THELEN, MARRIN, JOHNSON & BRIDGES
ATTORNEYS AT LAW
805 15TH STREET, N.W.
WASHINGTON, D.C. 20005-2207
(202) 962-3000
FAX (202) 842-0830

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(202) 962-3060

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OFFICE OF THE SECRETARY

June 1, 1992

BY MESSENGER

Ms. Donna R. Searcy
Secretary
Federal Communications Commission
1919 M Street, NW, Room 222
Washington, DC 20554

Re: ET Docket No. 92-100/Metriplex, Inc.
Petition for Award of Pioneer's Preference.

Dear Ms. Searcy:

On behalf of Metriplex, Inc., we have been asked to file the enclosed "Petition of Metriplex, Inc. For Pioneer's Preference" in ET Docket No. 92-100, in accordance with the requirements established in FCC Public Notice 22922, dated April 30, 1992. The Petition requests the creation of a new Hybrid Data Network Service in the 930-931 MHz Band. A facsimile copy of the signature page, containing the signature of Steve Stutman, the President of Metriplex, is attached to the original Petition. The original signature is being delivered by overnight courier and will be filed with the Commission tomorrow.

All inquiries concerning this Petition may be addressed to Steve Stutman, President of Metriplex, at its offices at 47 Third Street, Suite 300, Cambridge, Massachusetts 02141, or alternatively, to the undersigned at the above-printed address. Thank you for your assistance in expediting the association of this Petition with the appropriate docket files.

Yours very sincerely,

Lawrence J. Movshin

LJM/att
Enclosures

cc: Steve Stutman
Rodney Small (w/enc)
Carl Huie (w/enc)

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ORIGINAL

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:	)	ET Docket No. 92-100
	)	
Request for Award of a	)	
Pioneer's Preference For A	)	
License For Hybrid Data	)	
Network With Acknowledgement	)	
Paging in the 930-931 MHz Band	)	

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PETITION OF
METRIPLEX, INC.
FOR PIONEER'S PREFERENCE

Metriplex, Inc.
25 First Street
Cambridge, MA 02141
(617) 494-9393

June 1, 1992

Thelen, Marrin, Johnson
& Bridges
Lawrence J. Movshin
805 15th Street, NW
Suite 900
Washington, DC 20005-2207
(202) 962-3000

Counsel

DC5EH296.DOC

SUMMARY

Metriplex, Inc. ("Metriplex"), by its attorneys and pursuant to Section 1.402 of the Commission's Rules (47 CFR 1.402), hereby requests the award of a Pioneer's Preference for a new High Speed, Hybrid Data Network with Acknowledgement Paging, hereafter to be described as Hybrid Data Network with Acknowledgement Paging ("HDNAP") to be operated on a nationwide basis. Metriplex patitions the Commission to allocate a portion of reserved spectrum in the 930-931 MHz band for a common carrier-based HDNAP.

As demonstrated herein, Metriplex has pioneered concepts of information services and data delivery via alphanumeric paging, also known as "wireless computing", and has integrated this with pioneering concepts in so-called acknowledgement paging. Metriplex is currently working with manufacturers of palmtop personal computers to develop wireless computing applications which incorporate acknowledgement paging.

Metriplex's development of the novel HDNAP concepts, the development of unique control software, the development of the prototype receiver/acknowledgement ("ack") transmitter, the proposal for spectrum allocation, as well as a useable bandplan, meet all of the commission's prerequisites for the award of a Pioneer's Preference.

The Commission should allocate the requisite spectrum in the

The Commission should allocate the requisite spectrum in the 930 - 931 MHz band to the HDNAP network service and establish licensing parameters. In so doing, Metriplex should be awarded a Pioneer's Preference assuring that it will be granted a nationwide license to provide the HDNAP telecommunication services to the public.

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, DC 20554

In the Matter of:	)	ET Docket No.
	)	
Request For Award Of A Pioneer's Preference For A License For Hybrid Data Network with Acknowledgement Paging in the 930-931 MHz Band.	)	92-100

To: The Commission

PETITION OF
METRIPLEX, INC.
FOR PIONEER'S PREFERENCE

Metriplex, Inc. is petitioning for a Pioneer's Preference for allocation of spectrum for a Hybrid Data Network w/Acknowledgement Paging ("HDNAP"), which when used in conjunction with existing Metriplex developed software, data telemetry, and information services, will provide a new advanced communications service.

HYBRID DATA NETWORK

Metriplex proposes that a Hybrid Data Network ("HDN") be implemented in the 930-931 MHz band. The HDNAP will combine necessary features of a high-speed one-way data and paging

channel operating at a minimum speed of 2400 bps with the functions of an Acknowledgement Paging System ("APS") operating on a second (back) channel. The HDNAP will allow the user of the system to utilize as many features as are necessary and economically justifiable. Metriplex feels that the relative cost of system use should be considered just as practically as any technical or regulatory facet might be.

As discussed elsewhere, Metriplex has extensive experience with the transmission of data over very large regional systems which in turn are networked and controlled from a central computer. Different user populations exhibit variable needs for closed-loop acknowledgement signalling. It is Metriplex's experience that all user populations are cost-sensitive. It thus becomes extremely important to provide the user population with the ability to easily use only that communications capability which is necessary (i.e. to pay only for what is needed).

Metriplex proposes HDNAP as a national communications service which will allow the sender of a message to verify reception by means of an acknowledgment signal returned from a data receiver/acknowledgement transmitter which is essentially similar to a conventional alphanumeric pager with the addition of a low-power (approx. 4W ERP) transmitter.

The new service will eliminate the necessity for a telephone

in most pager messaging transactions as well as allow provision of high integrity supervised telemetry of data such as industrial process control parameters and medical laboratory information.

Metriplex proposes that part of the 930-931 MHz segment be allocated by the Commission for this new paging service.

METRIPLEX: Background

Metriplex is a Delaware corporation with principal offices in Cambridge, Massachusetts. Metriplex is a privately held telecommunications company that designs, develops, and implements mobile/wireless communication systems that enable customers to receive time-critical information while on the move.

Metriplex has pioneered several information services and messaging applications integrating personal computers with alphanumeric pagers.

Pioneering Applications

1. Spring, 1986: Metriplex first offered its Metriplex/STOCKWATCH™ transmission software for sale in March of 1986. This software was the first to enable fully automated transmission of information from personal computers to alphanumeric pagers via common carrier paging networks.

2. Fall, 1986: PcPAGE®, the industry alpha messaging software for MS-DOS is introduced.

3. Summer, 1988: Metriplex has operated the GLOBAL24® information network 24 hours/day, continuously since

September 1988. This network utilizes paging channels for the transmission of data, exception reports, and personal messages via alphanumeric pagers.

4. Winter, 1988: McPAGE™, the industry alpha messaging software for Macintosh-based computers is introduced.

5. Fall, 1991: Smart Radio Buffer™, the industry's first embedded controller designed to seamlessly integrate mobile personal computers with one and two-way radio communications.

In general, Metriplex is a recognized developer of technology used in alphanumeric paging as well as a provider of service to the public. Metriplex has experience gained from thousands of customers for alphanumeric messaging software such as PcPAGE® and subscribers to the GLOBAL24® information network. As a provider of information and messaging services via alphanumeric paging, Metriplex is well situated to understand the needs of the public for advanced paging services.

Since 1986, Metriplex has demonstrated both commitment to advanced paging applications as well as performance in the delivery of such applications. Extensive market research within our customer base as well as direct requests from customers in the process control, medical, and transportation sectors evidence

a strong need for data delivery and messaging services with acknowledgement.

Metriplex has prototyped the receiver/acknowledgement ("ack") transmitter unit and is in the process of applying for experimental licenses necessary to test this hardware as well as the accompanying application software which Metriplex has also developed.

DESCRIPTION OF ACKNOWLEDGEMENT PAGING APPLICATIONS

Conventional paging applications can be classified in one of three categories:

A) Tone only: sender of message dials a telephone number; recipient of message receives a "beep" which is interpreted as a signal to perform an action, usually to call a specific telephone number in an office. Recipient has no means of determining the content of message. In most cases a telephone in required to call back and obtain the message.

B) Numeric: sender of message dials a telephone number and upon connection to that number hears a prompt after which a telephone number can be entered by means of the telephone keypad. The telephone number entered is received by the recipients unit and displayed on screen. The recipient then usually calls the displayed number. In rare instances numeric codes are sent instead of or in addition to the telephone number to indicate certain actions or levels of immediacy. Recipient has very little means of determining message content; again a telephone is usually required.

C) Alphanumeric: sender of message types message on a PC using software such as Metriplex PcPAGE[R] or other terminal device or interacts with an answering service. Message is sent via

modem to the paging system controller (terminal) and is then received on screen on recipients pager. Message has specific content and can give instructions, specific data, indicate level of immediacy etc. Recipient can then form a judgement as to the appropriate response. In most cases a telephone call is not necessary since the message has already been received in full.

In all three cases the sender's only positive acknowledgement of receipt of message is a return telephone call from the message recipient. In peak channel traffic situations where queue depths may reach several minutes, senders will often send a message again if there is no response from the recipient within a few minutes, thus further adding to the queue and wasting valuable spectrum.

A newer, enhanced service currently offered by Metriplex is an extension of alphanumeric paging which transmits data to palmtop and laptop computers. This has become known as "wireless computing". In 1987 Metriplex demonstrated data transmission to a laptop computer using alphanumeric paging technology and software enhancements.

A frequent question from any paging customer is "how do I know that the message was received"? While it is generally agreed that virtually all pages in a well designed and operated paging system are received, it is difficult to give positive assurance

to sectors involved in mission critical applications such as process control, nuclear powerplants, hospitals, financial trading, and emergency response. With conventional paging, the only positive acknowledgement is a return telephone call, often a clumsy and time-consuming process, given the contemporary availabilities of public telephones.

Customers from various industries have told Metriplex that an acknowledgement or "ack" returned from the recipient's pager to the sender would have benefits ranging from peace of mind, to less time wasted, to fulfilling absolute necessities in alphanumeric paging and wireless computing applications where return telephone calls are not typically made.

In response to these customer requests, Metriplex proposes that a new form of paging be offered. Acknowledgement Paging Service ("APS") is a limited two-way signalling modality. The sender, whether an individual or an automated system, transmits a message or data to the recipients receiver in a conventional fashion. Integrally housed with the recipient's receiver is a small, low-power (2-4W ERP), transmitter which can transmit an acknowledgement signal, either automatically upon receipt of message, or in response to a manual operation by the recipient. In the latter case the acknowledgement can contain one of three responses:

1. "Yes", in response to a properly phrased message.
2. "No", in response to a properly phrased message.
3. "Send More", indicating that the recipient cannot evaluate the message without further information.

The "ack" signal is received by a secondary network of receivers which are not necessarily collocated with the paging system transmitters. Signal to Noise (S/N) considerations in many RF environments will necessitate much greater density of "ack" receivers than of transmitters. Urban areas will require especially high densities of "ack" receivers to ensure reliable operation.

The output and hence the effectiveness of the recipient's low-power "ack" transmitter will be largely a function of transmitting antenna pattern and gain and battery considerations such as size and weight. It is unreasonable to assume that the transmitting antenna will have a known orientation, hence the use of a high-gain (and presumably directional in at least one-axis) antenna poses problems. Similarly, customers are unwilling to be burdened by devices which are much larger than their current pagers. Thus even if relatively exotic and expensive battery technologies such as lithium or zinc-air cells are employed, the available power and total energy from the battery will have severe constraints.

The above-mentioned factors underline the need for extensive testing in real-world conditions for both the pager/ack transmitter unit as well as the "ack" receiver network to determine optimal design and implementation if the systems are to be successful. Thus another motivation for this petition is the need for the Commission to make available necessary spectrum segments so that testing may begin.

Once the "ack" signal is received by the receiver network it is decoded and passed to the system controller. The system controller, which has previously attached to the recipient's message an "acknowledgement number" at time of transmission, checks all received "ack" signal (which contain the acknowledgment number) data with all acknowledgement numbers transmitted. When messages are transmitted and subsequently not acknowledged within some preset time interval appropriate for the particular recipient or type of data, the message is retransmitted until acknowledged or until a retransmission limit is reached as set by either system users or operators. Messages which are not acknowledged after a different preset time interval (e.g. five retransmissions), will in turn generate a "not acknowledged" message within the system controller. This "not acknowledged message" will in turn signal the sender by means of messages sent to such systems as electronic mail (E-mail), another pager, personal computer, a computer network or other appropriate display device. In certain emergency response cases,

a recipient may need to signal "ack" rapidly, for example a cardiac response team in a hospital ICU, public safety personnel etc. In these cases the sender, when sending the message via the system controller, will stay connected to the system controller long enough, (perhaps 60 seconds) to determine whether or not "ack" has been received from the recipient.

Metriplex believes that several frequency pair in the 930-931 MHz band should be reserved for APS. One channel would be used to send data to the recipient's receiver, the other would be used to send acknowledgments back to the system controller. Metriplex has extensive experience with wireless computing applications and believes that it is unreasonable to assume that "ack" messages sent from a low-power transmitter with a modest antenna (from recipient to controller) will necessarily be sent at the same data rate as data from system controller (sender) to recipient. Experience has shown that it is easier to maintain necessary link S/N with relatively large (1000W ERP) base stations sending to mobile receivers, than it is to have small transmitters (less than 4W ERP) successfully sending to an arbitrarily dense "ack" receiver network. It should also be noted that the arbitrarily dense "ack" receiver network may be problematic to interconnect economically in urban areas such as New York and Los Angeles.

Since "ack" messages will in general be shorter than the

data whose receipt they are acknowledging it will be possible to send "ack" at a lower data rate which will enhance reliability of reception.

HDNAP Applications

There are certain applications, such as messenger and delivery services, which prove to be extremely cost sensitive. Often, cost differentials of as little as $1.50/month/user can determine whether or not an enhanced communication service feature will be used.

There is a certain class of applications such as repair service (e.g. dispatching a repair technician), where the market is willing to bear cost differentials of perhaps $8-10/month/user. This may be seen in the gradual shift from numeric to alphanumeric pagers in this market segment. Our market research, conducted with some of our personal computer software customers, indicates that this segment will pay perhaps $5-8/month/user for APS.

Mission-critical applications such as medical information telemetry and messaging, telemetry and monitoring of large industrial processes such as refineries and nuclear power plants, and public safety comprise a class in which cost is perhaps secondary. It must be realized however that the end-user, the recipient, of mission-critical information may also receive messages which are less important and which may therefore not require APS. Since paging receivers are in general fix-tuned to one channel (footnote about NEC scanner and synthesizer power

drain) and since most users will require a cost-efficient mix of high speed data/messaging and APS, a successful system must integrate both seamlessly.

Existing paging systems typically employ a variety of analog and digital signalling formats on the same channel. Channel throughput is severely compromised because of the necessity to key (up/down) between different batches of different formats as well as the need to establish synchronization at the beginning of digital batches. While often ignored, even in large regional systems, such inefficiencies may render a large regional data channel commercially inviable.

Metriplex has extensive experience in utilizing the "airtime" of common carriers for data transmission, and has also engineered and supervised the construction of RCC and PCP systems for data transmission. This experience has demonstrated to Metriplex the need for systems which are dedicated to integrated high-speed data and messaging. Economics make existing infrastructures in general unsuitable for data transmission, while technical considerations demand that new control architectures be implemented. It is unlikely that existing carriers, faced with the current erosion of profit margins found in the paging industry, will be willing or able to discard existing equipment which is not yet amortized, in favor of investment in new equipment required for new services.

SYSTEM CONSTRUCTION

The proposed system can be constructed in an orderly, staged fashion. As discussed in the APS section, receiver placement for APS is critical. Receiving network performance will be highly dependent on signal absorption by vegetation and structures. In plain terms, big buildings in big cities will necessitate that receivers will in many cases be placed not by computer models but by fieldwork. In the real world a good network design is the best first step, but is usually augmented by "customer response" (service complaints), which in turn motivate a responsible operator to add additional sites.

The most rational course for construction would then seem to be:

1. Construct high-speed (forward) data and messaging channel
2. Construct APS back channel receiver network in some representative areas.
3. Begin operation with APS using auto-"ack"
4. Analyze "ack" reception data from operation of APS
5. Make APS back channel more robust by adding receivers as necessary to ensure reliable operation.

By implementing the HDN in phases, the system can be built out to best serve the communication needs of the public while minimizing unnecessary expense which in turn would raise consumer costs.

GEOGRAPHIC SCOPE

Metriplex believes that a nationwide license would best meet the needs of the proposed HDNAP system and its users.

The service offered by HDNAP will be most frequently be used by those who are themselves involved in the provision of some service and are frequently mobile. It is Metriplex's experience that customers are very wary of system boundaries, because inevitably, many customers will require service outside a given boundary (in for example, a regional system).

A nationwide system provides the proposed service with necessary flexibility because service can be regionalized when economically required and functionally appropriate. At the same time, service and transportation companies with a nationwide mobile presence can be accommodated with commonality of equipment and information/message input structures.

EXPERIMENTAL LICENSES

Metriplex is currently preparing applications for experimental licenses to test the prototype hardware and software. Field tests of both the receiver/ack transmitter as well as practical performance measurements of the ack receiver network elements will begin after granting of the experimental license.

As soon as prototype testing has begun, Metriplex will begin integration trials of many elements of our information network with the novel concepts embodied in HDNAP.

NETWORK INTEGRATION & TEST

Metriplex is aware of the ongoing trials of various PCN, PCS, and CT-2 systems in Canada, U.K., and the United States. Metriplex is currently investigating various methods for backhauling the ack receiver network data. Methods under consideration include cable television networks and VSATs. Metriplex will test a variety of communication infrastructures as they become available. There may well be interactions between HDNAP and other personal communication modalities.

BANDPLAN

Metriplex proposes that the 930-931 band be divided into 40, 25 kHz segments, each of which will contain a conventional NBFM digital paging bandwidth. Use of existing channel bandwidth will enable the most rapid and economical implementation of working systems.

Each HDNAP will require two channels, a forward channel for data and paging from system to recipient and a back or acknowledgement channel for acknowledgements sent from recipient to system. Metriplex believes that the back channel traffic will be sent at a rate significantly lower than the forward channel traffic due to real world situations which cause channel degradation and decreased S/N in most dense and urban RF environments. As previously stated, Metriplex system traffic models indicate that a two-channel system will better serve the desired application because of the unique problems presented by the need to receive a data packet ("ack") from a low-powered transmitter with an arbitrarily oriented antenna.

Metriplex proposes that a 500 kHz spacing be used between each pair of forward and back channels. In this way forward channels will be clustered in one half of the available spectrum and back channels will be clustered in the other half. This will tend to minimize the adjacent channel front end desensitization and other deleterious intermodulation effects which might occur if forward and back channels were for example interleaved.