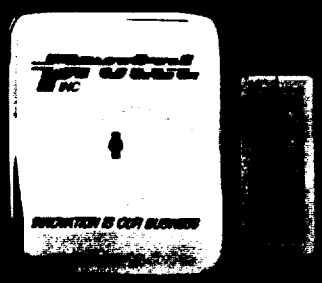
Model	*A + 1000*	*A + 2000*	*A + 3000*
Price Quote	149	189	229
Programming Quote	25	25	25

Note:

[1] Programming of Profit Phones is included in purchase price.

Protel's Stellar™ Series Model 310





Simply the Best "Workhorse" Payphone You Can Own!

Protel's Stellar™ Series Model 310 smart payphone provides a low cost, high value solution for your locations that demand basic coin telephone service.

The "workhorse" for the Payphone Service Provider market, the line-powered Stellar™ Series Model 310 payphone uses Protel's proven reliable technology combined with the durability and feature-rich performance that has become synonymous with Protel® products.

To maximize reliability and customer value, the Stellar™ Series Model 310 is offered exclusively as a complete telephone utilizing Protel's HABITAT® housing. HABITAT® housings feature electrodeposition undercoating protection, custom powdercoat finish, super chrome-plated fixtures, waterguard seals, all-metal superdial, micromagnetic Lexan® hookswitch and upper housing lock guard.

The Stellar™ Series Model 310 is designed for your locations which require a smart payphone that provides the best combination of maximum product value, reliability and simplicity of use and operation.

Simplicity ◆ Reliability ◆ Value

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ISO 9001

Stellar™ Series Model 310

Stellar™ Series Model 310

Features of the Stellar™ Series Model 310

ASSET MANAGEMENT TOOLS/ELECTRONIC SERIALIZATION

Tracking your payphone assets is easier than ever before with the Model 310 electronic serialization. Each Model 310 chassis contains a nonerasable electronic serial number and automatically reports the location of each chassis to the management software, providing positive board identification.

CALL REVENUE AND COST VERIFICATION/CALL DETAIL RECORDING

The Model 310 records information about each call made from the payphone. This information can be used to aid in verifying Dial Around Compensation, Operator Service Provider commissions, long distance bills, local measured usage charges, call volume discounts and other call-related items.

LEAST COST ROUTING/CALL PROFIT MAXIMIZATION/CALL REROUTING CAPABILITY

Using the Model 310 call routing features, you can route your long distance calls to the least-cost carrier and at the same time, route your operator-assisted calls to the Operator Service Provider offering you the best options in commissions and services. In fact, you can even utilize multiple carriers and OSPs.

PROTECTIVE COVER

Minimize unintentional chassis damage during handling, installation or servicing with the Model 310 protective chassis cover. You'll be pleased with this protective cover, which surrounds the electronic components to protect electronic devices from mishandling and abuse.

PAYPHONE MANAGEMENT SOFTWARE

Protel's PC-based payphone route management software provides a method to keep you up-to-date on your telephone's performance. The management system communicates easily with your phones to give them call rating and routing information, operating parameters, collect call data records, and generate a variety of useful management reports.

REDUCED SERVICE COSTS/DOWNLOADABLE FLASH MEMORY

The Model 310 includes 4 MG of downloadable flash memory, which eliminates the need for costly site visits to change operational programs that may be required to keep up with your changing payphone business.

ADDITIONAL FEATURES

- Modular design simplifies field installation
- Trouble diagnostics assist service dispatch and telephone service
- Voice error messages assist telephone service
- Cash box status and reporting
- Electronic serialization/anti-fraud design
- 1200 baud FSK modem communications
- ExpressNet®/Panorama™ software compatible
- Missing handset detection circuitry
- Voice prompts enhance user friendliness
- Automatically corrects protocol dialing errors, increasing customer satisfaction
- Compatible with external volume control switch
- UL-recognized on-board self-resettable surge protector
- Standard built-in electronic ringer
- DTMF and pulse dialing capability
- Patented and proven line-powered technology
- UL listed
- FCC registered

Model 310 Option Boards and Accessories

- Electronic Coin Scanner (ECS II) Interface
- Mechanical Double Gong Ringer

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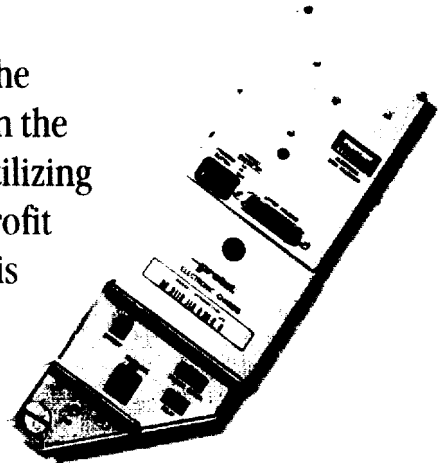
▸Welcome to the 21st Century!

Protel's Sentinel™ Series Payphones – Tomorrow's "Smart" Payphones, Today.

The Model 7000 is the foundation of Protel's Sentinel™ Series "smart" payphone product line. Especially designed for the Independent Payphone Provider (IPP) / Payphone Service Provider (PSP), the Model 7000 combines microprocessor-based intelligence with a flexible modular design to adapt to the challenges of a diversifying payphone industry.

The base Model 7000 offers a feature-rich smartphone at an affordable price. The addition of available plug-in option boards allows you to tailor the Model 7000 to your specific payphone requirements without removing the telephone from service.

Protel's long history of providing payphones with the lowest life cycle cost in the industry continues with the Model 7000. Available as a complete telephone utilizing Protel's rugged HABITAT® payphone housing or as a retrofit kit for your existing GTE-style housing, the Model 7000 is your vehicle into the 21st Century.



Electronic Chassis

SENTINEL™ SERIES MODEL 7000

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SENTINEL™ SERIES MODEL 7000

Features of the Sentinel™ Series Model 7000

◆ CALL REVENUE AND COST VERIFICATION/ CALL DETAIL RECORDING

The Model 7000 records information about each call made from the payphone. This information can be used to aid in verifying Dial Around Compensation, Operator Service Provider commissions, long distance bills, local measured usage charges, call volume discounts and other call-related items.

◆ IN-SERVICE ABILITY TO UPGRADE

You can buy what you need today, and sleep easy knowing that you can upgrade your Model 7000 payphones in the future as your needs change. The Model 7000, with its affordable, feature-rich base chassis, is designed to allow you to add additional features by installing optional plug-in electronic circuits. With the Model 7000, you will be able to adapt your payphones and your route to the growth of your business.

◆ ASSET MANAGEMENT TOOLS/ ELECTRONIC SERIALIZATION

Tracking your payphone assets is easier than ever before with the Model 7000 electronic serialization. Each Model 7000 chassis and each available option board contains a nonerasable electronic serial number and automatically reports the location of each chassis and option board to the management software, providing positive board identification.

◆ PAYPHONE MANAGEMENT SOFTWARE

Protel's PC-based payphone route management software provides a method to keep you up-to-date on your telephone's performance. The software easily communicates with your phones to give them call rating and routing information, operating parameters, collect call data records, and generate a variety of useful management reports.

◆ LEAST COST ROUTING/CALL PROFIT MAXIMIZATION/CALL REROUTING CAPABILITY

Using the Model 7000 call routing features, you can route your long distance calls to the least-cost carrier and at the same time, route your operator-assisted calls to the Operator Service Provider offering you the best options in commissions and services. In fact, you can even utilize multiple carriers and OSPs.

◆ SMART CREDIT™ AUTOMATIC TROUBLE OPERATOR

Increase customer satisfaction and decrease the cost of providing refund service with the Model 7000 Smart Credit™ Automatic Trouble Operator. This allows a trouble operator to verify coin deposits, issue credits and/or dial a destination number while on the line with a caller, eliminating costly refund checks for 211 service calls and increasing instant customer satisfaction.

◆ PROTECTIVE COVER

Minimize unintentional chassis damage with the Model 7000 protective chassis cover. You'll be pleased with this protective cover, which surrounds the electronic components to protect electronic devices from mishandling and abuse.

◆ STORE & FORWARD CAPABILITY

The Model 7000, when used with Protel's ExpressNet III® payphone management software, is equipped with all the call processing and billing collection tools you need to establish your own Store & Forward Operator Service Provider right in the telephone. And with Protel telephones, you choose your own validation, billing and collection partners to maximize your profits.

◆ REDUCED SERVICE COSTS/ DOWNLOADABLE MEMORY

The Model 7000 includes downloadable memory, which eliminates the need for costly site visits to change operational programs that may be required to keep up with the changing payphone business.

◆ IN-SERVICE UPGRADE MEMORY

Socketed memory devices and configuration jumpers allow you to upgrade memory capacity of the Model 7000 without removing the telephone from service. The changing payphone business may some day demand features that require more memory than is used today. With the Model 7000, you will be ready to respond to those demands.

◆ ADDITIONAL FEATURES

- Modular design simplifies field installation
- Trouble diagnostics assist service dispatch and telephone service
- Voice error messages assist telephone service
- Cash box status and reporting
- Anti-fraud design
- Compatible with external vault alarm switch
- Communicates with Protel's payphone management software
- Missing handset detection circuitry
- Voice prompts enhance user friendliness
- Automatically corrects protocol dialing errors, increasing customer satisfaction
- Compatible with external volume control switch
- UL-recognized on-board self-resettable surge protector
- Standard built-in electronic ringer
- DTMF and pulse dialing capability
- Patented and proven line-powered technology
- UL listed
- FCC registered

MODEL 7000 OPTION BOARDS AND ACCESSORIES

- Electronic Coin Scanner (ECS II) Interface
- Mars Electronics® MS-16 Interface
- Bell 212-A (1200 baud) DPSK Modem Interface
- Coin Line Interface
- Mechanical Double Gong Ringer

A1-5

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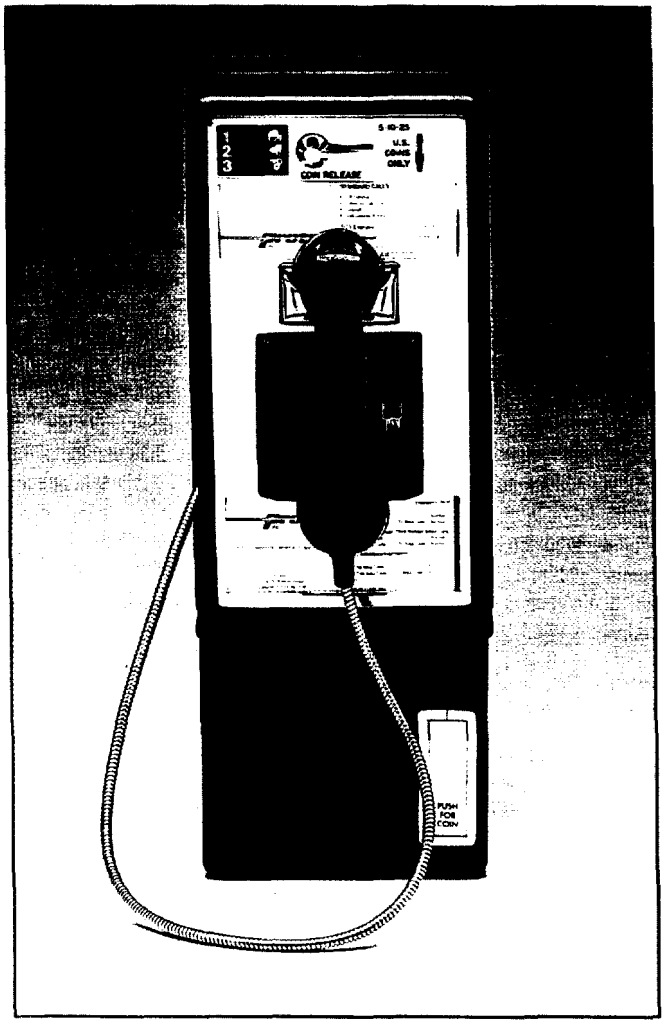

The Model 7500 is the next step in Protel's Sentinel™ Series "smart" payphone product line. Especially designed for the Independent Payphone Provider (IPP) / Payphone Service Provider (PSP), the Model 7500 incorporates magnetic card reading capabilities into a flexible smart payphone to meet the diverse needs of the payphone industry.

The base Model 7500 offers a feature-rich smartphone with insertion-style magnetic card reading capability. The addition of available plug-in option boards allows you to tailor the Model 7500 to your specific payphone requirements without removing the telephone from service.

Available as a complete telephone, the Model 7500 utilizes Protel's rugged HABITAT® payphone housing designed specifically for the card reader. You can be confident that the Model 7500 will provide the professional appearance your customers expect.

SENTINEL™ SERIES MODEL 7500

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